



**PUBLIC DISCLOSURE OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSEMENT REPORT FOR THE PROPOSED 400 kV UGANDA (OLWIYO) TO SOUTH SUDAN (JUBA) TRANSMISSION LINE AND ASSOCIATED SUBSTATIONS PROJECT**

The Government of Uganda through Uganda Electricity Transmission Co. Ltd (UETCL) proposes to construct the 400 kV Uganda to South Sudan Interconnection Project, which shall transmit power over approximately 150km (Uganda side) to Interconnect with the South Sudan National Grid.

An Environmental & Social Impact Assessment (ESIA) was conducted for the Project in line with the provisions of the law and related requirements, including but not limited to the Environmental & Social Safeguards of the African Development Bank. The findings of the ESIA study shall guide on the related mitigation measures to minimize negative environmental impacts and enhance the positive outcomes.

The National Environment Management Authority (NEMA) has duly approved the final ESIA report. A copy of the NEMA approval Permit and the related study report is herewith attached.

The developer (UETCL) on behalf of the Government of Uganda shall be grateful to receive any comments/queries/ concerns on the ESIA, which should be addressed in writing or e-mail to:

The Chief Executive Officer  
P.O. Box 7625, Kampala, Uganda  
Plot 10 Hannington Road, Nakasero  
email: [transco@uetcl.com](mailto:transco@uetcl.com)

**Disclosure**

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Joshua Karamagi, CFA  
CHIEF EXECUTIVE OFFICER  
Thursday 9<sup>th</sup> August 2024



THE REPUBLIC OF UGANDA

## NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

### The National Environment Act, No.5 of 2019

*The National Environment (Environmental and Social Assessment) Regulations No.143 of 2020*

## Certificate of Approval of Environmental and Social Impact Assessment

Certificate Number: CERT/1287/2024/8

Issue Number: 01

*This is to certify that that the Project Brief/Environment and Social Impact Statement  
received from*

M/s: **UGANDA ELECTRICITY TRANSMISSION CO. LTD**

of **NAKASERO HILL, NAKASERO II, KAMPALA CENTRAL, KAMPALA (TEL:  
256417802000)**

submitted to the National Environment Management Authority (NEMA) in accordance with  
the National Environment Act, No.5 of 2019 regarding:

**THE PROPOSED UGANDA (OLWIYO) - SOUTH SUDAN (JUBA) 400 KV POWER  
INTERCONNECTION PROJECT**

*(Title of Project)*

briefly described as **EXPLORATION AND POWER GENERATION, TRANSMISSION  
AND DISTRIBUTION INFRASTRUCTURE.**

*(Nature, Purpose)*

Declared Investment cost **UGX 475,398,000,000**

located at **NONE, NONE, NONE, NONE**

*(District/Sub-county/City/Town/Ward)*

***has been reviewed and was found to:***

\*\* have significant environmental impacts and the following appropriate mitigation  
measures were identified and made a condition precedent for approval and  
implementation:

*(The relevant conditions are attached in the subsequent pages)*

This certificate is issued on **6th August, 2024** and is valid for 5 years.

Signed:

*Executive Director*



The details in this certificate can be verified at: <https://eservices.nema.go.ug>



**CONDITIONS OF APPROVAL FOR THE ENVIRONMENT AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED UGANDA (OLWIYO) - SOUTH SUDAN (JUBA) 400KV POWER INTERCONNECTION PROJECT TO BE LOCATED IN THE NORTHERN REGION OF UGANDA ACROSS 3 DISTRICTS (NWOYA, AMURU ADJUMANI, AND LAMWO) (AT GPS CO-ORDINATES 36N 376759mE, 280286mN; 376716mE, 280311mN; 376664mE, 280511mN; 376760mE, 280659mN; 396451mE, 377679mN; 396549mE, 377679mN; 396598mE, 377741mN; 399057mE, 381160mN; 413943mE, 388480mN; 417238mE, 401077mN).**

1. This Certificate is issued in accordance with the requirements of the National Environmental Act Cap 181, the Physical Planning Act, 2020, and National Environment (Environmental and Social Assessment) Regulations, S.I No. 143/2020, and any other applicable laws.
2. In addition to implementing the mitigation measures outlined in the Environment and Social Impact Statement, this **Certificate of Approval** is granted on condition that **the Developers, M/s. Uganda Electricity Transmission Company Limited**, complies with approval conditions stated below.

**3. ADMINISTRATIVE CONDITIONS OF CERTIFICATE**

1. Issuance of this Certificate of Approval is based on the content of/information contained in the Environment and Social Impact Statement submitted by **the Developers, M/s Uganda Electricity Transmission Company Limited**. Thus the management of **M/s Uganda Electricity Transmission Company Limited**, shall be held responsible for any omissions, falsified information or any other anomalies that are contrary to the provisions of the relevant laws governing the proposed project.
2. This Certificate of Approval is **VALID for an initial period of 5 YEARS** the period which covers both the construction and operational phases of the project. **This certificate may be revised upon request or when site conditions change.**
3. The project **must commence within the first 24 months** (from the date of approval) of the validity period, failure of which this Certificate shall be varied, cancelled or otherwise dealt with by this Authority.
4. **The Executive Director shall be NOTIFIED** and consent sought for any transfer of ownership, variation/alteration of

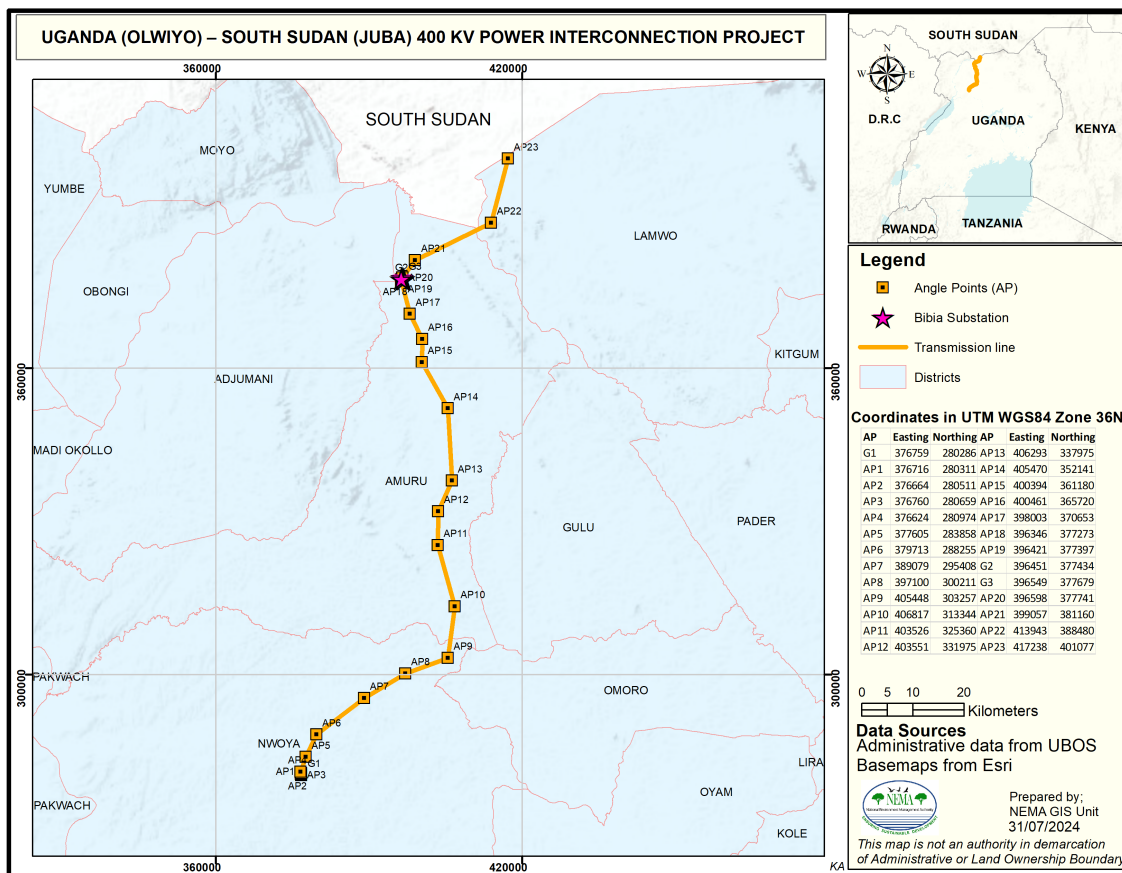
the project design or components, or surrender of this Certificate of Approval.



## 1. SPECIFIC CONDITIONS OF APPROVAL

### 4.1 Land Acquisition and Compensation:

1. Ensure that the proposed project area for the Proposed Uganda (Olwiyo) South-Sudan (Juba) 400kv Power Interconnection Project is legally obtained in accordance with the Land Act, Cap. 227, and any other applicable laws.
2. Compensate all project affected persons arising from the operations of the Uganda (Olwiyo)-South Sudan (Juba) 400kv Power Interconnection Project line in accordance with the national laws governing compensation.
3. Ensure that the project components are accommodated within the project boundaries (Grid coordinates) of the targeted project areas, as determined and approved by the relevant competent lead agencies including the District Local Governments Authorities, Uganda National Roads Authority (UNRA), Uganda Forestry Authority (NFA), Uganda Wildlife Authority (UWA) among others.
4. All the project components and activities must be restricted to the demarcated approved area as indicated by the GPS coordinates in Figure 1 below.





#### 4.2 Construction and Design:

1. Implement the project in conformity with the planning provisions for the different project areas as provided for by Amuru, Lamwo, Gulu, Adjumani and Nwoya District Local Government authorities and in accordance with the requirements stipulated in the Physical Planning Act 2010, the electricity act 1999 and any other relevant laws.
2. Undertake comprehensive hydrological studies/survey covering the section of the River Nile and its catchment and the hydrological survey report should be submitted to Directorate of Water Resource Management for the purpose of understanding the complexity of the water drainage system in the project area and to guide the developer before commencement of the construction and operation phase of the project.
3. Adhere to the environmental flow as shall be described by Electricity Regulatory Authority (ERA) and Directorate of Water Resource Management (DWRM).
4. Have in place comprehensive inventory records of compensation and resettlement action plan to cater for all the project affected persons PAPs and use them in a transparent and timely manner, in accordance with the agreed compensation terms and rates, as required under the national laws governing compensation.
5. Develop, implement and maintain an onsite drainage system and ensure that it blends in with the existing drainage for the project area.
6. Note that **the other relevant support structures and components** including temporary workers camp site, equipment's or material storage area, park yard, are located away from ecologically sensitive areas.
7. Be duty bound to protect sensitive and protected areas including Keyo Central Forest Reserve in Amuru District, against any form of encroachment and degradation during the project implementation phase as provided for by the National Environmental Act Cap 181, the National Forestry and tree planting Act 2003, the road Act Cap 358 and the National Environment (River Banks, Lake Shores and Wetland) Regulations S.1 153 .5 and any other relevant laws.
8. Liaise with Amuru, Lamwo, Adjumani and Nwoya District Local Governments and the department of Museum and

monuments (DMM) Ministry of Tourism, wild Life and Antiquities (MTWT) to handle in proper manner matters pertaining to conservation/ protection of certain shared resources.



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9. All the proposed transformer should be fitted each with an oil sump, of adequate capacity (normally  $\geq 110\%$  of the volume of oil in the transformer) to contain transformer oil in case of spillages and leakages. The oil sumps should be connected to appropriate oil interceptors to facilitate separation of oil in event of leakages/spillages) from the general rainwater, before discharge into the environment.
10. The project should equip the substations with adequate fire detection and suppression system to avert any likely fire incidents that may arise during operation.

#### **4.3 Relevant Approvals:**

(i) This approval is for proposed Uganda (Olwiyo) - South Sudan (Juba) 400kv Power Interconnection Project only. Note that any other developments including project support structures that were not contemplated at the time of undertaking the environment and social impact assessment for this project must be subjected to a separate environment and social impact assessment.

1. Adhere to and comply with the legal requirements for easements for the area as provided for by the Amuru, Lamwo, and Nwoya District Local Government planning provisions and legal requirements, and as provided for under Section 117(4) of the National Environment Act, 2019.
2. Obtain approvals, from the relevant competent lead agencies regarding specifications, engineering design and routing and the corridors of the transmission line, site lay out plan as well as the auxiliary components.
3. Obtain all other required approvals, permits and licenses from the relevant lead agencies notably National Environment Management Authority (NEMA), Ministry of Energy and Mineral Development (MEMD), Electricity Regulatory Authority (ERA), Directorate of Water Resources Development (DWRD), Occupational safety and health department in the Ministry and Gender Labour and Social Development (MGLSD), Amuru, Lamwo, Adjumani and Nwoya District Local Governments.

#### **1. CONSTRUCTION AND OPERATIONAL PHASE CONDITIONS**

#### **5.1 Environmental Management Plan:**

1. In executing the project, the environmental management and monitoring plans in the ESIS shall be adhered to at all times, in accordance with Section 122 (3) of the National Environment Act, 2019.



2. Promote efficient resource use at the proposed plant and institute good housekeeping and environmental management practices as provided under the National Environment Act, 2019.
3. Note that site clearance, excavation and removal of spoil are likely to lead to occurrences of landslides and erosion when construction activities are undertaken during rainy season and increased sediment loading of river will affect the downstream power station. **Such activities should be carried out during the dry season** and measures to minimize inducement of landslides or rock rolling down the hilly slope and techniques for slope stabilization if any should be applied to minimize occurrence of accidents among other hazards.
4. Be duty bound to ensure that construction materials (Wood, Gravel, sand stones and among others) **Not Extracted** from the regulated/fragile area including wetland areas and Forest Reserves, river banks, river beds, Wild life protected areas, as required under the relevant laws governing the management of such sensitive ecosystem.
5. Provide well documented information on the identified potential sites/source for extraction of construction materials (Water, Stones, Sand, Marrum, Wood among others) as well as site for waste disposal and disclosed to Amuru, Lamwo, and Nwoya District Local Governments, Notational Environment Management Authority, DWRM so that technical guidance and approvals are obtained from authorities in timely manner before commencement of the project activities.
6. Put in place water source protection plan in accordance with the source protection guide lines (of available in) Directorate of Water Resources Development (DWRD) and ensure that project activities along the River do not compromise domestic water sources while providing water for the communities in the affected section of the River.
7. Document all critical baseline information/data and subsequent updates of the information/data regarding the project area aspects of water quality and hydrology associated with the water catchments area supporting the project sediment load of the river and environmental flow of the river and ensure the information/data available and disclosed to the relevant lead agencies from time to time to monitor environmental performance of the project
8. Ensure to restore all damaged affected areas during project implementation (barrow pit) to their original or near original state as possible and to re-vegetate the degraded land surface with native tree species and to avoid the introduction of alien species.

## 5.2 Waste management and pollution control

1. Put in place appropriate mechanisms or systems for handling all forms of waste, both hazardous and non-hazardous waste generated, in accordance with the National Environment (Waste Management)



2. Notwithstanding condition (i) above, ensure that all waste generated is disposed of at locations gazetted by Amuru, Lamwo, and Nwoya District Local Government as waste dump-sites and that **no waste including stockpile and debris, is dumped into water bodies, wetland ecosystems, around settlements and protected areas.**
3. Put in place a system for adequate treatment and disposal of wastewater stream generated at the Project site in accordance with the Public Health Act, Cap. 281 and the National Environment (Standards for Discharge of Effluent into Water and Land) Regulations, S.I. No. 144/2020.

**1. Environmental Monitoring:**

1. Put in place mechanisms to ensure that noise and vibration generated at the Project site premises during construction and/or operations of the Project does not exceed the levels stipulated in the National Environment (Noise Standards and Control) Regulations, S.I No. 30/2003, and as indicated in the table-2.

*Table-2: Acceptable limits for noise and vibration*

**General Environment**

Noise Levels	Noise Limits dB (A) (Leq)	
	Day	Night
6.00a.m-10.00p.m	6.00a.m-10.00p.m	10.00p.m-6.00a.m
Residential + Industry or small-scale production + Commerce	60	50

<b>Factory/Workshop</b>	
Noise Limits dB (A) (Leq)	
Noise Levels shall not exceed	Leq dB (A)
Factory/Workshop	85
Offices	50
Factory Workshop Compound	75
Vibrations at 10 – 50Hz frequency	12.5mm/s

1. Put in place measures to ensure that emissions from auxiliary components (for example standby generators among others) within the facility premises do not emit noxious gases, odour and particulate matter beyond the permitted levels in accordance with the East African Standard for Air Quality Specifications CD/T/66:2010.
2. Air conditioners and refrigeration/ cooling systems to be used at the Project Premises must be those permitted under the National



Environment (Management of Ozone Depleting Substances and Products) Regulations, S.I No. 48/2020; and, banned refrigerants and related equipment must not be used at any one time.



3. In accordance with the Public Health Act 281 and the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, S.I. No. 153-3, put in place measures to monitor and ensure that both surface and ground water resources are protected against contamination and/or pollution from the facility.
4. Carry out periodic sampling (at least quarterly) of surface water and groundwater within and outside the perimeter of the project site for qualitative analysis at designated reference laboratories. Results of the analysis should be submitted to NEMA, Directorate of Water Resources Management (DWRM) and the Hoima Council Authorities.

**1. Social Aspects:**

1. All employees including casual workers should be accorded decent working conditions and clear terms and conditions of employment in accordance with the Employment Act, 2011.
2. There shall be no use of child labour during project execution in accordance with the Children Act, 2016.
3. Put in place a grievance handling mechanism in liaison with the Amuru, Lamwo and Nwoya District Local Government Authorities, and any other relevant Lead Agency.
4. Put in place measures to ensure community health and safety, including restricting access to the facility, putting in place appropriate signage, and fencing off the project site during construction and operation.

**1. Occupational Health and Safety:**

1. In accordance with the Occupational Safety and Health Act, 2006, put in place appropriate and adequate occupational safety and health policy measures and procedures and train/sensitize workers on these procedures.
2. All employees including casual workers should be accorded decent working conditions, provided with appropriate personal protective equipment (PPE), and given clear terms and conditions of employment in accordance with the Employment Regulations, 2011.
3. Put in place appropriate and comprehensive emergency response and monitoring plans well known to the workers/users and a response plan to cater for all risk-areas especially those prone to oil spills and fires.
4. Post clearly legible signs reading "NO SMOKING" within the project premises, in accordance with safety requirements and the provisions of the National Environment (Control of Smoking in Public Places) Regulations, 2004.



5. Conduct induction and refresher trainings to the contractor and sub-contractor teams on the environmental and social safeguard policy, other applicable laws, regulations and standards.

- 1. Public Health:**

1. Put in place an awareness and prevention program for HIV/AIDS, Sexually Transmitted Diseases (STD) and Hepatitis-B, for both the workers and persons accessing the Project Site.
2. Put in place appropriate and/or adequate on-site sanitary facilities separate for the respective sex of project site workers, in accordance with the Public Health Act, Cap. 281.
3. Provide safe drinking water for site workers in accordance with the Water Act, Cap. 152.

## **6.0 GENERAL CONDITIONS OF APPROVAL**

- 1. Record Keeping and Reporting:**

Ensure proper record-keeping as required under Section 176 of the National Environment Act, 2019, and transmit the records to this Authority, as required under Section 177 of the National Environment Act.

### **6.2 Environmental Audits:**

Carry out the first annual environmental audit in accordance with Section 126 of the National Environment Act, 2019 and the National Environment (Audits) Regulations, S.I. No. 47/2020 and by **31<sup>st</sup> August, 2025.**

- 1. Operational Changes:**

Seek written approval from this Authority for any operational changes under this Certificate.

- 1. Notification:**

1. Notify this Authority of any malfunction of any component under this project, **within 12 hours** and that mitigation measures are put in place.
2. Notify this Authority in writing of the intent to decommission any components under this project, and submit a decommissioning plan **three months** in advance.

- 1. Unanticipated Impacts:**

In accordance with Section 126 (6) (b) of the National Environment Act, No.5 of 2019, take all reasonable measures and mitigate any other undesirable environmental impacts that may arise due to implementation of the project, but were not contemplated during

the assessment and by the time of issuing this approval, and report on those measures to the relevant Lead Agencies and this Authority



1. **Display of Certificate of Approval:**

Ensure to display this Certificate of approval (NEMA Certificate) at the project premises at all times including displaying the NEMA Certificate Number on the project sign-posts, as provided for under regulation 52 of the National Regulations, No. 143 of 2020.

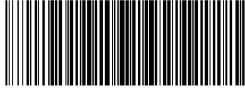
1. **DECOMMISSIONING AND RESTORATION PHASE CONDITIONS**

1. Ensure that a decommissioning plan is submitted to this Authority for approval **at least 3 (three) months** prior to decommissioning the project components.
2. Undertake to decommission the project components when their life-span comes to an end as per the decommissioning plan, or as will be prescribed by the relevant Lead Agencies.
3. Restore all scarred areas affected during the conduct of various project activities to their original or near original state as possible, and re-vegetate degraded ground surface with native plant species.
4. Report on the completed decommissioning and restoration activities to this Authority.

**8.0 SUSPENSION/WITHDRAWAL/CANCELLATION CONDITIONS**

1. This Certificate shall be suspended/withdrawn/cancelled if:

1. there is no compliance with any of the **Specific Conditions** set out in this Certificate in **Section 4.0 above and any other substantive conditions of the certificate;**
  2. there is unauthorized substantial modification of the project implementation or operations which may lead to un-assessed adverse environmental and social impacts that were not evaluated at the time of issuing this Certificate of Approval,
  3. there arise substantive undesirable effects that were not contemplated during the issuance of this Certificate of Approval; and
1. there is failure to mitigate un-assessed adverse environmental and social impacts as provided for under **Section 6.3 and 6.5 above.**
1. **This Certificate may be recalled without civil liability for review** on account of change in Government Policy, Standards, new conservation measures by this Authority and/or enforcement of court order.



CERT/1287/2024/8

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**EXECUTIVE DIRECTOR**

c.c The Permanent Secretary,  
Ministry of Energy and Mineral Development,

**KAMPALA.**

c.c The Permanent Secretary,  
Ministry of Gender, Labour and Social Development,

**KAMPALA.**

**Attn:** The Commissioner,  
Occupational Safety and Health Department.

c.c The Permanent Secretary,  
Ministry of Water and Environment,

**KAMPALA.**

**Attn:** The Commissioner,  
Directorate of Water Resources Management.

c.c The Executive Director,  
Electricity Regulatory Authority.

**KAMPALA**

c.c The Chief Administrative Officer  
Nyowa District Local Government

**NYOWA**

**c.c** The Chief Administrative Officer  
Amuru District Local Government

**AMURU**

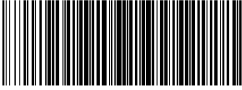
c.c The Chief Administrative Officer  
Lamwo District Local Government

**LAMWO**

**c.c** The Chief Administrative Officer

Adjumani District Local Government

**ADJUMANI**



CERT/1287/2024/8

A handwritten signature in blue ink, appearing to be 'M. D. ...' with a horizontal line underneath.

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**REPORT**

CONFIDENTIAL

APPROVED

C4007223

<b>Client</b>	Uganda Electricity Transmission Company Ltd (UETCL) South Sudan Electricity Corporation (SSEC)
<b>Subject</b>	Feasibility Study, Detailed Design and Preparation of Tender Documents; Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for the Uganda (Olwiyo) – South Sudan (Juba) 400 kV Power Interconnection Project <b>Final Full ESIA Report – Uganda – Volume I ESIA</b>
<b>Order</b>	NELSAP/OLWIYO-BIBIA-NIMULE JUBA/CTR/2022/FS/ESIA/RAP-01 Signed by UETCL in March 2023 NELSAP/OLWIYO-BIBIA-NIMULE JUBA/CTR/2022/FS/ESIA/RAP-01 Signed by SSEC in October 2022
<b>Notes</b>	

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<b>N. of pages</b>	540	<b>N. of pages annexed</b>	-
<b>Issue date</b>	1 August 2024		
<b>Prepared</b>	James Byamukama		
<b>Verified</b>	Paola Chiodi		
<b>Approved</b>	Paola Chiodi		

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## REVISIONS HISTORY

Revision number	Date	Protocol	List of modifications and/or modified paragraphs
Rev.00	23 May 2024	C4007223	First Emission
Rev.01	21 June 2024	C4007223	Revision after AfDB comments
Rev.02	1 August 2024	C4007223	Revision after AfDB comments

## ESIA TEAM

- James Byamukama – Lead Ecologist / TL
- Ettore Romagnoli – Environmental Specialist
- Vivian Michael Chambo – Environmental Expert
- Thomas Lado – Zoologist
- Andrew Nkambo – Botanist
- Paola Chiodi – Social Expert
- Pietro Macchi – Cultural Heritage Expert
- Collins Tulikuno – Land Economist
- Dennis Juko – Communication Expert

## CLIENT'S ESIA TEAM

	NAME	DESIGNATION	ROLE
1	Joseph Jones Ogwal	Manager Environment	Team Leader ESIA/Environment safeguards
2	Edward Muteesa	Manager Land Acquisition	Team Leader RPF/Social safeguards
3	Edward Bamuhame	Ag. Manager Lands Acquisition	Team Leader RPF/Social safeguards
4	Rachel Arinda	Manger Grid Development	Team Leader Grid Development Planning
5	Diana Nakabugo	Planning Engineer	Project Manager
6	Akena Charles	Planning Engineer	Deputy Project Manager
7	Arthur Kumbu	Survey and GIS	Project Survey and GIS
8	Maima Reagan	Surveyor	Project Survey & Valuation
9	Matovu Brian	Environment Officer	Field work and review of reports

**SYMBOLS AND ABBREVIATIONS**

AfDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
AoI	Direct Area of Influence
AU	African Union
BAU	Business As Usual
BoQ	Bill of Quantity
CA	Child Abuse/Exploitation
CH	Critical Habitat
CBA	Cost-Benefit Analysis
CITES	Convention on International Trade in Endangered Species
CNDPF	Comprehensive National Development Planning Framework
CSO	Civil Society Organization
DEO	District Environmental Officers
EAAA	Ecologically Appropriate Area of Influence
EAC	East African Community
EAPP	Eastern African Power Pool
EHSGs	Environmental, Health and Safety Guidelines
EIA	Environmental Impact Assessment
ELU	Environmental Liaison Unit
EMF	Electric and Magnetic Fields
EOO	Extent of Occurrence
EPFI	Equator Principles Financial Institution
EPPU	Environment Protection Police Unit
ERA	Electricity Regulatory Authority
ESS	Environmental and Social Standard
ESIA	Environmental and Social Impact Assessment
ESMD	Environmental and Social Management Division
ESMO	Environmental and Social Management Organization
ESMP	Environmental Social Management Plan
FGD	Focus Group Discussion
FPIC	Free, Prior and Informed Consent
GBV	Gender-based Violence
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GIS	Geographic Information System
GOU	Government of Uganda
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
HH	Household
HIV	Human Immunodeficiency Virus
HPP	Hydro Power Plant
HV	High Voltage
HVRM	Highly Vulnerable Rural Minorities
HVTG	High Voltage Transmission Grid
IAoI	Indirect Area of Influence
IBA	Important Bird and Biodiversity Area

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IEA	International Energy Agency
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFC	International Finance Corporation
ILO	International Labour Organization
ISS	Integrated Safeguards System
JTC	Joint Technical Committee
KII	Key Informant Interview
MEMD	Ministry of Energy and Mineral Development
MGLSD	Ministry of Gender, Labour & Social Development
MLHUD	Ministry of Lands, Housing and Urban Development
MV	Medium Voltage
MWE	Ministry of Water and Environment
NBI	Nile Basin Initiative
NDP	National Development Plan
NEA	National Environment Act
NEAP	National Environment Action Plan
NFA	National Forestry Authority
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEMA	National Environment Management Authority
OHTL	Over Head Transmission Line
OPGW	Optical Ground Wire
OS	Operational Safeguard
PA	Protected Areas
PAP	Project Affected Person
PCB	Polychlorinated Biphenyls
PCR	Physical Cultural Resources
PIMS	Project Implementation Manuals
POP	Persistent Organic Pollutant
PV	Photovoltaic
RAP	Resettlement Action Plan
REA	Rural Electrification Agency
RES	Renewable Energy Sources
RoW	Right of Way
SDGs	Sustainable Development Goals
SEAH	Sexual Exploitation, Abuse and Sexual Harassment
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
SS	Substation
STD	Sexual Transmittable Disease
TB	Tuberculosis
TEP	Transmission Expansion Plan
TL	Transmission Line
UEB	Uganda Electricity Board
UETCL	Uganda Electricity Transmission Company Limited
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UWA	Uganda Wildlife Authority
WB	World Bank

## 1. EXECUTIVE SUMMARY

### Overview of the project

The Government of Uganda (GoU) through the Uganda Electricity Transmission Company Limited (UETCL) proposes the construction of the 400 kV Power Interconnection Project between Olwiyo (Uganda) and Juba (South Sudan). This Project was prioritized by the Governments of Uganda and South Sudan under Nile Basin initiative (NBI) and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP). It is a bilateral project that is jointly undertaken by the Governments of Uganda and South Sudan, each country being responsible for its portion of the interconnection.

The specific objectives of the Project include:

- provide transmission capacity to cater for grid interconnection between Uganda and South Sudan and its neighbouring countries;
- Provide transmission infrastructure to cater for grid interconnections to other Nile Basin Initiative countries upstream and downstream;
- promote regional cooperation through sharing of power generation resources i.e. cross-border electricity trading (promotion of electricity markets);
- Improve security in the project area by providing stable power supply;
- facilitate rural electrification and improvement in the standard of living for the population in the project areas;
- provide a stable power supply to the Ugandan communities near the border and to the South Sudan around Juba, in order to improve businesses for social and economic development of the project area;
- poverty reduction and improvement in the standard of living by providing electricity needed for health, education, clean water and communication infrastructures.

The ultimate goal of the project is regional integration by improving the livelihood of the people as well as the quality of the socioeconomic development environment for Uganda and South Sudan, through increased availability and affordability of electricity supply.

According to the energy generation and demand forecast scenarios analyzed in the Feasibility Study, the energy flowing on the interconnection is expected to increase more and more over the interconnection project lifetime.

In the first period of operation of the interconnection, until 2038, the energy is expected flowing from Uganda to South Sudan, due to the significant increase of the demand and the lack of generation in South Sudan.

In the second period of operation of the interconnection, after the development of the transmission grid in South Sudan and the interconnection between Ethiopia and South Sudan, Uganda is expected to import from the interconnection with South Sudan. Thanks to the interconnection, in the long-term period Uganda will be able to import cheap and sustainable hydropower energy from Ethiopia and South Sudan and avoid the realization of about 900 MW of new thermal generation capacity.

This report presents the outcomes of the Environmental and Social Impact Assessment (ESIA) on the selected and approved transmission line route of the 400 kV Power Interconnection Project in Uganda. The study is subdivided in two volumes:

- Volume I – ESIA Report
- Volume II – ESMP

**Brief description of the project**

A previous Feasibility Study and Environmental and Social Impact Assessment was already carried out in years 2020-2021 on the Olwiyo – Nimule 400 kV Transmission Line and associated substations in Uganda. The line route from this previous study and other two different line routes have been analysed and compared in the alternative analysis. The transmission line routes have been refined on the basis of the findings of the reconnaissance visit. In particular, due to the presence of the existing Olwiyo – Nebbi 132 kV transmission line and Olwiyo – Gulu 132 kV transmission line connecting to Olwiyo substation, some adjustments are applied to Option 2 and Option 3 routes in the approach to the substation, in order to obtain more favourable crossing conditions of the existing electric lines. Some other adjustments have also been introduced.

The updated line routes are shown Figure 1-1. Their lengths are as follows:

- a. Option 1 (blue line) – length 152.5 km
- b. Option 2 from previous study (green line) – length 150.1 km
- c. Option 3 (red line) – length 153.3 km

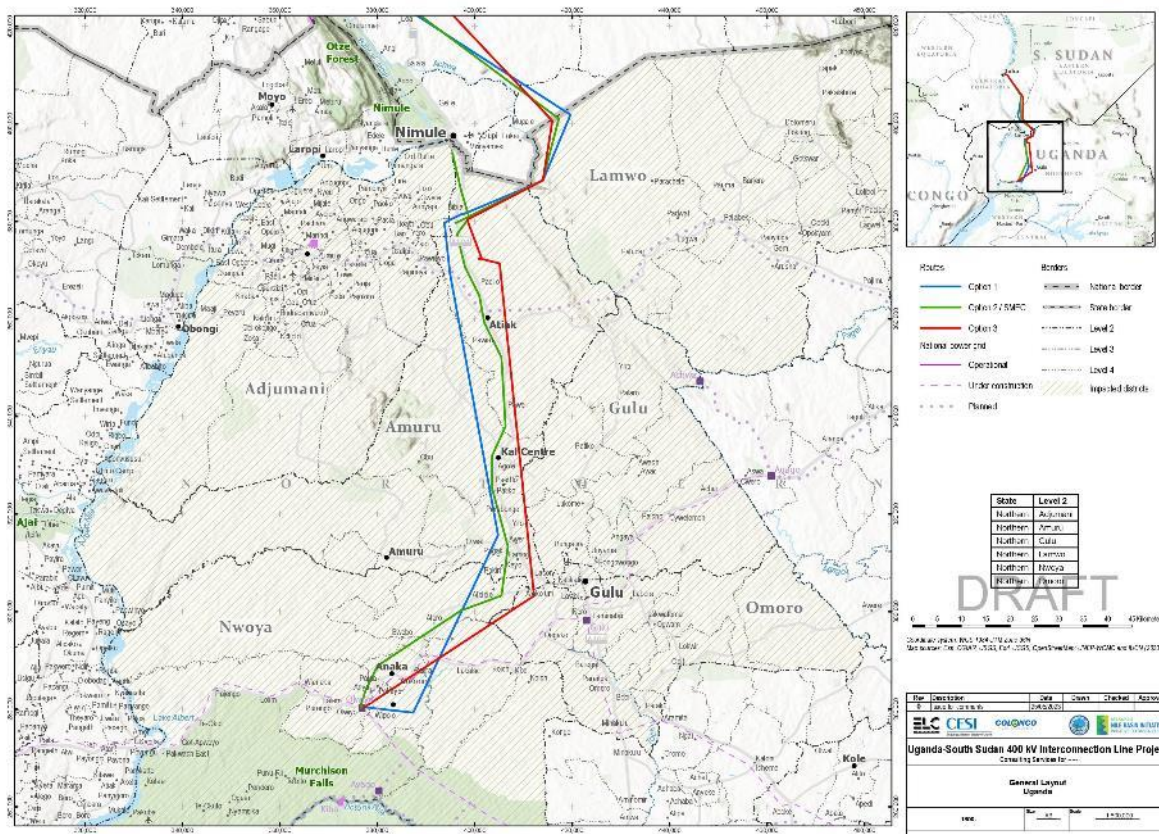


Figure 1-1 – Route options for the Ugandan section of 400 kV Interconnection project.

The most optimal line route was then selected by analyzing all technical considerations as well as environmental and socio-economic characteristics of the three route options through the application of quantitative Multi Criteria Decision Analysis (MCDA). It is underlined that all three transmission line routes pass through densely cultivated areas and will cause loss of agricultural land.

The ranking methodology applied to the three project alternatives shows that the best option from environmental and social point of view is Option 2, which is the one already studied by previous consultants. Option 2, in particular, intersects less forested/natural areas than the other two alternatives. Moreover, it runs closer, on average, to main road network (Olwiyo – Gulu, Gulu – Nimule), thus requiring lower length of access roads.

Then, the selected route has been partially modified, on the basis of the findings of the reconnaissance visit, and has been indicated as the Optimal transmission line option. For example, the last section close to South Sudan border has been re-routed in order to avoid the Nimule National Park, which instead was crossed by the previous line routing. This Optimal line route (in Figure 1-2) has been formally approved by Uganda Electricity Transmission Company Limited (UETCL) with Letter Ref. No. RA/dn/ak/US-SS Lineroute/12.12.23 dated 14 December 2023.

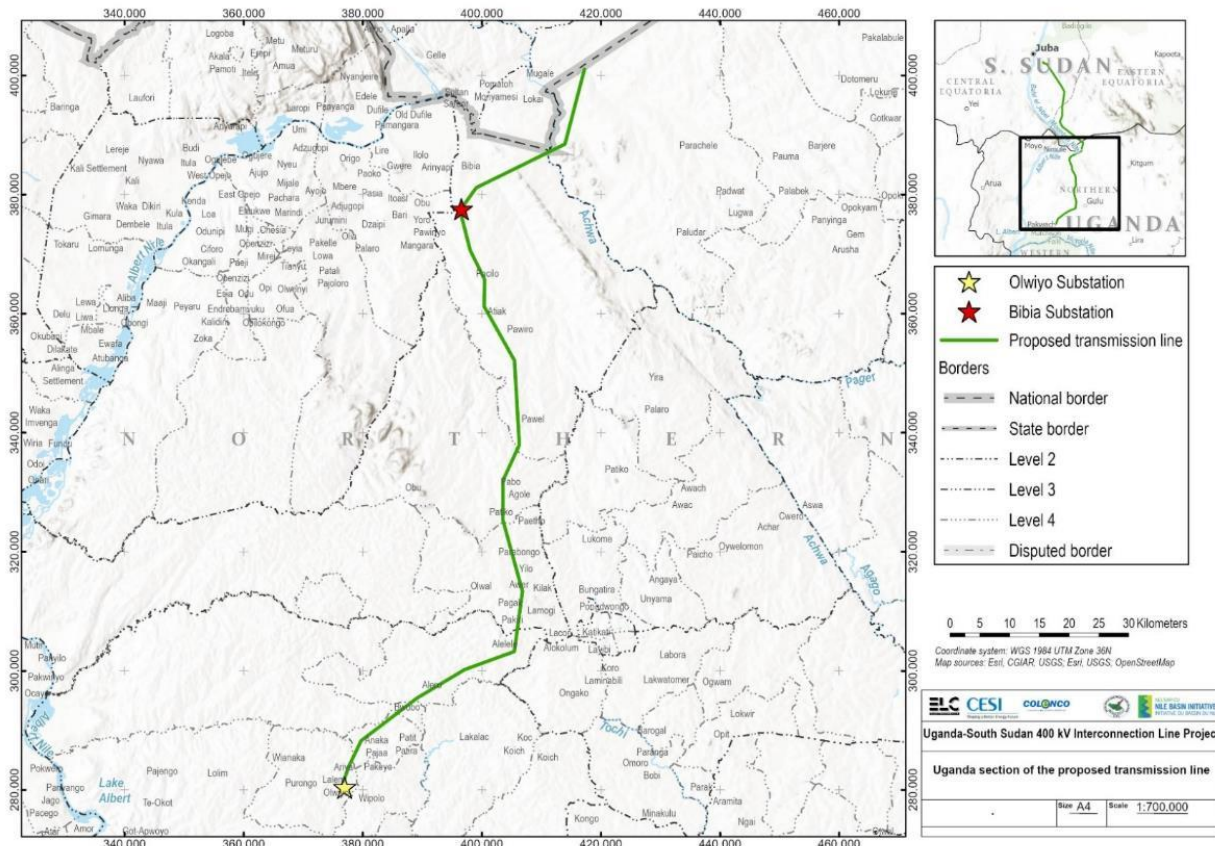


Figure 1-2 – Proposed transmission line route options for the Ugandan section of 400 kV Interconnection project.

The approved Ugandan section of the project envisages the following components:

- Construction of 150 km long 400 kV AC Over Head Transmission Line (OHTL) from Olwiyo S/S to South Sudan border (see Figure 1-2);
- Upgrade of existing Olwiyo substation to 400/132/33kV;
- Construction of the completely new 400/132/33kV Bibia substation (see Figure 1-3), close to the South-Sudanese border;
- Extension of the existing 400/132/33kV Karuma Substation, with 2 additional line bays 400 kV.



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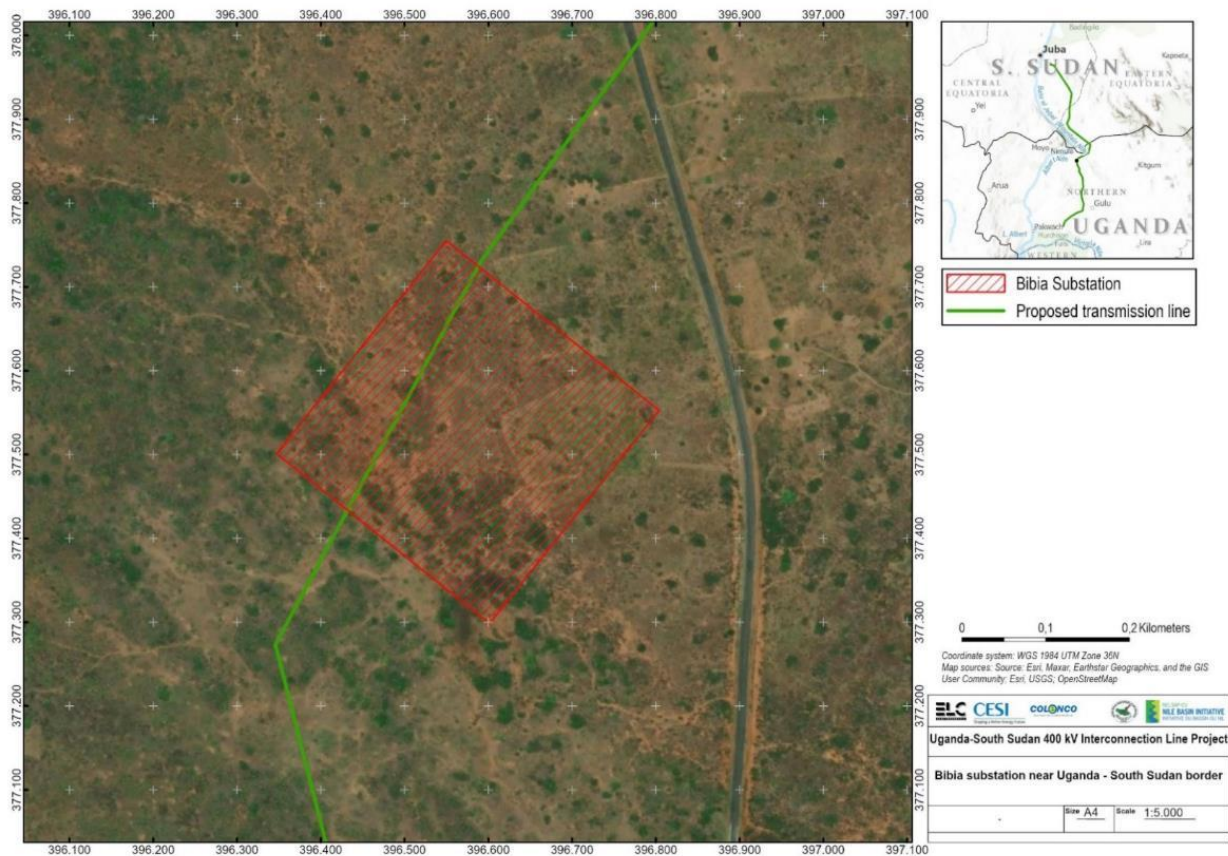


Figure 1-3 – Proposed 400/132/33 kV substation site in the proximity of Bibia near the Uganda – South Sudan border

The corridor for the 400 kV transmission line is 60 m, according to the standards of Uganda (UETCL Policy): 10 m for the Right of Way (RoW) and additional 25 m of Wayleave to each side of the RoW. RoW of 10 m is enough for both the access track and the four legs of towers and will be acquired permanently and ownership transferred to the project proponent. As per the UETCL’s Wayleaves Policy, the wayleave is the strip of 25 m on either side of the right of way, is recognised as the safety corridor outside of which negative impacts from transmission lines (electro-magnetic fields and corona-noise effects emitted from the line) are assumed to be negligible.

No permanent structures, such as buildings will be allowed to remain or be constructed within the corridor. Within the wayleave, growth of crops will be permitted, but limited to a height of 1.8 m (6 feet) or less, thus mostly annual crops and low growing perennial crops. The land required for the wayleaves will remain under the ownership of the owners and no transfer is required.

The project will be located in Northern Region of Uganda; the proposed transmission line route crosses 3 Districts (Nwoya, Amuru and Lamwo), 3 Counties (Nwoya, Kilak and Lamwo), 7 Sub-Counties and 23 Parishes. The crossed Sub-Counties and Parishes are namely:

- Purongo (parishes Pawatomero, Patira and Paromo);
- Anaka Town Council (Labyei Ward and Ceke Ward);
- Alero (parishes Panyabono, Pangu, Paibwor, Kal and Bwobonam);
- Palabek Ogili (parish Padwat);
- Pabbo (parishes Parubanga, Palwong and Kal);
- Lamogi (parishes Palema, Oboo and Coke);
- Atiaak (parishes Pupwonya, Pawel, Palukere, Pacilo, Kal and Bibia)

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The project Direct Area of Influence (AoI) is defined through consideration of the project footprint including the Transmission Line corridor (Right of Way and Wayleave), the Substations, the access roads and all ancillary project components.

The Indirect Area of Influence (IAoI) of the project is determined by biological and ecological factors, including the movement of species through the environment that may be affected by the project. It has been identified as a 1 km habitat connectivity zone surrounding the project footprint.

*Table 1-1 – Project area calculations*

Project Area	Area (ha)
Right of Way (RoW)	151.02
Wayleave	755.21
RoW + Wayleave	906.24
Direct Area of Influence	914.82
Indirect Area of Influence	30335.89

*Table 1-2 – Calculations of Direct area of influence in relation to administrative boundaries*

District	County	Sub-County	Parish	Area (ha)
Nwoya	Nwoya	Alero	Bwobonam	14.08
			Kal	31.47
			Paibwor	18.75
			Pangu	53.24
			Panyabono	39.71
		Anaka Town Council	Ceke Ward	48.88
			Labyei Ward	17.66
			Purongo	Paromo
		Patira		3.56
		Amuru	Kilak	Atiaak
Bibia	131.79			
Kal	36.44			
Pacilo	68.64			
Palukere	39.80			
Parwaca	0.00			
Pawel	57.11			
Lamogi	Pupwonya			36.64
	Coke			43.92
	Oboo			27.82
	Palema			38.29
Pabbo	Kal			19.09
	Palwong			33.62
	Parubanga			25.23
Lamwo	Lamwo			Palabek Ogili
<b>Total</b>				<b>914.82</b>

As illustrated in Figure 1-4, the project area is characterized mainly by agricultural areas; however, natural areas are present mainly in the vicinity of the major rivers. Woodland areas, savanna and forest/savanna mosaic characterize the proposed project area. Furthermore, some important riverine habitats and wetlands are in the proximity of the project proposed area, including both permanent and temporary rivers.

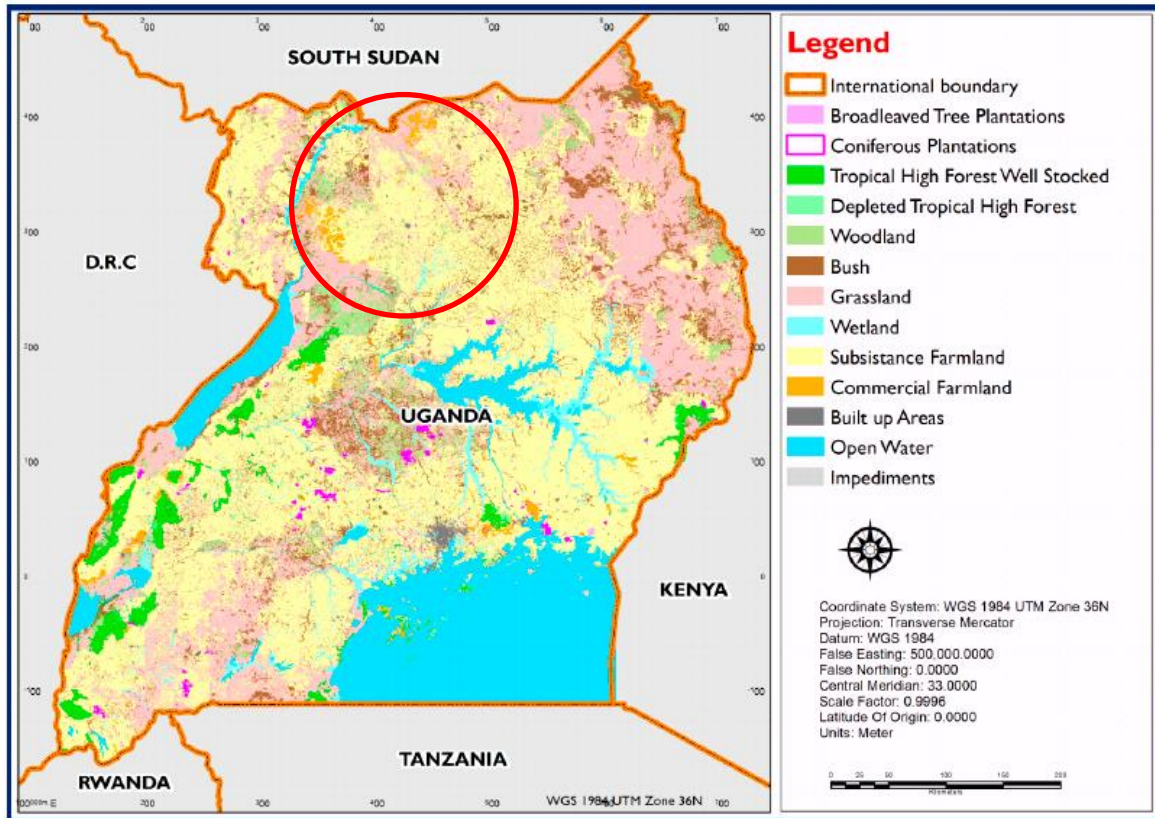


Figure 1-4 – Land use map of Uganda.

Source: “Assessing the Extent of Historical, Current, and Future Land Use Systems in Uganda” by Majaliwa Gilbert Jackson Mwanjalolo, Barasa Bernard, Mukwaya Isolo Paul, Wanyama Joshua, Kutegeka Sophie, Nakyeeyune Cotilda, Nakileza Bob, Diisi John, Ssenyonjo Edward and Nakangu Barbara, 2018)

The valued environment and social compounds (VECs) have been recognized as the environmental and social components of major concern that can be severely impacted by the Project activities, based on the impact assessment and stakeholder feedback.

Table 1-3 – List of valued environmental and social compounds (VECs).

Component	Description
Biodiversity and Habitats	Protected areas in the proximity of project footprint (e.g. Otze Forest Wildlife Sanctuary, Keyo Forest Reserve, Murchison Fall National Parks)
	Punctual and fragmented presence of two threatened habitats in the project area: Moist <i>Combretum</i> savanna (EN) and <i>Butyrospermum</i> savanna (VU)
	Wetlands (mainly seasonal) and riverine habitats in the proximity of project footprint

Component	Description
Flora and vegetation	Presence of natural vegetation type (grassland, shrubland and wooded grassland) and modified vegetation type (gardens, plantations and fallows)
	Presence of vulnerable tree species according to IUCN redlist ( <i>Afzelia africana</i> and <i>Vitellaria paradoxa</i> ). Presence of tree species from national reserved species list ( <i>Mangifera indica</i> , <i>Albizia zygia</i> , <i>Maesopsis eminii</i> , <i>Vitellaria paradoxa</i> , <i>Ficus sp.</i> )
Fauna	Presence of threatened terrestrial wildlife species (3 mammals and 1 reptile) in the 1 km buffer zone around the project footprint
	Presence of 14 threatened bird species in the 1 km buffer zone around the project footprint
Livelihood	The majority of the people in the project area rely on land-based livelihoods, especially agriculture and livestock.
	Access to timber and non-timber forest products
Landholding and ownership	Landholding and ownership based on different forms of land tenure, including customary land
Community and culture	Linguistic and cultural diversity, traditional knowledge and ethnic identity
	Gender roles and disadvantaged groups

### Institutional and legal framework for implementation of the project

The proposed interconnection project is in line with aspirations of Uganda’s Vision 2040, a national policy which set goals to achieve by the year 2040 ranging from political, economic, social, energy and environment.

Key Ugandan legislations governing the conduct of Environmental and Social Impact Assessment (ESIA) are the National Environment Act (Cap. 153, 2019) and the Environmental Impact Assessment Regulations (1998). The National Environment Act established the National Environment Management Authority (NEMA) and entrusts it with responsibility to ensure compliance with the ESIA process in planning and execution of development projects.

Other Acts and Regulations of particular relevance to the proposed 400kV Olwiyo-Nimule interconnection project are:

- the Constitution of the Republic of Uganda, 1995;
- the National Environment (Control and Certification of Environmental Practitioners) Regulations, 2001;
- the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999;
- the National Environment (Waste Management) Regulations, 2020
- the National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2001;
- the Land Act, 1998;
- the Electricity Act, 1999;
- the Uganda Wildlife Act (2000);
- the National Forest and Tree Planting Act, 2003;
- the Historical Monument Act, 1967;
- the Water Act, 1997;
- the Occupational Safety and Health Act, 2006;
- the Public Health Act, 1964;

- the Workers Compensation Act, 2000;
- the Employment Act (2006);

The project implementation agencies of the project are:

- Nile Basin initiative (NBI) / Nile Equatorial Lakes Subsidiary Action Program (NELSAP): NBI / NELSAP was mandated in the signed Inter Governmental MOU of 2015 between and the Governments of Uganda and South Sudan to mobilize financing of the project.
- Uganda Electricity Transmission Company Limited (UETCL): UETCL is a public limited company with the mission to efficiently dispatch and transmit reliable bulk power, act as a commercially focused single buyer, and address emergency power situations. UETCL is responsible for the Olwiyo-Nimule transmission line project, overseeing its construction, operation, and maintenance. The company will also be responsible for ensuring compliance with environmental and social standards throughout the project lifecycle.

Other relevant institutional actors in the Project's environmental assessment and resettlement process are presented in the following:

- National Environmental Management Authority (NEMA): NEMA is mandated with the responsibility to oversee, coordinate and supervise environmental management in Uganda, including the review of environmental impact assessments carried out for various projects. NEMA has the responsibility to ensure compliance with the ESIA process in planning and execution of development projects.
- Ministry of Energy and Mineral Development (MEMD): The Ministry of Energy is responsible for policy formulation, implementation, and monitoring in the energy sector. Although the Ministry has an environmental monitoring department, it may not be able to adequately supervise all current government energy projects.
- Electricity Regulatory Authority (ERA): the ERA is an agency of MEMD and is charged with the mandate of regulating the energy sector. ERA will license and ensure the planned project's costs align with set standards and tariffs. It also has a well-staffed environmental unit to monitor compliance in energy projects.
- Local Government Administration Structures: local governments are mandated (by the Local Governments Act, Cap 243) to oversee development activities through departments such as environment, lands, and water resources. The District and Local Council administrations of Nwoya and Amuru will be crucial in implementing the project by mobilizing political support and educating local communities. These administrations will contribute to the Environmental Impact Assessment (EIA) process and ongoing monitoring.
- Uganda Wildlife Authority (UWA): UWA is a corporate body under the Ministry of Tourism, Wildlife, and Antiquities. UWA's primary function is to ensure sustainable wildlife management in conservation areas by coordinating, monitoring, and supervising wildlife management issues. UWA is engaged in the project to assess the potential impact of the project on wildlife and on protected areas and should have a role in the implementation of planned restoration of forest reserves under the project.
- National Forestry Authority (NFA): The NFA is a corporate body operating within the Ministry of Water and Environment. NFA can assist the Project in identifying mitigation or compensation measures where clear-cutting of forested areas will be necessary.
- Ministry of Gender, Labour & Social Development (MGLSD): MGLSD is responsible for coordinating social development in Uganda. MGLSD will be responsible for inspecting the project for compliance with occupational health and safety regulations, national labour laws and gender equity.

- Ministry of Lands, Housing and Urban Development (MLHUD): The MLHUD is responsible for land, housing and urban development.

In addition to compliance with national regulatory requirements, the Project will also adhere to the international conventions ratified by Uganda, such as the Convention on Wetlands of International Importance especially as waterfowl habitat (1971), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES – 1973), the United Nations Convention on Biological Diversity (1992), the United Nations Framework Convention on Climate Change (1992), the Paris Agreement (2015), etc.

The 400 kV Power Interconnection Project is financed by the African Development Bank (AfDB) and therefore must undergo environmental and social impacts screening as per the Bank’s Environmental and Social Safeguards Policy. The AfDB’s Integrated Safeguard System (ISS), that are triggered by the Project are the following:

- *Operational Safeguard 1 (OS1):* Environmental and Social Assessment;
- *Operational Safeguard 2 (OS2):* Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation;
- *Operational Safeguard 3 (OS3):* Biodiversity, Renewable Resources and Ecosystem Services;
- *Operational Safeguard 4 (OS4):* Pollution Prevention and Control, Hazardous Materials and Resource Efficiency;
- *E&S Operational Safeguard 5 (OS5):* Labour Conditions, Health and Safety;

A gap analysis has been conducted between the national legislation and the African Development Bank Environmental and Social Operational Safeguards (E&S OSs).

For example, the National Environment Act (NEA) 2019 requires consideration of both environmental and social impacts during project risk assessment and mitigation, which is materially consistent with the OS1. The OS5 on Labour conditions, health and safety is aimed at ensuring health and safety of workers and to promote the fair treatment, non-discrimination and equal opportunity of project workers. Much as OS5 is materially consistent with the Constitution, the Employment Act (2006) and Equal Opportunities Act (2007), even if there is weak enforcement of Ugandan laws leading to non-compliance by Employers and gender-based discrimination at the workplace.

### Stakeholder Engagement and Information Disclosure

During this study the consultation process was structured on two rounds of meetings, the first with district authorities and environmental authorities to verify the critical aspect of the project alternatives, and the second with direct affected people and villages authorities.

#### 1<sup>st</sup> round of consultations

During this study a first round of consultation was carried out during the scoping and the alternative analysis phase.

The environmental impact assessment necessitated stakeholder engagement, involving the Uganda Wildlife Authority (UWA), to address potential impacts of the project on wildlife and on protected areas like Keyo Central Forest Reserve and Murchison Falls National Park. The meeting was held on 23rd November 2023, at UWA headquarters in Kampala.

Discussions focused on understanding the social and environmental implications of the project, including issues like human-wildlife conflicts and habitat protection. Recommendations from UWA highlighted the importance of mitigating cumulative impacts, addressing wildlife crimes and implementing strategies to

manage human-wildlife conflicts, emphasizing the need for collaboration and proactive measures during project implementation.

The conclusion of the stakeholder engagement with UWA underlines that, while the project does not directly impact UWA protected areas like Murchison Falls National Park, proactive implementation of recommended mitigation measures is crucial to minimize potential cumulative impacts, including human-wildlife conflicts and illegal activities. UWA suggests that project developers seek support, particularly in wildlife rescue operations, by requesting assistance from rangers.

The consultant visited district and sub-county offices in October 2023 in order to engage various stakeholders and discuss matters relating to acquisition of land and landed assets in the affected districts. The following organizations/ offices were engaged for the purpose of the study:

- The District Land Board of Lamwo District
- The District Land Board of Amuru District
- The Town council of Atiak sub-county
- The District Land Board Nwoya District

Key issues that were discussed are women land rights, existing land conflicts, the ongoing process of registration of freehold land ownership, the Certificates of Customary Ownership (CCOs) and their impact on land acquisition, the validation of compensation rates for each visited district and the delays in approving compensation rates for 2023/24 Financial Year in some of the Districts where the project will be implemented.

### 2<sup>nd</sup> round of consultations

In January 2024, the consultant visited district and sub-county in order to sensitize PAPs about project characteristics and clarify pending issues related to land acquisition and compensation. During these meetings, PAPs were able to raise their concerns and obtain clarifications about their specific cases. Key issues discussed during these meetings are:

- land requirements and locations
- eligibility for compensation
- grievance redress mechanisms
- compensation for contested land
- relocation of graves and cultural sites
- relations between current and previous surveys
- difference in compensation in the right of way and in the way leave
- relation between timing of land valuation and the agricultural calendar
- farmers refusing to give up their land for compensation

## Environmental baseline

### Climate

Uganda's climate is largely tropical with two rainy seasons per year, March to May and September to December. The northern region, which forms one quarter of the country lies outside the tropical belt, and hence experiences only one rainy season, March to October. Overall, Uganda experiences moderate temperatures throughout the year, around 22.8°C, with monthly temperatures ranging between 21.7°C (July) and 23.9°C (February). During this period, total annual average precipitation is 1,197 mm. The project is located in an area where average rainfall is around 1,100 mm (see Figure 1-5).

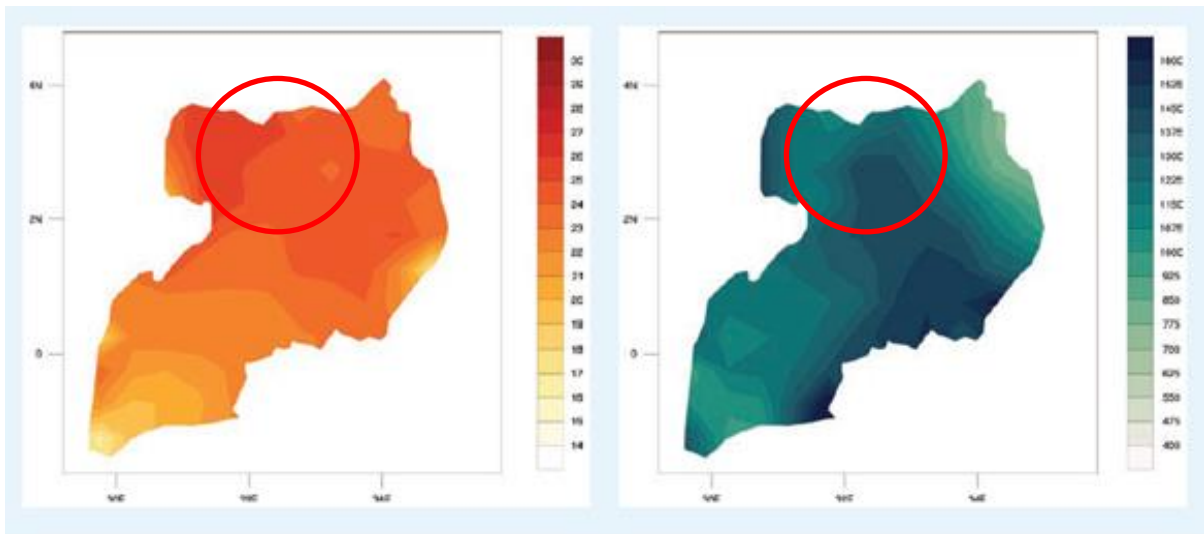


Figure 1-5 - Map of average annual temperature (left); annual precipitation (right) of Uganda, 1991–2020.  
 Source: WB – Uganda Climate Risk Country profile, 2018).

### Geology

The Archaean Ugandan Craton is part of the African Plate, a large area of continental crust consisting of the accretion of small cratons (e.g. Uganda, Tanzania) welded together by Proterozoic mobile belts. Much of northern and central Uganda is underlain by Archaean basement gneisses. Major rift faulting commenced in the Tertiary and continued to the present.

Western Uganda is a seismically active region. Seismic hazard decreases significantly in the central and eastern parts of Uganda.

### Soils

Most of the agricultural soils in Uganda consist of Ferrasols and Nitisols that are in their final stages of weathering and as a result have very low nutrient reserves. In the project's area, the most common soils are Leptsols that are unattractive soils for rainfed agriculture because of their inability to hold water, but may sometimes have potential for tree crops or extensive grazing.

### Land use

A total of 29 land use systems can be identified in Uganda. These land use systems fall into the following broad land use/cover classes: agricultural land, bushlands, forest and woodland, grasslands, impediments, open water, built-up areas and wetlands.

### Hydrology

Northern Uganda hydrology is dominated by the presence of Lake Albert, which is Africa's seventh-largest lake, as well as the second biggest of Uganda's Great Lakes.



Lake Albert is part of the complicated system of the upper Nile. Its main sources are the White Nile, ultimately coming from Lake Victoria to the southeast, and the Semliki River, which issues from Lake Edward to the southwest. The lake's outlet, at its northernmost tip, is the Albert Nile section of the White Nile.

The project's area is located at the east of the Albert Nile where there is the Erudz River (located few kilometres west of Atiak) seems to be the only perennial stream.

### Water Quality

The Nile Basin Initiative's 2021 State of the River Nile Basin report indicated that the quality of the Nile waters has generally deteriorated over the previous decades due to factors such as population growth, urbanization, agricultural intensification, and industrial development.

Groundwater and shallow wells monitoring data also reveal a high risk of faecal bacteriological contamination at various sites (Baseline Study of the Status of Water Quality Monitoring in Uganda, NBI 2005).

Poor sanitary coverage is a concern, as surveillance results of water sources for drinking such as rivers, streams, boreholes, shallow wells, and protected springs indicate faecal contamination. Poor agricultural practices and ecosystem degradation are seriously contributing to siltation and sedimentation in rivers. According to the Nile Basin Water Resources Atlas (UNDP), the percentage of the rural and urban population of Uganda with access to improved drinking water sources was 17% and 77%, respectively, in 2015. Moreover, the percentage of the population using improved sanitation was 65% in rural areas and 73% in urban areas.

Field studies on the rivers and streams traversed by the Project within the AoI were conducted in two campaigns, in 2020 (previous study) and in 2024. Analysis of the 2024 water samples revealed poor bacteriological quality, as indicated by high levels of faecal coliforms detected in all six samples. With the exception of two parameters, all physical-chemical parameters complied with the permissible limits set by DEAS 12:2018. The exceptions were colour and total suspended solids (TSS), likely caused by agricultural practices along the riverbanks.

### Air Quality

The project area is characterized by sparsely populated rural areas with minimal anthropogenic activities contributing to air quality. Natural background levels dominate, with occasional dust arising from unpaved roads and windblown soil. Towns experience limited air pollution from local traffic, market activities, and wind; notably absent are major industrial sources. Particulate matter, primarily from traffic, elevates during dry seasons.

Air quality assessment was evaluated at selected points along the transmission corridor to benchmark baseline air quality conditions prior to the implementation of the project. Field studies were conducted in two campaigns, in 2020 (previous study) and in 2024. The 2024 survey expanded the 2020 assessment by measuring VOCs, SO<sub>2</sub>, CO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub> in 15 sampling points. Gaseous emissions remained within established standards. However, PM<sub>2.5</sub> and PM<sub>10</sub> levels exceeded permissible limits at most locations. This could be attributed to proximity to main roads, bush burning for agricultural purposes, and dust generated during the dry season.

### Noise

Noise levels along the transmission line corridor are primarily influenced by ambient sounds related to surrounding human settlement. Slightly elevated levels occur within markets and urban centres due to economic activities like workshops, businesses and entertainment venues. Road traffic, including cars,

motorcycles, and human voices from traders and customers during business hours, contributes to the main noise pollution along the corridor.

Noise assessments were conducted at two field campaigns (2020 and 2024) across the project site, coinciding with the air quality survey locations. During the 2024 survey, baseline noise levels recorded along the transmission line corridor ranged from 38.5 to 70.6 dBA. The primary noise sources were identified as traffic on nearby roads, community activities and wind. All recorded values remained within the permissible range as specified by relevant regulations.

### Ecosystem and Landscape Diversity

Uganda is a country of exceptional biological diversity, encompassing a zone of overlap between the savannahs of East Africa and the rainforests of West Africa. Natural forests and woodlands together cover an area of nearly 50,000 km<sup>2</sup>. Open water resources cover up to 17% of the country's surface area and include five major lakes - Victoria, Albert, Kyoga, Edward and George - and some 160 smaller lakes and an extensive river system.

Grasslands/savannas cover more than 50% of the land area of Uganda and are dominated in different locations by species as diverse as grasses, palms or acacias.

Uganda has a total of 735 forest and wildlife Protected areas.

The proposed project area overlaps the Keyo Forest reserve and lies in the vicinity of other protected areas as shown in Figure 1-6 . In addition to Keyo Forest reserve, the other closest PAs are some Forest Reserve, such as the Otze Forest Wildlife Sanctuary in the border with South Sudan, the East Madi Wildlife Reserve, approximately 33 km from the project area, and, in the Southern part, with Murchison Fall National Park, approximately 6.5 km from the project area. The importance of these PAs is recognized nationally and internationally, particularly the National Parks, for their high biodiversity and conservation values and for hosting fundamental and unique biological processes.

In addition to the Keyo FR that is crossed by the transmission line, other forest reserves are close: Gwengdiya FR distant 1.5 km; Anaka 2 km; Olwal 4.4 km; Got - Gweno 9 km; Labala 12 km; Kilak 13.8 km; Wiceri 22 km.

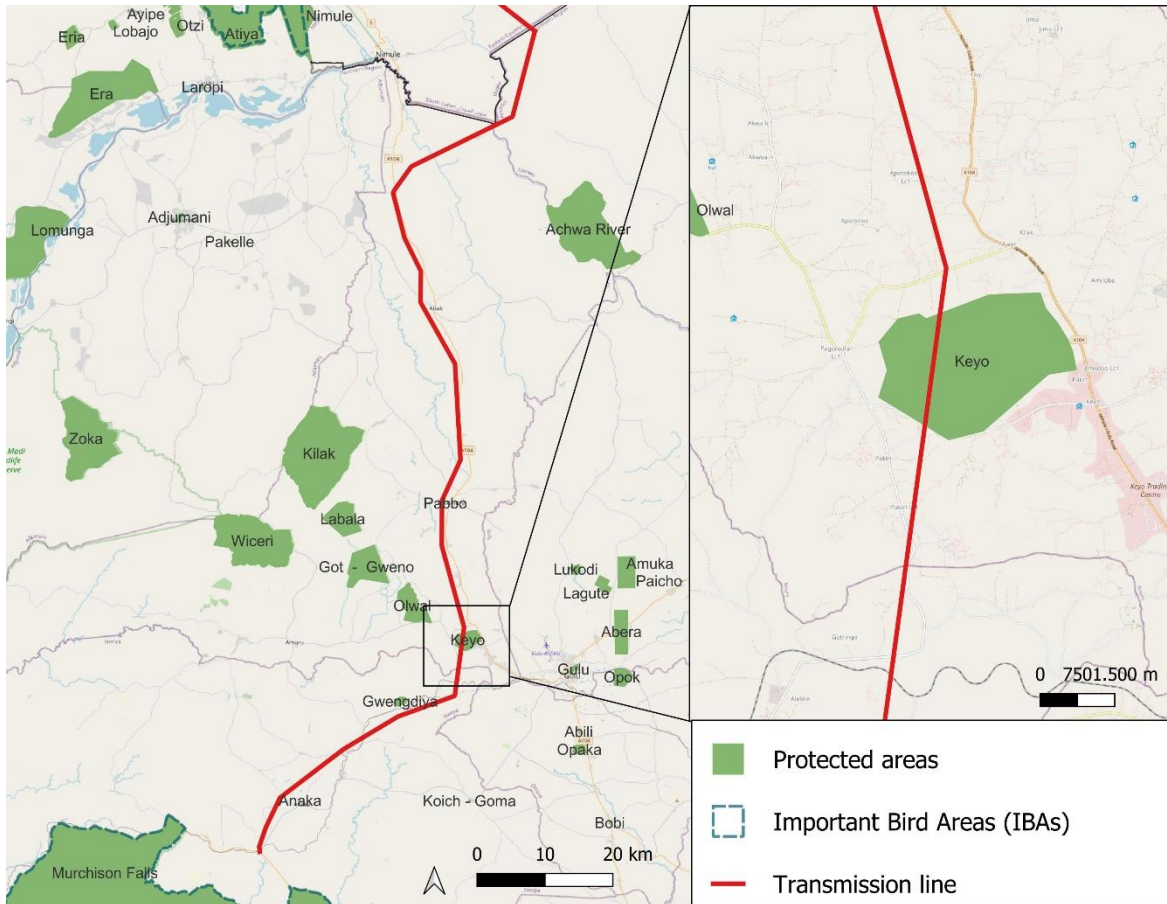


Figure 1-6 – Location of protected areas and the transmission line alignment. To the left a zoom on the Keyo Forest reserve.

**Biological Environment**

Uganda’s rich biodiversity is found in both terrestrial and aquatic habitats. Most of the biodiversity is found in natural forests, but a significant amount is also found in other natural ecosystems such as mountains, savannahs, wetlands, lakes and rivers.

Several direct and indirect impacts of the project could potentially affect biodiversity and ecosystems at different spatial scales, therefore a multi-scalar approach, from the regional level to the project area, was used to assess the baseline information and the impacts of the project on the biological environment. In particular, the biological components within a 50 km buffer around the proposed transmission line route were considered to assess the baseline information and impacts at the landscape scale. Therefore, a more detailed assessment was performed using a 1 km buffer to obtain information at local scale.

The International Union for Conservation of Nature (IUCN) products were used to gather general information on the conservation status, management and threats to species and protected areas that could be affected by the implementation of the project. From the same source, spatial data of species potentially present in the project and its surrounding areas were downloaded and analysed.

the spatial distribution of species was weighted by their conservation status to produce a conservation value map, showing how the different species are distributed and highlighting sensitive areas with high numbers of species and threatened species.

**Vegetation, Habitat and Plant Communities**

Forest land in Uganda is presently estimated at 3.3 million hectares or 16% of the total country area. Of the total area of forests, 30% are in protected areas (forest reserves, national parks and wildlife reserves)

while 70% is found on private and customary land. Uganda is estimated to be losing its forest cover at a rate of 200,000 hectares per year implying a loss in forestry biodiversity as well. The majority of the forest loss has occurred outside of protected areas largely due conversion of forest lands into agriculture and over-harvesting wood for energy supply in form of firewood and charcoal (NFA, 2011).

One of the sensitive habitats in Uganda is wetland, that are known to support a rich biodiversity (dragon flies, molluscs, fish, amphibians, birds, mammals, reptiles and macrophytes).

The project area is characterized mainly by agricultural areas; however, natural areas are present mainly in the vicinity of the major rivers. Woodland areas, savanna and forest/savanna mosaic characterize the proposed project area. Furthermore, some important riverine habitats and wetlands are in the proximity of the project proposed area, including both permanent and temporary rivers.

Wildlife diversity

Based on the evaluation of the potentially present species in and around the project proposed area from IUCN spatial data, an assessment of the potential impacts of the project on wildlife was carried out. The IUCN spatial indicate the presence of the following wildlife within 50 km of the proposed project area:

- 195 mammal species, of which 169 are Least Concern, 8 Near Threatened, 7 Vulnerable, 3 Endangered and 8 Data Deficient. The conservation values map shows areas of higher conservation status in the southern side of project area.
- 92 reptile species, of which 88 are listed as Least Concern, two as Near Threatened, and two as Vulnerable. The distribution map shows a higher conservation value in the southern and western sides of the area.
- 22 amphibian species, all listed as Least Concern.
- 234 arthropod species, of which 230 are Least Concern, three are Data Deficient and one is Vulnerable. The southern part of the area is the richest in terms of species diversity.
- 656 bird species; according to the IUCN spatial data, there appears to be no obvious difference in conservation value in the 50km buffer around the project area. There are several IBAs in the proposed project area and its surroundings, which indicate bird hotspots, most of which overlap with National Parks or other protected areas.

The protected species in Uganda are listed in the Uganda Wildlife Act 2020. In the 50 km buffer around the project area, following the IUCN spatial data, four species are Critically Endangered, nine Endangered and 16 Vulnerable (Table 1-4). More in detail, the number of species in 1km buffer around project area are four Critically Endangered, six Endangered and 11 Vulnerable (Table 1-5).

*Table 1-4 – Number of Vulnerable, Endangered and Critically Endangered species for each taxon in the 50 km buffer around project proposed area.*

Taxa	VU	EN	CR
Mammals	7	3	-
Birds	6	6	4
Reptiles	2	-	-
Amphibians	-	-	-
Arthropods	1	-	-

Table 1-5 – Number of Vulnerable, Endangered and Critically Endangered species for each taxon in the 1 km buffer around project proposed area.

Taxa	VU	EN	CR
Mammals	3	-	-
Birds	6	5	4
Reptiles	1	-	-
Amphibians	-	-	-
Arthropods	-	-	-

**Baseline data surveys – Biological Environment**

Field surveys of biological environment have been performed. Distinct sampling methodologies were deployed for each taxonomic group of interest, encompassing plants, mammals, birds, herptiles, and arthropods. These scientifically sound sampling techniques ensure the collection of robust baseline data, fostering a rigorous and comprehensive assessment of the biodiversity within the project area.

The proposed methodology involves conducting:

- transect surveys, where surveyors systematically assessed habitat, plant, and wildlife species along designated paths. This approach provides valuable insights into the distribution, abundance, and diversity of species across different habitats and landscapes. Transects of 500 m were surveyed by different team of experts.
- point count method, which is a widely used bird survey method in ornithology and ecological research. It involves stationary observations of birds from specific points, during which bird species and their behaviours are recorded. Points were located in the middle of each 500m transects.
- Vegetation plot sampling, which is a systematic method used in ecology and environmental science to study and analyse plant communities in a particular area. At the beginning of each transect a vegetation plot of 10x10m has be placed. The botanist collected vegetation data including species name, abundance (% cover of the 10x10 m plot), habit, DBH and Hight for trees, and the use of the plants by locals.

The surveyed locations in Lamwo, Amuru, and Nwoya districts present diverse ecological landscapes and land use patterns, as evidenced by the collected data. In Lamwo, bushed woodlands dominate, hosting a variety of plant species such as *Combretum molle*, *Erythrina abyssinica*, and *Vitellaria paradoxa*. These areas serve as suitable habitats for amphibians, reptiles, and occasional stray mammals, amidst sporadic cultivation and grazing practices. Similarly, Amuru exhibits a blend of cultivated fields with dense tree cover and active gardens, fostering a mix of species including *Albizia zygia* and *Mangifera indica*. Notably, the terrain in Amuru features relatively flat lands with ridged characteristics, influenced by small rock fragments. In Nwoya, the landscape is characterized by cultivated fields interspersed with woodlots, settlements, and riverside vegetation. *Eucalyptus* woodlots and dense cultivation mark the region, with significant human settlements nearby. This survey underscores the importance of understanding the intricate relationship between land cover, land use and biodiversity distribution in these regions, crucial for effective conservation and management strategies.

The wildlife survey was carried out by Byamukama James from 17<sup>th</sup> to 20<sup>th</sup> of January 2024. The survey was conducted on twenty-two (22) transects of approximately 500 metres each, giving a total survey length of approximately 10 kilometres.

Despite its proximity to Murchison Falls National Park, Nyowa District exhibited limited wildlife presence. The observations revealed that the Nyowa section of the surveyed powerline traversed predominantly settled areas, characterized by extensive cultivation, drained wetlands, and grasslands dominated by spear grass (*Heteropogon contortus*). Wetland areas were often found to be converted to sugarcane plantations or utilized for out-of-season crop cultivation. Conversely, wildlife sightings were concentrated primarily within the Atiak Subcounty of Amuru District, characterized by woodland habitats and evidently receiving less precipitation compared to Nyowa. Human activity in this region predominantly revolved around cattle husbandry.

The survey took place during the dry season, coinciding with prevalent burn marks across most surveyed areas. Notably, burning practices were more commonly observed in Amuru District compared to Nyowa District.

Along the transects, the most common indirect sign of wildlife presence documented were fresh droppings attributed to the common duiker (*Sylvicapra grimmia*) and burrows indicative of giant rats *Cricetomys gambianus*. The species detected along the transect are very common species and are classified as Least Concern by the IUCN Red List.

The birds most commonly observed during the survey predominantly comprised species associated with savanna grassland and woodland habitats, characterized by their reliance on insects, seeds, and fruits as primary dietary components. Among the noteworthy sightings were the Nubian woodpecker, helmeted Guinea fowl, cuckoo, red-eyed dove, African paradise flycatcher, African fire finch, and red-wing francolin, albeit encountered less frequently. The species detected during point count survey method are very common and all are classified as Least Concern by the IUCN Red List.

Habitat modification and degradation emerge as significant factors potentially influencing wildlife abundance in the project area. The observations reveal extensive deforestation within the woodlands, primarily driven by activities such as charcoal production and the collection of firewood for brick kiln utilization. In addition, it was found that almost 100% of the wetlands within the transects had been drained and subsequently converted for agricultural purposes, mainly for the cultivation of out-of-season crops or the establishment of perennial sugar cane plantations.

#### Critical Habitat Assessment

An assessment using available data was undertaken to identify the possible existence of Critical Habitats (CHs) within the project area and in the Indirect Area of Influence (IAoI) in accordance with the criteria outlined in the International Finance Corporation (IFC) Performance Standard 6 (PS6). On the basis of available data, observed during field surveys and collected by secondary sources, no critical habitats have been identified within the project area.

#### **Socio-Economic and Cultural baseline**

The socio-economic environment was investigated through 400 social economic questionnaires aimed at deeply investigate the social profile of affected people and through checklists necessary to carry out the census of the affected landowners. The findings of the questionnaire were corroborated with data of Uganda Bureau of Statistics (UBOS) and previous data. The project will be located in Northern Region, in Acholi Sub Region, crossing the Districts of Nyowa, Amuru, Lamwo.

**Demographic features**

Northern Uganda and specifically Acholi sub-region was severely affected by the civil war that lasted for 20 years (1986–2006) between the Lord’s Resistance Army (LRA) and the Uganda People’s Defense Force (UPDF), which affected social, political, and economic service delivery and structures.

The war destabilized the entire northern region, displacing 90% of the population. Many people were forced into displacement camps and could not access their land. When the war ended and people returned to their home communities and numerous competing claims on land emerged. This is partly attributable to population increase in Acholi region, with a 100% increase within the 20 years of war and half of this population is below 15 years of age (UBOS, 2007 and UBOS, 2014).

The family size in these regions ranged from 4 to 6 persons per household, and family labour stands out in all districts as the primary source of farm labour.

Table 1-6 Population projection at district level (UOBS)

District	2023			2024		
	Male	Female	Total	Male	Female	Total
<b>AMURU</b>	114.100	118.400	<b>232.500</b>	116.700	121.000	<b>237.700</b>
<b>LAMWO</b>	70.500	77.600	<b>148.100</b>	70.900	78.400	<b>149.300</b>
<b>NWOYA</b>	157.000	157.300	<b>314.300</b>	172.600	172.700	<b>345.300</b>

The transmission line project will affect over 600 households (HHs).

**Ethnicity**

in the project area 99,7% of affected people are Acholi. The Acholi society is traditionally organized into clans and sub-clans, each occupying specific areas in Acholiland, which provide identity, kinship, and communal land rights. However, this structure was disrupted when Acholi people were forcibly displaced from their ancestral lands during a period of rebellion, between approximately 1996 and 2007. This displacement led to nearly 90% of the Acholi population living in internally displaced persons (IDP) camps. As a result, younger generations were unable to learn traditional cultural knowledge, including practices related to land use and stewardship, which had significant implications for their cultural continuity and connection to their ancestral lands.

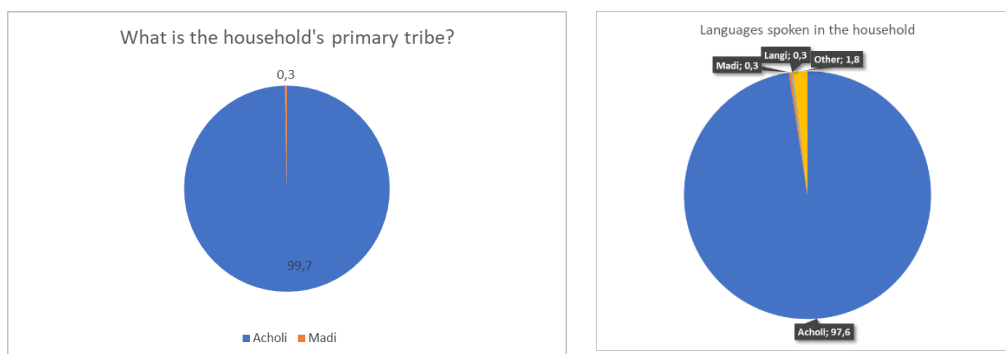


Figure 1-7 – Distribution of ethnicity and languages spoken across households.

Local Economy and Livelihood

In the project area, two main livelihoods (FEWS livelihood mapping methods) have been identified: Amuru-Gulu Rice, Groundnut, Sorghum, and Livestock livelihood zone and North Kitgum-Gulu-Amuru Simsim, Sorghum, and Livestock Zone Soils.

The Amuru-Gulu Rice, Groundnut, Sorghum, and Livestock livelihood zone is a bimodal, primarily rain-fed agricultural area. Most households in this zone source their food needs from a combination of own crop production and purchases. Better-off households supplement these food sources with that from their livestock. Households in this zone earn cash income from the sale of crops, especially rice, groundnuts, and simsim and from the sale of labour, the majority of which is undertaken in local rural areas. Market access in this zone is fair to good, with a good feeder road network, though most roads are seasonal and become difficult to pass during the rainy season.

North Kitgum-Gulu-Amuru Simsim, Sorghum, and Livestock Zone Soils in this zone are primarily clay and are relatively fertile. The main source of food for most households in this zone comes from their own crop production. Better-off households’ source additional food needs from a combination of purchase and their livestock. The primary source of cash income for the majority of households in this zone comes from crop sales. Poorer households complement their income from crop sales with cash earned from labour sales – mainly unskilled labour at construction sites and brick making – and from the sale of natural products such as firewood, thatching grass, and charcoal.

The results of socio-economic survey are in line with the regional profile as indicated in the analysis. More than 90% of affected households practise agriculture as primary occupation. Cash crops are mostly cultivated. The remaining households are engaged in trading, livestock and employment.

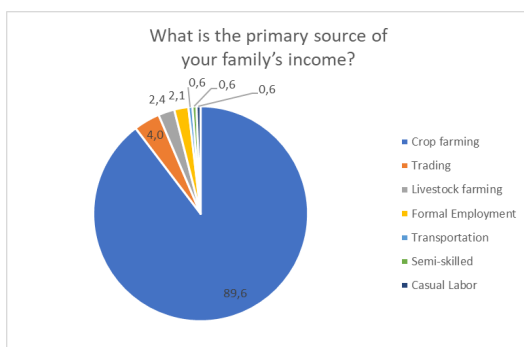


Figure 1-8 – Primary source of family's income in the project area.

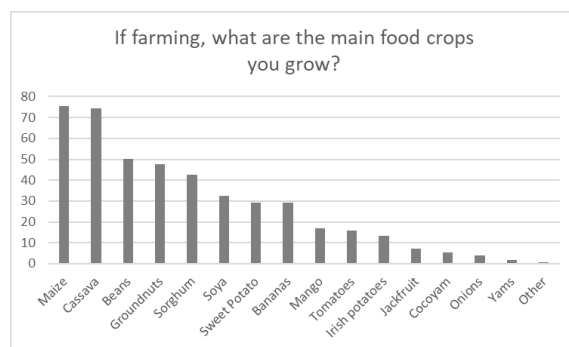


Figure 1-9 – Main food crops cultivated in the project area.

Gender, Disadvantaged and Vulnerable Groups

For what concerns in Acholi society, gender disparities manifest prominently through traditional customs such as polygamy, widow inheritance, and bride price obligations. Prior to the conflict, clans enjoyed strong cohesion, bolstered by extensive livestock and land holdings, which provided robust safety nets that particularly benefited women, who held pivotal caregiving responsibilities for clan heirs. However, the aftermath of the war ushered in a period of food scarcity and heightened competition for resources,



fundamentally reshaping these dynamics. Concurrently, the prevalence of alcoholism among men exacerbated living conditions, further amplifying the burdens shouldered by women.<sup>1</sup> In terms of disadvantages and vulnerable people, more than 80% of project affected households resulted to have in their families at least one of the vulnerabilities presented in the Figure 1-10.

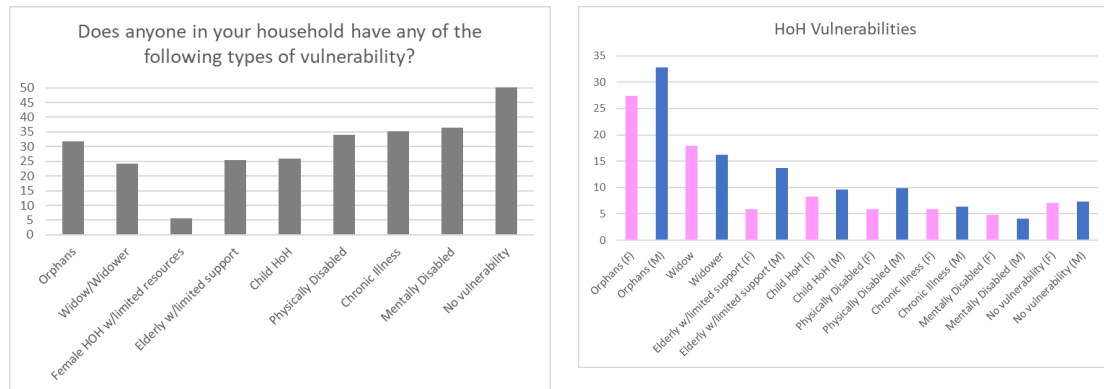


Figure 1-10 – Comparison between male and female households on the types of vulnerabilities of project population.

**Landholding and land ownership**

According to Article 237 (3) of the 1995 Constitution of Uganda and Section 2 of the Land Act, the citizens of Uganda hold land under four 4 tenures namely:

- Mailo Land
- Freehold land
- Leasehold
- Customary land

With the exception of Buganda which is mainly held under Mailo, land in other parts of Uganda is held mostly under the customary tenure. The Land Act describes customary tenure as land that can be owned communally, by a clan, or a tribe, a family. In 2015, the government of Uganda introduced Certificates of Customary Ownership (CCOs) for owners of customary land. A customary land owner can apply for a CCO as proof of ownership of the land.

**Physical Cultural Resources**

For what concern-built heritage there are no indication of monuments or major heritage site in the project areas, though it is clear from the analysis of previous studies that in the project area the main evidence of remains refers to family burial sites as common practice in north of Uganda in Acholi sub region. Kaiser (2008) describes how the Acholi people typically bury family members on the family compound, maintaining a shrine to the family ancestors nearby.

**Environmental and Social Impacts**

Starting from the baseline conditions, the potential impacts on the different components (physical environment, biological environment, socio-economic and cultural environment) that could result from the project activities during the construction and operational phases have been identified. The significance of these impacts was assessed with and without site-specific mitigation measures (identified by the specialists to reduce or avoid negative impacts and improve positive impacts), as summarised in the tables below.

<sup>1</sup> Acholi Clan, Ethnic, and National Identities in PostConflict Northern Uganda: A Case Study in Koch Goma Sub-County, Nwoya District

The impact factors identified during the analysis of the project and through the definition of the project phases and project actions are assessed in their relevance, using a scoring system.

- Duration (D): is the duration of the impact factor and can vary from short to long according to the following definitions.
- Frequency (F): is the frequency with which the impact factor manifests itself.
- Spatial extent (E): is the geographical area within which the impact factor can exert its effects.
- Intensity (I): is a measure of the physical, biological, economic or social severity of the impact factor.
- Sensitivity (S): The sensitivity of an environmental or social component is typically evaluated on the basis of the presence/absence of some features which define both the current degree of the environmental or socio-economic quality and the susceptibility to environmental or social changes of the component.
- Reversibility (R): is the property of an impact to diminish its magnitude over time and to eventually recede entirely.

The Impact Value (IV) obtained from the aggregation of the previous attributes represents a quantitative measure of the impact magnitude or significance.

Possible mitigation measures have been therefore defined, with reference to the Mitigation Hierarchy Approach. The effectiveness of the identified mitigation measures to reduce or eliminate the negative impact, or enhance positive impacts, has been also rated. The residual impact is obtained multiplying the impact value (IV) by the mitigation effectiveness (or the enhancement effectiveness in the case of positive impacts).

A description of identified impacts is provided in Table 1-7 and Table 1-8 in matrix format.

Table 1-7 – Matrix of impact significance during the construction phase

ENVIRONMENTAL AND SOCIAL COMPONENTS	IMPACTS	IMPACT VALUE	RESIDUAL IMPACT
<b>PHYSICAL ENVIRONMENT - CONSTRUCTION PHASE</b>			
Climate	Increased emission of GHG	Low (-)	Negligible (-)
	Reduction of carbon sinks (due to vegetation clearance)	Low (-)	Low (-)
Geology and Soils	Changes in local morphology	Low (-)	Low (-)
	Soil disposal	Low (-)	Negligible (-)
	Soil erosion and slope instability	Medium (-)	Low (-)
Hydrogeology	Groundwater contamination	Medium (-)	Low (-)
Surface Water Resources	Increased turbidity and total	Low (-)	Negligible (-)
	Pollutants contamination in	Medium (-)	Low (-)
Air Quality	Exhaust gas emissions	Negligible (-)	Negligible (-)
	PM and dust emissions	Medium (-)	Low (-)
Noise and Vibration	Increase of Noise and vibration levels	Low (-)	Negligible (-)
Waste	Waste production	Low (-)	Negligible (-)
<b>BIOLOGICAL ENVIRONMENT - CONSTRUCTION PHASE</b>			
Vegetation and Habitat	Agricultural lands disruption and damage	Negligible (-)	Negligible (-)
	Habitat degradation, disturbance and fragmentation	Medium (-)	Low (-)
	Loss of flora and vegetation	Medium (-)	Low (-)
	Invasive alien species	Medium (-)	Low (-)
	Impact to threatened and protected species and habitat	High (-)	Low (-)
	Wetland alteration and degradation	Medium (-)	Medium (-)
	Forest alteration and degradation	High (-)	Medium (-)
Fauna	Fauna disturbance	Low (-)	Low (-)
	Desease	Negligible (-)	Negligible (-)
	Illegal hunting and other human disturbance	Medium (-)	Negligible (-)
<b>SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT - CONSTRUCTION PHASE</b>			
Beneficial	Job opportunities	Medium (+)	Medium (+)
	Increase of business opportunities	Medium (+)	Medium (+)
Displacement	Physical displacement	Very High (-)	Medium (-)
	Economic displacement	Very High (-)	Medium (-)
	Physical Cultural Resources	Very High (-)	Medium (-)
Disturbance	Disturbance during construction	Negligible (-)	Negligible (-)
	Sexual harassment	Very High (-)	Medium (-)
	Increase of social conflicts	High (-)	Low (-)
	Increase of STD and VBD	Very High (-)	Medium (-)
	Child labor	Very High (-)	High (-)

Table 1-8 – Matrix of impact significance during the operation phase

ENVIRONMENTAL AND SOCIAL COMPONENTS	IMPACTS	IMPACT VALUE	RESIDUAL IMPACT
<b>PHYSICAL ENVIRONMENT - OPERATION PHASE</b>			
Climate	Reduction of GHG emissions from electricity consumption	Very High (+)	Very High (+)
	GHG emissions (SF <sub>6</sub> )	Low (-)	Negligible
Landscape	Visual and aesthetic impact	Very High (-)	Very High (-)
Water Resources	Reduction of aquifer's recharge area	Low (-)	Negligible (-)
	Risk of groundwater and surface water contamination	Medium (-)	Negligible (-)
Noise	Operation of the substations	Negligible (-)	Negligible (-)
	Wind effect on cables and corona discharge	Negligible (-)	Negligible (-)
EM field	Increase of Electromagnetic field	Medium (-)	Negligible (-)
<b>BIOLOGICAL ENVIRONMENT - OPERATION PHASE</b>			
Vegetation and Habitat	Degradation of ecosystem services	Medium (-)	Medium (-)
	Loss of flora and vegetation	Medium (-)	Negligible (-)
	Habitat degradation and fragmentation	High (-)	Medium (-)
Fauna	Disturbance and mortality of avifauna and bats	Very High (-)	Medium (-)
	Habitat degradation and fragmentation	High (-)	Medium (-)
	Electric and Magnetic Fields, noise effect	Low (-)	Low (-)
<b>SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT - OPERATION PHASE</b>			
Beneficial	Rural electrification	Very High (+)	Very High (+)
Disturbance	Disturbance during operation and maintenance	Negligible (-)	Negligible (-)

### Cumulative Impact Assessment

In the initial stretch of the transmission line, in the proximity of Olwiyo substation, other electric lines are present, as detected during the site reconnaissance and described in the Preliminary Design Report. These are:

- the Olwiyo – Nebbi 132 kV TL, which route is directed westward and will be crossed by the Interconnection project route;
- the Olwiyo – Gulu 132 kV TL, which route is directed eastward;
- the Karuma – Olwiyo 400 kV TL (currently operated at 132 kV), which route is directed to the south-east.

Furthermore, according to UETCL Grid Development Plan 2018-2040, a new 132 kV transmission line Agago – Adjumani is foreseen to be commissioned in 2040, which will cross the Interconnection project route close to the border with South Sudan, in the proximity of Nimule.

The presence (and future planning) of other transmission lines in the project area may contribute to increase the impacts on bird species. The Interconnection project already includes rigorous mitigation measures to reduce the risk of bird collision and electrocution, including bird flight diverters along the line crossing sensitive areas for birds, i.e. the southern part near the Murchinson NP and the northern part near Nimule. The area of this mitigation measure included the Olwiyo substation where other two electric lines are present, to ensure that cumulative impacts were mitigated.

There would also be cumulative impacts on habitat (and therefore species). These would be directly proportional to the amount of ground disturbed and would be limited to the transmission line right of way (RoW).

Cumulative effects also depend to some extent on whether or not other construction activities in the project area are concurrent or overlapping. Increased land acquisition, traffic and possibly increased habitat disturbance could result from concurrent construction. However, the implementation of the mitigation measures identified for the proposed project will ensure that impacts are mitigated.

### **Environmental and Social Management Plan (ESMP)**

The purpose of the Environmental and Social Management Plan (ESMP) is to describe in detail the possible actions that must be taken to ensure that identified impacts will be mitigated as much as possible.

Most of the impacts, which occur during the construction phase, can be reduced, or avoided through the application of sound construction management guidelines.

Some impacts will be permanent and cannot be mitigated. In some cases, these impacts will be compensated, or enhancement activities will be implemented. Enhancement is an important part of the overall management plan as it is used to improve existing environmental conditions, restrict any likely environmental degradation (which is not directly related to the project) in the future, and it can form a part of compensatory measures.

This Environmental and Social Management Plan (ESMP) further acts as a framework for the Contractor to develop its mitigation and management plans. UETCL and the Contractor will be required to develop standalone mitigation and monitoring plans, implementing the requirements contained within this document as a minimum, according to the responsibilities specified in the subplans.

UETCL will have the overall responsibility for the compliance of the scheme during the construction and operation phases and for the implementation of the mitigation measures outlined within this ESMP.

UETCL will ensure that the agreements will legally oblige the Contractor to comply with this ESMP using the GIIP (Good International Industry Practices) and enforcing the principle that the stricter among national and international standard applies.

UETCL shall monitor the Contractor's performance and all subcontractors on a regular basis.

Mitigation measures described for the operational phase will be implemented by UETCL.

To further detail the necessary mitigation and management actions of ESMP, the Contractor shall provide the following Sub-Plans, which shall be developed as guidelines for minimizing environmental impacts from specific activities of the Project, primarily during construction.

- SP01: Erosion and Sediment Control Management Plan
- SP02: Water and Soil Pollution Control Management Plan
- SP03: Air pollution and Dust Management Plan
- SP04: Noise and Vibration Management Plan
- SP05: Waste Management Plan
- SP06: Hazardous Material Management Plan
- SP07: Vegetation Clearing Management Plan
- SP08: Biodiversity Management Plan
- SP09: Traffic Management Plan
- SP10: Cultural Heritage Management Plan
- SP11: Occupational Health and Safety Management Plan
- SP12: Community Health and Safety Management Plan
- SP13: Stakeholders Engagement Management Plan
- SP14: Local Employment Management Plan
- SP15: Contractor Management Plan
- SP16: Labor Influx Management Plan
- SP17: Security Management Plan
- SP18: GBV/SEA/CAE

An Environmental and Social Management Division (ESMD) within the project structure will actively liaison with the concerned stakeholders and Government of Uganda (GoU) agencies to assure a smooth implementation of the plans. The ESMD will have three sections namely Environmental Section, Grievance Section and Social Section.

The ESMD will have three sections namely Environmental Section, Grievance Section and Social Section. Environmental Section will be responsible for implementing physical and biological mitigation and enhancement programs and relevant monitoring activities, as well as compliance monitoring of programs implemented by the contractors as per contractual agreement.

Social Section will work on land acquisition and compensation, resettlement and rehabilitation, community development, livelihood programs, health related programs, etc. and relevant monitoring of social programs implemented by the project and compliance monitoring of programs implemented by the contractors as per contractual agreement.

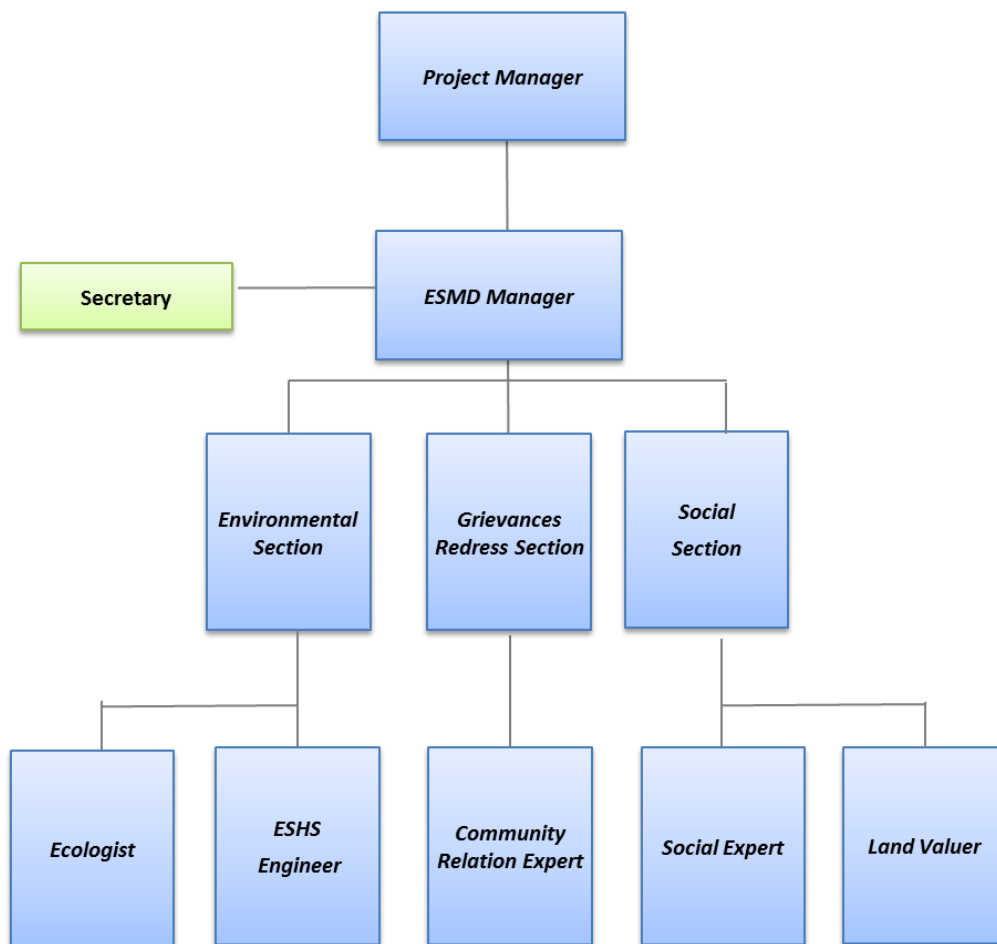


Figure 1-11 – ESMD Organization Chart

Grievance Redress Organization will work with Project Affected Persons (PAPs) to raise their concerns and grievances to the Project in a transparent manner over the agreed procedural steps.

During the project construction phase, ESMD will be a full-fledged office, but it will be reduced in size as Environmental and Social Management Organization (ESMO) during the operation phase.

The detailed description of all the mitigation (and enhancement) measures envisaged in the Environmental and Social Management Plan (ESMP) is provided in a separate volume (Volume II - ESMP), subdivided for physical, biological and social environment.

The mitigation (and enhancement) measures for both pre-construction/construction and operation phases are illustrated in tables, providing the following details:

- Environmental or social component to be addressed;
- Project area;
- Description of each mitigation and enhancement measure;
- Identification of the parties responsible for the implementation of the mitigation measure and for the monitoring during implementation;
- Monitoring frequency
- Cost of the mitigation (or enhancement) measure;
- Phase of the project during which the mitigation (or enhancement) measure has to be implemented

The most important mitigation measures included in the ESMP are provided in the following table.

Table 1-9 – Mitigation and management measures on biological environment.

Environmental Component	Project Area	Mitigation and Enhancement	Responsibility		Monitoring Frequency	Phase: Constr. (C) Oper. (O)
			Mitigation	Monitoring		
Flora	All construction area and its surroundings	<ul style="list-style-type: none"> <li>▪ prepare a general <b>Vegetation clearing Management Plan</b> including conceptual design of vegetation clearing and controls to be implemented on-site in accordance with project’s specific requirements;</li> <li>▪ minimize and possibly avoid access road construction and construction material within the boundaries of the Riverine and hill side forest;</li> <li>▪ carefully select the trees that need to be cut to implement the project activities;</li> <li>▪ avoid any useless cutting of trees with particular attention to protected species;</li> <li>▪ minimize as much as possible the construction areas;</li> <li>▪ revegetate the temporarily used areas only with local species, forbidding any use of alien and invasive species and enhance natural regrowth;</li> <li>▪ buy timber required for construction only from authorized dealers;</li> <li>▪ provide energy for cooking to the workers to avoid the use of local timber and wood;</li> <li>▪ strictly forbid any buying or selling of timber or any other floral natural product within the construction area;</li> <li>▪ strictly forbid any poaching of floral natural product by the contractors’ workers;</li> <li>▪ avoid any fire risk caused by activities within the project area;</li> <li>▪ Adjust pole placements to span wetlands or limit equipment access in wetlands, wherever possible;</li> <li>▪ avoid introduction of invasive alien species: early detection and eradication are recommended;</li> <li>▪ consider translocation of protected species in suitable habitat;</li> <li>▪ if necessary, a compensatory reforestation plan to be defined based on baseline surveys and final alignment.</li> </ul>	Contractor	ESMD	Detailed design stage; Before construction activities begin; During construction; During the decommissioning stage	C



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Environmental Component	Project Area	Mitigation and Enhancement	Responsibility		Monitoring Frequency	Phase: Constr. (C) Oper. (O)
			Mitigation	Monitoring		
Fauna	All construction area and its surroundings	<ul style="list-style-type: none"> <li>prepare a general <b>Biodiversity Management Plan</b> including conceptual design of biodiversity management controls to be implemented on-site in accordance with project's specific requirements;</li> <li>all animal dens close to the work areas must be marked as no-go areas;</li> <li>the project work force should be instructed to avoid harassment and disruption of wildlife;</li> <li>if the use of explosive is necessary, it should be used only within specified time and distances from any wildlife sensitive area;</li> <li>awareness creation training to construction workers at toolbox meetings, so that they contribute to the effort of protection of wildlife;</li> <li>carry out periodic monitoring of habitat integrity of the area;</li> </ul>	Contractor	ESMD	During construction activities	C
	All construction sites	<ul style="list-style-type: none"> <li>establish and monitor implementation of a speed limit of 25 km/hour in the habitat zone or wildlife crossing area and 40 Km/hour in the rest of construction roads;</li> <li>clearly identify by warning signs, habitat zones or wildlife crossing areas;</li> <li>strictly forbid to all vehicles involved in the project to honk at wild animals, especially while the animals are crossing the road;</li> <li>all vehicles' drivers involved in the project must attend at least one wildlife safety training before they start working</li> </ul>	Contractor	ESMD	Ensure all measures are included in ToR of the Contractor. Check drivers' training. Check traffic signs every month.	C
	All construction sites	<ul style="list-style-type: none"> <li>adhere to National or IFC EHS standards for noise quality, whichever are higher. All vehicles and heavy equipment shall have an adequate silencer and shall be properly maintained;</li> <li>minimize traffic congestion by proper traffic management;</li> </ul>	Contractor	ESMD	Check measures are implemented. Monitor noise every 3 months	C
	Project area	<ul style="list-style-type: none"> <li>strictly forbid to construction workers to hunt and/or poach wildlife and to fish as well as to buy and/or sell wild animals;</li> <li>strictly forbid workers to supply food from hunting or fishing;</li> <li>implement adequate practices of food waste management to avoid any attraction of wildlife scavengers;</li> </ul>	Contractor	ESMD	Check measures are regularly implemented. Inspect food waste disposal every month	C
		<ul style="list-style-type: none"> <li>transmission line height greater than 6 meters to avoid electrocution of terrestrial species, such as giraffes and elephants;</li> </ul>	Contractor	ESMD	Ensure all measures are included in ToR of the Contractor.	C
		<ul style="list-style-type: none"> <li>installation of dynamic BIRD-FLIGHT Diverter (BFD) in strategic areas to avoid electrocution and bird collision. The installation of BFD must follow the guidelines of the IUCN reported in the 'Wildlife and power</li> </ul>	Contractor	ESMD	Ensure all measures are included in ToR of the Contractor.	C

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Environmental Component	Project Area	Mitigation and Enhancement	Responsibility		Monitoring Frequency	Phase: Constr. (C) Oper. (O)
			Mitigation	Monitoring		
		<p>lines: guidelines for preventing and mitigating wildlife mortality associated with electricity distribution networks' report.</p> <p>Martín Martín, J., Garrido López, J.R., Clavero Sousa, H. and Barrios, V. (eds.) (2022). Wildlife and power lines. Guidelines for preventing and mitigating wildlife mortality associated with electricity distribution networks. Gland, Switzerland: IUCN.</p>				

Table 1-10 – Mitigation and management measures on social environment

Social component	Target population	Mitigation and enhancement	Responsibility		Monitoring Frequency	Phase: Preconst. (P) Constr. (C) Oper. (O)
			Mitigation	Monitoring		
Land	HHs affected by project land taking	Avoid as much as possible any settlement through design. Develop a RAP inclusive of a Livelihood Restoration Plan for HHs who lose more than 20% of their productive assets (they will be entitled of livelihood restoration programs proportionally to their loss and vulnerability status).	UETCL	ESMD	Quarterly basis After compensation payment of biannual basis for two years	P
Labor Equity in local employment benefits/mini mize social conflicts	All National and international workers, included labor from nearby communities	Develop Project Human Resource Policy which includes provision: <ul style="list-style-type: none"> <li>▪ to prioritize local employment considering available skills in accordance with Local Authorities/Village leaders and UETCL,</li> <li>▪ to promote non-discrimination and equal opportunities,</li> <li>▪ to provide additional specialized training to local workforce in skills required by contractor (i.e. administrator, driving etc.).</li> </ul>	Contractor	ESMD	Quarterly basis	C
Labor Labor grievance mechanism	All National and international workers, included labor from nearby communities	Develop Project Grievances Mechanism for labor: <ul style="list-style-type: none"> <li>▪ Complaint from worker about unfair treatment or unsafe living or working condition;</li> <li>▪ Grievance policies and mechanism must be developed and disclosed.</li> </ul>	Contractor	ESMD	Quarterly basis	C
Labor Protecting the workforce	All National and international workers, included labor from nearby communities	Develop a Project Human Resource Policy which consider at least the following aspect: <ul style="list-style-type: none"> <li>▪ freedom of association and collective bargaining;</li> <li>▪ prohibit the hiring of underage workers, as defined in relevant ILO Conventions;</li> <li>▪ prohibit recruitment, use and practices of forced labor and child labor;</li> <li>▪ prohibit discrimination in hiring practices or pay;</li> <li>▪ provide fair and favorable working conditions as per</li> </ul>	Contractor	ESMD	Quarterly basis	C

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Social component	Target population	Mitigation and enhancement	Responsibility		Monitoring Frequency	Phase: Preconst. (P) Constr. (C) Oper. (O)
			Mitigation	Monitoring		
		contract terms and make sure that conditions are transparent and understood by workers prior to recruitment; <ul style="list-style-type: none"> <li>▪ avoid excessive recruitment or transportation fees, or to keep identity documents or working papers;</li> <li>▪ guarantee freedom of movement in and out of the workplace and workforce accommodation;</li> <li>▪ guarantee wages as per industry standards/minimum wage;</li> <li>▪ guarantee access to workforce grievance mechanisms;</li> <li>▪ guarantee provision of sufficient rest periods and rest days to avoid fatigue;</li> <li>▪ guarantee safe and healthy workplace conditions;</li> <li>▪ guarantee provision of food and water for drinking and sanitation;</li> <li>▪ guarantee working conditions and accommodation standards, as per guidance note by IFC;</li> <li>▪ guarantee provision of appropriate personal protective equipment (PPE)</li> </ul> These requirements shall also be reflected in subcontractors' employment policy.				
Occupational Health Maintain the wellbeing of workers living in camps	All National and international workers, included labor from nearby communities	<ul style="list-style-type: none"> <li>▪ Worker's accommodation shall follow international best practices such as ILO recommendation, guidance note by IFC on Workers' accommodation.</li> <li>▪ Systematically plan participatory hygiene promotion campaigns can reduce water, sanitation, and hygiene (WASH)-related diseases in camps.</li> <li>▪ Hence, hygiene promotion campaigns focus on addressing the riskiest practices for diarrheal disease transmission through safe disposal of excreta, effective handwashing, and reduction of household</li> </ul>	Contractor	ESMD	Quarterly basis	C

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Social component	Target population	Mitigation and enhancement	Responsibility		Monitoring Frequency	Phase: Preconst. (P) Constr. (C) Oper. (O)
			Mitigation	Monitoring		
		drinking water contamination.				
Occupational and community health Spread of STD	All National and international workers, included daily labor from nearby communities and villages directly impacted by the project construction activities	<ul style="list-style-type: none"> <li>Inform workers and community of risks, infectious and all communicable diseases and protection to minimize risk of infection to workers and communities.</li> <li>Provision of awareness and prevention briefings.</li> <li>Include requirements for case-finding and treatment of curable STIs, social marketing of condoms, peer educators' program, condom distribution, and Voluntary Counselling &amp; Testing (VCT) targeting PACs. Implement and evaluate quarterly.</li> </ul> This activity shall be planned in conformity to Health Regulation at District Level-	Contractor	ESMD	Quarterly basis	C
Occupational and community health Spread of Respiratory Disease	All National and international workers, included daily labor from nearby communities and villages directly impacted by the project construction activities	<ul style="list-style-type: none"> <li>Prevent spread of respiratory disease, including the production of epidemics that can pass back and forth between the project and the community.</li> <li>Communicate with local-level TB-control program coordinator to initiate case finding, treatment, and follow-up with family members and others living within the same housing compound as workers diagnosed with active TB.</li> <li>Distribute of mask to prevent from dust in the villages most impacted by the air pollution.</li> </ul> These activities shall be planned in conformity to Health Regulation at Parish Level	Contractor	ESMD	Quarterly basis	C
Occupational and community health Spread of Vector Borne Disease	All National and international workers, included daily labor from nearby communities and villages directly	<ul style="list-style-type: none"> <li>Provision of Mosquito nets and repellent</li> <li>Training on good practices and behavior to minimize the risks</li> </ul>	Contractor	ESMD	Quarterly basis	C

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Social component	Target population	Mitigation and enhancement	Responsibility		Monitoring Frequency	Phase: Preconst. (P) Constr. (C) Oper. (O)
			Mitigation	Monitoring		
	impacted by the project construction activities					
Community Grievance Mechanism	Affected communities	<ul style="list-style-type: none"> <li>Implement Community Grievances Redress Mechanism to address complains related to direct and indirect project impacts</li> </ul>	UETCL	ESMD	Quarterly basis	C
Occupational and community health Restrict access to sites, especially hazardous areas	All National and international workers, included daily labor from nearby communities and villages directly impacted by the project construction activities	<p>Develop a Project Occupational Health and Safety Management Plan and Community Health and Safety Management Plan including, at least:</p> <ul style="list-style-type: none"> <li>Provision to guarantee a safe and healthy work environment, considering inherent risks in the specific sector and specific classes of hazards in the work areas, including physical, chemical, biological, and radiological hazards.</li> <li>provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;</li> <li>training of workers;</li> <li>documentation and reporting of occupational accidents, diseases, and incidents;</li> <li>Emergency prevention, preparedness, and response arrangements.</li> <li>Appropriate fencing / signage at site entrance.</li> <li>Appointment of site security personnel.</li> <li>Road safety measures.</li> <li>First aid and medical assistance.</li> <li>HS measure at community level.</li> </ul>	Contractor	ESMD	Quarterly basis	C
Security social conflict	Villages of the Project Area	<ul style="list-style-type: none"> <li>Prepare a Security Management Plan with provisions for respect of Voluntary Principles on Security and Human Rights (VPSHR) and manage the influx of workers and followers through a Labor Influx Management Plan</li> </ul>	Contractor	Contractor and ESMD	Quarterly Basis	C

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Social component	Target population	Mitigation and enhancement	Responsibility		Monitoring Frequency	Phase: Preconst. (P) Constr. (C) Oper. (O)
			Mitigation	Monitoring		
		<ul style="list-style-type: none"> <li>▪ Harmonize the above plans with:</li> <li>▪ Local Employment Plan</li> <li>▪ Workers Code of Conduct</li> <li>▪ GBV/CAE/SEA plan, Occupational and Community Health and Safety plan</li> <li>▪ Establish continuous communication with Key stakeholders and traditional leaders.</li> <li>▪ Train foreign workers on local culture and traditions</li> </ul>				
Vulnerable Groups	Villages of the Project Area	<ul style="list-style-type: none"> <li>▪ GBV and CAE</li> <li>▪ Contractors are required to have sexual harassment policies and Worker's Code of Conduct. It is recommended that Codes of Conduct include specific prohibitions against SEA, including prohibition of sexual activities with children, defined as anyone younger than 18. This standard must hold even when national standards, laws and policies have a younger age of consent.</li> <li>▪ Worker Code of Conduct shall be translated in local language(s)</li> <li>▪ The Contractor is obliged to create and maintain an environment which prevents gender-based violence (GBV) and child abuse/exploitation (CAE) issues, and where the unacceptability of GBV and actions against children are clearly communicated to all those engaged on the project.</li> <li>▪ Complains on GBV and CAE episodes shall be channelized through the Project Grievances Redress Mechanism, it should state in simple, up-front language that perpetrators will be sanctioned. System of sanctions must be put in place that will unambiguously reflect the project's commitment to a violence-free workplace.</li> </ul>	Contractor	ESMD	Quarterly Basis	C

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Social component	Target population	Mitigation and enhancement	Responsibility		Monitoring Frequency	Phase: Preconst. (P) Constr. (C) Oper. (O)
			Mitigation	Monitoring		
		<ul style="list-style-type: none"> <li>Standardized training against sexual harassment and GBV should be part of on-boarding procedures for all contractor's employees at site.</li> </ul>				
		<p><b>CHILD LABOR</b>                      Develop a "child labor monitoring" system, a three-person team of community members (such as a schoolteacher, mothers' club member or retired policeman) are given training in how to monitor child labor. They then periodically visit places where children are likely to be working. If they find a child, they report the case to a specially constituted community committee, as well as to the labor inspector or local government authority for follow-up. Depending on the child's situation, the committee will recommend a course of action,                      Protecting older children in or at risk of hazardous work offering comprehensive packages of training and services to facilitate the transition from school to decent work (skills, apprenticeships, vocational training, job counselling, enterprise development, financing)                      Raising awareness among employers of productivity gains to be achieved through improvement of working conditions to a level that is safe for young people to work.                      Establishing joint worker-employer safety committees, safety representatives and connections to workers' organizations to provide support for young people in the work environment.                      Ensuring regular inspection of enterprises regarding workplace conditions and adherence to minimum age restrictions</p>	Contractor	ESMD, Communities	Quarterly basis	C



Social component	Target population	Mitigation and enhancement	Responsibility		Monitoring Frequency	Phase: Preconst. (P) Constr. (C) Oper. (O)
			Mitigation	Monitoring		
		Training frontline health-care providers to detect and document occupational injuries and illnesses of children These strategies are presented separately but they are interrelated. For instance, most preventive strategies also protect young workers, as is the case with regular monitoring of working conditions.				
Cultural heritage	Project area	Establish a Chance Finding Procedure Inventory of any archaeological finding and unmarked graves	Contractor	ESMD	Quarterly basis	C

### Environmental and Social Monitoring Plan

Monitoring will be done throughout the project life. Apart from external expert monitoring, internal monitoring by the project will be done as well as participatory monitoring involving governmental authorities or other stakeholders.

UETCL (ESMD) will have the principal responsibility for environmental and social baseline monitoring during the pre-construction phase.

Environmental and social monitoring during project construction will include two major groups of activities:

- Review of the contractor's plans such as 'storage and construction waste management plan', 'domestic waste management plan', 'health and safety plan', 'emergency medical response unit' and other environmental plans. Monitor implementation arrangements, compliance and impacts.
- Systematic observation to check that contract arrangements by contractors, and other agencies such as government, NGO/CBO, etc. are in fact complied with, and that emerging impacts are properly mitigated.

Both compliance and impact monitoring will be carried out during project operation phase. The compliance monitoring will focus on determining if the prescribed mitigation and enhancement measures in the operation phase are being fully and properly carried out by the project.

Impacts of activities implemented during construction phase and operation phase will be monitored at regular intervals. However, the monitoring intensity during the operational phase will be much lower, compared to the construction phase.

The detailed description of all the envisaged monitoring actions is provided in separate volume (Volume II - ESMP), subdivided for physical, biological and social environment.

The foreseen monitoring actions for both pre-construction/construction and operation phases are illustrated in tables, providing the following details:

- Project phase;
- Issue or impact to be monitored;
- Parameters to be monitored;
- Location of monitoring action;
- Monitoring frequency
- Identification of the party responsible for the implementation of the monitoring action;
- Cost of the monitoring action.

The most important monitoring parameters included in the *Environmental and Social Monitoring Plan* are provided in the following table.

Table 1-11 – Environmental monitoring actions on biological environment

Project phase	Issue	Parameters	Location	Frequency	Responsibility
Pre-construction and construction	Impacts on vegetation	- Survey to assess threatened species and habitat distribution and location. - mapping of Moist <i>Combretum</i> savanna and <i>Butyrospermum</i> savanna.	Areas will be indicated in the Biodiversity Management Plan	Single survey before construction	ESMD / Main Contractor / District Forest Office
	Impact on wildlife	Surveys to assess: a. Vultures and other threatened bird species distribution and abundance, roost counts and location, other supplementary feeding stations. b. Bats distribution, diversity and activity levels. c. Human-wildlife conflict	Entire Project Site	Two surveys before construction	ESMD / Main Contractor / District Wildlife Department
		Number of wild animals and birds affected by traffic accidents.	TL and SS Construction sites and vicinity (including the alignment of the access roads)	Monthly	ESMD / Main Contractor / District Wildlife Department
		Unwanted and illegal activities such as:  - On vegetation: logging and poaching with a specific focus on particular areas shall be monitored. If necessary, watchmen will be relocated to vulnerable and sensitive sites. - On wildlife: hunting, poaching, etc. shall be monitored. If necessary, guards may be relocated to vulnerable areas. Monitoring of enforcement of the agreed sanctions for illegal activities.	Entire Project Site	Continuous	ESMD / Main Contractor / District Forest Office / District Wildlife Department
Operation	Loss of resident avifauna (collisions,	Number and location of mortality/injured birds identified / affected & species of carcass found including whole carcass, decomposed, partial carcass, etc.	Transmission line corridor and its surroundings	Monthly	ESMD / ESMU

Project phase	Issue	Parameters	Location	Frequency	Responsibility
	barrier effect & displacement)				
	Residual impacts after construction to design further mitigation measures	Surveys to assess: a. Birds distribution, diversity and abundance. b. Vultures and other threatened bird species distribution and abundance, roots counts and location, other supplementary feeding stations. c. Bats distribution, diversity and activity levels.	Entire Project Site	Twice per year (in dry and wet season) for five years, after project completion	ESMD / ESMU

Table 1-12 – Social monitoring actions

Project phase	Issue	Parameters	Location	Frequency	Responsibility
Pre-construction and construction	Land Acquisition	<ul style="list-style-type: none"> <li>– Performance monitoring against timetable (Public meetings held; Census, assets inventories, assessments, and socioeconomic studies completed; Grievance redress procedures in place and functioning; Compensation payments disbursed; Housing lots allocated; Housing and related infrastructure completed; Relocation of people completed; Income restoration and development activities initiated; Monitoring and evaluation reports submitted).</li> <li>– Impact monitoring such as livelihood restoration against the baseline Assessment of PAP satisfaction</li> </ul>	Acquired Areas	<ul style="list-style-type: none"> <li>– Quarterly Basis for performance monitoring.</li> <li>– Semi-annual basis for impact monitoring</li> </ul>	UETCL
	Equity in local employment benefits / minimize social conflicts.	<ul style="list-style-type: none"> <li>– Disclosure of contractor recruitment plan at Site offices and to Chiefs of Affected Villages</li> <li>– Percentage of workers hired from all nearby communities.</li> <li>– Percentage of workers belonging to disadvantage groups</li> <li>– Grievances</li> <li>– Records of specialized training for local staff provided by contractor.</li> <li>– Certificates from contractor issued to employees (copied to UETCL) detailing training received / new skills acquired while employed.</li> </ul>	Project area and affected villages	Quarterly Basis	UETCL (ESMD)
	Labor grievance mechanism	<ul style="list-style-type: none"> <li>– Established of grievance mechanism shall be documented.</li> <li>– Complaints log and resolution action must be recorded.</li> </ul>		On monthly basis	UETCL (ESMD)
	Protecting the workforce	<ul style="list-style-type: none"> <li>– Regular weekly work hours, rest periods, lunch, etc.</li> </ul>	Project area	On monthly basis	UETCL (ESMD)

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Project phase	Issue	Parameters	Location	Frequency	Responsibility
		<ul style="list-style-type: none"> <li>- Overtime limits and exceptions.</li> <li>- Hour averaging minimum wage.</li> <li>- Overtime requirements and conditions. Labour contract provisions.</li> <li>- Social system payment liability.</li> <li>- Annual leave</li> <li>- Laws to protect disadvantaged workers. Severance pays.</li> <li>- Number and frequency of accidents.</li> <li>- Number and frequency of near misses.</li> <li>- Cases of illness due to working conditions.</li> <li>- Copy of training certificates.</li> </ul>			
	Maintain the wellbeing of workers living in camps	<ul style="list-style-type: none"> <li>- Worker camps audit reports as per CHECKLIST ON WORKERS' ACCOMMODATION (IFC Workers Accommodation Standards 2009)</li> <li>- corrective measures and action plan,</li> <li>- Photographs demonstrating corrective measures implemented.</li> </ul>	Project area	On monthly basis	UETCL (ESMD)
	Labor and Community Health and Safety <ul style="list-style-type: none"> <li>- Sexual Transmittable Diseases</li> <li>- Vector Borne Diseases</li> <li>- Respiratory Disease</li> </ul>	<ul style="list-style-type: none"> <li>- Number of STIs treated.</li> <li>- Attendance list of induction meetings and HSE induction material which raises malaria, dengue and other VBD or STD awareness and preventative measures.</li> <li>- number of TBs treated</li> </ul>	Project area	On monthly basis	UETCL (ESMD)
	Community Grievance Mechanism	<ul style="list-style-type: none"> <li>- Documented grievance mechanism established.</li> <li>- Maintenance of complaints log and resolution process.</li> </ul>	Project area	On monthly basis	UETCL (ESMD)

Project phase	Issue	Parameters	Location	Frequency	Responsibility
	Occupational and community Health and Safety	<ul style="list-style-type: none"> <li>Contractor HS internal audits and statistics.</li> <li>Records of accidents and near misses.</li> <li>Record of illness, diseases.</li> <li>Record of grievances.</li> <li>Record of emergencies.</li> <li>Informal feedback on effectiveness of Occupational and Community HS plan.</li> </ul>	Project area	On monthly basis	UETCL (ESMD)
	Restrict access to sites, especially hazardous areas	Provision / review of the following documentation: <ul style="list-style-type: none"> <li>Description / photographs of fencing / signage around site perimeter.</li> <li>Contractors to provide UETCL with CV and training certification of security personnel proposed as per contract requirements.</li> <li>Site registry identification system.</li> </ul>	Project area	On monthly basis	UETCL (ESMD)
	Occupational and community Health and Safety  Minimize traffic hazard within community	<ul style="list-style-type: none"> <li>Road Safety Plan documentation including identification of maximum speed limits for site and access routes.</li> <li>Requirement for contractor program of monitoring</li> <li>Reporting of accidents and statistics inclusive in HS performance records.</li> <li>Community training on safety</li> <li>Signs for local communities</li> <li>Document traffic safety sessions and maintain session schedule.</li> <li>Maintain attendance register.</li> </ul>	Project area	On monthly basis	UETCL (ESMD)
	Local Market distortion  Avoid distortion of local food prices and necessities due to	<ul style="list-style-type: none"> <li>Pre-project and project local market prices for food, services and entertainment.</li> <li>No. of vulnerable groups in comparison to the pre-project level.</li> <li>Income level and living standard conditions in comparison to pre-project level.</li> </ul>	Local Markets	On monthly basis	UETCL (ESMD)

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Project phase	Issue	Parameters	Location	Frequency	Responsibility
	influx of workers and followers				
	Vulnerable Groups GBV	<ul style="list-style-type: none"> <li>– Safety Audits through key informant interviews, FGD</li> <li>– N and Records of the awareness Trainings</li> <li>– Men &amp; Boys Self-Assessment Form – Awareness Raising</li> <li>– No. of qualified experts involved in the management and follow up of issues related to GBV</li> <li>– GRM log</li> <li>– No. of cases registered or reported by Health care providers</li> </ul>	Project Area	On monthly basis	UETCL (ESMD)
	Cultural Heritage	Reporting / notification of finds to the Archaeological Heritage Office	Project area	On monthly basis	Contractor
	Cultural Heritage/tombs	<ul style="list-style-type: none"> <li>– Records from Chance Finding Procedures</li> <li>– Photographs of findings</li> <li>– Remediation measures adopted</li> <li>– Payment completion</li> <li>– Relocation completion</li> <li>– Records of meeting</li> </ul>	Construction site / excavation sites	Pre displacement and post displacement	UETCL (ESMD)
	Stakeholder Engagement	– Records of public meetings, FGD, meeting with authorities, meeting with workers and community, dissemination of information.	Project area	Quarterly Basis	Contractor / UETCL (ESMD)
	Security Social Conflicts	<ul style="list-style-type: none"> <li>– No. of accidents, violence, strikes, brutal death</li> <li>– Way of dispute solution</li> <li>– Interviews with key informants</li> <li>– Evidence of training of security staff on Voluntary Principles on Security and Human Rights (VPSHR)</li> </ul>	Project area	On monthly basis	Contractor / UETCL (ESMD)



**Budget**

An indicative budget for the environmental and social mitigation, management and monitoring measures of the project impacts of the Ugandan stretch of the Uganda-South Sudan Interconnection is included in the ESIA study.

In the following table the overall summary of the environmental costs to mitigate, manage and monitor all the impacts considered in this study is given. In this table also 10% contingency costs are also considered.

*Table 1-13 – Matrix of impact significance during the operation phase.*

ITEM	US\$
Physical environment management measures	705,000
Biological environment management measures	610,000
Social environment management measures	885,000
<b>Overall management measures</b>	<b>2,200,000</b>
Physical environment monitoring measures	340,000
Biological environment monitoring measures	165,000
Social monitoring measures (included in operational cost of ESMD)	-
<b>Overall monitoring measures</b>	<b>505,000</b>
<b>Operational Cost of ESMD</b>	<b>300,000</b>
<b>Total</b>	<b>3,005,000</b>
Contingencies (10%)	300,500
<b>GRAND TOTAL</b>	<b>3,305,500</b>

(\*) Resettlement Action Plan (RAP) costs are excluded from this ESMP budget

The overall environmental and social cost of project implementation represent the 2.3% of the project development costs (142,582,000 US\$).

## 2. INTRODUCTION

### 2.1. Project Background

The countries within the Nile Basin Initiative and Eastern Africa Power Pool (EAPP) are building their interconnected electricity networks at several voltage levels including 132 kV, 220 kV, 400 kV as well as 500kV HVDC. The proposed 400 kV AC Overhead Transmission Line between Olwiyo (Uganda) and Juba (South Sudan) is an important additional asset to facilitate regional integration of electricity networks and facilitate power trade.

The proposed transmission line includes a first section in Uganda from Olwiyo to South Sudan border, which is estimated to cover a distance of 150 km, and a second section in South Sudan from Nimule to Juba with an estimated length of 148 km.

### 2.2. Overall objectives of the project

The ultimate goal of the project is regional integration by improving the livelihood of the people as well as the quality of the socioeconomic development environment for Uganda and South Sudan through increased availability and affordability of electricity supply.

The purpose of the Project is to improve access to electricity in Northern Uganda and South Sudan through increased cross-border sharing of power. Outputs of the preparatory activities would enable the NELSAP, the Ugandan and the South Sudanese involved stakeholders to take the necessary steps to have the transmission line constructed.

The required scope of work in the Ugandan section is summarized as below:

- **Construction** of the **400 kV AC Over Head Transmission Line (OHTL)**, double circuit configuration, 2-bundle conductors, divided into two segments: 118 km from Olwiyo S/S to Bibia S/S and 32 km from Bibia S/S to South Sudan border;
- **Upgrade** of existing 132/33kV **Olwiyo substation** to 400/132/33kV substation;
- **Construction** of the completely new 400/132/33kV **Bibia substation**, close to the South-Sudanese border;
- **Extension** of the existing 400/132/33kV **Karuma Substation**, with 2 additional line bays 400 kV, to facilitate the evacuation of the excess power from Karuma to Olwiyo;

### 2.3. Purpose of the Scoping Report

Scoping is the stage that sets out what needs to be assessed in the Environmental and Social Impact Assessment (ESIA) to help define how to approach the assessment and what information may be needed to identify the likely significant effects from the development.

The purpose of scoping is to identify the matters which should be covered in the environmental information submitted by the developer to a competent authority and, in particular to identify the matters which are of most importance so that these can be addressed in most detail. Scoping should ensure that all the relevant issues are identified and addressed in an appropriate manner in the environmental study.

Scoping is therefore primarily focused on identifying the impacts to be assessed and which of these are most important, but it may also address some or all of the following matters:

- What information will be used and needed for the assessment
- Any critical gaps and uncertainties in the information and how they will be accounted
- Methods for assessment and surveys
- Criteria that will be used to determine significance of effects

- Any environmental effect that may not be considered further and the reasons for this

## 2.4. Objectives of the ESIA study

The Environmental and Social Impact Assessment (ESIA) is a procedure for establishing which impacts a proposed project is likely to have on the environment and for recommending changes to the project to minimize any predicted negative impact. The goal of the Environmental Impact Assessment activity is to evaluate the temporary and permanent impact of the project on the natural and human environment and to propose mitigation measures.

The specific objectives of the ESIA are:

- To characterize the project area using scientific methods of environmental and social analysis and undertake baseline studies on the environmental, social, economic and cultural conditions in the project area;
- To identify, analyse and evaluate the type and extent of likely potential environmental and social impacts of the proposed project with emphasis on duration, significance, magnitude and distribution of beneficial/adverse effects of the planned project on the existing biophysical, socio-economic and cultural components, and assess the capacity of the institutions responsible for management of these impacts;
- To provide mitigation measures for the identified environmental and social impacts and where residual impacts are predicted, a plan for their management including but not restricted to offsets, action plans etc should be included;
- Evaluate the social and socio-economic aspects of proposed project, identify stakeholders, carry out public consultations, including potentially project affected persons (PAPs), analyse their views regarding the environmental and social impacts, design social provisions and measures, formulate strategies for participatory implementation, and recommend the incorporation of the findings into the project design;
- To assess the best alternative project option with most benefits and least costs in terms of financial, social, and environmental considerations;
- To develop the Environmental and Social Management Plans (ESMP). The ESMP shall outline the mitigation/enhancement, monitoring, consultative and institutional strengthening measures to prevent, minimize, mitigate or compensate for adverse environmental and social impacts and to enhance beneficial impacts, costs of the measures and monitoring requirements.

## 2.5. Structure of the Report

The Environmental Impact Assessment Study is subdivided in two volumes:

- Volume I – ESIA Report
- Volume II – ESMP

The Volume I – ESIA Report (this volume) is organized as follows:

- Section 1 – Executive Summary
- Section 2 – Introduction
- Section 3 – Project description
- Section 4 – Analysis of the Project alternatives
- Section 5 – Legal and Institutional Framework
- Section 6 – Stakeholder engagement and Information disclosure
- Section 7 – Environmental and Social Baseline
- Section 8 – Environmental and Social Impacts

The Volume II – ESMP is organized as follows:

- Section 1 – Executive Summary
- Section 2 – Environmental and Social Management Plan
- Section 3 – Environmental and Social Monitoring Plan
- Section 4 – Budget and Schedule
- Annexes

## 2.6. ESIA Team

An interdisciplinary team of International and National experts has contributed to the Environmental Impact Assessment Report. Their names are listed below.

- Ettore Romagnoli – Lead Environmental Planner
- Paola Chiodi – Lead Social Development Specialist
- Pietro Macchi – Archaeologist and Cultural Heritage Expert
- Andrew Nkambo – Botanist / Ecologist
- Collins Tulikuno – Land / Environmental Economist
- Dennis Juko – Communication Specialist
- James Byamukama – Ecologist
- Thomas Lado – Zoologist
- Vivian Michael Chambo – Water Quality, Air Quality and Noise Specialist

### 3. PROJECT DESCRIPTION

#### 3.1. Background

The Government of Uganda through the Uganda Electricity Transmission Company Limited (UETCL) proposes to construct a 400kV transmission line from Olwiyo substation to South Sudan border near Nimule. The proposed interconnection project was prioritized under Nile Basin initiative (NBI), Nile Equatorial Lakes Subsidiary Action Program (NELSAP).

The proposed project will provide a medium-term prospect of supplying power to the Southern parts of South Sudan around Juba. In addition, the project will promote rural electrification both in Uganda and South Sudan, in the areas connected with the new planned Bibia substation. This will be possible because peace has returned to these areas and the population is now engaged in activities to improve their livelihoods.

Currently, the power demand in the districts in Northern Uganda is supplied using 33 kV lines. However, with the implementation of the high voltage transmission line, power reliability and availability in the region will be increased and promoted.

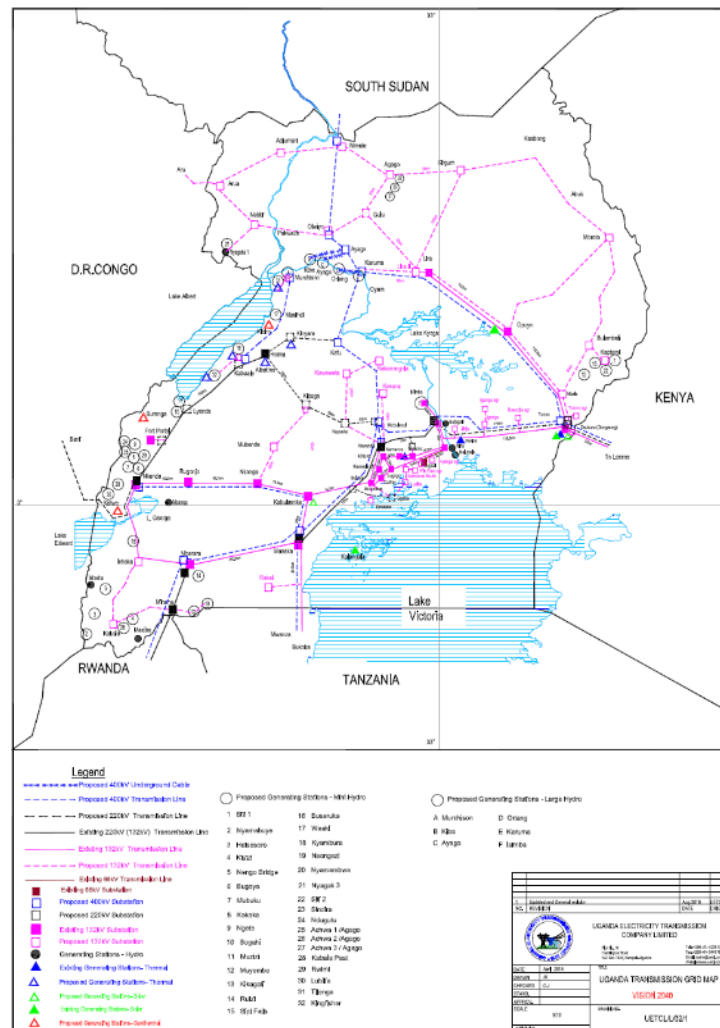


Figure 3-1 – Uganda electricity grid map – Base case Vision 2040.

### 3.2. Description of the Power Interconnection Project

The Uganda (Olwiyo) – South Sudan (Juba) 400 kV Power Interconnection Project aims at contributing to the regional integration of Uganda and South Sudan to aid in power trade in general. It was also prioritized in the Regional Integration Plan of South Sudan into Regional Electricity Grid completed in July 2015 as well as in the EAPP master plan study of 2014.

In the Ugandan section, the proposed Interconnection Project envisages the following components:

- **Construction** of the **400 kV AC Over Head Transmission Line (OHTL)**, double circuit configuration, 2-bundle conductors, divided into two segments: 118 km from Olwiyo S/S to Bibia S/S and 32 km from Bibia S/S to South Sudan border;
- **Upgrade** of existing 132/33kV **Olwiyo substation** to 400/132/33kV substation;
- **Construction** of the completely new 400/132/33kV **Bibia substation**, close to the South-Sudanese border;
- **Extension** of the existing 400/132/33kV **Karuma Substation**, with 2 additional line bays 400 kV, to facilitate the evacuation of the excess power from Karuma to Olwiyo.

The specific objectives of the Project include:

- Provide transmission capacity to cater for grid interconnection between Uganda and South Sudan and its neighbouring countries;
- Provide transmission infrastructure to cater for grid interconnections to other Nile Basin Initiative countries upstream and downstream;
- Promote regional cooperation through sharing of power generation resources i.e. cross-border electricity trading (promotion of electricity markets);
- Improve security in the project area by providing stable power supply;
- Facilitate rural electrification and improvement in the standard of living for the population in the project areas;
- Provide a stable power supply to the Ugandan communities near the border and to the South Sudan around the Capital Juba, in order to improve businesses for social and economic development of the project area;
- Poverty reduction and improvement in the standard of living by providing electricity needed for health, education, clean water and communication infrastructures.

According to the energy generation and demand forecast scenarios analyzed in the Feasibility Study, the energy flowing on the interconnection is expected to increase more and more over the interconnection project lifetime.

In the first period of operation of the interconnection, until 2038, the energy is expected flowing from Uganda to South Sudan, due to the significant increase of the demand and the lack of generation in South Sudan.

In the second period of operation of the interconnection, after the development of the transmission grid in South Sudan and the interconnection between Ethiopia and South Sudan, Uganda is expected to import from the interconnection with South Sudan. Thanks to the interconnection, in the long-term period Uganda will be able to import cheap and sustainable hydropower energy from Ethiopia and South Sudan and avoid the realization of about 900 MW of new thermal generation capacity.

In accordance with the Terms of Reference, the consultancy assignment will involve preparing Feasibility Study, Detailed Design, Tender Documents, Environmental and Social Impact Assessment (ESIA) and

Resettlement Action Plan (RAP) for the Uganda (Olwiyo) – South Sudan (Juba) 400 kV Power Interconnection Project.

The main features of the 400 kV Power Interconnection Project are inferred from the preliminary studies and design conducted in 2020 on the Ugandan section of the project, from Olwiyo to Elegu (at the Uganda – South Sudan border).

The 400 kV transmission line envisages the use of lattice towers. The steel monopoles are not used since there are no major stretches of fragile ecosystems affected to warrant the use of such structures.

The steel lattice towers are the commonly used type worldwide. Tension towers were proposed to be used at angle points, dead end points, at points where the local topography demands it, and at intervals of approximately 5 km along straight stretches of line. They are designed to take horizontal and vertical loads and thus, are heavier than the suspension towers.

Concrete pad and chimney foundations shall be used for the towers though raft foundations may be required for some locations especially around areas where the water table is high (wetland ecosystem), if erecting towers in wetlands is deemed necessary. The towers will be about 30-33 m in height, although the specific height of the towers may vary depending on the topography and other factors. The distance between towers will vary between 300-450 m.

The corridor for the 400 kV transmission line is 60 m (see Figure 3-1), according to the standards of Uganda (UETCL Policy): 10 m for the Right of Way (RoW) and additional 25 m of Wayleave to each side of the RoW.

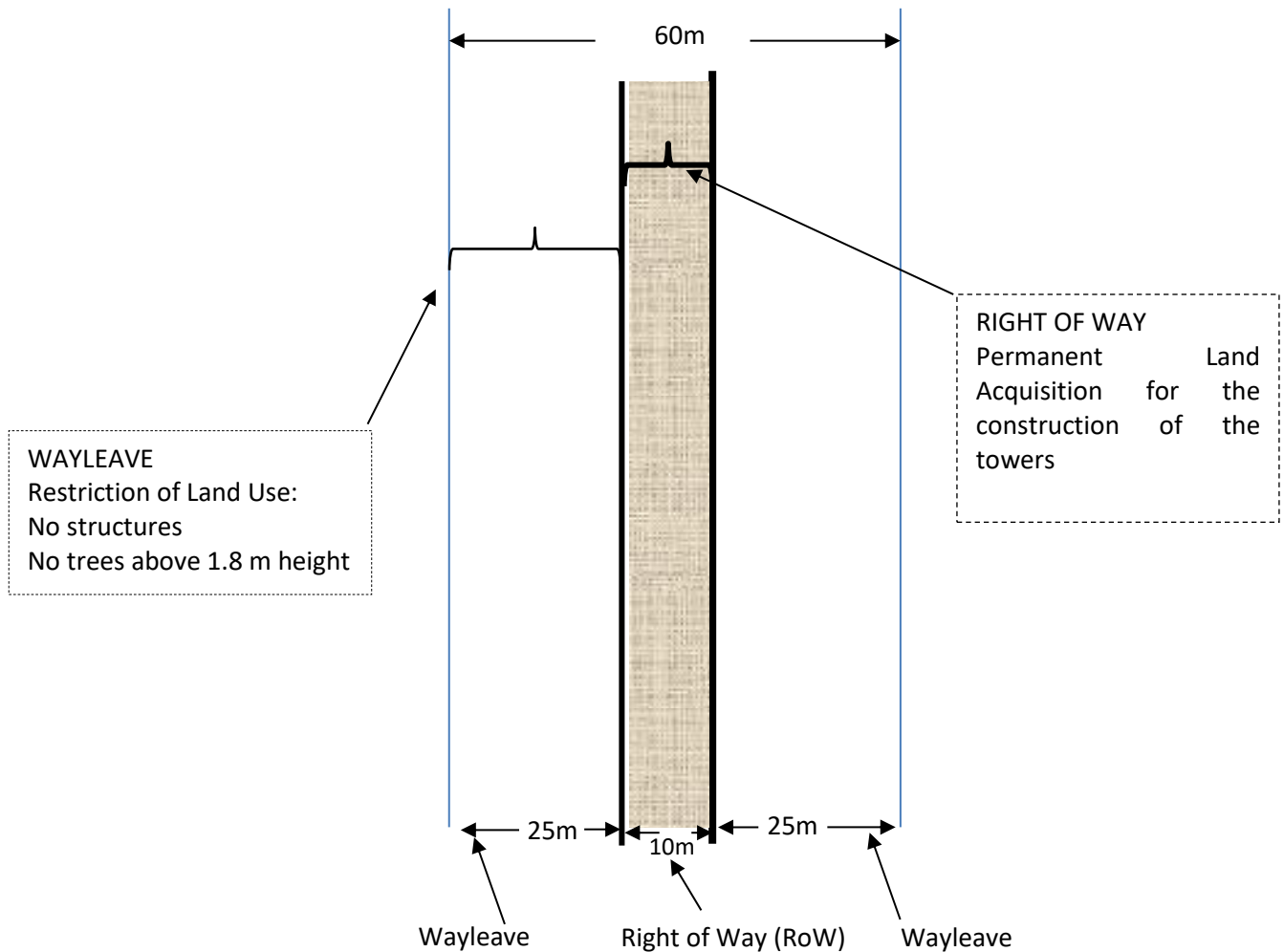


Figure 3-2 – Representation of the Right of Way and Wayleave (according to standards of Uganda, UETCL).

RoW of 10 m is enough for both the access track and the four legs of towers, and will be acquired permanently and ownership transferred to the project proponent. As per the UETCL’s Wayleaves Policy, the wayleave is the strip of 25 m on either side of the right of way, is recognised as the safety corridor outside of which negative impacts from transmission lines (electro-magnetic fields and corona-noise effects emitted from the line) are assumed to be negligible.

No permanent structures, such as buildings will be allowed to remain or be constructed within the corridor.

Within the wayleave, growth of crops will be permitted, but limited to a height of 1.8 m (6 feet) or less, thus mostly annual crops and low growing perennial crops.

The land required for the wayleaves will remain under the ownership of the owners and no transfer is required. However, a percentage of the value of land will be paid for restricting (instituting an encumbrance) owner from planting trees and installing permanent structures on the land.



### 3.3. Site Location and Extent

The proposed transmission line extends from Olwiyo Substation, on the Karuma-Pakwach road in Nwoya District, and entails the construction of approximately 150 km of 400 kV line to the proposed Bibia 400/132/33 kV substation located near the South Sudan border.

The project will be located in Northern Region of Uganda; the proposed transmission line route (best option) crosses 3 Districts (Nwoya, Amuru and Lamwo). Each district is furtherly divided into counties and municipalities, which are furtherly subdivided into sub-counties, which are subdivided into parishes, which are subdivided into villages. The head elected official in a district is the chairperson of the Local Council five (usually written with a Roman numeral V).

Table 3-1 below presents a summary of the various administrative units crossed by the transmission line. Details of each sub-county and village affected will be collected in the subsequent phases of the project.

Table 3-1 – Districts and Counties affected by the Project.

District	County	Sub-County	Parish
AMURU	KILAK	ATIAAK	BIBIA
			KAL
			PACILO
			PALUKERE
			PAWEL
			PUPWONYA
		LAMOGE	COKE
			OBOO
			PALEMA
		PABBO	KAL
			PALWONG
			PARUBANGA
LAMWO	LAMWO	PALABEK OGILI	PADWAT
NWOYA	NWOYA	ALERO	BWOBONAM
			KAL
			PAIBWOR
			PANGU
			PANYABONO
		ANAKA TOWN COUNCIL	CEKE WARD
			LABYEI WARD
		PURONGO	PAROMO
			PATIRA
			PAWATOMERO

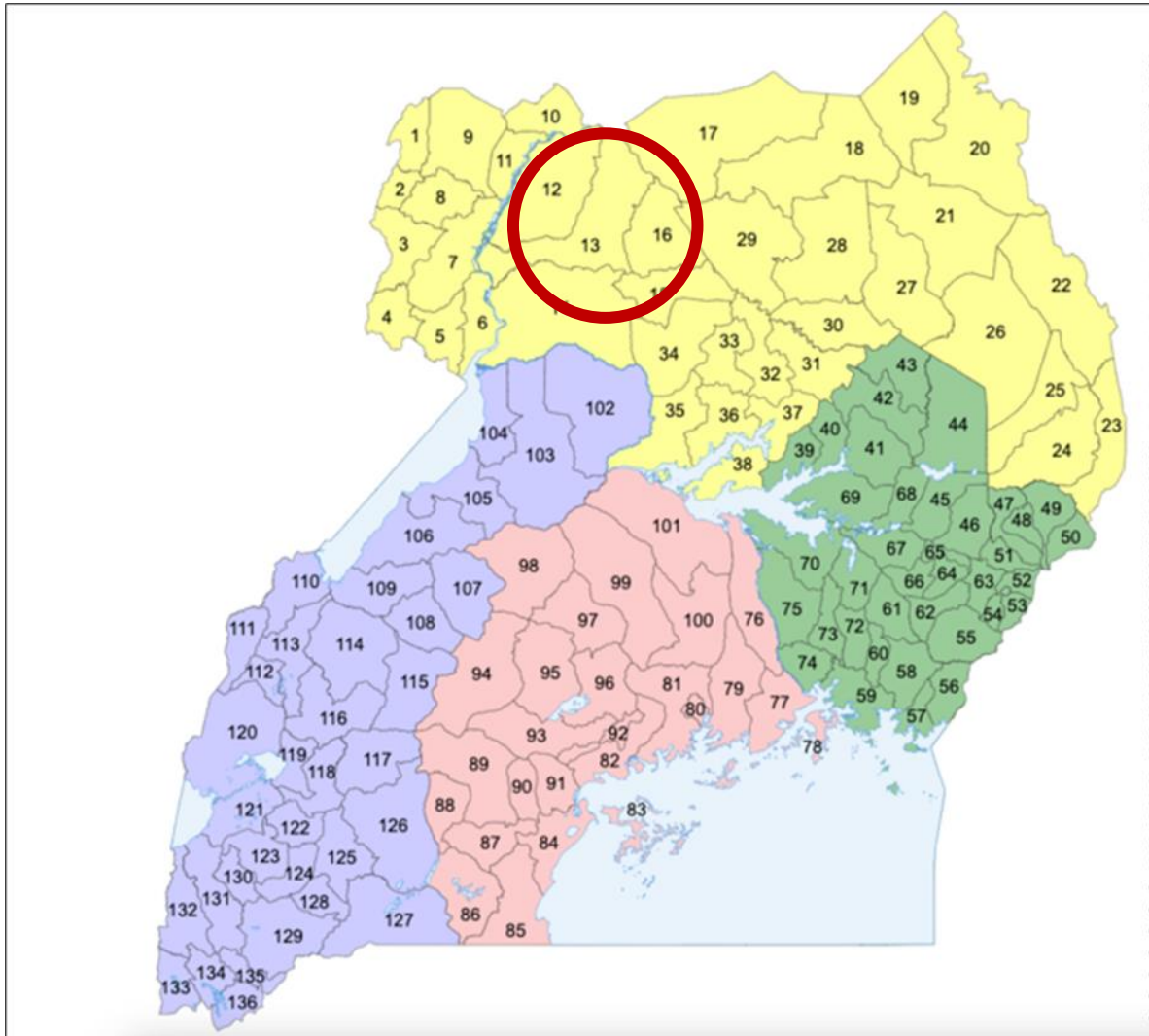


Figure 3-3 – Administrative map of Uganda with indication of Project area.

### 3.4. Project Features

For the Ugandan section of the Project, a review of the previous Feasibility Study/ESIA has been performed considering the submitted Line Selection Report along with comments that had not been incorporated, identifying gaps and updates and achieving definition of alternative power line routes and substation layouts. The previously studied line route (Option 2 – green line), as well as two alternative options (Option 1 – blue line and Option 3 – red line), have been analysed and compared through environmental and social criteria (see Chapter 4 – Alternative Analysis).

The previous transmission line route, studied by SMEC/Sinohydro, has been selected as the preferred option, with appropriate modifications. The last section has been modified in order to avoid the Nimule National Park, which instead was crossed by the previous line routing. The approximate length of the selected transmission line route, connecting Olwiyo substation to the new substation close to South Sudan border, is 150.1 km.

The proposed transmission line is shown in Figure 3-4. The transmission line route has also been refined on the basis of the findings of the reconnaissance visit, due to the presence of the existing Olwiyo –

Nebbi 132 kV transmission line and Olwiyo – Gulu 132 kV transmission line connecting to Olwiyo substation (see Figure 3-5).

The interconnection project envisages also the construction of a new 400/132/33 kV Substation in the area of Bibia/Elegu, near the Uganda – South Sudan border. Three different substation location were compared from the environmental and social points of view, as described in Chapter 4.

The proposed substation site is located on the selected line route according to UETCL proposal, changing the position envisaged in the previous studies by SMEC/Sinohydro. The substation site is close to the Nimule – Gulu main road, South of Bibia, and it is shown in Figure 3-6.

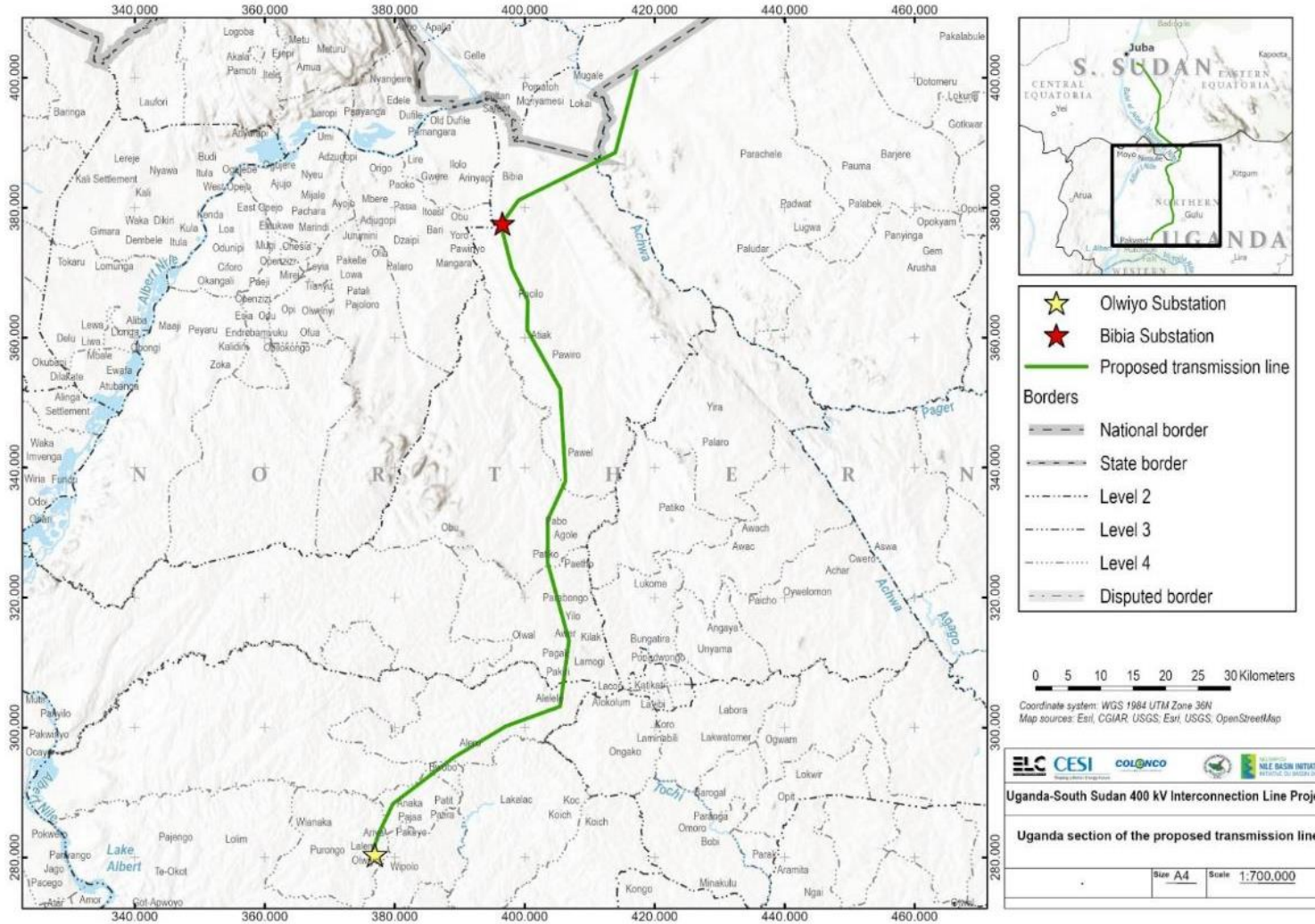


Figure 3-4 – Proposed transmission line route options for the Ugandan section of 400 kV Interconnection project.

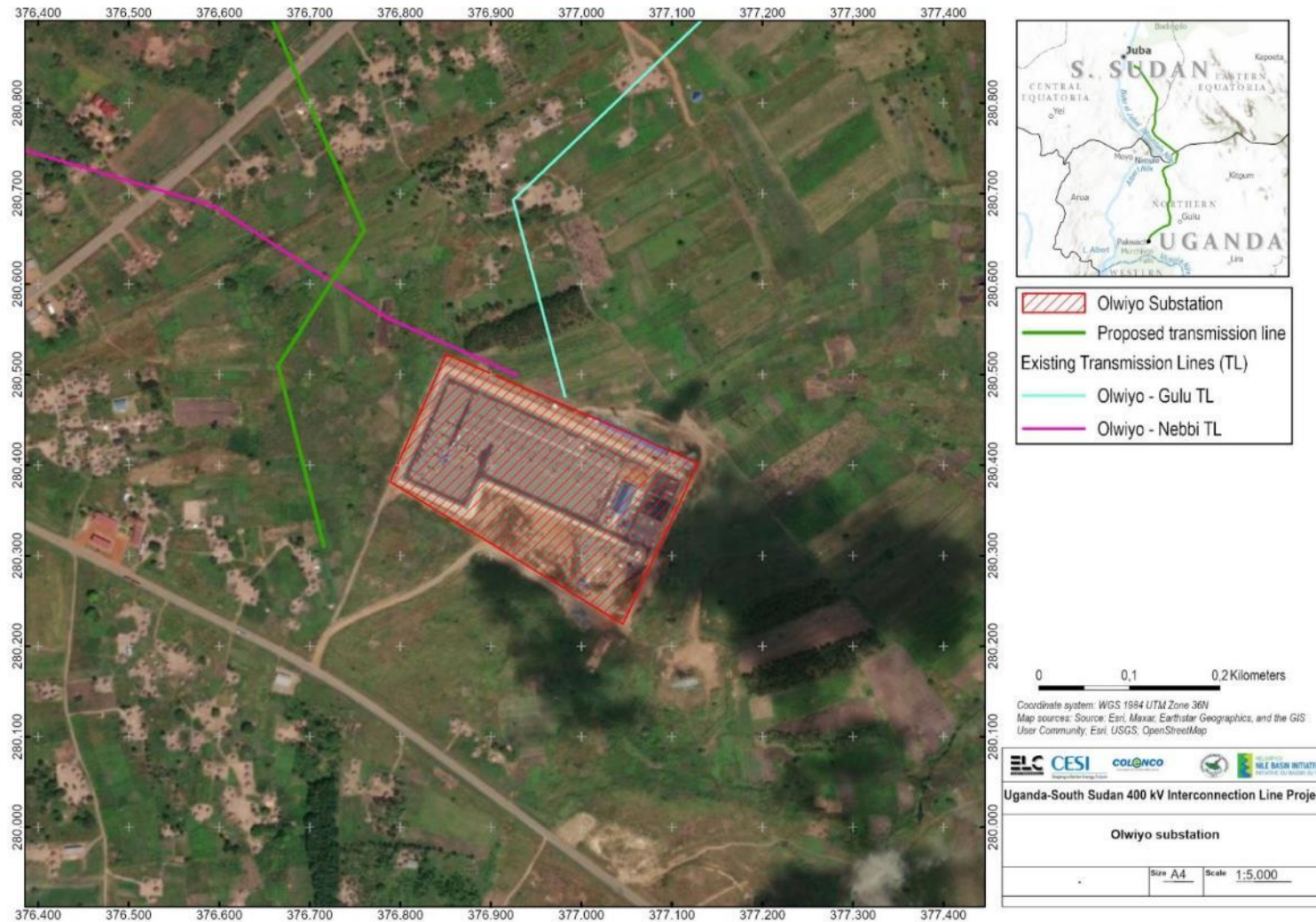


Figure 3-5 – Location of Olwiyo substation; existing 132 kV transmission lines are marked in cyan (Olwiyo – Gulu) and magenta (Olwiyo – Nebbi).

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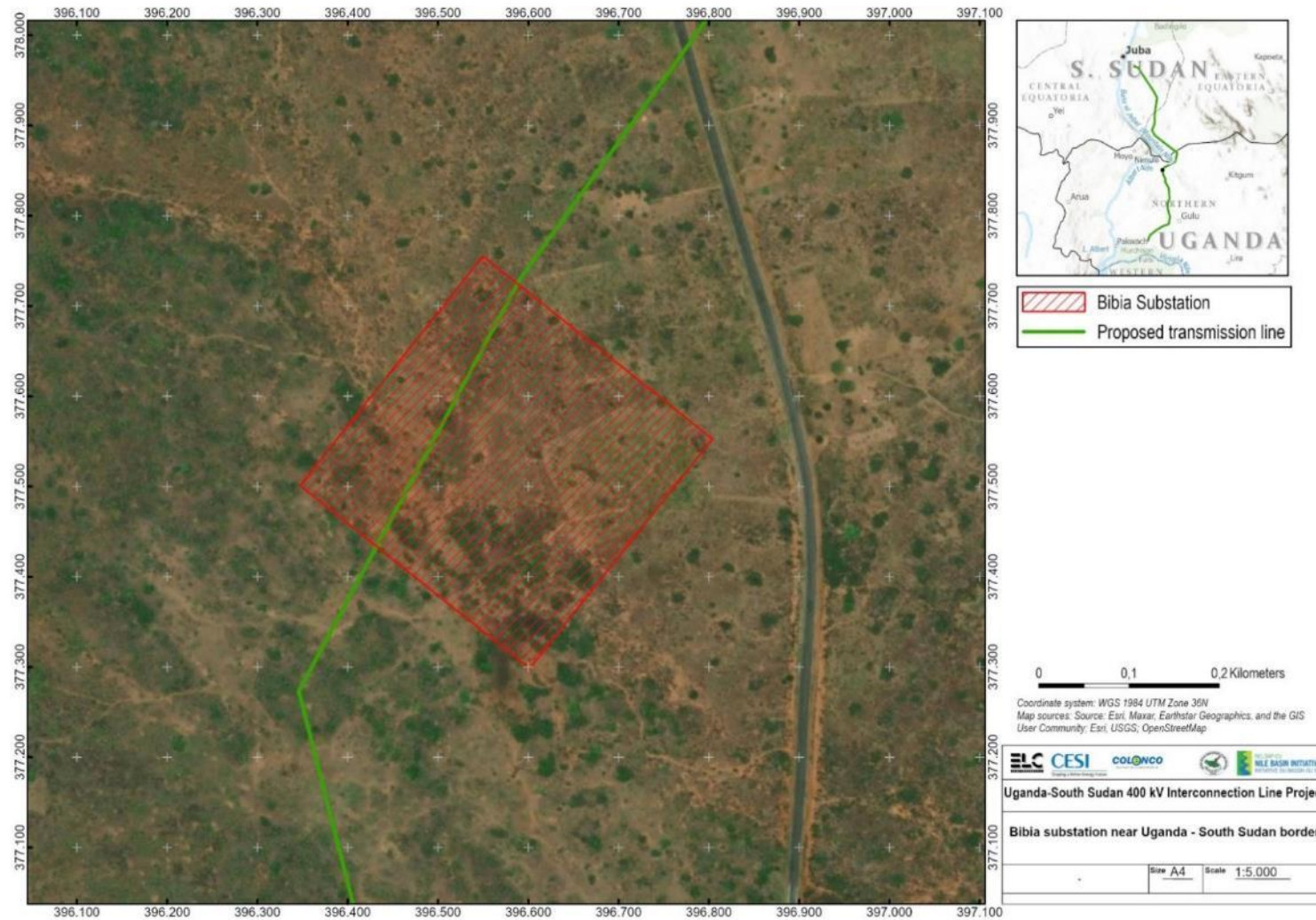


Figure 3-6 – Proposed 400/132/33 kV substation site in the proximity of Bibia near the Uganda – South Sudan border.

### 3.5. Project Area of Influence

The project **Direct Area of Influence** (AoI) is defined through consideration of the project footprint including the Transmission Line corridor (Right of Way and Wayleave), the Substations, the access roads and all ancillary project components.

The **Indirect Area of Influence** (IAoI) of the project is determined by biological and ecological factors, including the movement of species through the environment that may be affected by the project. It has been identified as a 1 km habitat connectivity zone surrounding the project footprint. This decision was based on data gathered during field surveys, particularly considering the movement patterns of species that might be impacted by the project.

Annex 1 provides a map of the project Direct Area of Influence overlapped on satellite imagery.

*Table 3-2 – Project area calculations.*

Project Area	Area (ha)
Right of Way	150.35
Wayleave	902.31
Direct Area of Influence	910.89
Indirect Area of Influence	31298.62

Table 3-3 – Calculations of area of direct influence in relation to administrative boundaries.  
 Parish names with an asterisk will be affected by substations.

District	County	Sub-County	Parish	Area (ha)
AMURU	KILAK	ATIAAK	BIBIA*	131.75
			KAL	36.43
			PACILO	68.62
			PALUKERE	39.79
			PAWEL	57.1
			PUPWONYA	36.63
		LAMOGI	COKE	43.9
			OBOO	27.81
			PALEMA	38.28
		PABBO	KAL	19.08
			PALWONG	33.61
			PARUBANGA	25.23
LAMWO	LAMWO	PALABEK OGILI	PADWAT	97.69
NWOYA	NWOYA	ALERO	BWOBONAM	14.08
			KAL	31.46
			PAIBWOR	18.74
			PANGU	53.22
			PANYABONO	39.69
		ANAKA TOWN COUNCIL	CEKE WARD	48.87
			LABYEI WARD	17.65
		PURONGO	PAROMO	19.53
			PATIRA*	3.56
			PAWATOMERO	8.17
<b>Total</b>				<b>910.89</b>



## 3.6. Project Phases

### 3.6.1. Pre-construction Phase

Pre-construction activities associated with design work include geotechnical investigations and detailed survey of the transmission line route and substation location. Before entering in the construction phase, the transmission line corridor (including Right of Way and Wayleave) shall be marked and acquired by the Project proponent.

For the overhead transmission line, it is expected that the towers will be of lattice steel type, with each tower requiring four reinforced concrete foundations. The foundation depth and design will depend on the findings of the geotechnical investigations. The exact bearing capacity has to be determined from soil investigation at the site. The design and selection of tower foundations and earthing depends on the findings of geotechnical investigation, to be carried out at transmission line angle points in this phase.

#### 3.6.1.1. Land acquisition and resettlement

Land acquisition is required for the proposed project, mainly for the 10 m Right of Way which must be cleared of vegetation and obstacles to a certain extent (bush clearing) and for the construction of an access road (where it is not feasible to use the existing adjacent access road).

A process is required to identify, consult and compensate project affected persons (PAPs) for any physical or economic displacement as a result of project activities. This is undertaken through a Resettlement Action Plan (RAP).

The resettlement process includes two main phases: planning followed by implementation. Stakeholder engagement will run in parallel alongside these activities and build on what was undertaken during the ESIA. It may be in the form of key informant interviews, focus group meetings, public meetings, public sharing of documents and information, and consultation with individual households. Thereafter 'after project' community support, overlapping with the construction and operational phases, is required to ensure the resettlement is effectively implemented.

### 3.6.2. Construction Phase

The construction activities of the overhead transmission line (OHTL) include the following:

- Clearance works for the Right of Way (RoW) prior to the installation of the towers;
- Construct the site access tracks and Contractor's site camps;
- Storage and transportation of equipment and materials;
- Tower spotting;
- Construction of access and tower corridor tracks;
- Tower foundation and erection;
- Installation of tower suspension accessories: they are erected manually by hauling the accessory using chain pulley;
- Stringing of pulling line over each stringing block for the conductor: the pilot wire is manually strung over valley in mountainous area which is attached to power cable. The pilot wire is sometimes shot using winch or through drones;
- Tensioning and sagging of conductor: tension and sag corrected using manual winch, chain pulleys, bull wheel type pullers and other associated equipment.

The construction activities of the substation include the following:

- Site preparation: including but not limited to: site clearance (limiting ground disturbance to existing networks during site preparation), fences construction, preparing site camp,

preparing access road (if needed) for moving construction material and machineries and temporary storage of construction materials, machineries, etc.

- Besides the site preparation, the approvals or the permissions from the competent authorities and surrounding establishments shall be obtained.
- Construction of concrete works: footing, foundations, SS framework, support structures and equipment and other concrete construction for OHTL path, etc.
- Construction of supporting buildings: including administration building and facilities, control room, etc.
- Erection of the equipment: including transformers, switches yards, electrical panel, etc.
- Waste management: including generated domestic and construction waste (hazardous and non-hazardous). This activity will include waste identification, temporary storage, handling and transportation to the designated landfill.

### 3.6.3. Operation Phase

Once the transmission lines are constructed there is relatively little ongoing maintenance required. The key maintenance activities will involve surveillance of the condition of the transmission line and way leaves; emergency maintenance and repairs; and vegetation maintenance activities. Vehicular access to sections of the way leaves during O&M will be for supervision, monitoring and to carry out line repairs when needed.

Cropping and grazing beneath the conductors is normally permitted. Outside agriculture areas or otherwise cleared areas, undesirable vegetation within the way leaves will be controlled by cutting. Herbicides will not be used in vegetation control. The vegetation clearance in the weaves will take place in accordance with existing wayleaves clearance programme which allows it to be done once annually. As for the substations, their normal operations will generally be manned by 3-5 operational staff whose work will be to monitor and guard the installations. There will be modest public health facilities to serve such staff in the substations. The majority of traffic to and from the substation will be light vehicles, i.e. no regular loads greater than two tonnes, and should be no more than five vehicle movements per day. The transmission system will be almost free from noise, and emissions will be limited to a low hum. This will not be noticeable from within buildings outside the substation site.

At the substation, the regular maintenance will be limited to annual cleaning and checking of circuit breaker connections, and will require a team of approximately five engineers and semi-skilled workers, for approximately one week. Regular/routine changing of transformer oil will not be required.

Other maintenance activities that could be required at the substation include:

- General check: for the fitting, oil quality, performance of the transformers, gas insulation quality and quantity etc.
- Oil filtration: during operation of the GIS/AIS substation. Please note that during the operation and maintenance, it is expected to generate limited amounts of the rejected oil, since oil is generally filtered using the oil filter machine available at the SS site.
- Transformer replacement: due to the increased power demand at some areas, the owner may change the transformer. The old transformer would be reused at other SS with less demand on electricity.
- Replacement of cables and insulators: the old and rejected insulators, OHTL cables, etc.
- Waste management: including the generated domestic waste and rejected waste (rejected cables and spare parts). The waste management will include waste identification, temporary storage, handling and transporting to the designated landfill.

### 3.6.4. Decommissioning Phase

It is anticipated that the transmission facilities will be continuously maintained and repaired, and will be operated for several decades. Because of its long useable life, the circumstances under which it might ultimately be decommissioned are difficult to foresee at this stage.

Project facilities such as towers, cables and substation equipment have long lifespans. However, following their useful lifespans they may become less effective to continue operation, become difficult to repair or simply obsolete. In such an event, it can be deemed necessary to replace existing project equipment with new project equipment on the same site or abandon the line altogether. The major components that will be required for decommissioning of a transmission line after its lifespan include:

1. Transmission line components removal;
2. Electrical systems removal;
3. Structural foundations removal;
4. Re-vegetation.

General decommissioning guidelines are provided below. However, it is noteworthy that the specific requirements and approach for each activity may not be as exactly as it was before commissioning because the technologies and construction techniques available when the project will be decommissioned may have changed.

Assuming the transmission line has gone through its useful life and no longer serves a useful purpose for the area, it will be disassembled and removed. Initially the conductors will be de-energized, removed from the tower hangers, collected and be transported and disposed-off in accordance with relevant national waste management regulations and guidelines applicable at the time of decommissioning. The lattice steel tower components would then be disassembled and removed, including grounding rods. Using lifting cranes, tower sections would be loaded in trucks and managed in accordance with relevant national waste management regulations guidelines applicable at the time of decommissioning.

The disassembly and removal of substation equipment will essentially be the same as its installation, but in reverse order.

The areas around the transmission line towers, along with any access roads that were necessary, will be reclaimed. When towers are removed from their foundations, the foundations need to be removed too so as to enable re-vegetation of the land. The concrete and steel in the foundations will be broken-up and removed to appropriate depth. All concrete and steel debris will be removed from the site and disposed-off as per National and financier's guidelines. The excavated lattice tower foundations are to be backfilled with soil material.

A re-vegetation plan is to be prepared following the project useful lifespan for re-vegetation of the project footprint. This plan is to be prepared in collaboration with a botanical expert and the following elements are to be considered in its preparation:

- Best native plant species to be chosen for restoration;
- Best time for re-vegetation depending on species to plant and habitat to restore;
- Preferential habitats for endangered species.

Reclaimed areas will then be re-vegetated according to the plan.

### 3.7. Project components

#### 3.7.1. Access Roads

To the extent feasible, access to the transmission line wayleaves and substations will be gained largely by use of public highways and local existing access roads. Where the planned transmission line follows an existing transmission line, the existing access tracks within such way leaves will be used. Access to the new tower locations will be gained via a short 'spur' from such way leaves.

The right of way may also be used by the project proponent for building a maintenance road along the whole alignment, linking all pylons. This requirement however depends on the accessibility of the area and level of theft and vandalism of tower structures in the area. Where there are high incidents of thefts of tower parts and vandalism, the access road is required for rapid response and reconstruction.

The access roads leading to the transmission line corridor and substations will be constructed where they are absolutely necessary. However, where there are no existing access tracks, an access track (single carriage) of approximately 5 m width will be cut through vegetation along the way leaves following the centreline of the way leaves. To the extent feasible, in areas of the way leaves outside the access tracks, clearance of vegetation will be minimized.

No paved access roads would be constructed, unless there are steep sections of the route where erosion is a risk. Generally, the access track would be a single dirt track with limited earthworks to protect the road and surroundings from erosion.

According to recommendations in the ESIA report, no permanent access roads will be built in wetland areas. If there is any temporary access requirement in wetlands, all construction activities should happen during the dry season. All temporary access roads will also be decommissioned after construction activities in order to minimize permanent line footprint in sensitive ecosystems.

The additional access road designs/routings will be determined by the Contractor prior to construction. They are excluded from the present ESIA's scope.

#### 3.7.2. Clearing of the Right of Way

A permanent area (60 m in width, i.e. 5 m Right of Way + 25 m of Wayleave per each side from the centre line, see Figure 3-2) of land will be required to accommodate the transmission line, when completed. A parallel strip of land through those sections of the route which pass through vegetation shall be completely cleared of all trees, scrub and undergrowth vegetation during the construction stage.

Routine maintenance is carried out along the RoW to ensure the appropriate clearances between towers, conductors and vegetation and other objects are maintained according to the required safety/operation specifications listed above. A 5m wide path along the line route will be required in the absence of a public road. Maintenance is normally carried out twice a year (dependent on-site conditions).

#### 3.7.3. Foundations

Following construction of the access tracks and the clearance of the Right of Way, the construction of the overhead lines would begin with the construction of the foundations for the towers. Tower foundations will vary according to the prevailing geology. In flat or moderately hilly areas, the foundations would generally comprise either standard pad and chimney, concrete block designs or be piled depending on ground conditions.

For the majority of towers, pad and chimney foundations will be used, which will be excavated mechanically. By this method, a concrete pad will be constructed at the bottom of the excavation, and each foot of the tower erected within its own 'chimney' of steel reinforced concrete. After 48 hours, the form work will be removed, and the excavation will then be back-filled to original ground level and compacted.

Pre-mixed concrete would be delivered to site along with steelwork for the foundation frames and bases. The foundation would comprise reinforcing steelwork cylinders encased in concrete.

In areas that may be prone to seasonal flooding and wetland areas, a raft foundation for transmission line towers will be used. The raft foundation is similar in concept to the pad and chimney foundation, except all four feet of each tower will be set on a single raft of concrete. If the tower is sited upon hard rock, a minimal foundation only is required. Any required excavation of rock will be carried out by drilling, barring, wedging or use of compressed air tools. It is not anticipated that blasting will be necessary.

Additional temporary land will be required for worker camps and storage of construction materials during the dry season as well as the line corridor.

#### **3.7.4. Tower structures and equipment erection**

All the towers of the transmission line will be constructed prior to the installation of conductors. The tower structure is primarily made of lattice steel bolted together. The tower shape will be designed for vertical arrangement; most probably, lattice steel self-supporting double circuit towers will be used. The positioning of the conductors and of the earth-wires on the tower shall be determined considering the following clearances:

- Clearance to ground and obstacles.
- The clearances between tower's live and earthed parts.
- The clearances between the conductors and between conductors and earth-wires in mid-span and still air.
- The earth-wire's shade protection angle.
- Clearances between conductors at structures.

Upon delivery of the steelwork from the storage yard to the tower location, erection of the transmission towers will proceed using a winch and gin pole. Typically, the gin pole will be supported on one leg of the tower while the sections are bolted on. The gin pole will then be lifted to a higher attachment point to repeat the process.

The modular lattice towers would be erected in sections, with a mobile crane. The insulators would be fastened to the towers in preparation for the installation of the conductors.

#### **3.7.5. Conductor stringing**

Once the towers are erected, the conductors and shield wires will be strung and tensioned with specialized equipment to achieve the designed sag. The conductor lines would be delivered to site on drums using HGVs and would be installed in sections between tension poles using tensioning and pulling machines.

Stringing is carried out first by hanging a pilot wire from each tower, connecting the pilot wires together, and then using the pilot wire to draw the conductor along the insulators. This is normally done in sections of six to seven km at a time. Guard structures will be used when installing the conductor over highways, main roads, waterways, railroads or any overhead power or communication lines to ensure the conductors do not cause a hazard to the public or the construction staff.

Compression dead-ends and splices will be used to secure the conductor to certain towers and join sections of conductor. After the conductors and shield wires are attached to the insulators or clipped to supports, the lines will be sagged to the proper tensions, and fitted with vibration dampers.

Scaffolding may be required in some instances to protect members of the public and assets from overhead line construction works. Items that may require protection include roads, tracks, railways, buildings, and lower voltage overhead lines. Scaffolding would be assembled in situ prior to stringing or

other works on the overhead lines. Where scaffolding is not used temporary road closures would be used.

### **3.7.6. Substation**

Detailed technical analysis and power system studies are required to determine the orientation of equipment and the extension of the new substation. During selection of the substation site, several factors are put into consideration which include:

- Sufficient land area required for installation of equipment with necessary clearances for electrical safety, and for access to maintain large apparatus such as transformers.
- Enough space for expansion due to load growth or planned transmission additions.
- Very low environmental effects such as drainage, noise and road traffic.
- Other factors to be considered is calculation of Grounding (earthing) and ground potential rise to protect passers-by during a short-circuit in the transmission system.
- Site accessibility (existing road network, land topography, etc.).
- Ingoing and outgoing distribution line configuration.

Generally, substation works will entail both civil and several mechanical processes such as site grading and levelling, construction of control rooms, construction of all substation infrastructure and installation of transformers and other support structures and equipment.

For the proposed new substation, topsoil would be removed, and an appropriate working platform established for the development. Construction of concrete foundations for some of the electrical equipment would be undertaken. A series of earth tapes or an earth grid would be installed below the ground to create an 'earth mat' to make the compound electrically safe. The substation support structures, electrical equipment and GIS/AIS buildings, where appropriate, would then be erected.

Substations would be constructed mainly on areas of permeable stone chippings. Rainfall intercepted by the site would run off external impervious surfaces into filter drains. Impervious site drainage would be collected in piped drains. Surface water drainage and disposal would follow GIP and would be formalised within a management plan for the substation.

Upon completion of the works temporary site installation facilities and working areas would be removed and the soil replaced.

## 4. ANALYSIS OF THE PROJECT ALTERNATIVES

### 4.1. “No-go” Alternative

In the absence of the proposed project, there would be benefits lost as well as negative impacts averted. Notwithstanding the identified negative impacts that can be mitigated, the action alternative should be supported to enhance electricity coverage for the end user around the country. Uganda needs electricity to develop and reduce on biomass energy use which is rated at 90% (Ministry of Energy 2010).

Hydro-electricity coverage was at 5% for the entire country but of recent, it has risen to 10% due to the establishment of Rural Electrification Scheme under the Ministry of Energy and Mineral development. The above figures reveal a great need for the construction of the proposed transmission line and therefore all effort towards the establishment of the proposed Olwiyo-Nimule power line should be greatly supported.

Furthermore, the interconnection project will promote cross-border power trade between South Sudan and Uganda, to address electricity excess supply and deficits, as already described in previous chapter. No Action means forfeiting all positive impacts that the proposed transmission line would provide to the Network users in Nwoya, Amuru, Adjumani and the surrounding districts.

### 4.2. Routing Alternatives

The selection of OHTL route should be undertaken according to criteria that fulfils technical, environment as well as socioeconomic objectives in order to achieve the most feasible application.

The previously studied line route option, as well as two more options for the interconnection from existing Olwiyo substation area to the South-Sudan border, have been identified (see Figure 4-1).

The proposed alternatives and their length are the following:

- a. Option 1 (blue line) – length 154 km
- b. Option 2 from previous study (green line) – length 152 km
- c. Option 3 (red line) – length 154 km

Regarding the green line, the alternative follows the previous line routing, studied by SMEC/Sinohydro, except for the last section where a deviation is proposed in order to avoid the Nimule National Park, which instead was crossed by the previous line routing proposal.

Concerning the new substation 400/132/33 kV to be constructed near the Uganda – South Sudan border, three alternative locations are currently proposed (see Figure 4-2):

- 1) Option 1 (blue line) – Substation site in the proximity of Bibia, East of Nimule – Gulu main road
- 2) Option 2 (green line) – Substation site close to the Nimule – Gulu main road, South of Bibia
- 3) Option 3 (red line) – Substation site in the proximity of Pacilo, East of Nimule – Gulu main road

The location of the Option 2 substation is set according to UETCL proposal, changing the position envisaged in the previous studies by SMEC/Sinohydro.

Maps of considered line alternatives are provided in Annex 8.

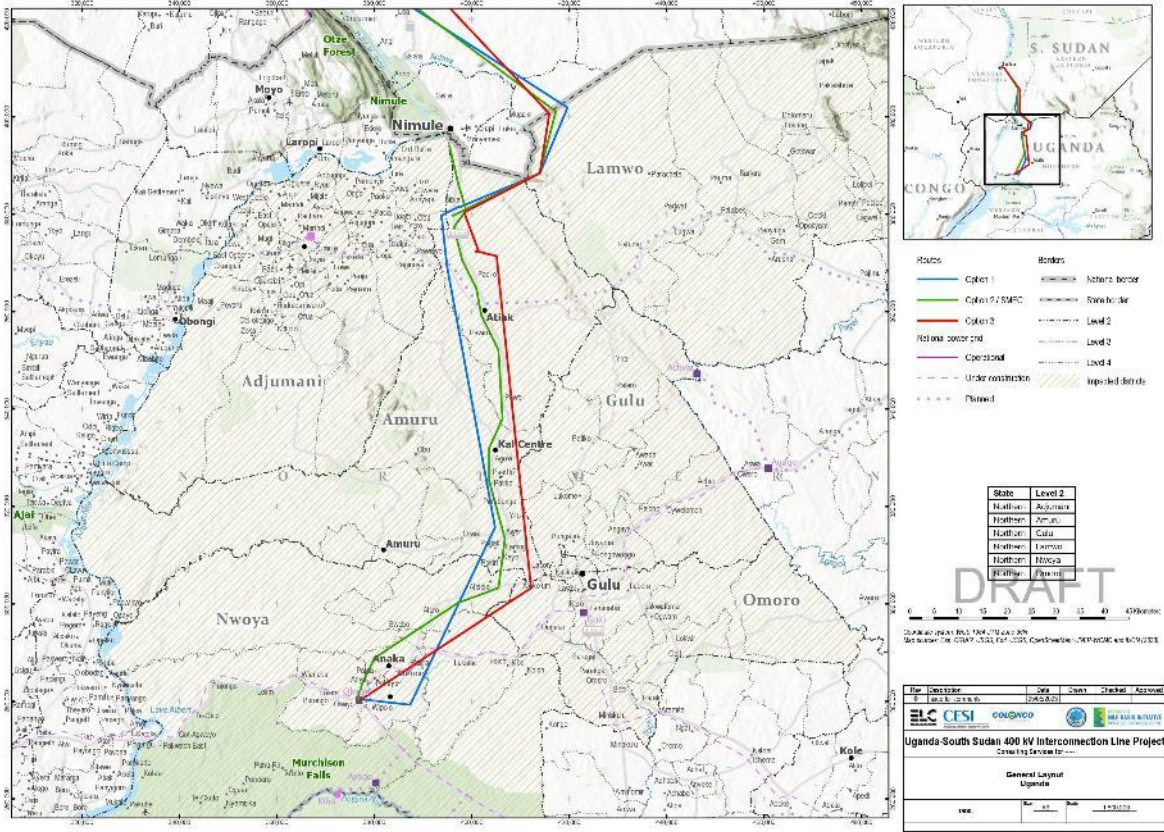


Figure 4-1 – Route options for the Ugandan section of 400 kV Interconnection project.



Figure 4-2 – New substation sites close to the border.



#### 4.2.1. Environmental and Social Ranking Methodology

The environmental and social ranking methodology is based on standard literature indications on this topic (PADC Environmental Impact Assessment and Planning Unit). Table 4-1 below defines the existing environmental and social conditions which might be affected by actions. In the present analysis, 9 environmental and social factors and 5 actions which might impact certain factors have been identified (see Table 4-2). It is underlined the present analysis considers only the environmental and social factors and impacting actions that are expected to distinguish the different alternatives.

Table 4-1 – Environmental and social factors.

<b>WATER</b>	Alteration of wetlands and/or riverine habitats
<b>LANDSCAPE</b>	Alteration of natural landscape
<b>VEGETATION</b>	Loss of forested areas
<b>FAUNA</b>	Terrestrial corridor fragmentation
	Risk of collision and electrocution
	Migratory route fragmentation
<b>HABITAT</b>	Loss of sensitive habitat
<b>LAND</b>	Agriculture
	Barren/Grazing
	Urban/semi urban
<b>PUBLIC INFRASTRUCTURES</b>	Relocation of Schools, Health Posts, Religious Building etc.
<b>PEOPLE</b>	Physical displacement
	Economic Displacement
<b>PHYSICAL CULTURAL HERITAGE</b>	Impact on sacred and cultural resources

*Table 4-2 – Actions which might impact environmental and social factors.*

Site Preparation (access roads)	<b>Construction Phase</b>
Vegetation clearing	
Construction of TL (foundation and tower structure erection)	
Construction of Substations	
Wire-stringing operations	
Operation & maintenace	<b>Op. Ph.</b>

The matrix resulting from the combination of the environmental and social factors and the impacting actions is called “Matrix of Identification of Impacts”. The following is the matrix of identification of impacts for an alternative, in which positive, negative or negligible impacts have been defined.

Table 4-3 – Matrix of Identification of Impacts for an Alternative.

**Option 1 (154 km)**

E&S FACTORS	IMPACT	IMPACTING ACTIONS					
		Costruction Phase					Op.
		1	2	3	4	5	6
		Site Preparation (access roads)	Vegetation clearing	Construction of TL (foundation and tower structure erection)	Construction of Substations	Wire-stringing operations	Operation & Maintenance
<b>WATER</b>	Alteration of wetlands and/or riverine habitats	✗	✗	✗		✗	
<b>LANDSCAPE</b>	Alteration of natural landscape		✗	✗			✗
<b>VEGETATION</b>	Loss of forested or natural areas	✗	✗	✗	✗	✗	
<b>FAUNA</b>	Terrestrial corridor fragmentation	✗	✗	✗		✗	✗
	Risk of collision and electrocution	✗					✗
	Migratory route fragmentation		✗				✗
<b>HABITAT</b>	Loss of sensitive Habitat	✗	✗	✗		✗	✗
<b>LAND</b>	Agriculture	✗		✗	✗	✗	✗
	Barren / Grazing	✗	✗	✗			
	Urban / Semi-urban			✗			✗
<b>PUBLIC INFRASTRUCTURES</b>	Relocation of Schools, Health Posts, Religious Buildings, etc.			✗			
<b>PEOPLE</b>	Physical displacement			✗	✗		
	Economic displacement	✗		✗	✗		
<b>PHYSICAL CULTURAL HERITAGE</b>	Impact on sacred and cultural resources		✗	✗			
<b>Legend</b>	Negative impact	✗					
	Positive impact	✔					
	Positive or negative impact with little relevancy or no impact	-					

**4.2.2. Description of Environmental and Social Factors**

The list of the environmental and social factors which could be impacted during the different project phases is given below. It is underlined that environmental and social factors which are deemed equivalent for all the transmission line routes (e.g. air quality, soil, noise, vulnerable groups, employment, etc.) are not taken into account in the present alternative analysis. Instead, a more detailed and complete set of environmental and social impacts will be considered in the subsequent impact assessment on the selected project alternative.

**WATER**

**Alteration of wetlands and/or riverine habitats:** The construction of access roads and transmission line may interfere with the natural drainage systems and modify flow of surface water. These changes can contribute to soil erosion, flooding, channel modification, downstream scouring and

sedimentation in streams, drainage channels and wetlands/swamps. This impact is however expected to be minimal and temporary.

## LANDSCAPE

**Alteration of natural landscape:** The overhead transmission lines would be highly visible in natural landscapes. The artificial appearance of a transmission line may have visually intrusion associations for some, particularly in a predominantly natural landscape. Generally, transmission lines and new roads are more easily accepted when they are situated close to existing roads. Visual evidence of these projects cannot be completely avoided, reduced, or concealed.

## VEGETATION

**Vegetation (loss of forested or natural areas):** The construction of the transmission line will involve tree removal and reduction of woody biomass due to clearance in the 60 m wide corridor, included in the Right of Way (RoW) and/or wayleave. However, being a narrow line, the vegetation loss will be relatively small in comparison to the total coverage of the affected vegetation types.

The RoW will be managed by periodic vegetation maintenance during operation of the transmission line. However, vegetation will generally be allowed to grow under the overhead line up to a height of about 2-3 m. Permanent vegetation loss will hence be restricted to the immediate areas surrounding the tower foundations and the access roads.

## FAUNA

**Terrestrial corridor fragmentation:** The construction of the transmission line will involve vegetation clearance in the Right of Way/Wayleave, resulting in habitat loss or habitat fragmentation for wildlife. However, the line corridor is small in comparison to the entire habitat size and therefore no considerable loss is anticipated. The line is not likely to permanently displace birds and animals from their native habitats since they can easily relocate to adjacent undisturbed areas, even if some microhabitat for specific animals, such as amphibians, could be destroyed (e.g. wetlands).

**Risk of collision and electrocution:** A special feature of transmission line projects is the danger of accidental kills of birds and flying or climbing animals. The kills can occur as a result of collision between the flying animal and a power cable, or it can occur if a climbing or resting animal happens to short circuit the conductors. The risk for collisions is influenced by the way the line runs in the landscape. Power lines following hill crests are less likely to cause kills than line in hillsides or line crossing valleys. The danger of attracting climbing animals is greatest for lines running through a dense forest with high trees on each side. The risk of collision and electrocution is also increased if a transmission line is located within important bird migratory routes.

The opening of access roads increases also the risk of collision of terrestrial fauna with the vehicles moving at project site during construction activities.

**Migratory route fragmentation:** The open space created by the access roads and in the right of way can potentially act as a barrier to wildlife and lead to habitat fragmentation. Therefore, in case the transmission line corridor crosses migratory routes of terrestrial fauna, this can lead to disturbance to the animal passage in the open space of the corridor.

## HABITAT

**Loss of sensitive habitat:** The potential presence of sensitive or critical habitats impacted by the project footprint represents an additional risk to be evaluated in the analysis. The impacts on habitats with high biodiversity value, of significant importance or unique ecosystems (e.g. forest reserves, natural parks, wetlands, etc.), which deserves particular attention, have to be considered.

## LAND

**Impact on Agriculture – Barren / Grazing – Urban / Semi-urban land:** The project will lead to land acquisition for transmission line right of way, causing permanent loss of land ownership for a number of families, clans and ethnic communities.

Cultivation of seasonal crops and grazing/pastoral activities are likely to continue in the right of way / wayleave, although crop damage and restrictions to livestock movement is expected to occur during the construction phase and possibly also during repair and maintenance. Restricted land use will prevent the cultivation of trees and some perennial crops as well as erection of new buildings or other physical structures.

The need of permanent land acquisition cannot be estimated at the moment. Only preliminary analysis on the land use is possible, based on the available alignments and desktop studies.

## PUBLIC INFRASTRUCTURES

**Relocation of Schools, Health Posts, Religious Buildings:** the transmission line corridor could potentially pass through location of public infrastructures, such as schools, health posts, religious buildings, etc. Even if public infrastructures should be avoided as much as possible, in case such impact is present, it shall be adequately mitigated by relocation of the impacted infrastructure.

## PEOPLE

**Physical displacement (Loss of residential land / relocation of inhabitants):** The project will lead to land acquisition for transmission line right of way, causing permanent loss of land ownership for a number of families, clans and ethnic communities. A number of houses, secondary structures and community buildings that are located within the RoW will be demolished or moved. Upgrading of new and existing roads may also cause some displacements. This impact shall be mitigated by adequate compensation of the property losses.

Secondary displacement, especially in areas previously under conflict, is not considered in the alternative analysis, since at the present stage there are no sufficient data to evaluate this specific impact. The alternative line routes cross the same regions and at present it is impossible to differentiate the potential secondary displacement associated to each option. Therefore, this impact (secondary displacement) will be included in the detailed assessment of the selected line route.

**Economic displacement (Loss of agricultural, grazing and commercial land):** Land is an important asset and the majority of the people rely on land-based livelihoods. The project construction activities may cause losses in agricultural/grazing/commercial land. This impact shall be mitigated by adequate compensation of the property losses.

## PHYSICAL CULTURAL HERITAGE

**Physical and cultural resources:** Archaeological sites, burial grounds, sacred sites and local shrines could potentially be encountered along the transmission line corridor in the process of corridor clearing and foundation excavation. This kind of impact can be mitigated through appropriate measures, e.g. relocation of small holy places.

The presence of trees or natural areas with spiritual or socio/cultural values is an additional factor to consider. If such kind of natural sites are impacted by a project component, could be permanently lost.

### 4.2.3. Definition of the Impacting Actions

The following actions have been identified as the ones which could impact the environmental and social factors. It is underlined that the impacting actions which are deemed equivalent for all the transmission

line routes (e.g. installation of contractor's camps, exploitation of borrow and disposal areas during the construction phase; etc.) are not taken into account in the present alternative analysis.

A number of 5 impacting actions are considered during the construction phase.

### **Construction Phase**

- Site preparation (access roads): The construction of access roads can impact the environment through vegetation clearance, loss/fragmentation of habitat, compaction of land and permanent loss of land. Wetlands and riverine habitats can be also impacted during the construction of access road.
- Vegetation clearing: this impacting action includes vegetation clearing in the transmission line right of way / wayleave and in other permanent and temporary works areas.
- Construction of TL (foundation and tower structure erection): this impacting action includes all the activities required for the implementation of the transmission line: excavation, preparation of foundations, steelwork structure erection, installation of insulators, etc. The impacts related to the acquisition of land in the right of way/wayleave of the transmission line are considered in this impacting action.
- Construction of substations: this impacting action includes all the activities required for the construction of the substations: excavation, foundations, civil works for control building, electrical equipment installation, etc.
- Wire-stringing operations: the conductors and shield wires will be strung and tensioned with specialized equipment to achieve the designed sag. This operation will potentially cause additional damage to the vegetation and existing annual crops.

### **Operation and Maintenance Phase**

- Operation & Maintenance: during the normal operation of the OHTL and annexed substations, the main impacts are due to the presence of the suspended wires (risk for collision and electrocution of wildlife and avifauna) and the creation of an electromagnetic field around the conductors. Periodic maintenance along the RoW / wayleave of the transmission line will also require clearing of regrowth vegetation along and adjacent to the line. Cropping and grazing beneath the conductors is normally permitted.
- Regular maintenance and monitoring activities along the transmission lines and at the substations are minimum: it involves periodically inspecting the OHTL, assuring that the safety clearances are maintained, and annual cleaning and checking of circuit breaker connections at the substations. Exceptional maintenance interventions could be: replacement of cables and insulators along OHTL, replacement of electrical equipment at substations (transformers, circuit breakers, etc.), change of transformer oil, etc.

#### **4.2.4. Definition of the Importance of the Impacts**

The *importance* of the impact on an environmental and social factor is calculated using defined attributes: sign, magnitude, spatial extension, duration, reversibility and frequency.

The mentioned attributes are defined as follows:

- Sign: this attribute defines nature of the impact (beneficial or harmful).
- Magnitude: this attribute defines magnitude of the incidence of the impacting action on the considered environmental or social actor. Its intensity is classified as low, medium, high.
- Spatial Extent: this attribute represents the extension of the affected area in relation to the project components. The spatial extension is classified as site specific, local, regional.

- **Duration:** this attribute refers to the time lap between the beginning of the impacting actions and the end of the relevant impacting effect. The time of occurrence is classified as short term, medium term and long term.
- **Reversibility:** this attribute refers to the possibility of restoring the affected factor and, if possible, the time lap necessary for the restoration. The reversibility is classified as short term, medium term and irreversibility.
- **Frequency:** this attribute refers to the frequency of occurrence of the impact. The frequency is classified as infrequent, frequent and continuous.

The *importance* of an impact is calculated, per each action impacting an environmental and social factor, with the following equation:

$$I_{ij} = Si \cdot (MA_{ij} + SE_{ij} + DU_{ij} + RE_{ij} + FR_{ij})$$

The scores are given as indicated in Table 4-4.

Table 4-4 – Attributes for the definition of the importance of an impact, with related scores.

Attributes	Description		Score
Sign (Si)	+	Positive	+1
	-	Negative	-1
Magnitude (MA)	L	Low	1
	M	Medium	2
	H	High	6
Spatial Extension (SE)	SS	Site Specific	1
	Lo	Local	2
	Re	Regional	6
Duration (DU)	S	Short Term	0.5
	M	Medium Term	1
	L	Long Term	2
Reversibility (RE)	S	Short Term	1
	M	Long Term	2
	I	Irreversible	6
Frequency (FR)	I	Unfrequent, aperiodic, discontinuous	0.5
	F	Frequent	1
	C	Continuous	2

The attributes for the definition of the *importance* of the impacts on environmental and social factors, as reported in Table 4-4, were evaluated in relative terms among the different project Alternatives, according to the estimation of the impact. In fact, the intensity and spatial extension of some of the impacts were defined in quantitative terms according to the available data, documentation and calculations. Whenever the quantification of the impacts was deemed difficult, the impacts were evaluated according to the Consultant’s judgement.

The impacts of the transmission line on the existing environmental and social factors, i.e. forest areas, physical and economic displacement, etc., will be quantified basing on the available topographic/satellite cartography, thematic maps, secondary data and will be subsequently verified during the site visits.

The preliminary alignment of the access roads was defined for the Alternative considered. Since the impact of access roads on forest areas, physical and economic displacement, religious sites, etc., can be hardly defined now and since the final access road alignment is not yet defined, the impacts of the access roads were quantified as proportional to the transmission line length.

As an example, the following table shows the definition of the importance of the impacting action “Construction of Transmission Line” on the different environmental and social factors.

Table 4-5 – Definition of the importance of the impacting action “Construction of Transmission Line” on the different environmental and social factors for Option 1.

**Construction of TL (foundation and tower structure erection)**  
**Option 1 (154 km)**

FACTOR	IMPACT	ATTRIBUTES						IMPORTANCE
		Sign	Magnitude	Spatial Extent	Duration	Reversibility	Frequency	
WATER	Alteration of wetlands and/or riverine habitats	-	H	SS	L	I	C	-17
LANDSCAPE	Alteration of natural landscape	-	H	Re	L	I	C	-22
VEGETATION	Loss of forested or natural areas	-	H	Lo	L	I	C	-18
FAUNA	Terrestrial corridor fragmentation	-	H	Lo	S	S	I	-10
	Risk of collision and electrocution							
	Migratory route fragmentation							
HABITAT	Loss of sensitive Habitat	-	H	Lo	L	I	C	-18
LAND	Agriculture	-	M	SS	L	I	C	-13
	Barren / Grazing	-	M	SS	L	I	C	-13
	Urban / Semi-urban	-	L	SS	L	I	C	-12
PUBLIC INFRASTRUCTURES	Relocation of Schools, Health Posts, Religious Buildings, etc.	-	L	SS	L	I	C	-12
PEOPLE	Physical displacement	-	M	SS	L	I	C	-13
	Economic displacement	-	M	SS	L	I	C	-13
PHYSICAL CULTURAL HERITAGE	Impact on sacred and cultural resources	-	M	SS	L	I	C	-13

+	L	SS	S	S	I
-	M	Lo	M	M	F
	H	Re	L	I	C

**4.2.5. Matrices of Importance**

The matrix, which includes the importance of the impact of all the actions on the environmental and social factors, is called Matrix of Importance. This matrix of importance is built aggregating the vectors of importance (i.e. the last column of Table 4-5) relevant to each considered impacting actions. Through this procedure, the matrix of identification of impacts (Table 4-3) is compiled with the importance values given to the E&S factors.

Summing all the importance values on each row of the matrix of importance, the overall positive and negative scores of each environmental and social factor is computed.

The matrices of importance of the different project alternatives are provided in the following. The negative impacts are highlighted in red while the positive impacts in green. Empty cells represent positive or negative impacts with little relevancy or no impact at all.



Table 4-6 – Matrix of importance for Option 1 – Negative impacts in red, positive in green.

FACTOR	IMPACT	IMPACTING ACTIONS						Sum of Impacts	
		Construction Phase						Positive Impacts	Negative Impacts
		1	2	3	4	5	6		
		Site Preparation (access roads)	Vegetation clearing	Construction of TL (foundation and tower structure erection)	Construction of Substations	Wire-stringing operations	Operation & Maintenance		
<b>WATER</b>	Alteration of wetlands and/or riverine habitats	-12	-13	-17		-9		0	-51
<b>LANDSCAPE</b>	Alteration of natural landscape		-14	-22			-18	0	-54
<b>VEGETATION</b>	Loss of forested or natural areas	-14	-14	-18	-12	-6		0	-64
<b>FAUNA</b>	Terrestrial corridor fragmentation	-14	-18	-10		-6	-18	0	-66
	Risk of collision and electrocution	-11					-22	0	-33
<b>HABITAT</b>	Migratory route fragmentation		-18				-22	0	-40
	Loss of sensitive Habitat	-14	-14	-18		-14	-12.5	0	-72.5
<b>LAND</b>	Agriculture	-14		-13	-12	-5		0	-56
	Barren / Grazing	-14	-5.5	-13				0	-32.5
	Urban / Semi-urban			-12			-13	0	-25
<b>PUBLIC INFRASTRUCTURES</b>	Relocation of Schools, Health Posts, Religious Buildings, etc.			-12				0	-12
<b>PEOPLE</b>	Physical displacement			-13	-12			0	-25
	Economic displacement	-14		-13	-12			0	-39
<b>PHYSICAL CULTURAL HERITAGE</b>	Impact on sacred and cultural resources		-12	-13				0	-25
								0	-595

Option 1 (154 km)

Table 4-7 – Matrix of importance for Option 2 – Negative impacts in red, positive in green.

FACTOR	IMPACT	IMPACTING ACTIONS						Sum of Impacts	
		Construction Phase					Op. Ph.	Positive Impacts	Negative Impacts
		1	2	3	4	5			
	Site Preparation (access roads)	-7	-9	-12				0	-33
	Vegetation clearing		-9	-12				0	-43
	Construction of TL (foundation and tower structure erection)	-9	-9	-13	-12			0	-48
	Construction of Substations	-10	-13	-6				0	-52
	Wire-stringing operations	-6						0	-28
	Operation & Maintenance		-14					0	-36
		-10	-10	-14				0	-60.5
		-9	-9	-17	-13			0	-60
		-9	-5.5	-17				0	-31.5
				-12				0	-25
				-12				0	-12
				-13	-12			0	-25
		-7.5		-13	-13			0	-33.5
			-13	-13				0	-26
								0	-514

Option 2 - SMEC (152 km)

Table 4-8 – Matrix of importance for Option 3 – Negative impacts in red, positive in green.

FACTOR	IMPACT	IMPACTING ACTIONS						Sum of Impacts	
		Construction Phase					Op. Ph.	Positive Impacts	Negative Impacts
		1	2	3	4	5	6		
	Site Preparation (access roads)	-7	-9	-13				0	-34
	Vegetation clearing		-10	-14				0	-50
	Construction of TL (foundation and tower structure erection)	-10	-10	-14	-13			0	-53
	Construction of Substations	-10	-14	-10	-5.5	-6		0	-63.5
	Wire-stringing operations	-7						0	-29
	Operation & Maintenance							0	-41.5
		-10	-10	-14		-14		0	-60.5
		-10		-17		-9		0	-48
		-10	-5.5	-17				0	-32.5
				-12				0	-25
				-12				0	-12
				-17				0	-17
		-10		-17				0	-27
			-13	-17				0	-30
								0	-523

Option 3 (154 km)

#### 4.2.6. Comparison of Substation

The importance of the impacts related to substation construction is extracted from the previous matrices, in order to allow for a direct comparison between the different substation options. The corresponding matrices of importance of the three options are provided in the following.

Table 4-9 – Matrix of Importance for Substation Option 1 – Negative impacts in red, positive in green.

SS Option 1		Construction of Substations	Sum of Impacts	
			Positive Impacts	Negative Impacts
FACTOR	IMPACT			
WATER	Alteration of wetlands and/or riverine habitats		0	0
LANDSCAPE	Alteration of natural landscape		0	0
VEGETATION	Loss of forested or natural areas	-12	0	-12
FAUNA	Terrestrial corridor fragmentation		0	0
	Risk of collision and electrocution		0	0
	Migratory route fragmentation		0	0
HABITAT	Loss of sensitive Habitat		0	0
LAND	Agriculture	-12	0	-12
	Barren / Grazing		0	0
	Urban / Semi-urban		0	0
PUBLIC INFRASTRUCTURES	Relocation of Schools, Health Posts, Religious Buildings, etc.		0	0
PEOPLE	Physical displacement	-12	0	-12
	Economic displacement	-12	0	-12
PHYSICAL CULTURAL HERITAGE	Impact on sacred and cultural resources		0	0
			0	-48

Table 4-10 – Matrix of Importance for Substation Option 2 – Negative impacts in red, positive in green.

FACTOR		IMPACT	Construction of Substations	Sum of Impacts	
				Positive Impacts	Negative Impacts
<b>WATER</b>		Alteration of wetlands and/or riverine habitats	0	0	0
<b>LANDSCAPE</b>		Alteration of natural landscape	0	0	0
<b>VEGETATION</b>		Loss of forested or natural areas	-12	0	-12
<b>FAUNA</b>		Terrestrial corridor fragmentation	0	0	0
		Risk of collision and electrocution	0	0	0
		Migratory route fragmentation	0	0	0
<b>HABITAT</b>		Loss of sensitive Habitat	0	0	0
<b>LAND</b>		Agriculture	-13	0	-13
		Barren / Grazing	0	0	0
		Urban / Semi-urban	0	0	0
<b>PUBLIC INFRASTRUCTURES</b>		Relocation of Schools, Health Posts, Religious Buildings, etc.	0	0	0
<b>PEOPLE</b>		Physical displacement	-12	0	-12
		Economic displacement	-13	0	-13
<b>PHYSICAL CULTURAL HERITAGE</b>		Impact on sacred and cultural resources	0	0	0
			0		-50

Table 4-11 – Matrix of Importance for Substation Option 3 – Negative impacts in red, positive in green.

SS Option 3		Construction of Substations	Sum of Impacts	
			Positive Impacts	Negative Impacts
FACTOR	IMPACT			
WATER	Alteration of wetlands and/or riverine habitats		0	0
LANDSCAPE	Alteration of natural landscape		0	0
VEGETATION	Loss of forested or natural areas	-13	0	-13
FAUNA	Terrestrial corridor fragmentation	-5.5	0	-5.5
	Risk of collision and electrocution		0	0
	Migratory route fragmentation	-5.5	0	-5.5
HABITAT	Loss of sensitive Habitat		0	0
LAND	Agriculture		0	0
	Barren / Grazing		0	0
	Urban / Semi-urban		0	0
PUBLIC INFRASTRUCTURES	Relocation of Schools, Health Posts, Religious Buildings, etc.		0	0
PEOPLE	Physical displacement		0	0
	Economic displacement		0	0
PHYSICAL CULTURAL HERITAGE	Impact on sacred and cultural resources		0	0
			0	-24

The Substation Option No. 1 and No. 2 are both located in areas with heterogeneous land use, characterized by the presence of cultivated fields, scattered houses/sheds and vegetation. They have similar negative impacts; substation option No. 2 is the most impacting due to the higher presence of agricultural land. Option 3, instead, is located in a rural/natural area and therefore has a lower environmental and social impact than the other two options.

**4.2.7. Comparison of Alternatives**

To score each Alternative a weight is assigned to each environmental and social impact component. A weighted value is calculated for each positive and negative impact.

The weights of the considered environmental and social factors, or impact categories, has been defined by applying the Analytic Hierarchy Process (AHP) methodology (Saaty, 1980). This is a Multi Criteria decision making method that relies on judgements of experts to derive priority scales. The pairwise comparisons are made ranking the factors *importance* in the decision-making process, i.e. in the selection of the most preferable project Alternative.

In this analysis each impact category is compared with all the other categories on a numerical scale from 1 to 10, in ascending order of importance, according to the judgement of a team of environmental and

social experts. The explanation of the ranking given to each project impact is detailed below in Table 4-12.

A final comparative matrix was elaborated while putting both in rows and columns the considered impact categories as well as assigning to each element  $a_{ij}$  the ratio between the rankings of the corresponding impact in row  $i$  and the ranking of the impact in column  $j$ .

For each column, every single entry was divided by the sum of entries of the corresponding column. This yields a new normalized matrix, in which the sum of the elements of each column vector is 1. By computing the average value of all elements in a row, an estimate of the best value for the vector of the weights  $w^*=\{w_i^*\}$  is obtained.

The calculated figures represent the mathematical weights of the ranking (based on expert’s judgement) assigned to each impact component. The list of the obtained weightings for the various impact categories is reported in Table 4-12.

Table 4-12 – Ranking and weighting of the impact categories.

IMPACT CATEGORY	RANK	EXPLANATION	WEIGHT
<b>WATER</b>	4	Alteration of wetlands and/or riverine habitats	8.9%
<b>LANDSCAPE</b>	3	Alteration of natural landscape	6.7%
<b>VEGETATION</b>	7	Loss of forested areas	15.6%
<b>FAUNA</b>	5	Terrestrial corridor fragmentation	11.1%
		Risk of collision and electrocution (especially for avifauna)	
		Migratory route fragmentation	
<b>HABITAT</b>	8	Loss of sensitive habitat	17.8%
<b>LAND</b>	6	Agriculture	13.3%
		Barren/Grazing	
		Urban/semi urban	
<b>PUBLIC INFRASTRUCTURES</b>	1	Relocation of Schools, Health Posts, Religious Buildings, etc.	2.2%
<b>PEOPLE</b>	9	Physical displacement	20.0%
		Economic Displacement	
<b>PHYSICAL CULTURAL HERITAGE</b>	2	Impact on sacred and cultural resources	4.4%

The weights reported in Table 4-12 above will be used to weight the negative and positive impacts of each transmission line alternative. In particular, the positive and negative scores of each environmental and social factor from the Matrix of Importance is multiplied by the weights of Table 4-12. Then all the weighted single scores can be summed up in order to obtain an overall weighted impact score (positive and negative) of each project Alternative, as shown in Table 4-13. The best alternative is therefore selected as the one providing the lowest negative score among all the alternatives.

Table 4-13 – Final matrix for the selection of best alternative, based on weighted impact scores.

FACTOR	WEIGHT	IMPACT	WEIGHTED SCORES					
			Option 1		Option 2		Option 3	
			Positive Impact	Negative Impact	Positive Impact	Negative Impact	Positive Impact	Negative Impact
WATER	8.9%	Alteration of wetlands and/or riverine habitats		-4.5		-2.9		-3.0
LANDSCAPE	6.7%	Alteration of natural landscape		-3.6		-2.9		-3.3
VEGETATION	15.6%	Loss of forested or natural areas		-10.0		-7.5		-8.2
FAUNA	11.1%	Terrestrial corridor fragmentation		-2.4		-1.9		-2.4
		Risk of collision and electrocution		-1.2		-1.0		-1.1
HABITAT	17.8%	Migratory route fragmentation		-1.5		-1.3		-1.5
		Loss of sensitive Habitat		-12.9		-10.8		-10.8
LAND	13.3%	Agriculture		-2.5		-2.7		-2.1
		Barren / Grazing		-1.4		-1.4		-1.4
		Urban / Semi-urban		-1.1		-1.1		-1.1
PUBLIC INFRASTRUCTURES	2.2%	Relocation of Schools, Health Posts, Religious Buildings, etc.		-0.3		-0.3		-0.3
		Physical displacement		-2.5		-2.5		-1.7
PEOPLE	20.0%	Economic displacement		-3.9		-3.4		-2.7
PHYSICAL CULTURAL HERITAGE	4.4%	Impact on sacred and cultural resources		-1.1		-1.2		-1.3
			<b>0.0</b>	<b>-48.9</b>	<b>0.0</b>	<b>-40.8</b>	<b>0.0</b>	<b>-41.0</b>
			<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>			
			<b>-48.9</b>	<b>-40.8</b>	<b>-41.0</b>			

As shown in Table 4-13, the ranking methodology applied to the three project alternatives shows that the best option from environmental and social point of view is Option 2 (with a weighted score of -40.8), which is the one already studied by previous consultants. It is underlined that all three transmission line routes pass through densely cultivated areas and will cause loss of agricultural land.



Option 2, in particular, intersects less forested/natural areas than the other two alternatives. Moreover, it runs closer, on average, to main road network (Olwiyo – Gulu, Gulu – Nimule), thus requiring lower length of access roads.

Other Alternatives rank from the best to the worst in the following order: Option 3 (weighted score - 41.0) and Option 1 (-48.9). Option 1 is the most impacting route, especially from the environmental point of view, crossing different rivers and natural areas.

It is remarked that the difference between Option 2 (the best one) and Option 3 (ranked at second place) is only 0.2 points in term of weighted score. Actually, Option 2 definitely remains the best option in terms of transmission line alignment, even if its score is affected by the substation location, whose impact weighs 2.5 points more than the Option 3 substation. As a matter of fact, deducting the difference in substation impact, Option 2 would score -38.3.

The final selection of the optimal project Alternative, to be furtherly developed, will take into account the findings of this Environmental and Social ranking analysis, which represent one of the elements, together with the technical and economic evaluations, of the overall decision process. Any possible refinements of the present alternative analysis will be performed in accordance to feedback from the survey teams.

#### **4.2.8. Optimization of selected line route option**

The transmission line routes have been refined on the basis of the findings of the reconnaissance visit. In particular, due to the presence of the existing Olwiyo – Nebbi 132 kV transmission line and Olwiyo – Gulu 132 kV transmission line connecting to Olwiyo substation, some adjustments are applied to Option 2 and Option 3 routes in the approach to the substation, in order to obtain more favourable crossing conditions of the existing electric lines. Some other adjustments have also been introduced.

The updated line routes are shown in Figure 4-3 and Figure 4-4. Their lengths are as follows:

- d. Option 1 (blue line) – length 152.5 km
- e. Option 2 from previous study (green line) – length 150.1 km
- f. Option 3 (red line) – length 153.3 km

It is remarked that the update of the alignments does not affect the performed alternative analysis, since the modifications are referred to limited line portions and the new affected areas are similar with the previous ones, in terms of land cover and habitat significance.

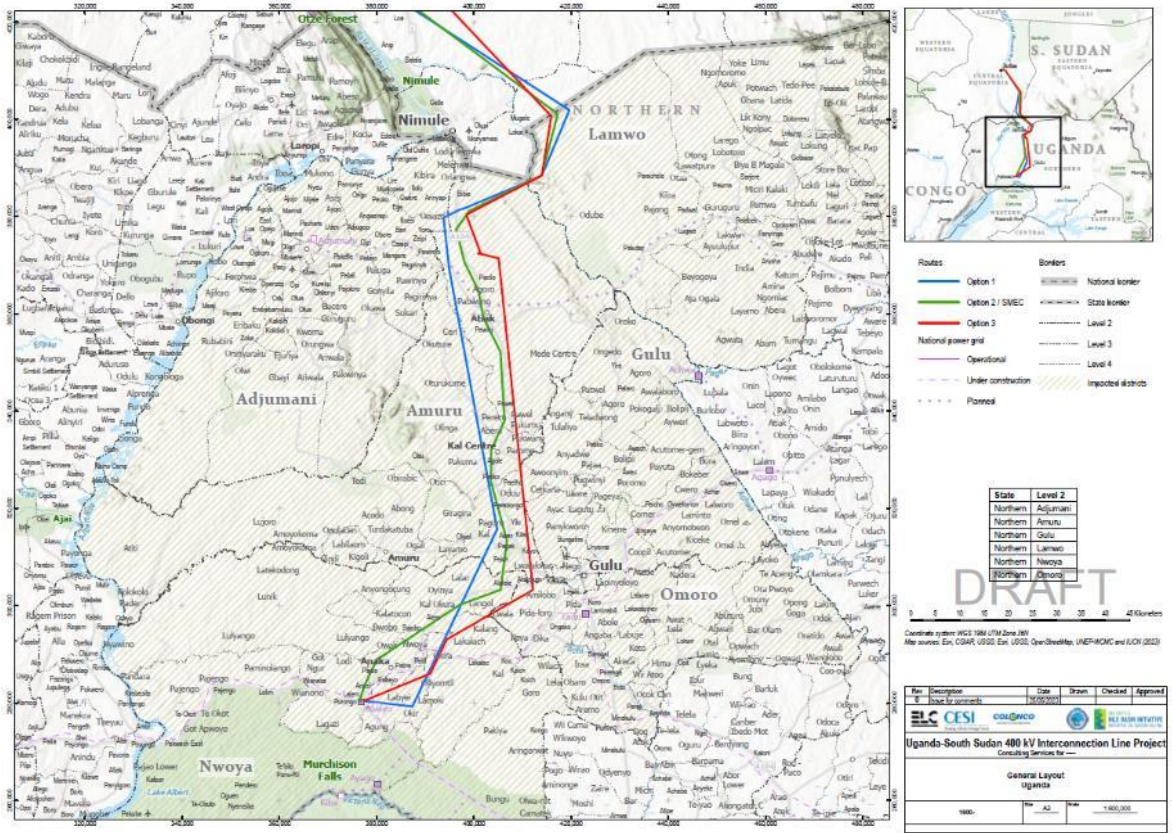


Figure 4-3 – Updated line route options for the Ugandan section of 400 kV Interconnection Line project.



Figure 4-4 – Location of Olwiyo substation; existing 132 kV transmission lines are marked in cyan (Olwiyo – Gulu) and magenta (Olwiyo – Nebbi).

## 5. LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter describes the relevant policies, laws and administrative framework within which the project will be implemented. The Consultant has identified the pertinent regulations and standards, both at local and international levels (AfDB Safeguard Policies, World Bank Environmental and Social Standards, Equator Principles), governing the environmental quality, health and safety, protection of sensitive areas, protection of endangered species, land use control and ecological and socio-economic issues. The examination of the legislation includes the relevant international conventions to which the governments are signatories. The Consultant has identified also the relevant government agencies involved in environmental and social management issues, to ensure that the ESMP will be effectively implemented.

### 5.1. Uganda Policies, Laws, Rules, Conventions and Guidelines

This Chapter covers relevant Ugandan and Development Partner policies (African Development Bank, World Bank, etc.), legislations and guidelines. Key Ugandan legislations governing the conduct of ESIA are the National Environment Act (Cap. 153) and the Environmental Impact Assessment Regulations (1998). The National Environment Act established the National Environment Management Authority (NEMA), and entrusts it with responsibility to ensure compliance with the ESIA process in planning and execution of development projects.

Policy framework is critical in planning and implementation of development projects. In regard to the ESIA of the 400kV Olwiyo-Nimule Transmission Line, policies related to energy sector and environment are important.

#### 5.1.1. National Policies and Guidelines applicable to the Project

The key Ugandan policies relevant to the proposed project include:

- The National Energy Policy, 2002
- The National Environment Management Policy, 1994
- Vision 2025
- The Uganda's Vision 2040
- The Land Policy
- National Gender Policy
- HIV/AIDS Policy
- Wetlands Policy
- National Development Plan II and III
- National Water Policy

##### 5.1.1.1. The National Energy Policy (2002)

The goal of the energy sector in Uganda is to meet the energy needs of the Ugandan population for social and economic development in an environmentally sustainable manner. The National Energy Policy objectives include:

- establishing availability, potential and demand of the various energy resources in the country;
- increasing access to modern and reliable energy services as a contribution to poverty eradication;
- improving energy governance;
- stimulating economic development; and
- managing energy related environmental impacts.

In pursuit of these objectives, the Government of Uganda (GOU) will therefore ensure that environmental considerations are given priority by energy suppliers and users to protect the environment and will put in place a monitoring mechanism to evaluate compliance with established environmental protection guidelines.

#### 5.1.1.2. *The National Environmental Management Policy (1994)*

The National Environment Management Policy for Uganda (1994) is the cornerstone of the country's commitment to social and economic development that is environmentally sustainable and brings the benefits of a better life to all. The National Environment Management Policy gives the overall policy framework, which calls for sustainable development that maintains and enhances environmental quality and resources productivity to meet human needs of the present generation without compromising ability of future generations to meet their own needs.

The framework points out cross-sectoral guiding principles and strategies to achieve sustainable socio-economic development. The policy sets a guiding principle that Environmental Impact Assessment should be required for any activities, which cause significant impact on the environment.

The National Environment Management Policy 1994 supports and promotes the proposed 400 kV Olwiyo-Nimule transmission line activity under its energy sector objective, "To meet the national energy needs through increased use of hydropower...".

#### 5.1.1.3. *Vision 2025*

Vision 2025 is a set of goals that the Uganda government set to achieve for the common good and economic development of the country by the year 2025. The goals cover political, economic, social, environmental, and cultural aspects of life.

Key in the environmental goal is the desire by Ugandans to have a sustainable socio-economic development matched with environmental quality and ecosystem resilience. In order to achieve a sustainable socio-economic development, government prioritized industrialization (value addition) as the key factor. To this end, Rural Electrification program was established to catalyze the socio-economic development of the rural areas of the country.

In order for the people of Nwoya, Amuru and the surrounding districts of Uganda to benefit from the rural electrification program, reliable grid power is one of the key ingredients. The proposed 400 kV Olwiyo-Nimule power line will go a long way to meeting this mission.

#### 5.1.1.4. *Uganda's Vision 2040 (2013)*

In 'Vision 2040' Uganda Government set goals to achieve by the year 2040 ranging from political, economic, social, energy and environment. With respect to environmental goals, the government aspired to have sustainable social-economic development that ensures environmental quality and preservation of the ecosystem. Vision 2040 recognizes energy as a key driver of the economic development and notes that for Uganda to shift from a peasantry to an industrialized and urban society, it must be propelled by electricity as a form of modern energy. It estimates that Uganda will require 41,738 MW of electricity by year 2040 thus increasing its electricity consumption per capita to 3,668 kWh. Furthermore, access to the national grid must significantly increase to 80 percent. To this end, Uganda will fully exploit its hydropower potential by developing large and small Hydropower plants including Isimba, Ayago, Karuma, Kalagala and Murchison Bay besides other renewable sources of energy such as wind, solar and bio-gas. To reduce the energy deficit, in the long-term, government would invest in development of nuclear power from uranium deposits in the country. Vision 2040 notes that to improve access and availability of electricity to the rural and urban areas, especially to economic zones and other productive areas, new transmission lines to evacuate power will be built and rural electrification programs accelerated. Therefore, the proposed Olwiyo-Nimule interconnection project is in line with aspirations of Vision 2040. Uganda Vision 2040 is to be implemented through the

Comprehensive National Development Planning Framework (CNDPF), articulated in three 10-year development plans and six five-year National Development Plans (NDPs, see below).

#### 5.1.1.5. *National Gender Policy (1997)*

The overall goal of this policy is to mainstream gender concerns in the national development process in order to improve the social, legal/ civic, political, economic and cultural conditions of the people of Uganda, particularly women. Thus, in the context of the power sector, this policy aims to redress imbalances which arise from existing gender inequalities and promotes participation of both women and men in all stages of energy project cycle, equal access to, and control over significant economic resources and benefits.

This policy would especially apply to recruitment of transmission line construction labour where women should have equal opportunity as men for available jobs. This policy also requires provision of a working environment that is conducive to women as well as for men in addition to gender-disaggregated impacts and vulnerabilities.

This policy would especially apply to recruitment of construction labour for transmission line construction where women should have equal opportunity as men for available jobs. This policy also requires provision of a work environment that is safe and conducive to women as is for men considering gender-disaggregated differences and vulnerabilities. This, for example, applies to onsite worker's sanitation facilities where women should have separate facilities from men's.

#### 5.1.1.6. *HIV/AIDS Policy (1992)*

In Uganda, current effort to combat HIV/AIDS is characterized by a policy of openness by Government and this has, to a large extent, been emulated by civil society, political and social institutions, and workplaces. HIV/AIDS is recognized by Ministry of Health as a considerable risk in construction of infrastructure projects and it (together with the ministry responsible for labour) encourages employers to develop in-house HIV/AIDS policies, provide awareness and prevention measures to workers and avoid discriminating against workers or living with or affected by HIV/AIDS. To ensure HIV/AIDS is addressed in the workplace, the policy encourages employee awareness and education on HIV/AIDS. To protect the infected and affected persons from discrimination, employers are required to keep personal medical records confidential. Employees living with, or affected by, HIV infection and AIDS, and those who have any related concerns, are encouraged to contact any confidant within the organization to discuss their concerns and obtain information. It is anticipated that during construction of the proposed power line, there may be an influx of people into the project area possibly resulting into sexual fraternization and a risk of HIV/AIDS spread. These requirements are expected to be fulfilled by the transmission line construction contractors or their subcontractors.

The requirements of this policy are expected to be fulfilled by the Olwiyo-Nimule transmission line construction contractors or their subcontractors, especially in regard to having an in-house HIV Policy, worker sensitization and provision of free condoms. This policy is relevant to the project if implementation of proposed transmission line construction leads to in-migration into the project area by people seeking construction jobs and indulging in prostitution or irresponsible sexual fraternization associated with HIV/AIDS risk.

#### 5.1.1.7. *Wetlands Policy (1995)*

The national policy on conservation and management of wetlands aims at curtailing loss of these resources and ensuring that their benefits are equitably distributed to all people of Uganda. The wetlands policy calls for:

- Sustainable use to ensure that benefits of wetlands are maintained for the foreseeable future;
- Environmentally sound management of wetlands to ensure that other aspects of the environment are not adversely affected;

- Equitable distribution of wetland benefits;
- Application of environmental impact assessment procedures on all activities to be carried out in a wetland to ensure that wetland development is well planned and managed.

In order to operationalize the policy and to provide a legal framework for its implementation, wetland related issues have been adequately incorporated into the National Environment Act, Cap 153. This policy is relevant to the project since riverine swamps and streams may be present within the project area.

#### 5.1.1.8. *Second National Development Plan (NDPII) 2015/16 – 2019/2020*

NDP II is the second in a series of five-year plans tailored to achieving Uganda Vision 2040, whose goal is to transform Uganda into an upper middle-income country. NDP II was launched by the President of Uganda in June 2015. NDP II is anchored on five priority areas - agriculture, tourism, infrastructure, mineral, oil and gas and human capital development. Under NDPII, Government plans to invest in the necessary Infrastructure to facilitate the exploitation of the abundant renewable energy sources including hydropower, geothermal, and nuclear, so as to increase power generation capacity from 850MW in 2013 to 2,500MW in 2020 and prepare for achievement of the required 41,738 Mega Watts by year 2040. Also, the country targets to increase per capita electricity consumption from 80 Kwh to 588kWh by 2020 and 3,668 kWh by 2040. As significant as power generation is the extension of the transmission networks into a national grid in line with the regional agreements. The plan mentions several hydropower plants in the pipeline and new grid network to provide alternative routes to make power supply more reliable. Therefore, the proposed Olwiyo-Nimule transmission line fulfils the five major priority areas of the NDPII.

#### 5.1.1.9. *Third National Development Plan (NDPIII) 2020/21 – 2024/25*

The country is currently implementing its Third National Development Plan (NDP III), whose goal is to increase Ugandans' household incomes and improve their quality of life. This is expected to be achieved through resource-led sustainable industrialization, with a focus on key growth opportunities in agriculture, tourism, oil and gas, and minerals. Having missed the lower middle-income status target that had been envisaged by 2020, the country is focusing on increasing productivity and accelerating growth to propel the economy into lower middle-income status, with per capita GDP equivalent to US\$1,198, by 2025.

The NDP III is also informed by key regional and global aspirations and frameworks, including the 2030 Agenda for Sustainable Development, Africa Agenda 2063, EAC Vision 2050, COMESA and AfCFTA. The plan also recognizes the challenges and threats that regional and global trends pose, including climate change, regional conflicts leading to large-scale population movements and loss of markets, cybersecurity concerns, terrorism, epidemics and brain drain stifling innovation, research and entrepreneurship capacity. The NDP III objectives include:

1. Enhance value addition in key growth opportunities;
2. Strengthen the private sector to create jobs;
3. Consolidate and increase the stock and quality of productive infrastructure;
4. Enhance the productivity and social wellbeing of the population; and,
5. Strengthen the role of the state in guiding and facilitating development.

#### 5.1.1.10. *Land Policy (2012)*

The Uganda's National Land Policy was approved in February 2013 by Cabinet as the framework for development and use of Uganda's land resources for the next decade. The Policy has two major objectives: (1) to re-orient the land sector in national development by articulating management co-ordination between the land sector and other productive sectors.

in the economy; and (2) enhancing the contribution of the land sector to the social and economic development of the country.

The Key Issues outlined in the Policy include:

- The creation of a customary register to facilitate registration of customary rights;
- Strengthening women's land rights through enactment of provisions promoting the regime of marital property law and joint ownership of land and property for married parties;
- The need to overhaul the existing institutional framework for land administration and land management through decentralization of land services by bringing land services nearer to the populace to make them more efficient, cost-effective and accessible;
- The re-institution of administrative Land Tribunals to handle escalating land conflicts and land evictions; and
- The legal recognition of the dual operation of both customary system and statutory system in land rights administration, land dispute resolution and land management by empowering customary authorities to perform their functions.

Therefore, all pre- and post-construction activities undertaken by either UETCL or the contractor or both shall be coordinated with district local governments of Nwoya, Amuru, etc. taking into all interpretations provided in the Land Policy.

#### *5.1.1.11. National Water Policy (1999)*

The goal of this policy is to provide guidance on development and management of the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations. The policy aims to:

- Promote rational use of water.
- Control pollution and promote the safe storage, treatment and disposal of waste, which could pollute water and impact public health.

This policy is relevant to the Project since it requires rational use of water from streams in the project area and avoidance of contamination of water course.

### 5.1.2. *Legislative Framework*

There are a number of legislative and regulatory instruments in Uganda that address environmental management in both general and specific terms. Among these is the 1995 Constitution of the Republic of Uganda and a number of Acts. The Acts and Regulations of particular relevance to the proposed 400kV Olwiyo-Nimule interconnection project are:

- the Constitution of the Republic of Uganda, 1995
- the National Environment Act 2019
- the Environmental Impact Assessment Regulations, 1998
- the National Environment (Control and Certification of Environmental Practitioners) Regulations, 2001
- the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999
- the National Environment (Waste Management) Regulations, 2020
- the National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2001
- the Electricity Act, 1999 (and its Amendment, 2022)
- the Land Act, 1998
- the Uganda Wildlife Act, 2000
- the National Forest and Tree Planting Act, 2003
- the Historical Monument Act, 1967
- the Water Act, 1997
- the Occupational Safety and Health Act, 2006
- the Public Health Act, 1964
- the Workers Compensation Act, 2000
- the Employment Act, 2006
- the Uganda Investment Code, 1991
- the Local Government Act, 1995 (revised in 2010)

#### 5.1.2.1. *Constitution of the Republic of Uganda (1995)*

The most important instrument and supreme law in environment management and legislation in Uganda is the 1995 Constitution of the Republic of Uganda. The Constitution provides for the right of every Ugandan to a clean and healthy environment. The Constitution puts the duty to maintain a clean and healthy environment on the Parliament of the Republic of Uganda. It stipulates that Parliament shall provide measures intended to protect the environment from abuse, pollution and degradation.

The 1995 Constitution provides for:

- matters pertaining to management of land, natural resources and the environment, and the sustainable development thereof (Objective XXVII), including energy resources;
- the right of every Ugandan to a clean and healthy environment (Article 39);
- the responsibility of government to enact laws that protect and preserve the environment from degradation and to hold in trust for the people of Uganda such natural assets as lakes, rivers, wetlands, forest reserves, game reserves and national parks [Article 237(2)]; and
- the right of every Ugandan to fair and adequate compensation in instances of the compulsory acquisition of land.



#### 5.1.2.2. *National Environment Act, Cap 153 (2019)*

The main law relating to the protection of the environment in Uganda is the National Environment Act (NEA), 2019. This Act states the duty to protect and preserve the environment and provides for the establishment of measures to manage the environment for sustainable development and promotion of environmental awareness. The NEMA was created under the NEA and is mandated with the responsibility to oversee, coordinate and supervise environmental management in Uganda, including the review of environmental impact assessments carried out for various projects.

The Act outlines the principles of environmental management and the rights to a decent environment. Furthermore, the Act sets out principles for:

- Institutional arrangements
- Environmental planning
- Environmental regulations
- Environmental standards
- Environmental restoration orders and easements
- Records, inspection and analysis
- Financial provisions
- Offences
- Judicial proceedings and
- International obligations

The fifth schedule of the Act section 3 lists Exploration and Power Generation, Transmission and Distribution Infrastructure among projects requiring environmental impact assessment. The schedule specifies that any development that involves electrical infrastructure (including High voltage transmission lines and electrical substations) must be subjected to an Environmental Impact Assessment (EIA). The act requires that environmental and social impacts of the proposed project be assessed, quantified and appropriate mitigation measures be suggested to protect the environment from any form of pollution or degradation in accordance with section 110-116 of the Act.

It is therefore on the above basis that an ESIA for the 400kV Olwiyo-Nimule power line has to be conducted.

#### 5.1.2.3. *Environmental Impact Assessment Regulations (1998)*

Environmental Impact Assessment Regulations, 1998 provide for implementation of the NEA. These Regulations require that all projects listed in the third schedule of the NEA should be subjected to an impact assessment before implementation. Electrical infrastructure is identified as a Category III listed activity requiring a full ESIA. The ESIA process goes through three major stages: Screening, the ESIA study, and decision-making. The Environmental Impact Assessment Regulations, 1998 are majorly the basis for conducting the Olwiyo-Nimule ESIA.

#### 5.1.2.4. *National Environment (Control and Certification of Environmental Practitioners) Regulations (2001)*

Regulation 16(1) states that no person shall conduct an ESIA or carry out any activity relating to conduct of an environmental impact study or environmental audit as provided under the Act, unless that person has been duly certified and registered in accordance with these regulations. These Regulations apply to all persons certified and registered under the regulations as Environmental Practitioners, and corporate persons and partnerships registered under the regulations to co-ordinate individually registered persons to conduct environmental impact assessments or environmental audits. They also deal with those who wish to conduct ESIA's in Uganda.

The regulations set out the procedures of the application for certification and the code of practice and professional ethics. The practitioners have to pay prescribed fees (Fourth Schedule) before they can be fully registered.

This is a relevant provision meant to professionalize the ESIA practice in the country so that the findings of an ESIA study are authoritatively used in decision-making.

#### *5.1.2.5. National Environmental (Standards for Discharge of Effluent into Water or on Land) Regulations (1999)*

These regulations provide standards for effluent discharge. Section 6 (2) detail maximum permissible limits for 54 regulated contaminants, which must not be exceeded before effluent is discharged into water or on land. The materials used in the re-construction of the transmission line may have some of the regulated contaminants in which case the provisions become relevant in designing the ESMP.

#### *5.1.2.6. National Environment (Waste Management) regulations (2020)*

These regulations provide for the management of waste and apply to all waste classified under Schedule 2, Schedule 3 and Schedule 4 of the National Environment Act (2019).

Part II covers General provisions relating to waste management, in particular the environmental principles that a person who generates waste or a waste handler must comply with (prevent harm and ensure safety of human health, prevent pollution, use best available technologies and best environmental practices, ensure resource efficiency).

Part IV focus on the management of domestic and municipal waste, the local government responsibility and the development of a waste management plan.

Part V is about the extended producer responsibility and product stewardship (use of best available technology and processes, monitoring the product cycle, take-back of the product). Under this Part is also included the management of plastics and associated waste (including the prohibition of importation, sale and use of plastic bags and other plastics used for packaging as well as the duty to minimize plastic waste) and the management of electrical and electronic waste.

Part VI regulates the management (waste manifest, handling, storage, labelling, collection and transportation) of hazardous waste, its classification, characterization, categorization and the responsibility for its handling.

These provisions apply to the proposed 400kV Olwiyo-Nimule power line. During the construction process, domestic waste, construction material waste and those related will be generated. Management of this waste should comply with provisions of this regulatory standard.

#### *5.1.2.7. National Environment (Wetlands, River Banks and Lake Shores Management) Regulations (2001)*

These regulations provide for the management of wetlands, river banks and lake shores. Regulation 17 (1) states every landowner, occupier or user who is adjacent or contiguous with a wetland shall have a duty to prevent the degradation or destruction of the wetland and shall maintain the ecological and other functions of the wetland.

Section 12 (1) of the regulations provides that 'subject to the provisions of these regulations, a person shall not carry out any activity in a wetland without a permit issued by the Executive Director (of NEMA). Section 23 (1) (a) of the regulations require a person who intends to 'use, erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, under, or over the river bank or lake shore;' to make an application to the NEMA for Environment Impact Assessment before any such activity takes place.

The wetlands, river banks and lake shores regulations in section 34 provide that 'a developer desiring to conduct a project which may have a significant impact on a wetland, river bank or lake shore, shall be

required to carry out an environmental impact assessment in accordance with sections 20, 21 and 22 of the National Environment Act’.

The proposed 400kV Olwiyo-Nimule power line diversion could potentially affect streams and few wetland systems in both Nwoya & Amuru districts. For the intended project to comply with this regulation, the developer (UETCL) is required to secure a permit from NEMA before construction of the transmission line across those wetlands which can be affected.

#### 5.1.2.8. *Electricity Act Cap 145 (1999)*

The Electricity Act 1999 provides for the need to protect the environment during consideration, development and operation of Electricity supply projects. The Act, established the Electricity Regulatory Authority (ERA), as a statutory body mandated to regulate all aspects of the electricity industry in Uganda. Section 10 of the Electricity Act, 1999, clearly defines ERA’s mandate as regulator and comprises 19 specific functions.

S.50 (2) makes it a condition to follow procedures laid down in the National Environment Act, 1995 (CAP 153 of the Laws of Uganda) during removal of installations considered inappropriate for further operations of the plant/activity.

Furthermore, Section 68 of the Electricity Act, 1999 outlines procedures and conduct of licensee during placement and maintenance of any electricity supply lines in, over or upon any land. Subsection (3) requires the licensee to make as little damage as possible to land and to the environment and should ensure prompt payment of fair and adequate compensation to all interested persons for any damage or loss sustained by the placement and maintenance of any electricity supply lines in, over or upon any land. The Electricity Act, 1999 gives adequate guidelines for the conduct of a licensee and recognizes the need to make good any damage and notice to those who may be affected by the project activities.

The proposed 400kV Olwiyo-Nimule power line ESIA adequately covers these provisions. The mitigation measures for foreseeable impacts shall be detailed in the ESMP.

#### 5.1.2.9. *Electricity (Amendment) Act, 2022*

The Electricity (Amendment) Act, 2022 of Uganda was enacted into Law in May 2022 to amend certain provisions of the Electricity Act (the Principal Act) of 1999. The amendment was necessitated by certain inconsistencies in the law including: lack of flexibility in implementation of the Principal Act, lack of streamlined operations of the electricity sector, failure to effectively address issues relating to the responsibilities of institutions, inadequate compliance enforcement mechanisms, insufficient penalties for electricity theft and, vandalism of electrical facilities, etc. Furthermore, all purchase of electricity generated in Uganda is carried out by a single entity whose network does not cover the entire country. In addition, successor companies to the Uganda Electricity Board, are mandated to report to the Minister for Finance as opposed to the Minister for Electricity, thereby posing significant bottlenecks to the management of electricity throughout the country.

The Ugandan Electricity (Amendment) Act is a welcome development with key provisions including the expansion of the recognized mix of renewables and provision for the utilization of feed in tariffs, net metering provisions, penal repercussions for electricity theft and vandalism,

The Act amends section 5 of the Principal Act which relates to the appointment of ministers. It promotes gender equality by stating that one-third of the members of the Ministry must be women. Gender perspective is a globally recognized issue, considering that some issues and constraints related to energy projects success are gender specific. As such, this is a welcome development in promoting gender main streaming in the energy sector of Uganda.

#### 5.1.2.10. Land Act Cap 227 (1998)

The Land Act, Cap 227 provides that the Government or the local government shall hold land in trust for the people and protect natural lakes, ground water, natural streams, wetlands and any other land reserved for ecological purposes for the common good of the citizens of Uganda.

A local government may, upon request to the government, be allowed, to hold land in trust for the people and the common good of the citizens of Uganda. Section 40 (1) points out issues to be addressed during acquisition of land. It spells out that, no person shall:

- sell, exchange, transfer, pledge, mortgage or lease any land;
- enter into any contract for the sale, exchange, transfer, pledging, mortgage or lease of any land; and give away any land, or enter into any other transaction in respect of:
  - land on which the person ordinarily resides with his or her spouse, and from which they derive their sustenance, except with the prior written consent of the spouse;
  - land on which a person ordinarily resides with his or her dependent children of majority age, except with the prior written consent of the dependent children of majority age;
  - land on which a person ordinarily resides with his or the children below the age of the majority, except with the prior written consent of the Committee; and
  - land on which ordinarily reside orphans below majority age with interest in inheritance of the land, except with the prior written consent of the Committee.

Sections 43, 44 and 45(1) and (2) of the Land Act (1998), provides that national or local government may acquire land in accordance with the provisions of Article 26 and clause (2) of Article 237 of the Constitution of the Republic of Uganda.

The Act furthermore requires any person who owns or occupies land to manage and utilize it in accordance with the National Environment Act Cap 153 and any other laws binding.

Enforcement of the Land Act guidelines is through the Land Regulations (2001). The Regulations give details on matters such as application for Certification of Occupancy, converting leasehold into freehold system, formation of Community Land Associations, procedures for paying annual ground rent.

Part III sections 43, 44, and 45 specifically address the utilization of land in accordance with the various statutes and acts of environmental concern, which include the National Environment Act, The Water Act, and any other law passed by a competent authority. In addition, section 45 addresses the control of environmentally sensitive areas.

The relevant provisions of this act are very crucial under the proposed 400kV Olwiyo-Nimule power line because, several individuals are likely to be displaced and/or inconvenienced during the construction and operation of the project. Furthermore, amongst these communities are women and children whose rights to family land have to be protected. The mitigation measures in the ESMP shall adequately cover possible impacts.

#### 5.1.2.11. Uganda Wildlife Act, Cap 200 (2000)

The main objective of the Uganda Wildlife Act, Cap 200 of 2000 is to protect wildlife resources and enable derivation of benefits. The need for sustainable management of wildlife resources is captured within the framework of effective planning and stakeholder participation. The Act allows local community involvement and opens up wildlife management to the non-governmental/private sector by making it possible for the private sector to manage protected areas / wildlife and provide services.

The Uganda Wildlife Act provides for, inter alia, the sustainable management of wildlife, and establishes the Uganda Wildlife Authority (UWA) as the body mandated with the co-ordination, monitoring and supervision of wildlife management. It does so in partnership with neighbouring communities and stakeholders. It was established as a result of a merger between the Uganda National Parks and the Game Department.

Wildlife is defined by the Act to mean any wild plant or wild animal or species native to Uganda and includes wild animals that migrate through Uganda.

Considering that much of the line will go through remote section of the countryside involving clearing of vegetation, and excavation of land to create anchor transmission towers, the Act is quite relevant, and applicable provisions should be complied with.

The Act in S.15 (1) & (2) requires that any developer desiring to undertake any project which may have significant impact on any wildlife species or community undertakes an ESIA in accordance with the National Environment Act.

#### *5.1.2.12. National Forest and Tree Planting Act (2003)*

This Act makes provision for the conservation, management and development of forest resources in Uganda and establishes the National Forestry Authority and a fund for tree planting. The purposes of the Act include the creation of an integrated forest sector, conservation of biological diversity, the devolution of functions and powers in the forest sector and the sustainable development of that sector. Forests in Uganda are classified as: (a) central forest reserves; (b) local forest reserves; (c) community forests; (d) private forests; and (e) forest forming part of a wildlife conservation area declared under the Uganda Wildlife State, 1996. The Act provides for the declaration and management of central forest reserves, local forest reserves and community forests. Private forests and forest plantations may be registered with the District Land Boards. Management plans shall be prepared for central forest reserves, local forest reserves and community forests.

The Act further makes provision for, among other things: the protection and conservation of forest biological resources and the declaration of reserved or protected tree species; protection of forest reserves against human activities; inventory of forests; tree planting and growing; forestry licences; trade in forest produce; administration of forest resources; the establishment of the National Forestry Authority as a body corporate and regulation-making powers of the Minister.

Section 38 provides that a person intending to undertake a project or an activity which may, or is likely to have significant impact on forests shall undertake an EIA.

#### *5.1.2.13. Historical Monument Act, Cap 46 (1967)*

The existing law relating to archaeological sites in Uganda is the Historical and Monuments Act, 1967, which the Commissioner for Antiquities and Museums has currently placed under review.

The Act provides for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical, and traditional interest. Under this Act, the minister responsible may cause any of the aforesaid objects to be declared as preserved objects.

The Act prohibits any person from carrying out activities on or in relation to any object declared to be preserved or protected. Section 10 of this Act spells out the procedures and requirement to declare and inspect newly discovered sites that may have archaeological, paleontological, ethnographical, historical and traditional significance for purposes of protection.

Whereas there were no sites of archaeological, paleontological, ethnographical, historical and traditional significance identified in the power line corridor, chance findings may be encountered. Moreover, along the proposed route corridor graves might be found, which are revered traditional sites. The developer is urged to exercise due diligence and apply a Chance Find procedure where historical property and other related activities are discovered in any way during construction of the 400kV Olwiyo-Nimule power line.

#### *5.1.2.14. Water Act Cap 152 (1997)*

The objectives of the statute are, inter alia, to allow for the orderly development and use of water resources for purposes other than domestic use, such as irrigation and agriculture, in ways that would minimize harmful effects to the environment.

According to Part II (Water Resources) of Water Act, the Minister and the Director are responsible for the implementation of this Act which provides for:

- The use, protection and management of water resources and supply;
- Provide constitution of water and sewage authorities;
- Facilitating devolution of water supply and sewerage undertakings.

According to section 18 (1) of this Act, no person is allowed to construct or operate any water works unless authorized under this act to do so. Thus, this act will be applicable since some water sources (rivers, wetlands) will be crossed.

#### *5.1.2.15. Occupational Safety and Health Act (2006)*

The Occupational Safety and Health Act of 2006 consolidate, harmonize and update the law relating to occupational safety and health and repeals the Factories Act of 1964. The Act provides for the health, safety, welfare and appropriate training of persons employed in work places.

During the construction and operation of the proposed transmission line, safety, welfare and training will be of paramount importance. Precautionary measures on Occupational Safety and Health shall be stipulated in the ESMP.

#### *5.1.2.16. Public Health Act Cap 281 (1964)*

Section 7 of the Public Health Act Cap 281 provides local authorities with administrative powers to take all lawful, necessary and reasonably practicable measures for preventing the occurrence of, or for dealing with any outbreak of, any infectious communicable or preventable disease in order to safeguard and promote the public health.

Section 105 of the Public Health Act (1964) imposes a duty on the local authority to take measures to prevent any pollution that is dangerous to the health to enter any water supply that the public has a right to use for drinking or domestic purposes. The Act further details the location of waste disposal facilities such as solid waste skips and septic tanks in relation to settlements and food points.

During the construction and operation of the proposed 400kV Olwiyo-Nimule power line, some activities may lead to contamination of the water supplies or spread of communicable diseases. Appropriate mitigation measures shall be suggested in the EMP.

#### *5.1.2.17. Workers Compensation Act (2000)*

The Workers compensation Act, 2000 provides for the provision of financial compensation for work related injury or illness.

#### *5.1.2.18. Employment Act (2006)*

The Employment Act 2006 shall be the governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, management and compensation of workers. The premise of Employment Act 2006 is the provisions of Article 40 of The Constitution of Uganda. The Act mandates Labour Officers to inspect regularly the working conditions of workers to ascertain that the rights of workers and basic provisions are provided and workers' welfare is attended to. The Act also provides for the freedom of association of workers permitting workers to join labour organizations. This provision is also supported by the Labour Unions Act 7, 2006, which provides elaborate guideline and regulation for membership.

Other laws related to workers' safety, social security and protection worth noting include:

- the Labour disputes (Arbitration and settlement) Act, 2006
- the Workers' Compensation Act, Cap 225
- the National Social Security Act Cap 222, and
- the Labour Unions' Act, 2005.

#### 5.1.2.19. Uganda Investment Code (1991)

The Code makes legal provision for both local and foreign investments in Uganda. It seeks to provide more favorable conditions for investment in the country and promotes the contribution to locally or regionally balanced socio-economic development. It establishes the Uganda Investment Authority to provide for other related matters. Utilization of local materials and the introduction of modern technology as well as the improvement of indigenous technology require a Developer to carry out an EIA of the likely impacts of implementing these technologies. The Olwiyo-Nimule proposed development is still in line with this law.

#### 5.1.2.20. Local Government Act (1995, revised in 2010)

This Act provides the legal foundation of the Government policy on decentralization and devolution of functions, powers, and services to Local Governments. Under this Act, district and lower local councils are given the responsibility to manage their natural resources including environment at the local government level. District natural resources committee are created and made responsible for environmental issues at district level.

Thus, Local Governments will be involved and consulted in the ESIA process and will be involved in issues of land acquisition, compensation and environmental and social monitoring and compliance in this project. They will be responsible for environmental and social monitoring during construction and operation of the power transmission line. Local government officers whose contributions should be sought for during project implementation must include social staff such as Gender Officers, Community Development Officers, Probation Officers (for prevention and management of penal infractions by Project workers, for example child abuse risks), as well as Labour Officers.

**5.1.3. International Conventions**

In addition to compliance with regulatory requirements, the Project will also adhere to the international conventions ratified by Uganda. Key conventions and treaties potentially relevant to the Project are outlined in Table 5-1. Other important international instruments relevant to the Project are also outlined in Table 5-2.

*Table 5-1 – International Treaties, Conventions or Agreements relevant to the Project.*

Treaty, Convention, Agreement	Requirement of the Treaty, Convention, and Agreement	Relevance to the Project
<b>International Labour Organisation's Fundamental Conventions</b>	Labour, working conditions, health and safety are the subject of numerous international agreements, conventions, policies and standards. Fundamental labour standards formulated by the International Labour Organisation (ILO) include forced labour, child labour and workmen’s compensation among others.	Labour policies for the Project and impact mitigation measures for employment should be in accordance with the requirements of these Conventions.
<b>African Convention on the Conservation of Nature and Natural Resources (1968, revised in 2013)</b>	The convention aims at enhancing environmental protection, conservation and sustainable use of natural resources in Africa in accordance with the scientific principles and with due regard to the best interest of the people. The convention further identifies water as a critical resource which needs to be maintained at quantitative and qualitative levels.	Project planning should ensure that the project takes appropriate measures to minimize potential impacts on biodiversity by putting in place measures to control siltation of water bodies and wetlands, disorientation of migrating birds and hunting/illegal exploitation of wildlife resources by contracted teams.
<b>Convention on Wetlands of International Importance especially as waterfowl habitat (RAMSAR), 1971</b>	The Convention is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value. It advocates the conservation of flora and fauna, and especially waterfowl by combining national policies with international actions. It was signed at Ramsar, Iran on 2 <sup>nd</sup> February 1971 and amended by the protocol of 3 <sup>rd</sup> December 1982. Further amendments were done on 28 <sup>th</sup> May 1987.	The implementation of the project shall promote the conservation of wetlands and waterfowl in case of project areas within wetlands.



Treaty, Convention, Agreement	Requirement of the Treaty, Convention, and Agreement	Relevance to the Project
<b>Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) – UNESCO, 1972</b>	The Convention sets out the duties of States Parties 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 States Parties are encouraged to integrate the protection of the cultural and natural heritage into regional planning programmes, set up staff and services at their sites, undertake scientific and technical conservation research and adopt measures which give this heritage a function in the day-to-day life of the community	The convention will be relevant to the protection of cultural heritage (if any) that may be identified in the project areas during project implementation.
<b>The African Convention on the Conservation of Nature and Natural Resources, 1968</b>	Encourage conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.	This will be relevant to the conservation, utilization and development of soil, water, flora and fauna within the interconnection project areas.
<b>Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973</b>	This convention seeks to ensure that international trade in species of wild fauna and flora does not threaten their survival in the wilderness.	This Convention will be relevant to prevention of poaching of wildlife in wildlife conservation areas imprinted by EASP project activities.
<b>Vienna Convention on the Protection of the Ozone Layer (1985) and Montreal Protocol on Substances that Deplete the Ozone Layer (1987)</b>	Parties should take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from destruction of the Ozone layer.	The Proposed Project should undertake measures to minimise emissions that deplete the Ozone layer by locally sourcing for materials that are required for the project to avoid long overland transportation of imported materials.

Treaty, Convention, Agreement	Requirement of the Treaty, Convention, and Agreement	Relevance to the Project
<p><b>Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (Basel Convention), 1989</b></p>	<p>The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. The provisions of the Convention aims to:</p> <ul style="list-style-type: none"> <li>- the reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal;</li> <li>- the restriction of transboundary movements of hazardous wastes except where it is perceived to be in accordance with the principles of environmentally sound management; and</li> <li>- a regulatory system applying to cases where transboundary movements are permissible.</li> </ul>	<p>The project implementation shall be conducted in accordance with the provisions of the convention, i.e. reduction in the production of hazardous waste, sound environmental management, restriction of transboundary movements, etc.</p>
<p><b>Convention on the Rights of the Child (1989)</b></p>	<p>The Convention is the most comprehensive compilation of international legal standards for the protection of the human rights of children. It acknowledges children as individuals with rights and responsibilities according to their age and development, as well as members of a family or community. This includes non-discrimination, the best interest of the child, the right to life, survival and development and the right to participation.</p>	<p>Activities associated with the development of project such as construction activities will require semi-skilled and unskilled labour that pose a potential risk of engaging child labour.</p>
<p><b>Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, 1991</b></p>	<p>Requires party states to use legal, administrative and other measures to prevent the import of hazardous waste into Africa from non-contracting parties. All signatories to the Convention are required to impose strict, unlimited liability as well as joint and several liabilities on hazardous waste generators; ensure that environmentally sound treatment and disposal facilities for hazardous wastes are located, to the extent possible, within its jurisdiction; and ensure that persons managing hazardous wastes take all actions necessary to prevent pollution arising from the management of such wastes.</p>	<p>Hazardous waste generated during the implementation of the proposed Project and therefore there is need for compliance with the requirements of this Convention.</p>

Treaty, Convention, Agreement	Requirement of the Treaty, Convention, and Agreement	Relevance to the Project
<b>UN Convention on Biological Diversity, 1992</b>	Its objectives are to conserve biological diversity or (biodiversity), promote the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and technologies, and by appropriate funding (Article 1).	Uganda has a lot of biodiversity and Wildlife outside protected areas. Project planning should ensure that the project takes appropriate measures to minimise potential impacts on biodiversity and key habitats that may occur in areas earmarked to host project components.
<b>United Nations Framework Convention on Climate Change (UNFCCC), 1992</b>	The Convention seeks to regulate levels of greenhouse gases (GHGs) concentration in the atmosphere, so as to avoid the occurrence of climate change at levels that would harm economic development, or that would impede food production. The Convention is founded on the principle that contracting parties should take action, in respect of their economic and social activities, and with regard to the Convention’s specific requirements, that will protect the global climate to ensure sustainable development. Under Article 3 (3) parties are required to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	The interconnection project is expected to enhance the exploitation of renewable energy sources and therefore help to reduce the energy generation related emissions, thus contributing to the country’s Greenhouse Gas reduction. This among other things is designed to ensure that Uganda adopts a sustainable and low-carbon growth pathway while also supporting the country’s vision to increase Ugandans’ household incomes and improve their quality of life.

Treaty, Convention, Agreement	Requirement of the Treaty, Convention, and Agreement	Relevance to the Project
<p><b>The Treaty of the East African Community (1999)</b></p>	<p>The objective of this protocol is to provide for EAC joint effort to co-operate in efficient and sustainable use and management of natural resources and promote adaptation to climate change.</p> <p>Articles 111 and 112 of the EAC Treaty provide for conservation and management of environmental and natural resources. They require member states to take measures to control trans-boundary air, land and water pollution arising from development activities and take necessary disaster preparedness, management, protection and mitigation measures especially for the control of natural and man-made disasters.</p>	<p>The protocol will be relevant in promoting efficiency and sustainable use and management of the natural resources in a way that promotes adaptation to climate change mainly through the use clean energy.</p> <p>River Nile is a transboundary water resource shared between Uganda and South Sudan; therefore, measures should be undertaken to minimise/prevent pollution of surface water resources within the Nile Basin during the development of the project.</p>
<p><b>Stockholm Convention on Persistent Organic Pollutants, 2001</b></p>	<p>The Stockholm Convention is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs) of which Uganda became a party in October 2004. Key elements of the Convention include the requirement that developed countries provide new and additional financial resources and measures to eliminate production and use of intentionally produced POPs, eliminate unintentionally produced POPs where feasible, and manage and dispose of POPs wastes in an environmentally sound manner.</p>	<p>Under this treaty, several chemicals were identified as POP of which Polychlorinated biphenyls (PCBs) normally used in transformers are among other chemicals that were identified for elimination. Therefore, in accordance with the provisions of the Stockholm convention, all transformer oils and other oils used under this project shall not contain PCBs. Adequate provisions shall be put in the EMP to ensure that it meets the requirements of these conventions.</p>

Treaty, Convention, Agreement	Requirement of the Treaty, Convention, and Agreement	Relevance to the Project
<p><b>Convention for the Safeguarding of the Intangible Cultural Heritage, 2003</b></p>	<p>The objectives include to: safeguard the intangible cultural heritage, ensure respect for the intangible cultural heritage of the communities, groups and individuals concerned and raise awareness at the local, national and international levels regarding the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof.</p>	<p>The people of Uganda have a number of customs and beliefs that may entail tangible and intangible cultural heritage. Additionally, there could be graves/burial areas in sites that are earmarked to host project components. The implementation of the project should consider the potential impact on cultural heritage in the project area and implement measures to safeguard them where they exist.</p>
<p><b>Paris Agreement, 2015</b></p>	<p>Its goal is to limit global warming to well below 2 degrees Celsius, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.</p>	<p>The project will be deploying clean technologies or low carbon project interventions that are critical for reversing the effects of climate change.</p>

Table 5-2 – Other important international instruments relevant to the Project.

Title	Description	Relevance to the Project
<p><b>Africa Agenda 2063</b></p>	<p>This is Africa’s transformation plan over the next 50 years and sets out a number of aspirations that are to be realised during that period. The agenda has since been adopted by the African Union (AU), within the global context of the Sustainable Development Goals (SDGs).                      The following action items that are applicable to Uganda:</p> <ul style="list-style-type: none"> <li>- Develop strategies to grow African Green Economies. This action item is directly linked to SDG 12 (Responsible consumption and production);</li> <li>- Act with a sense of urgency on climate change and the environment. The AU proposes implementing the Programme on Climate Action in Africa, which includes, for example, climate resilient agricultural development programme, sustainable forest management programmes, national adaptation plans, systems and structures, etc.</li> </ul> <p>Each of these action items will support Uganda’s sustainable development, helping to mitigate climate change and adapt to its impacts.</p>	<p>The agenda promotes the development of infrastructure which is in tandem with proposed Project. The project will lead to the development of electricity infrastructure in Uganda.</p>
<p><b>The 2030 Sustainable Development Goals (SDGs)</b></p>	<p>The SDGs were formally adopted by Uganda and other member states in September 2015 as an integral part of the 2030 Agenda on Sustainable Development. Among other things, the document contains a set of 17 SDGs and 169 accompanying targets. These were further elaborated through indicators focused on measurable outcomes. SDG indicators and targets are to be integrated in the appropriate Sector and Local Government Plans and budgets coupled with implementation, monitoring and evaluation frameworks.</p>	<p>Development of the proposed project should comply with SDG 9 (industry, innovation and infrastructure). Additionally, this project will lead to economic growth of Uganda (SDG 8 – Decent work and Economic growth) and contribute to reduction of poverty levels (SDG 1 - No poverty and SDG 10 – Reduced Inequalities). Furthermore, the project shall and provide energy to remote areas, contributing to achievement of SDG 7 (Affordable and clean Energy) and promote a</p>

Title	Description	Relevance to the Project
<p><b>NBI Gender mainstreaming Policy and Guidelines, 2012</b></p>	<p>The purpose of the NBI gender mainstreaming Policy and Strategy is to achieve gender equality and women’s empowerment in all NBI policies, strategies, processes, programs and projects through capacity building, rationalization and harmonization, research, resource mobilization, partnership development and advocacy.</p> <p>Guiding principles for the implementation of the NBI Gender mainstreaming Policy and Strategy:</p> <ul style="list-style-type: none"> <li>a) Gender Equality and non-discrimination: Working towards equity and justice by ensuring that everyone irrespective of sex, age, race, color, ethnicity, class and religion has an equal opportunity to express and utilize her/his potential;</li> <li>b) Gender mainstreaming: Taking into account gender concerns systematically from planning through implementation strategies and programs to outcomes;</li> <li>c) Inclusiveness: this policy stresses paying attention to special needs and the disadvantaged groups;</li> <li>d) Partnership and collaboration of all stakeholders at all levels;</li> <li>e) Sensitivity to socio-cultural diversity in the Nile Basin region.</li> </ul>	<p>reduction of carbon emissions (SDG 13 – Climate action).</p> <p>The strategy forms an integral part of projects activities and aims at providing a view of the gender goals and to facilitate a process of learning and increased capacity to analyze and mainstream gender in the course of the work.</p>
<p><b>NELSAP Preliminary Environmental and Social Management Framework, 2009</b></p>	<p>This Environmental and Social Management Framework (ESMF) lays down the guiding principles and procedures for addressing environment and social concerns during the preparation and the implementation of NELSAP investment projects.</p> <p>The objectives of the ESMF therefore include the following: (i) to establish clear procedures and methodologies for the environmental and social planning, review and approval of the projects to be prepared under NELSAP; (ii) specify roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring</p>	<p>The ESMF recognizes the laws, regulations as well as national policies on environment and social issues and relevant World Bank safeguards. The ESMF includes procedures for screening all the projects to be prepared for environmental issues and impacts using national as well as International frameworks.</p>

Title	Description	Relevance to the Project
	environmental and social concerns related to projects; (iii) determine the training, capacity building needed to successfully implement the provisions of the ESMF and (iv) establish the project financing required to implement the ESMF.	
<b>Nile Basin Initiative (NBI) Strategic Action Program, 1999</b>	The NBI's Strategic Action Program is made up of two complementary programs: the basin-wide <i>Shared Vision Program</i> to build confidence and capacity across the basin, and <i>Subsidiary Action Programs</i> to initiate concrete investments and action on the ground at sub-basin levels. The <i>Shared Vision Program (SVP)</i> , which focuses on building regional institutions, capacity, and trust, lays the foundation for unlocking the development potential of the Nile. The <i>Subsidiary Action Programs (SAP)</i> are investment-oriented programs aimed to implement on the ground actual development projects at sub-basin level. These programs operate in two distinct sub-regions, the Eastern Nile Region and the Nile Equatorial Lakes Region.	This Project was prioritized by the Governments of Uganda and South Sudan under Nile Basin initiative (NBI) and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) for Scaling up the NELSAP Power Program following the Study for Hydropower Expansion Plan. It is within this background that the NELSAP/Nile Basin Initiative was mandated in the signed Inter Governmental MOU of 2015 between and the Governments of Uganda and South Sudan to mobilize financing of the project.
<b>Vulnerable and Marginalized Groups Framework</b>	A Vulnerable and Marginalized Groups Framework is developed when a proposed project design is not yet finalized so that it is impossible to identify all of the adverse impacts, as is required to prepare a Vulnerable and Marginalized Groups Plan (VMGP). The VMGF is used to qualify for funding from the World Bank and following best practice documented in the World Bank's Environmental and Social Policy for Investment Project Financing (ESS7).	The Project implementing agency will identify the individuals and groups who might be vulnerable and at risk of suffering adverse, compounded or disproportionate impacts, be discriminated against, marginalized, under-served or excluded from intended benefits in the given operation/project context (The same as "OS 7: Vulnerable Groups" section). The Project aims to help Marginalized and vulnerable groups to have access to energy.
<b>East African Community (EAC) Gender Policy, 2018</b>	This Policy provides a framework, intended to accelerate the realization of gender equality, fairness between men and women, non-discrimination and fundamental rights in East Africa. The Policy	Gender, Energy and Lighting is a priority action area of the Gender policy, and the commitment of



Title	Description	Relevance to the Project
	<p>framework is a tool to facilitate the advancement of East Africa’s political and social economic integration, guarantee that gender issues are included in the East African Community agenda, accelerate gender mainstreaming, contribute to higher living standards and enhance the efforts exerted by the East African people to play their rightful role in a globalizing world.</p> <p>The EAC is committed to increase access to affordable energy for men and women in order to increase economic development and improve standards of living.</p>	<p>increasing access to energy for men and women is expressed in the Project.</p>
<p><b>The IGAD Regional Gender Equality Strategy (2023-2030)</b></p>	<p>The IGAD Gender Equality Strategy sets the strategic framework for priority interventions areas of the implementation of IGAD's Vision 2050 and builds on several ongoing programs established to develop resilient ecosystems and economic growth. The gender strategy outlines an approach that intends to translate IGAD’s commitments to gender equality, inclusion, and empowerment into demonstrable results and impacts. The priorities of the strategy include:</p> <ul style="list-style-type: none"> <li>• Increase women’s participation in sustainable management of natural resources, resilience building, food, and nutrition security;</li> <li>• Advance gender equality in regional trade and economic integration;</li> <li>• Increase equitable access to health and basic social services for gender transformation;</li> <li>• Increase the participation of women in peace building and conflict management and protect women living in situations of conflict;</li> <li>• Advance efforts to eliminate all forms of violence against all women and girls in public and private spheres, including trafficking, sexual exploitation, and all other forms of exploitation;</li> </ul>	<p>The Project aims to promote gender equality in regional trade and economic integration by improving energy accessibility in remote areas. This will enable women to start new trades at a local level or connect existing ones to the rest of the country. Availability of energy will also improve the access of women to technology, education and health.</p>

Title	Description	Relevance to the Project
	<ul style="list-style-type: none"> <li>Strengthen IGAD’s institutional capacity for leadership and coordination of Gender Equality and Women’s Empowerment interventions.</li> </ul>	
<b>The African Development Bank Group Gender Strategy (2021-2025)</b>	<p>The African Development Bank has made gender equality and women central to its activities through developing and implementing strategies that integrate women’s concerns into the Bank’s internal and external operations and engagement. The Gender Strategy 2021-2025 will prioritize the need to reduce gender inequalities across Africa by increasing access to finance and technical assistance, enhancing technical skills and gender-responsive infrastructure. In recognition of the opportunity to further enhance gender equality and women and girl’s empowerment on the continent, the Bank, through its High 5s, intends to accelerate the continent’s economic and social transformation. The 5s are: Light up and Power Africa, Feed Africa, Industrialize Africa, Integrate Africa, Improve the Quality of Life for the People of Africa.</p>	<p>In a country such as South Sudan, where gender inequalities are prevalent, this Project will provide women in relatively isolated areas with access to electricity. This resource will contribute to the development of their local businesses and economy, ensuring a higher level of security. The Project is placed into the first High 5, Light up and Power Africa, with the aim of empowering women increasing access to social services through infrastructure and creating job opportunities.</p>

## 5.2. Institutional Framework

The relevant institutional actors in the Project's environmental assessment and resettlement process are presented in the following.

### 5.2.1. National Environmental Management Authority (NEMA)

The National Environment Act provides for establishment of NEMA as the principal agency responsible for coordination, monitoring and supervision of environmental conservation activities. NEMA is under the Ministry of Water and Environment (MWE) but has a cross-sectoral mandate to oversee the conduct of EIA through issuance of EIA guidelines, regulations and registration of practitioners. It reviews and approves environmental impact statements (EIS) in consultation with any relevant lead agencies. NEMA's enforcement branch is the department of Monitoring and Compliance. It is responsible for ensuring that enterprises comply with the various environmental regulations and standards. NEMA has appointed environmental inspectors whose powers and duties are spelled out in Section 81 of the National Environment Act and can include stopping any activity which pollutes the environment. The environmental inspector may also issue an improvement notice requiring an operator of any activity to cease any activities deleterious to the environment which are contrary to the Act. NEMA has power; to prosecute environmental offenders and offences committed under the National Environment Act may earn the offender fines and prison sentences. NEMA works with District Environment Offices and Local Environment Committees at local government level, which undertake inspection, monitoring and compliance enforcement on its behalf. Therefore, NEMA will review all EIAs and Project Briefs prepared in respect of this project.

### 5.2.2. Environmental Liaison Units in Ministries

NEMA is linked to sectoral lead agencies, private organisations and educational institutions through Environmental Liaison Units (ELUs). ELUs are charged with implementation of environmental programmes and integration of environmental concerns in sectoral policies, laws, regulations and programs. Consequently, they monitor investment programmes at their respective sectoral levels. Therefore, relevant ELU's are stakeholders in the Project and will have input into the EIA process. Such units include those at Ministry of Energy, Electricity Regulatory Authority, Makerere University, some NGOs such as Nature Uganda among others.

### 5.2.3. Ministry of Energy and Mineral Development (MEMD)

The Ministry is responsible for the energy sector, dealing specifically with policy formulation, policy implementation and monitoring. In 1999, following approval by cabinet of the Power Sector Reform and Privatization Strategy and enactment of new electricity law (The Electricity Act, 1999), Electricity Regulatory Authority (ERA) was established to regulate the energy sector. Thus, while the MEMD formulates policy, ERA is charged with the mandate of regulating the energy sector, independent of the Ministry. Therefore, Implementation of the Project will be by UETCL which is overseen by MEMD. Although MEMD has an environmental monitoring department which oversees environmental issues in energy projects, it may not be in position to adequately supervise all energy projects being undertaken by the government currently.

### 5.2.4. Electricity Regulatory Authority (ERA)

The Electricity Regulatory Authority (ERA) is a statutory body established in accordance with the Electricity Act of 1999 (CAP 145) as an agency of the Ministry of Energy and Mineral Development. The mandate of ERA is "to provide for the generation, transmission, distribution, sale and use of electricity" in Uganda; to guide the liberalization of the electricity industry; and to manage licensing, rates, safety and other matters concerning the electricity industry. The main functions of ERA include:

- Issuing licenses for generation, transmission, distribution, of electricity processing applications for investors in the energy sector;
- Enforcement of requirement under the Act to ensure compliance with regulations;
- Establishing tariffs, reviewing, and approving rates of investment in the electricity sector;
- Advising the minister regarding the need for electricity projects; and
- Developing and enforcement of energy standards.
- ERA will ensure that, the operations costing of energy from the planned project will be in accordance with its set standards and tariffs.

Therefore, ERA will license this project for its development and operation. ERA also has an environment unit which monitors environmental compliance in energy projects. This department is said to be adequately staffed.

#### **5.2.5. Uganda Electricity Transmission Company Limited (UETCL)**

Uganda Electricity Transmission Company Limited (UETCL) is a Public Limited Company which was incorporated in March 2001 as a result of the power sector reform and liberalization policy that unbundled Uganda Electricity Board (UEB) into successor companies. The Company operate under policy guidance of the Ministry of Energy and Mineral Development. UETCL's mission is to dispatch, transmit quality and reliable bulk power in a viable and efficient manner; be an efficient and commercially focused single buyer actor and mitigate emergency power situations in Uganda. The mandate of UETCL is to develop and implement national strategic plan as the appointed "Single Buyer Actor" in the power market. UETCL operational licenses require it to:

- Operate its Operation of High Voltage Transmission Grid (HVTG) facilities in compliance with the Grid code that involves promoting and developing policies and programs to achieve high level quality and reliable HVTG services in accordance with the Electricity Act.
- Operate the national power system with the objective of dispatching available electricity to meet load requirements at the lowest cost for customer service, maintaining system integrity and reliability.
- Purchase power to provide continuous and economic supply of electricity to meet the load requirement for customers served directly or indirectly from HVTG facilities at lowest reasonable cost.
- Import and export electricity power to neighbouring countries pursuant to the terms of the agreement(s) for such international power transactions.

It is the mandate of UETCL to transmit power to and from different substations in the national grid and in this regard, UETCL is the Developer for the Olwiyo-Nimule transmission line and will be responsible for its construction, operation and maintenance including the substations. UETCL has an environment department headed by the Principal Environment Officer. This department is well financed, staffed and has all the technical and financial capacity to monitor environmental issues under this project.

#### **5.2.6. Local Government Administration Structures**

The Local Governments Act, Cap 243 provides for decentralized governance and devolution of central government functions, powers and services to local governments that have their own political and administrative structures. Districts have powers to oversee implementation of development activities under supervision of their relevant departments such as environment, lands and water resources. District and Local Council administration of Nwoya and Amuru will be vital in implementation of the project by mobilizing political goodwill and sensitizing local communities. Local administration leaders e.g. District Environmental Officers (DEO) will also play role in environmental monitoring associated with project construction and operation. District and Local Council administrations are stakeholders in the

Project and will have input into the EIA process as well as subsequent monitoring. For example, DEOs will review the project EIA and provide guidance about local conditions to NEMA prior to approval decision. Environment departments at districts are overwhelmed with work due to understaffing and poor facilitation. These departments should be strengthened to ensure environment issues listed in the EMP are well managed, implemented and or monitored.

#### **5.2.7. Uganda Wildlife Authority (UWA)**

The UWA is a corporate body operating under the Ministry of Tourism, Wildlife and Antiquities. It was established by the Uganda Wildlife Act, Cap 200, which merged the then Uganda National Parks (NP) and Game Department (GD). Its main function is to ensure sustainable management of wildlife in conservation areas by coordinating, monitoring and supervising issues of wildlife management. The Wildlife Act places ownership of all wildlife in the country in the hands of the state, meaning that UWA has authority to manage wildlife in both protected and unprotected areas. Wildlife is defined as wild plants and wild animals of a species native to Uganda. For increased management effectiveness and to allow for greater community participation, UWA has zoned Uganda into six areas.

#### **5.2.8. National Forestry Authority (NFA)**

The NFA is a corporate body operating within the Ministry of Water and Environment. It was created in 2003 under section 52 of the National Forestry and Tree Planting Act and was launched on April 26<sup>th</sup>, 2004 to replace the Forest Department. The NFA is becoming largely self-supporting through collection of fees and revenue obtained from managing forests. It can assist the Project in identifying mitigation or compensation measures where clear-cutting of forested areas will be necessary. The National Forestry Authority's (NFA) main role is to manage Central Forest Reserves on a sustainable basis and supply high quality forestry-related products and services to communities and stakeholders. Therefore, as manager of central forest reserves traversed by the project, NFA should be involved during works in forest reserves. NFA should also have a role in the implementation of planned restoration of forest reserves under the project.

#### **5.2.9. Ministry of Gender, Labour & Social Development (MGLSD)**

Ministry of Gender, Labour & Social Development (MGLSD) is responsible for coordinating social development in Uganda. In collaboration with other stakeholders, MGLSD is responsible for inspecting state of occupational safety, labour relations, community empowerment, protection and promotion of rights and obligations of vulnerable groups for social protection and gender-responsive development. Therefore, MGLSD is a stakeholder in the project and will be responsible for inspecting the project for compliance with occupational health and safety regulations, national labour laws and gender equity. The District Labour Officer and District Community Development Officer(s) are the contact persons representing this ministry at the district. However, since these people are usually few and bearing in mind that they supervise the entire district, they may will require some form of facilitation to beef up their staff and financial resources to be able to monitor environmental issues associated with the project as presented in the ESMP.

#### **5.2.10. Ministry of Lands, Housing and Urban Development (MLHUD)**

The MLHUD is responsible for land, housing and urban development. It is therefore responsible for sustainable land management in Uganda. It supervises the Uganda Land Commission, which is responsible for holding and managing any land in the country which is vested in or acquired by the government in accordance with the constitution.

### 5.2.11. Project Implementation Setup

The project will be implemented by UETCL, which is responsible for the planning, construction, operation, maintenance, and development of the national electricity transmission system. UETCL will oversee all project activities, including procurement, contracting, and supervision. The company will also be responsible for ensuring compliance with environmental and social standards throughout the project lifecycle.

The table below outlines the key UETCL personnel involved in project implementation.

Table 5-3 – UETCL staff involved in the project implementation

#	Designation	Role
1	Manager Environment	Team Leader ESIA/Environment safeguards
2	Manager Land Acquisition	Team Leader RPF/Social safeguards
3	Ag. Manager Lands Acquisition	Team Leader RPF/Social safeguards
4	Manger Grid Development	Team Leader Grid Development Planning
5	Planning Engineer	Project Manager
6	Planning Engineer	Deputy Project Manager
7	Survey and GIS	Project Survey and GIS
8	Surveyor	Project Survey & Valuation
9	Environment Officer	Field work and review of reports

### 5.3. International Environmental and Social Policies

Development partners or their agencies fund most development projects in developing countries, Uganda inclusive. Most development partners require either the African Development Bank (AfDB) or World Bank (WB) guidelines as a basis for funding development projects. The 400kV Olwiyo-Nimule transmission line ESIA addresses the AfDB's social and environmental operational safeguard. The following guidelines and procedures are relevant to the 400kV Olwiyo-Nimule interconnection project.

#### 5.3.1. The African Development Bank's Integrated Safeguards System (2013)

Following the environmental and social safeguard policies established by the African Development Bank (AfDB) is a prerequisite for most development projects in developing countries, including Uganda, funded by external development partners or their agencies. This ensures projects comply with internationally recognized sustainability standards. The proposed project will specifically address the AfDB's Integrated Safeguards System (ISS), which was adopted in 2013.

The AfDB ISS is a comprehensive framework which established the Bank Group's commitment to sustainable development and has been designed to address environmental and social impacts anticipated from the implementation of development projects. The ISS aims to:

- *Integrate sustainability:* Ensure environmental, climate change, and social considerations are incorporated into development plans (Country Strategy Papers, Regional Integration Strategy Papers) across Africa.
- *Identify and mitigate risks:* Proactively assess the potential environmental and social impacts (including gender, climate change, and vulnerability) of AfDB-funded projects.
- *Minimize negative impacts:* Prioritize avoiding negative environmental and social impacts. If unavoidable, minimize, mitigate, and compensate for these impacts on affected communities.

- *Stakeholder engagement:* Ensure meaningful participation of stakeholders, particularly affected communities, throughout the project cycle. This includes timely access to information and consultation on issues that may affect them.
- *Effective risk management:* Guarantee effective management of environmental and social risks throughout project implementation and beyond.
- *Strengthen regional member countries capacity:* Support regional member countries (RMCs) in strengthening their environmental and social risk management systems. This includes assessing and building their capacity to meet AfDB's ISS requirements.

The ISS surpasses the limitations of the previous Environmental and Social Assessment Procedures (ESAP) by providing a robust procedural framework for integrating safeguards throughout the project cycle. It outlines specific procedures for the Bank, borrowers, and clients to ensure project compliance with the five Operational Safeguards (OS) at each stage.

The five AfDB's Operational Safeguards are the following:

- **Operational Safeguard 1 – Environmental and Social Assessment**

This safeguard creates a framework for project Environmental and Social Assessments (ESAs). It defines risk categories, assessment scope (climate change, consultation, etc.), client responsibilities (conducting ESA, ESMP), Bank staff roles (support, compliance), and legal/regulatory considerations. It builds on the Bank's existing environmental policy.

Additionally, OS 1 emphasizes public disclosure of the ESA process and findings to ensure transparency and stakeholder engagement. It outlines procedures for incorporating public feedback into the assessment and mitigation strategies.

While the primary focus is on identifying and mitigating environmental and social risks, the ESA process can also identify opportunities for positive social and environmental outcomes. The safeguard might encourage the project to create benefits for the local community or contribute to climate change adaptation/mitigation efforts.

- **Operational Safeguard 2 – Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation**

This safeguard strengthens the Bank's involuntary resettlement framework. It emphasizes avoiding resettlement whenever possible and minimizing impacts when unavoidable. Compensation includes social, cultural, and economic aspects to ensure fair replacement costs and improve livelihoods. The safeguard promotes inclusive resettlement through options and considerations that address specific needs of women, men, elderly, and disabled individuals. This empowers affected populations to rebuild their lives and become self-sufficient.

Furthermore, Operational Safeguard 2 requires the development of a Resettlement Action Plan (RAP) that details the resettlement process, compensation standards, livelihood restoration measures, and grievance redress mechanisms. This plan is developed with the involvement of affected communities, ensuring their voices are heard and concerns addressed.

The Bank also plays a role in monitoring the implementation of the RAP and the overall wellbeing of resettled populations. This ensures long-term sustainability of resettlement efforts and promotes positive outcomes for affected communities.

- **Operational Safeguard 3 – Biodiversity, Renewable Resources and Ecosystem Services**

This Operational Safeguard strengthens Bank project management regarding biodiversity and ecosystem services. It prioritizes conserving biodiversity and ecosystem integrity by minimizing project impacts. Unavoidable impacts are addressed through restoration and "net gain" offsets. The policy also safeguards natural habitats and sustains the flow of essential ecosystem services for affected communities and project success.

The Environmental and Social Assessment (ESA) integrates these goals. Borrowers identify potential opportunities, risks, and impacts on biodiversity and ecosystem services. A mitigation hierarchy is applied, prioritizing avoidance of harm, followed by reduction, mitigation/restoration, and lastly compensation/offsetting. The policy focuses on addressing major threats like pollution and habitat loss. Finally, recognized experts are consulted to assess the full range of biodiversity and ecosystem service values, including those identified by stakeholders.

In essence, this policy promotes responsible project development that safeguards biodiversity and ecosystem services for long-term sustainability.

- Operational Safeguard 4 – Pollution Prevention and Control, Hazardous Materials and Resource Efficiency**

This Operational Safeguard strengthens AfDB project practices by emphasizing pollution prevention and control (PPC) for high environmental performance and sustainable resource use. Borrowers adhere to a tiered compliance system, prioritizing national environmental regulations and best practices. When national regulations are less stringent, adherence to international conventions and best practices is mandatory. Justifications for alternative approaches, along with detailed technical and financial feasibility studies, are required through the environmental and social assessment process. Project-wide integration is crucial. Borrowers continuously assess and implement resource-efficient and pollution-prevention techniques throughout all project phases, ensuring cost-effectiveness alongside technical and financial viability. Ultimately, this safeguard promotes responsible project development that minimizes environmental impact and fosters long-term resource sustainability.

- Operational Safeguard 5 – Labor Conditions, Health and Safety**

This safeguard reinforces the Bank's commitment to worker well-being, recognizing labour as a cornerstone of poverty reduction and economic growth. It emphasizes the importance of worker rights in fostering a strong and productive workforce. Borrowers and clients are required to uphold specific standards concerning worker protections and basic needs. These include ensuring safe and healthy working conditions that meet national labour standards, respecting worker association rights, implementing robust occupational health and safety measures, and strictly prohibiting child and forced labour in any project activity. By adhering to these principles, borrowers and clients contribute to the development of a sustainable and empowered workforce, ultimately aligning with the Bank's broader goals of poverty reduction and economic growth.

The relevance of African Development Bank Operational Safeguards (OSs) to the proposed Project are outlined in Table 5-4.



Table 5-4 – African Development Bank OSs and their relevance to the Project.

SAFEGUARDS TRIGGERED BY THE PROJECT	
AfDB OSs	Relevance to the project
<b>OS1 – Environmental and Social Assessment</b>	<p>Whereas the activities to be financed by the project will have a range of environmental and social benefits, the activities could also be a source of adverse environmental and social impacts as highlighted below:</p> <ul style="list-style-type: none"> <li>- Generation of hazardous and non-hazardous waste;</li> <li>- Small scale soil erosion and alteration of land stability;</li> <li>- Landscape disturbance;</li> <li>- Potential risks to flora and fauna;</li> <li>- Introduction of occupational and community health risks;</li> <li>- Localized dust emissions from trenching and installation of equipment, emissions to air from vehicle fleets (exhaust emissions); and</li> <li>- Noise pollution from installation of equipment and transformer sets, among others.</li> </ul> <p><i>This standard aims at identifying all the probable E&amp;S risks on the project and defining appropriate mitigation measures in order to minimize such risks.</i></p>
<b>OS2 – Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation</b>	<p>The project is expected to require land acquisition in the right of Way of the Transmission Line.</p> <p><i>The project should aim at avoiding displacement of people. Where land take and displacement are inevitable for some project components as highlighted above, compliance with this standard must be sought to ensure compensation of affected individuals/communities. Additionally, impacts on assets and livelihoods must be considered.</i></p>
<b>OS3 – Biodiversity, Renewable Resources and Ecosystem Services</b>	<p>Activities involving creation of a right of way and construction of substations, will entail clearance of vegetation to set up project components.</p> <p>Electricity transmission lines pose fatal risks to birds through collision and electrocution and also habitat fragmentation for terrestrial fauna.</p> <p><i>Actions to enhance biodiversity conservation and protection of living natural resources should be considered by the project.</i></p>
<b>OS4 – Pollution Prevention and Control, Hazardous Materials and Resource Efficiency</b>	<p>Improper disposal of waste and leachate that is generated in landfills could cause pollution. Erosion and sedimentation as well as pollution, can result from civil works on transmission line and substations.</p> <p><i>The assessment of E&amp;S risks related to the project should identify the potential of pollution of environmental media (air, water, soil) as a result of implementing project activities during the construction, operation and decommissioning phases.</i></p> <p><i>Additionally, the potential for project activities to over use natural resources such as water and energy should be considered.</i></p>

SAFEGUARDS TRIGGERED BY THE PROJECT	
AfDB OSs	Relevance to the project
<b>OS5 – Labor Conditions, Health and Safety</b>	<p>The project will have direct and contracted workers that will be engaged by project implementing entities as well as primary supply workers. The workers will be exposed to occupational health risks when undertaking construction, operation and maintenance activities.</p> <p>Additionally, other risks such as exploitation and unfair wages, electrocution, discrimination at work and exposure to Gender Based Violence (GBV), Sexual Harassment (SH), spread of HIV/ AIDs and poor working conditions could impact on timely project delivery, lead to injury and even fatalities.</p> <p>Road accidents could also easily occur during project implementation.</p> <p><i>The project should ensure proper labour and working conditions during the construction, operation and decommissioning phases.</i></p>

### 5.3.2. The World Bank Group’s Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution

The World Bank Environmental and Social Framework also requires borrowers to apply the relevant requirements of the World Bank Group Environmental, Health and Safety Guidelines (EHSs) which are technical reference documents, with general and industry specific examples of Good International Industry Practice (GIIP).

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas. The document lists environmental issues, occupational health and safety concerns and community health and safety impacts which are associated with transmission lines.

All issues in these guidelines were either taken care of at design stage or are discussed and mitigated as part of this report. For example, air craft safety and navigation as part of the community health and safety concerns was taken care of during scoping study stage by ensuring that the line was routed away from airfields. The line was also designed to avoid Central Forest Reserves, congested areas and other sensitive habitats (wetlands and other protected areas) as a strategy of ensuring that adverse impacts are eliminated at design stage. The applicable issues are mainly terrestrial and habitat alteration, electromagnetic fields, hazardous materials, concerns due to live power lines, working at height, exposure to chemicals, visual amenity and noise.

### 5.3.3. Equator Principles

The Equator Principles are a credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions. Project finance is often used to fund the development and construction of major infrastructure and industrial projects.

The Equator Principles are adopted voluntarily by financial institutions and are applied where total project capital costs exceed USD 10 million. The Equator Principles are primarily intended to provide a minimum standard for due diligence to support responsible risk decision making.

The Equator Principles are based on the International Finance Corporation (IFC) Performance Standards on social and environmental sustainability and on the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines). They are intended to serve as a common baseline and framework for the implementation by each adopting institution of its own internal social and environmental policies,

procedures and standards related to its project financing activities. Reference is made to the latest available edition of Equator Principles, that is EP4 dated July 2020.

Table 5-5 – Equator Principles relevance to the Project.

Equator Principle	Relevance to the Project
<b>Principle 1: Review and Categorisation</b>	<p>According to the International Finance Corporation’s (IFC) categorisation process, the project is categorized by the Equator Principles Financial Institutions (EPFIs) based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change and biodiversity.</p> <p>The proposed Project, given its features, is classified as <b>Category A Project</b>, i.e. with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented.</p>
<b>Principle 2: Environmental and Social Assessment</b>	<p>The EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI’s satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project.</p> <p>For Category A Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). The client is expected to include assessments of potential adverse climate change risks as part of the ESIA or other Assessment.</p>
<b>Principle 3: Applicable Environmental and Social Standards</b>	<p>The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI’s due diligence will include, for all Category A and Category B Projects globally, review and confirmation by the EPFI of how the Project meet each of the Principles.</p> <p>The review of the Assessment process will establish, to the EPFI’s satisfaction, with supporting advice from the Independent Environmental and Social Consultant where applicable, the Project’s overall compliance with, or justified deviation from, the applicable standards. The applicable standards represent the minimum standards required by the EPFI.</p> <p>For Projects located in Non-Designated Countries, such as Uganda, compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability and the World Bank Group’s Environmental, Health and Safety Guidelines (EHS Guidelines) shall be evaluated.</p>
<b>Principle 4: Environmental and Social Management System and Equator Principles Action Plan</b>	<p>For all Category A and Category B Projects the EPFI will require the client to develop and / or maintain an Environmental and Social Management System (ESMS).</p> <p>Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards.</p>

Equator Principle	Relevance to the Project
<p><b>Principle 5: Stakeholder Engagement</b></p>	<p>For all Category A and Category B Projects the EPFI will require the client to demonstrate effective Stakeholder Engagement, as an ongoing process in a structured and culturally appropriate manner, with Affected Communities, Workers and, where relevant, Other Stakeholders. Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis.</p> <p>All Projects affecting Indigenous Peoples will be subject to a process of Informed Consultation and Participation, and will need to comply with the rights and protections for Indigenous Peoples contained in relevant national law, including those laws implementing host country obligations under international law. IFC Performance Standard 7 detail the special circumstances that require the Free, Prior and Informed Consent of affected Indigenous Peoples.</p>
<p><b>Principle 6: Grievance Mechanism</b></p>	<p>For all Category A Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.</p>
<p><b>Principle 7: Independent Review</b></p>	<p>For all Category A Projects, an Independent Environmental and Social Consultant, will carry out an Independent Review of the Assessment process including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence and determination of Equator Principles compliance.</p>
<p><b>Principle 8: Covenants</b></p>	<p>The client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects.</p> <p>Furthermore, for all Category A and Category B Projects, the client will covenant in the financial documentation:</p> <ul style="list-style-type: none"> <li>a) to comply with the ESMPs and EPAP (where applicable) during the construction and operation of the Project in all material respects; and</li> <li>b) to provide periodic reports that i) document compliance with the ESMPs and EPAP (where applicable), and ii) provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and</li> <li>c) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.</li> </ul>
<p><b>Principle 9: Independent Monitoring and Reporting</b></p>	<p>For all Category A Projects, in order to assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant.</p>

Equator Principle	Relevance to the Project
<p><b>Principle 10: Reporting and Transparency</b></p>	<p>For all Category A and, as appropriate, Category B Projects:</p> <ul style="list-style-type: none"> <li>• The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online and that it includes a summary of Human Rights and climate change risks and impacts when relevant.</li> <li>• The client will report publicly, on an annual basis, GHG emission levels during the operational phase for Projects emitting over 100,000 tonnes of CO<sub>2</sub> equivalent annually.</li> <li>• The EPFI will encourage the client to share commercially non-sensitive Project-specific biodiversity data with the Global Biodiversity Information Facility (GBIF) and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications.</li> </ul>

**5.3.4. Gap Analysis between national legislation and AfDB Environmental & Social Safeguards**

The Ugandan policy and legal framework are generally consistent with the African Development Bank Environmental & Social Operational Safeguards (E&S OSs), albeit some gaps. For example, the National Environment Act (NEA) 2019 requires consideration of both environmental and social impacts during project risk assessment and mitigation which is materially consistent with the OS1. The OS5 on Labour conditions, health and safety is aimed at ensuring health and safety of workers and to promote the fair treatment, non-discrimination and equal opportunity of project workers. Much as OS5 is materially consistent with the Constitution, the Employment Act (2006) and Equal Opportunities Act (2007), there is weak enforcement of Ugandan laws leading to non-compliance by Employers and gender-based discrimination at the workplace to the extent that some jobs such as construction of low voltage (LV) and medium voltage (MV) power lines are dominated by men.

A gap analysis between the national legislation and both African Development Bank Environmental and Social Operational Safeguards (E&S OSs) is presented in the following table.

*Table 5-6 – Gap analysis between Ugandan Laws and both African Development Bank (AfDB) Environmental and Social Operational Safeguards (E&S OSs).*

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
<b>OS 1: Environmental and social assessment</b>			
<ul style="list-style-type: none"> <li>Mainstream environmental, climate change, and social considerations into Country Strategy Papers (CSPs) and Regional Integration Strategy Papers (RISPs);</li> <li>Identify and assess the environmental and social impacts and risks—including those related to gender, climate change and vulnerability—of Bank lending and grant-financed operations in their areas of influence;</li> </ul>	<p>The National Environment Act (NEA) 2019 requires consideration of both Environmental and social impacts. The NEA (2019) in section 5.2(j) explicitly requires the application of the mitigation hierarchy in ESIA (avoid, minimize, restore, offsets).</p> <p>Ugandan Constitution promotes the protection and enhancement of equal opportunities and the rights of vulnerable groups. Also NEA 2019 requires consideration of vulnerability. As with all social issues however, the NEA provides no details.</p>	<p>The role of ESIA prescribed by NEA 2019 in the identification and management of social risks is not clearly defined through supporting guidance and regulation nor is fully understood by all relevant institutional actors. No standards for social impact assessment are provided.</p> <p>Although current legislative framework seeks to avoid and mitigate social risks, there is no explicit directive to minimize impacts or to promote the adoption of a clearly-defined mitigation hierarchy approach to managing social risks. In addition, the</p>	<p>The OS1 that focuses on an integrated Environmental and social risks and impacts will be followed during project implementation in synergy with the NEA 2019.</p> <p>The OS1 will be adopted to address the gaps.</p> <p>The OS1 will be employed during project</p>

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
<ul style="list-style-type: none"> <li>• Avoid or, if avoidance is not possible, minimise, mitigate and compensate for adverse impacts on the environment and on affected communities;</li> <li>• Provide for stakeholders’ participation during the consultation process so that affected communities and stakeholders have timely access to information in suitable forms about Bank operations, and are consulted meaningfully about issues that may affect them;</li> <li>• Ensure the effective management of environmental and social risks in projects during and after implementation; and</li> <li>• Contribute to strengthening regional member country (RMC) systems for environmental and social risk management by assessing and building their capacity to meet AfDB requirements set out in the Integrated Safeguards System (ISS).</li> </ul>	<p>Article 36 of the Constitution protects the rights of minorities to participate in decision-making processes and states that their views and interests shall be taken into account in making national plans and programs.</p> <p>Article 32 places a duty on the state to take affirmative action in favor of groups that have been historically disadvantaged on the basis of history, tradition or custom, for the purpose of redressing imbalances which exist.</p> <p>In principle, these two articles allow for the involvement of traditional local communities in development planning and affirmative action to ensure they benefit from the development process.</p> <p>There are no provisions under Ugandan law requiring enhanced consultation for traditional local communities.</p> <p>However, the National Environment Act 2019 requires that ESIA be carried out with human rights risk assessment (Section 111(3)) and in due regard for international human rights standards (section 5(2)(r)) and thus it requires consultations with cultural leaders for the traditional local communities.</p>	<p>current system emphasizes cash compensation as a mitigation measure and hence does not address other losses.</p> <p>The provisions in the Constitution do not explicitly require consideration of the differentiated impacts a project can have on vulnerable groups in social impact assessment.</p> <p>The mandated institutions have limited resources for the effective environmental and social management during project implementation and, with some exceptions, monitoring and compliance assessment is inadequate or absent.</p> <p>The lack of legislation to guide the consultation of people on matters that affect them remains a big loophole in ensuring planning and budgeting of meaningful consultations.</p> <p>The Consultations required by the NEA would be insufficient for the effective management of social risks, since it considers mainly environmental risks.</p>	<p>implementation, in order to promote effective inclusion of project affected parties in the implementation.</p>

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
	<p>There are various institutions systems, laws and regulations for the Environmental and Social management in the country.</p> <p>The Constitution requires the consultation of people on matters that affect their lives, including development projects. Consultations are required also in the National Environment Act (2019).</p> <p>The Decentralization Law requires project implementing agencies to engage with project affected communities in coordination with local governments.</p> <p>The National Environment Act (2019) and EIA Regulations (1998) require the explanation of project impacts to project affected persons, public participation in ESIA studies and the dissemination of information via newspapers and other mass media. There should also be access to information and contact with project staff at the local level.</p>	<p>There is no legislation describing how to do this in practice. As such, there is a general lack of planning and budgeting for meaningful consultation and inclusion of local stakeholders views in projects designs.</p> <p>The decentralization tends to be hampered by capacity and resource limitations. Ministries often fail to include local governments in institutional arrangements for managing a project. National projects may begin with local engagement but not follow up or may even be implemented without the knowledge of local authorities.</p>	
<b>OS 2: Involuntary resettlement: land acquisition, population displacement and compensation</b>			
<ul style="list-style-type: none"> <li>Avoid involuntary resettlement where feasible,</li> </ul>	<p>1995 Constitution guarantees protection of private property rights and the</p>	<p>The law does not, however, define any corresponding tenure-specific</p>	<p>Harmony will be made between the OS and the</p>



AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
<p>or minimize resettlement impacts where involuntary resettlement is deemed unavoidable after all alternative project designs have been explored;</p> <ul style="list-style-type: none"> <li>• Ensure that displaced people are meaningfully consulted and given opportunities to participate in the planning and implementation of resettlement programmes;</li> <li>• Ensure that displaced people receive significant resettlement assistance under the project, so that their standards of living, income-earning capacity, production levels and overall means of livelihood are improved beyond pre-project levels;</li> <li>• Provide explicit guidance to borrowers on the conditions that need to be met regarding involuntary resettlement issues in Bank operations to mitigate the negative impacts</li> </ul>	<p>Government’s power to compulsorily acquire private land for public use or in public interest. The terms “public use” and “public interest” however, are not clearly defined, leaving room for varied interpretations.</p> <p>Article 237(3) establishes four distinct land tenure systems, but these multiple regimes require multiple approaches to compensation for land.</p> <p>The Land Acquisition Act Cap 226 governs compulsory acquisition of land for public purposes in addition to the Art 26 (2) of Constitution of Uganda and S. 42 and S.77 of the Land Act.</p> <p>Compensation and resettlement rights of spouses and children are protected under the Constitution and Land Act (Cap 227). The consent of spouse and children must be acquired prior to any transaction by head of households on land on which the family lives.</p> <p>The Ugandan Constitution 1995 states in Article 26(2) that no person shall be compulsorily deprived of property unless the acquisition is for public use and done under a law that makes provision for the</p>	<p>approaches to land acquisition or compensation, which has resulted in contested compensation processes in practice.</p> <p>Land Acquisition Act contradicts the Constitution on several points:</p> <ul style="list-style-type: none"> <li>- Law does not recognize other rights to land (e.g. the right to farm, build, hold a mortgage, occupy and grant use to another) nor the eligibility of renters, licensees, informal settlers or users of public lands for compensation when the land on which they reside or operate is compulsorily acquired, occupation or use is less than 12 years, or occupants/users have ignored calls to leave.</li> <li>- No legal requirement in cases of land acquisition to set a cut-off-date after which people moving into a project area are no longer entitled to compensation, regulate the management of the displacement and resettlement of project-affected persons, prioritize avoidance and</li> </ul>	<p>Ugandan legislations to minimize the impact of land acquisition or restriction on land use by providing timely compensation for asset loss and restoration of livelihood.</p>

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
<p>of displacement and resettlement, actively facilitate social development and establish a sustainable economy and society; and</p> <ul style="list-style-type: none"> <li>Guard against poorly prepared and implemented resettlement plans by setting up a mechanism for monitoring the performance of involuntary resettlement programmes in Bank operations and remedying problems as they arise.</li> </ul>	<p>prompt and prior payment of fair and adequate compensation as well as right of access to a court of law by any person with an interest or right in the acquired property.</p> <p>The Ugandan Constitution declares that prompt and adequate compensation must be paid prior to acquisition of the affected property.</p> <p>Ugandan law makes no provision for project level GRMs. However, there are a number of formal and traditional mechanisms for grievance redress that operate at the local level which support and reinforce project level GRMs.</p>	<p>minimization of land acquisition, require the special protection of vulnerable persons, require the conducting of socio-economic and cultural studies or the undertaking of stakeholder consultation, participation, and information sharing or define the social development aspects of the resettlement process.</p> <ul style="list-style-type: none"> <li>In some case studies, resettled people were not assisted to resettle in their new communities; the resettlement policy does not have regard to the impact of the new community in which the resettled person has been resettled to.</li> </ul> <p>Furthermore, both the law and practice of resettlement in Uganda are almost exclusively focused on the payment of cash compensation and do not explicitly consider aspects such as livelihood restoration, transitional assistance or post resettlement support and assessment – principles enshrined in OS2. At present there is no requirement for an assessment of the impacts of resettlement on</p>	

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
		affected people (beyond asset valuation) making it impractical to seek to mitigate impacts.	
<b>OS 3: Biodiversity, renewable resources and ecosystem services</b>			
<ul style="list-style-type: none"> <li>Conserve biological diversity and ecosystem integrity by avoiding or, if avoidance is not possible, reducing and minimising potentially harmful impacts on biodiversity;</li> <li>Endeavour to reinstate or restore biodiversity, including, where some impacts are unavoidable, through implementing biodiversity offsets to achieve “not net loss but net gain” of biodiversity;</li> <li>Protect natural, modified, and critical habitats; and Sustain the availability and productivity of priority ecosystem services to maintain benefits to the affected communities and sustain project performance.</li> </ul>	<p>The Constitution (1995) requires GoU to ensure environmental protection &amp; provides Ugandans a right to clean &amp; healthy environment.</p> <p>Section 4(1) of the NEA (2019), proclaims the “nature has the right to exist, persist, maintain and regenerate its vital cycles, structure, functions and its processes in evolution”. Section 4(2) provides that “a person has a right to bring an action before a competent court for any infringement of rights of nature”.</p> <p>Wildlife Act Cap 200 provides for sustainable management of wildlife, to consolidate laws relating to wildlife management, establishes the Uganda Wildlife Authority, requires developers doing projects which may affect wildlife to undertake EIAs.</p> <p>Wildlife Policy, 2014 aims at conserving wildlife in a manner that contributes to sustainable development and wellbeing of</p>	<p>The National requirements on protection of Biodiversity accord with the OS3.</p> <p>Implementation is highly variable due to low enforcement, but generally good in the case of Bank funded projects.</p>	<p>The national requirements will be adhered to since they accord with the OS3.</p> <p>The OS3 will be adopted to address the gaps, so as to achieve good compliance.</p>

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
	<p>people. Includes management of wildlife protected areas.</p> <p>Forestry and Tree Planting Act (2003) provides for the conservation, sustainable management, development and use of forests for the benefit of the people. It provides that the forests shall be developed and managed so as to conserve natural resources, especially soil, air and water quality.</p> <p>Forestry Policy 2001 seeks to establish an integrated forestry sector that achieves sustainable increases in the economic, social and environmental benefits from forests and trees by the people of Uganda, especially the poor and vulnerable.</p> <p>Mitigation hierarchy is explicitly required by the NEA (2019) (section 5.2(j) (avoid, minimize, restore, offsets), but maximizing benefits is not emphasized.</p> <p>National Land Policy 2013 is aimed at ensuring efficient, equitable and optimal and sustainable utilization and management of land resources for poverty</p>		

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
	reduction, wealth creation and socioeconomic development.		
<b>OS 4: Pollution prevention and control, hazardous materials and resource efficiency</b>			
<ul style="list-style-type: none"> <li>Manage and reduce pollutants resulting from the project—including hazardous and nonhazardous waste—so that they do not pose harmful risks to human health and the environment; and Set a framework for efficiently using all of a project’s raw materials and natural resources, especially energy and water.</li> </ul>	<p>NEA 2019, Section 5 (d) includes the principle that there shall be “optimum sustainable yield in the use of renewable natural resources”.</p> <p>2011 EIA Guidelines for water resources related projects assist planners, developers, practitioners safeguarding water resources through EIAs.</p> <p>National Water Policy, 1999: promotes integrated water resources management. Stipulates that drainage water shall not pollute surface or ground water, prevent increase in salinity levels, and prevent soil pollution.</p> <p>Water Act cap 152: Provides for use, protection, supply, management of water; establishes water and sewerage authorities, facilitates devolution of water and sewerage undertakings.</p> <p>Public Health Act Cap 281 requires every local authority to take measures for preventing any pollution dangerous to public health.</p>	<p>The NEA 2019, EIA guideline and others as stated in this section accord with the OS on the promotion of sustainable use of resources.</p> <p>However, pollution remain a significant problem, since adherence to best practices is not always assured.</p> <p>Hazardous waste management is still a big challenge. Not enough is being done by government, the private sector, CSOs and other stakeholders to raise awareness.</p> <p>Although there are no gaps between international good practice on pest management and the Ugandan legal system, there are no comprehensive regulations to guide the implementation of the various Acts. This hampers the control of the use of damaging pesticides</p>	<p>Along with national requirements, OS4 will be applied in order to address the gaps, in particular those regarding pollution and waste management (hazardous and non-hazardous).</p>

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
	<p>NEA 2019, section 69 deals extensively with climate change.</p> <p>Agricultural Chemicals (Control) Act, No. 1 of 2006 controls and regulates the manufacture, storage, distribution and trade in, use, importation and exportation of agricultural chemicals.</p> <p>Uganda is a Party to the Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.</p>		
<b>OS 5: Labour conditions, health and safety</b>			
<ul style="list-style-type: none"> <li>• Protect workers’ rights;</li> <li>• Establish, maintain, and improve the employee employer relationship;</li> <li>• Promote compliance with national legal requirements and provide supplemental due diligence requirements where national laws are silent or inconsistent with the OS;</li> <li>• Align Bank requirements with the ILO Core Labor Standards, and the UNICEF Convention on the Rights of the Child, where</li> </ul>	<p>Workers Compensation Act (2000) establishes the provision of financial compensation for work related injury or illness. Occupational Safety and Health Act of 2006 consolidates, harmonizes and updates the law relating to occupational safety and health. The Act provides for the health, safety, welfare and appropriate training of persons employed in work places.</p> <p>Article 31(b) of Constitution guarantees (inter alia) gender equality and labour rights, and equal opportunity in political,</p>	<p>There is still no policy to guide its implementation of the Occupational Safety and Health Act (2006). This, along with the poor staffing and funding of the Ministry of Gender, Labour &amp; Social Development (MGLSD), has left many workers in unsafe working conditions.</p> <p>There is also limited coordination between the Directorate of Occupational Safety and Health Services (DOSHS), Police and Ministry of Health on data collection and oversight of OSH compliance in the workplace.</p>	<p>ESIA and ESMP will be developed applying the requirements of OS5 and addressing the gaps with national legislation.</p>

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
<p>national laws do not provide equivalent protection;</p> <ul style="list-style-type: none"> <li>Protect the workforce from inequality, social exclusion, child labour, and forced labour; and</li> </ul> <p>Establish requirements to provide safe and healthy working conditions.</p>	<p>economic and social activities, including through affirmative action.</p> <p>The 2012 Regulations of the 2006 Employment Act prohibit sexual harassment in the workplace. Employment Act (2006) requires the protection of workers during employment. The Employment Act (2006) (inter alia) prohibits the use of child labour. Labour policies that specifically address Gender and Vulnerability include the 2012 Employment Regulations, National Gender Policy, National Action Plan on Elimination of the Worst Forms of Child Labour in Uganda (2012/13-2016/17) and National Policy on HIV/AIDS and the World of Work (2007).</p> <p>National Constitution (1995) guarantees, in its Objective XIV(a), the right of all Ugandans to (inter alia) freedom of association, the right to collective bargaining, and paid vacation (Chapter Four). These and other rights are detailed in a set of laws that includes the Employment Act (2006), Workers' Compensation Act (2000), NSSF Act (1985), Labour Unions Act No 7 (2006), and Labour Disputes (Arbitration and Settlement) Act</p>	<p>The enforcement of employment laws is lacking, in part due to lack of budgeting and staffing, as well as the high unemployment in the country, which facilitates the exploitation of workers.</p> <p>Employment Act (2006) have weak or non-existent penalties for violations, e.g. non-compliance in the timely payment of wages or for unlawful deductions; excess of the maximum acceptable working hours per day and per week; failure to provide written particulars to the employees (i.e. contracts); etc.</p> <p>No applicable legislation on a minimum wage.</p> <p>Section 32 of the Employment Act contradicts other Ugandan laws, by allowing for the employment of children aged 14 for "light work" under adult supervision (in contradiction to Section 7 of the Children (Amendment) Act (2016) which sets the employment age at 16).</p>	

AfDB E&S OS Objectives	Uganda Laws Requirements	Gaps	Recommended action
	<p>(2006), Occupational Safety and Health Act (2006).</p> <p>Unions Act 2006 allows workers to establish and join unions and as such accords with provisions in ESS2.</p> <p>National Employment Policy for Uganda (2011) requires a mechanism to raise workplace concerns.</p>	<p>The Employment Act fails to clearly define hazardous employment. The legal framework also fails to provide express punitive penalties for those found in violation of laws prohibiting the employment of minors.</p> <p>The Ugandan labor movement is weaker with low worker participation and conflicts among unions this in return has an implication on the representation of workers in policy discussions.</p>	



## 6. STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE

### 6.1. Directly Affected Parties

The parties directly affected by the project are the villages located near the construction sites as per In these categories the key stakeholder in each village is: Head of Village; Informal/customary leader; Women Group, Children, Landowners, Sharecroppers etc. The administrative units affected by the preferred line route option are listed in the table below.

Table 6-1 - Administrative units affected by the Project

District	County	Sub-County	Parish
AMURU	KILAK	ATIAAK	BIBIA
			KAL
			PACILO
			PALUKERE
			PAWEL
		PUPWONYA	
		LAMOGI	COKE
			OBOO
			PALEMA
		PABBO	KAL
PALWONG			
PARUBANGA			
LAMWO	LAMWO	PALABEK OGILI	PADWAT
NWOYA	NWOYA	ALERO	BWOBONAM
			KAL
			PAIBWOR
			PANGU
			PANYABONO
		ANAKA TOWN COUNCIL	CEKE WARD
			LABYEI WARD
		PURONGO	PAROMO
			PATIRA
			PAWATOMERO

### 6.2. Indirectly Affected Parties

Other villages located outside the project area could be indirectly impacted by the heavy traffic and induced activities. To be identified in later stages, at the moment no parties are indirectly impacted.

## 6.3. Other Interested Parties

### 6.3.1. Government Bodies

The administrative authorities and technical offices will be part of consultation and disclosure activities due to their role in the decision making and monitoring purposes. The list below shows the main public institutions that will be involved in the engagement plan.

- Ministry of Lands, Housing and Urban Development (MLHUD)
- Ministry of Water and Environment (MWE)
- Ministry of Tourism, Wildlife and Antiquities
- National Environment Management Authority (NEMA)
- National Forestry Authority (NFA)
- Uganda Wildlife Authority (UWA)
- The District Local Government Authorities
- The District Land Boards
- The District Environmental Officer and Community Development Officer
- Ministry of Gender, Labor and Social Development (MGLSD), Department of Occupational Health and Safety

### 6.3.2. Project Proponent

The project proponent in Uganda (JETCL) is responsible for planning and development stage. This institution has responsibility to establish Transmission Line Development Plan. The proponent shall guide the implementation of the Environmental and Social Management measures during construction and operation phase at corporate level through a dedicated Chief Executive Officer responsible of the Project.

### 6.3.3. Project Implementation Consultant

The Project Consultant is represented by an association of international engineering firms (CESI S.p.A. in Partnership with ELC Electroconsult S.p.A. and Colenco Consulting Ltd.) with the scope to assist and support the proponent in all relevant fields for the design of the Transmission Line including ESIA and RAP Studies.

### 6.3.4. Contractors

The Project Contractors will be selected through competitive bidding. They will be responsible to apply all the environmental mitigation measures that will be described in the ESIA and any additional land acquisition according to the RAP.

## 6.4. Disadvantaged/Vulnerable Groups

**Vulnerable people** are distinct groups of people who might suffer more or face the risk of being further marginalized due to the project and specifically include: i) households that are headed by women, ii) household heads with disabilities, iii) households falling under the regional poverty line, and iv) elderly household heads. These specific groups will be reached during the consultation phase through the selection of representatives who can take the role of spokesperson and facilitators. In order for vulnerable groups to participate in project activities, they need to be invited to consultation activities with appropriate assistance according to the actual needs.

## 6.5. Summary of Consultations

The project developed several consultations throughout the years 2019-2024. During this study the consultation process was structured on two rounds of meetings, the first with district authorities and environmental authorities to verify the critical aspect of the project alternatives. The sectorial experts met the different officers after a formal introduction of UETCL. This round was essential to gain all the contacts of the key stakeholders at local level. A second round was organized during the census survey, from district, sub county and village level to share information about the project and organize the meeting with affected PAPs. The target villages are those crossed by the project as per Table 6-1. Through the support of village leaders, meeting with PAPs were carried out. Meeting was conducted with two days' notice by the village leader, the meetings were carried out with the help of translators. During the meeting the concept were presented through posters and maps.

### 6.5.1. Previous Consultations

Previous consultations were carried out in two phases: from October to December 2019, at the time of environment scoping and line route selection, and from January to March 2020, as part of the detailed ESIA and RAP studies.

Multiple groups of stakeholders were consulted. The four main groups were:

- directly affected people, those who reside in or derive their living from areas where the project has a direct impact on;
- those who reside near project areas or use resources in the project area and will have to relocate or adjust their livelihoods because of the project activities, or their access to the resources will be restricted due to the project activities;
- national Stakeholders and Government Institutions;
- local government institutions;
- civil society organizations

The stakeholder meetings with high level district authorities were conducted in English. Key concerns raised by the District Local government fall in the following categories:

- Compensation rates, and planning areas
- Registered land in Alero Sub County
- Relocation and resettlement
- Line routing and corridor size
- Route changes during implementation
- Graves and cultural sites

The RAP team organized a number of consultative meetings and discussions with various key stakeholders and PAPs. Later, sub county meetings and subsequently village meetings were held with residents of various villages traversed by the line. Formal interviews were held with PAPs using a standard socioeconomic questionnaire. The meetings with the community were held in English and translated to PAPs in Acholi and Madi. The PAPs were given an advance 2 days' notices through the LC 1 Chairman. The Chairman was visited by the team and shown points where the proposed transmission line crosses the village. Other notifications for meetings were done using FM radios radio announcements at Mega and Rupinyi in Acholi language. Fliers/brochures were also distributed to the residents. The content of the brochures had the project brief, key parameters, requirements for eligibility for compensation and contact details of officers to be contacted in case of any need for inquiry. These were further translated into Acholi and Madi for purposes of catering for the local language needs.

The issues of discussion with PAPs include:

- Information on project design/scope and project owner
- Disclosure in advance of details of the full compensation and resettlement procedure to be applied (disclosure of affected PAPs, negotiations on valuations, emission of notices to vacate, physical relocations)
- PAP eligibility criteria
- Methodology used for valuations
- Grievance redress mechanism
- Options available for compensations
- Availability of livelihood restoration measures and resettlement assistance
- Availability of assistance to vulnerable people.

### **6.5.2. 1st round of consultations**

During this study a first round of consultation was carried out during the scoping and the alternative analysis phase. This section shows the consultative meetings held for environmental and social components.

#### **Consultation with UWA Uganda Wildlife Authority**

The environmental impact assessment necessitated stakeholder engagement, involving the Uganda Wildlife Authority (UWA), to address potential impacts of the project on wildlife and on protected areas like Keyo Central Forest Reserve and Murchison Falls National Park. The meeting was held on 23rd November 2023, at UWA headquarters in Kampala, between representatives of consultants, and UWA staff (Manager EIA and Monitoring).

Discussions focused on understanding the social and environmental implications of the project, including issues like human-wildlife conflicts and habitat protection. Recommendations from UWA highlighted the importance of mitigating cumulative impacts, addressing wildlife crimes, and implementing strategies to manage human-wildlife conflicts, emphasizing the need for collaboration and proactive measures during project implementation. Additionally, strategies were proposed to address challenges such as poaching, wildfires, and habitat degradation, emphasizing the importance of effective management plans and community-based interventions.

Key issues raised and recommendations made by UWA were:

- Since the transmission line doesn't cross or touch the boundaries of the national park, no other wildlife conservation area within the project area of influence, under UWA, is recognized to be impacted, though the developer shall ensure that cumulative and indirect impacts of the project are mitigated.
- The project area is located within the Murchison Falls Conservation Area (MFCA) and Aswa range. Aswa zone cover parts of North and North-Eastern Uganda including Agago, Pader, Kitgum, Gulu, Kotido, Kaabong and Lamwo, Abim and Otuke Districts. This zone is managed from Pader Wildlife Station. The zone comprises of extensive areas of woodland which are habitats for key wildlife species such as buffaloes, elephants. In the North-East, large areas of the zone are used for cattle grazing and recently agriculture is being promoted which is likely to affect wildlife and cause an increase in Human-Wildlife Conflicts related to crop destruction. In addition to the perennial fire threats, charcoal production has been introduced as an economic activity targeting the high value woodland trees.

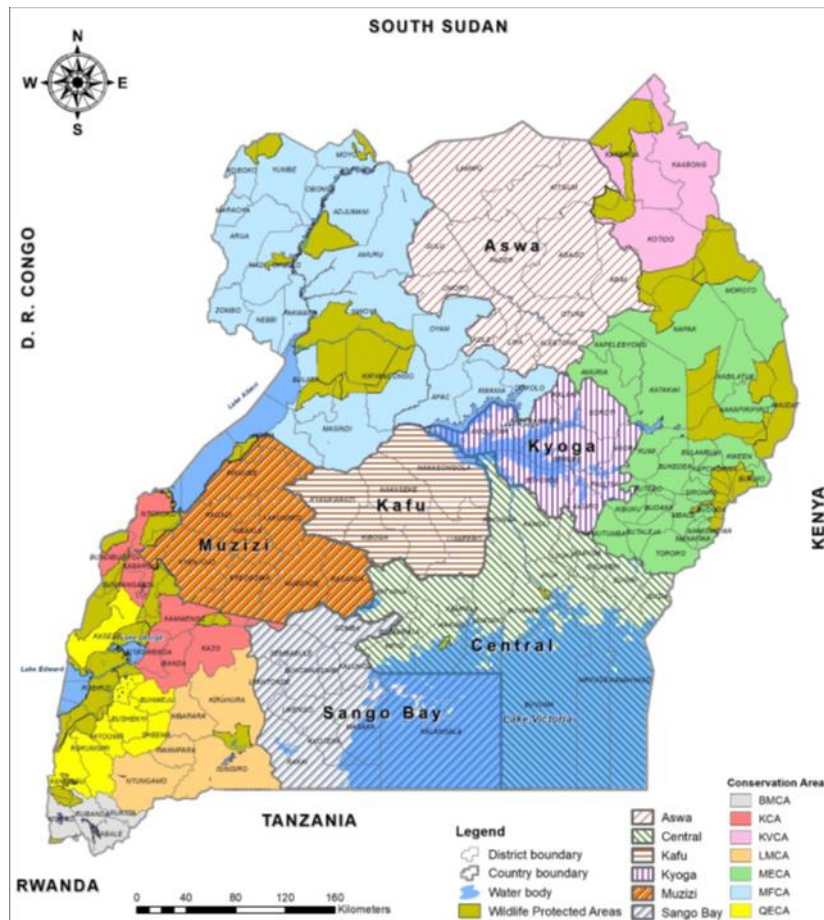


Figure 6-1 Wildlife Management Zones outside UWA Protected Areas

- Previous projects of the same nature (transmission line and roads) or linear projects have been identified to propel wildlife crimes such as poaching, proper sensitization and awareness training of workers during construction phase is key.
- Review the National Plan for Managing Wildlife Outside UWA Protected Areas 2021/2022 - 2030/2031. The Plan is to guide stakeholders in taking well informed decisions for the sustainable management of wildlife outside UWA protected areas. The plan prioritizes the activities and resources necessary for management of wildlife in critical ecosystems. It also defines mechanisms for how stakeholders can engage and benefit from the management of wildlife outside UWA protected areas specifically through active participation in implementation of collaborative initiatives.
- During project implementation, Identify and document problem animal hotspots, Support community-based interventions that address Human-Wildlife Conflicts, Implement the Human-Wildlife Conflict management strategy, Support Local Governments to develop and enforce land use plans around conservation areas.
- Seek UWA support in form of rangers as and when necessary, in case of wildlife encounters and need for rescue operations, especially during construction phase.
- Identify and map critical wildlife areas especially breeding sites for eventual protection during the construction phase.

- Report any cases of Human wildlife conflict and poaching to the Authority or nearby authorities like police.
- Uncontrolled bush fires contribute to habitat degradation and adversely affect wildlife survival. The most affected habitats include rangelands, woodlands, and wetlands. During the construction and operational phases, conduct awareness campaigns on wildfires, Support the development and implementation of management plans for areas that are prone to fires and which hold substantial wildlife numbers.
- Beware of animal distribution of these corridors and need to be protected if not avoided to manage human wildlife conflicts (HWC).

The conclusion of the stakeholder engagement with UWA underscores that while the project does not directly impact UWA protected areas like Murchison Falls National Park, proactive implementation of recommended mitigation measures is crucial to minimize potential cumulative impacts, including human-wildlife conflicts and illegal activities. UWA suggests that project developers seek support, particularly in wildlife rescue operations, by requesting assistance from rangers.

## Consultations with District Land Authorities

The consultant visited district and sub-county offices in October 2023 in order to engage various stakeholders and discuss matters relating to acquisition of land and landed assets in the affected districts.

The following organizations/ offices were engaged for the purpose of the study:

- The District Land Board of Lamwo District
- The District Land Board of Amuru District
- The Town council of Atiak sub-county
- The District Land Board Nwoya District

The mission allowed to assess to which extent key stakeholders are aware of the project's current development. Key issues that were discussed are women land rights, existing land conflicts, the ongoing process of registration of freehold land ownership, the Certificates of Customary Ownership (CCOs) and their impact on land acquisition, the validation of compensation rates for each visited district and the delays in approving compensation rates for 2023/24 Financial Year in some of the Districts where the project will be implemented. The main findings of these consultations are resumed in the following table.

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Date and place	Stakeholder group	Characteristics	Key Issues discussed	Minute of Meeting (Annex 7)
23 <sup>rd</sup> October 2023, Lamwo District Assistant's office	District Land Board of Lamwo District	Lamwo as a district was not affected earlier during the initial studies but is now likely to be affected due to the proposed diversion	The District Land Board confirmed that the board have approved the compensation rates provided by the Ministry of Lands, Housing and Urban Development There are no refugee settlements in the sub-County of Palabek- Nyimur. No ongoing land dispute within the proposed project area Discussion of Acholi customary institutions regulating women' land rights	UG_MoM_1st_1
24th October 2023, Amuru District Land Board Office	District Land Board of (Amuru District	In this district, the project is likely to affect some government land.	The office has no record of any land disputes at the time of consultation. The district Land Board is currently referring to compensation rates that are outdated, as they relate to the financial year 2020/21. The land board has received many applications for Freehold land ownership.	UG_MoM_1st_2
24th October 2023, Atiak sub-county	Atiak town council	The meeting allowed to clarify issues related to the recently created Atiak sub-county and demarcation of new administrative divisions.  It should be noted that land committees are constituted at sub-county level.	There was a misunderstanding because the project was expected to solve a problem related to the existing power line which cuts through people's commercial plots.	UG_MoM_1st_2



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Date and place	Stakeholder group	Characteristics	Key Issues discussed	Minute of Meeting (Annex 7)
27th October 2023, Nwoya District Land Board Office	District Land Board of Nwoya District	The District Physical Planner and Senior Land Officer were not aware of the project at the time of consultation.	Existing strip maps were displayed to district officials for further clarification. In this district, the Land Board has issued many Certificates of Customary Ownership (CCOs).  The district Land Board approved compensation rates for the financial year 2023/24.	UG_MoM_1st_3

### 6.5.3. 2nd round of consultations

In January 2024, the consultant visited district and sub-county in order to sensitize PAPs about project characteristics and clarify pending issues related to land acquisition and compensation. During these meetings, PAPs were able to raise their concerns and obtain clarifications about their specific cases. They were also given information about the purpose of the social survey to clearly assess socio-economic profiles and adapt compensation measures accordingly. The majority of the PAPs is in favour of the project.

Key issues discussed during these meetings are:

- land requirements and locations
- eligibility for compensation
- grievance redress mechanisms
- compensation for contested land
- relocation of graves and cultural sites
- relations between current and previous surveys
- difference in compensation in the right of way and in the way leave
- relation between timing of land valuation and the agricultural calendar
- farmers refusing to give up their land for compensation

The mission also allowed to assess at which extent PAPs are aware of the project development.

The main findings of these consultations are resumed in the following table.

During the first two consultation phases, field activities were hampered by a very fragile security situation near the border with South Sudan. These difficulties relate to the section of the power line route through Lamwo district territory. In the next stages of the project, it will therefore be essential to ensure the direct involvement of other institutional actors, starting with the Minister of the Interior. The objective will be the creation of a coordination unit or ad hoc committee including, UETCL, SSEC and Lenders focusing on security issues, to be activated in cooperation with other interested ministers or departments, to follow the process of activities on the ground and ensure the presence of security personnel. One of the priorities of this unit will be to facilitate the coordination of efforts to secure census and field construction operations in the cross-border areas, to ensure that adequate funds are made available for this purpose, and to ensure that the communities living in these regions on both sides of the border are informed of the ongoing activities and involved in the project activities through awareness-raising campaigns and other initiatives as deemed appropriate.

District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
Amuru	Pabbo	Palwong	31/01/24	PAPs	27M, 17F	A key issue discussed during this meeting is the relation between current consultations and previous surveys. This concerns in particular PAPs who in 2020 received “plot numbers” written on small pieces of paper and wonder what is the actual importance of this informal document for land compensation.	UG_MoM_2nd_3
	Kilak North sub-county	Pabbo town council, Central ward parish	30/01/24	PAPs	65M, 16F	Other cases were discussed such update of PAP register for land bought after 2020 survey, compensation for land disputed between family members, change in land valuation after the 2020 survey.	UG_MoM_2nd_2
	Lamogi sub county	Pakiri parish	30/01/24	PAPs	37M, 5F	Explication on the project through maps, practical examples of land requirements, impacts and	UG_MoM_2nd_1

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
	Lamogi sub county	Apotokitoo parish	30/01/24	PAPs	24M, 2F	<p>compensation measures, grievance redress mechanisms.</p> <p>Several cases of compensation were discussed such as deceased landowner, compensation rates used for parcels that were initially surveyed in 2019, or errors in transcribing names in PAPs register.</p>	
	Lamogi sub county	Odur parish	31/01/24	PAPs	19M, 2F	<p>Other questions concerning the relation between previous and current surveys were raised, such as the case of a farmer who cut trees after the 2020 survey informed him that he will have to vacate his land.</p> <p>Farmers also asked when the land value will come, because the planting season was approaching at the time of the survey, and they don't know if agricultural activities (including the decision</p>	UG_MoM_2nd_4

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
						to rent land to other farmers) will affect land value.  Choice of in-kind compensation was also discussed.	
	Lamogi sub county		30/01/24	Community development officer	1	The Consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.	UG_MoM_2nd_5
	Lamogi sub county		30/01/24	Chief Administrative Officer	1	The communications consultant gave an overview of the project.	
	Lamogi sub county		30/01/24	Local Council Chairperson	1	The communications consultant gave an overview of the project.	
	Lamogi sub county		31/01/24	Resident district commissioner	1	The communications consultant gave an overview of the project.	

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
	Guruguru sub-county		31/01/24	Community development officer	1	The communications consultant gave an overview of the project.	
	Atiak sub-county		31/01/24	Local Council Chairperson	1	The Chairperson informed the team that the affected villages have since the 2020 survey been split into two; Pacilo West Village and Pupwonya South Village.	
	Atiak sub-county		1/02/24	Town clerk and CDO	1	The Town Clerk informed the project team that the villages previously listed as Kal-East and Kal-West have since been split and renamed to Pabuga Ward, Amoyo-Kol Ward, and Pagimoro Ward. He also offered support to mobilize PAPs to attend the sensitization meetings and other future project activities.	
	Atiak sub-county		1/02/24	local leaders	11	During the sensitization meeting the PAPs raised their concerns about project's activities and were given clarifications on their specific cases, such as a PAP who lost his national ID and was	UG_MoM_2nd_6

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
						advised to replace it ahead of compensation.	
	Atiak sub-county	Pupwonya parish	2/02/24	local leaders	9	Several issues were discussed during this meeting, such as the obligation for PAPs to vacate land within a period of 6 months since the payment of compensation. The consultant provided additional information concerning this point and compensation measures.	
	Pacilo West village		31/11/24	local leaders	11	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. Among several issues raised during the discussion, one PAP referred to the use of an independent valuer for his property besides the government valuer.	
	Opara sub-county		2/02/24	local leaders	20	During this report, local leaders raised the issue of power supply for the communities living alongside the line. The consultant	

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
						explained that smaller power lines can only be constructed where substations are available.	
<b>Nwoya district</b>	Alero sub county	Okura parish	10/02/24	PAPs	10M, 4F	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. Several key issues were discussed during this meeting, such as PAPs not willing to sell their land, treatment for pieces of land owned by different persons that were combined and captured as one during the first survey, and compensation measures for affected property which is communally owned.	UG_MoM_2nd_7
	Alero sub county	Panyabono parish	10/02/24	PAPs	10M, 2F		
	Alero sub county	Bwobo nam parish	10/02/24	PAPs	24M, 5F		
	Alero sub-county	Kale parish	10/02/24	PAPs	17M, 7F		
	Paminya sub-county	Langol parish	10/02/24	PAPs	6M, 2F	Issues discussed during this meeting are: possibility to use land after pegging, compensation for crops died out after the previous survey.	
	Paminya sub-county	Lalar parish	10/02/24	PAPs	5M, 1F		
	Anaka town	Ceke Ward parish	9/02/24	PAPs	53M, 22F	PAPs were given details concerning the treatment for	



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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
	council sub-county					vulnerable persons and updating of compensation rates. Reference was made to the payment of compensation payment for the Nwoya-Gulu 132Kv power line, since this line was constructed before PAPs were paid. PAPs were informed that construction of the new power line will only begin after PAPs have been paid.	
	Anaka town council sub-county	Labyei ward parish	9/02/24	PAPs	34M, 12F		
	Lungulu sub-county	Lolango parish	9/02/24	PAPs	36M, 5F	Among the attendants, PAPs demolished their houses in the old corridor and reconstructed new houses outside but find their new houses falling in the new diverted corridor. They were informed that their case will be take in due consideration by UETCL for further investigation of the cases. Farmers also asked for clarifications concerning the Certificates of Customary Ownership (CCO) for their land,	

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
						and the relevance of this document for compensation purposes.	
	Purongo sub-county	Paromo parish	8-9/02/24	PAPs	---	Issues discussed during this meeting are: explanation of the concrete marks used as control points by the survey team, questions raised by PAPs concerning the line diversions, delays in payment of compensation.	
	District HQ		5/02/24	Chief administrative officer	1	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.	UG_MoM_2nd_5
			6/02/24	Resident district commissioner	1		
			1/02/24	Community development officer	1		
			5/02/24	Local council chairperson	1		

## 6.6. Stakeholder engagement program

This section presents the purpose and timing of stakeholder engagement program through a framework for the entire project life cycle.

Two matrices for the stakeholder engagement planning are hereunder presented: one for consultation and one for disclosure.

Table 6-2 – ESIA Consultations during Feasibility

ESIA Consultations	Method	Stakeholder	Feasibility Phase	Implementing Agency
<b>ROUND 1</b>				
Project presentation and collection of information	<b>Project presentation</b>	National Environment Management Authority (NEMA)	<b>November 2023</b>	Consultant
<b>ROUND 2</b>				
During baseline data collection Collection of data and information on habitat, ecosystem services, wildlife, human and wildlife conflicts.	<b>Project presentation</b>	Wildlife Authority Forest Authority	<b>December 2023</b>	Consultant

Table 6-3 – ESIA Consultations during Construction

ESIA Consultations	Method	Stakeholder	Construction Phase	Implementing Agency
Set up of Security Committee	Meetings	UETCL, SSEC, Lenders, South Sudan and Uganda Ministry of interior	Pre construction phase	UETCL and SSEC
Project kick off, schedule and impacts	Meetings	Authorities, PAPs and Communities	2026	UETCL
Labor influx and Community Health and Safety (induction training)	Community meetings And radio announcement	PAPs and Communities	Before mobilization	Each Contractor and Sub Contractor

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ESIA Consultations	Method	Stakeholder	Construction Phase	Implementing Agency
Periodic meeting on ESHS (SUBPLANS as per ESMP)	Community/ schools meetings And radio announcement	PAPs and Communities	Every month after mobilization and when necessary, as described in the Contractors Sub Plans	Each Contractor and Sub Contractor
Periodic FGDs of GRM	KII and FGDs	COMMUNITIES, PAPs, WORKERS, GRM Committee	Every month	UETCL
Effectiveness of compensation measures and livelihood restoration	KII and FGDs	COMMUNITIES, PAPs, WORKERS	Every month the first year of construction and every 4 months from second	UETCL

Table 6-4 – ESIA Information Disclosure Program

F=Feasibility PC/M=Pre-Construction/Mobilization

ESIA Disclosure Process	Method	Stakeholder	F	PC/M	Implementing Agency
Disclosure of Draft ESIA	Presentation	Affected Districts and Counties Chiefs of Affected Parishes and Villages	March 2024	na	UETCL
Disclosure of Draft ESIA	Presentation	Ministry of Energy and Mineral Development National Environmental Management Authority (NEMA)	March 2024	na	UETCL
Disclosure of Draft ESIA and ESMP	Non-technical Summary	Chiefs of Affected Parishes and Villages	March 2024	na	UETCL
Disclosure of Approved ESIA	Report	Available to the public on web site	-	2025	UETCL
Disclosure of Approved ESIA and ESMP	Non-technical Summary	Chiefs of Affected Parishes and Villages	-	2025	UETCL

Table 6-5 -RAP Consultation

RAP Consultations	Method	Stakeholder	Feasibility	Implementing Agency
<b>ROUND 1</b>				
Conflicts over the land, cadastral information, dissemination of the project and RAP surveys approach. Collection of district rates Land tenure at Parish and Village level (community/customary, private, land for returnees etc)	<b>KI INTERVIEWS CHECKLIST</b>	Affected Districts Authorities	<b>October 2023</b>	Consultant
<b>ROUND 2</b>				
CENSUS AND LAND SURVEY CUT OFF DATE	<b>HH Questionnaire with opening and closing consultations.</b>	All affected land holder along the right of way for new alignment or updated alignment	<b>January 23, 2024 February 25, 2024</b>	Consultant
COMMUNITIES	<b>MEETINGS/ CONSULTATIONS/ FGDs</b>	District Authorities, PAPs, Chiefs of Parishes	<b>January 23, 2024 February 25, 2024</b>	Consultant

Table 6-6 – RAP Information Disclosure Program

F=Feasibility DS=Detailed Design PC/M=Pre-Construction/Mobilization

RAP Disclosure Process	Method	Stakeholder	F	DS	PC/M	Implementing Agency
<b>PROJECT STUDIES ANNOUCEMENT CENSUS /CUT OFF DATES</b>	<b>Information through sub district and villages to affected peoples</b>	Directly interested Parties	February 2023 And with Approval of CGV			UETCL
<b>Disclosure of RAP</b>	<b>PIB (Public Information Booklet, bulletin on board in every sub districts/villages)</b> Collection of written comments via booklet and presentation of answer to AP representatives selected by the communities	Directly interested Parties		2024 (After approval of CGV)		UETCL
<b>Payment Notification</b>	<b>Letter and Meeting</b>	Directly interested Parties			2025	UETCL
<b>Displacement Notification</b>	<b>Letter and Meeting</b>	Directly interested Parties			2025	UETCL



## 7. ENVIRONMENTAL AND SOCIAL BASELINE

### 7.1. Physical Environment

The Republic of Uganda, encompassing approximately 241,038 km<sup>2</sup>, lies in eastern Africa straddling both the both Northern and Southern Hemispheres. Its approximate latitude ranges from 2°S to 5°N, and longitude from 29.5° to 36.0°. The country is bordered by Kenya to the east, South Sudan to the north, the Democratic Republic of the Congo to the west, and the Rwanda and Tanzania to the south. While much of its border is lakeshore, Uganda is landlocked with no access to the sea, but it is a fertile and well-watered country that consists of many lakes and rivers including the largest, Lake Victoria. As the country sits in the heart of the Great Lakes region, and is surrounded by three of them, Lake Edward, and Lake Albert. The central part of Uganda is a plateau, surrounded by four main mountain ranges: Rwenzori, Elgon, Mufumbira and Moroto; the highest point is the peak of Mt. Rwenzori at 5,110 m a.s.l..

Field surveys were conducted in 2020 and 2024, adhering to meticulously drafted work instructions. The primary objective was to comprehensively assess the physical environment within the designated Area of Interest (Aoi). The surveys encompassed:

- Water quality: assessing various parameters to determine overall water health.
- Air quality: analyzing various pollutants to evaluate air quality.
- Noise evaluation: measuring and interpreting noise levels within the Aoi.

#### 7.1.1. Climate

Uganda's climate is largely tropical (see Figure 7-1) with two rainy seasons per year, March to May and September to December. The northern region, which forms one quarter of the country lies outside the tropical belt, and hence experiences only one rainy season, March to October. The rest of Uganda lies within a relatively humid equatorial climate zones, and the topography, prevailing winds, and lakes and rivers cause large differences in rainfall patterns across the country. It's location in the tropics and across the equator results in the country's weather and seasonal being determined by the large-scale Indian Monsoon, Congo air mass, Indian Ocean Dipole (IOD) and the Inter Tropical Convergence Zone (ITCZ) systems.

Overall, Uganda experiences moderate temperatures throughout the year, around 22.8°C, with monthly temperatures ranging between 21.7°C (July) and 23.9°C (February). During this period, total annual average precipitation is 1,197 mm, and mean monthly precipitation of the country varies from 39.6 mm in January to 152.7 mm in April.

**Monthly Climatology of Min-Temperature, Mean-Temperature, Max-Temperature & Precipitation 1991-2020 Uganda**

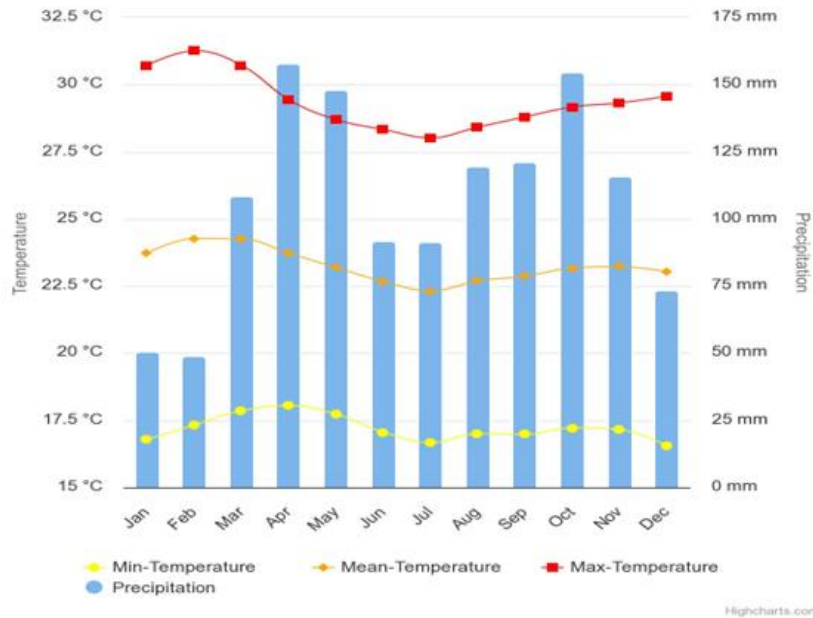


Figure 7-1 - Uganda main climatic features.  
 Source: Climate Change Knowledge Portal – World Bank Group

The project is located in an area where average rainfall is around 1,100 mm (see Figure 7-2).

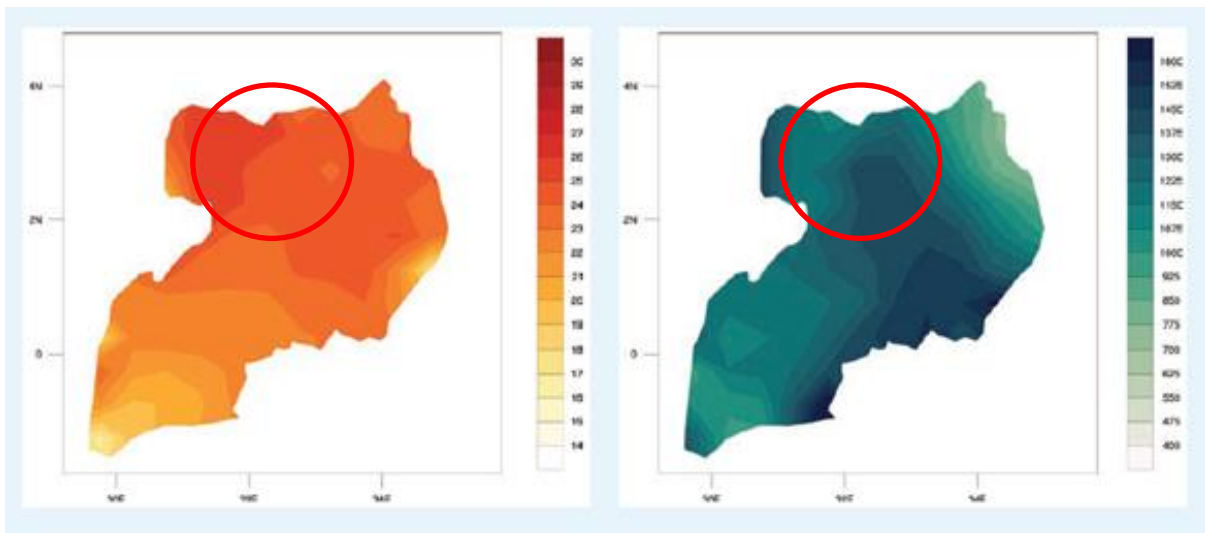


Figure 7-2 - Map of average annual temperature (left); annual precipitation (right) of Uganda, 1991–2020.  
 Source: WB – Uganda Climate Risk Country profile, 2018).

**7.1.2. Geology**

The Archaean Ugandan Craton (see Figure 7-3) is part of the African Plate, a large area of continental crust consisting of the accretion of small cratons (e.g. Uganda, Tanzania) welded together by Proterozoic mobile belts. Much of northern and central Uganda is underlain by Archaean basement gneisses. Major rift faulting commenced in the Tertiary and continued to the present. Tertiary volcanism also occurred, forming large shield volcanoes, the most prominent in Uganda being Mt. Elgon on the Kenyan border. Great thicknesses of Tertiary to Recent sediments fill the fault valleys, especially along the Western, or Albertine, Rift in western Uganda.

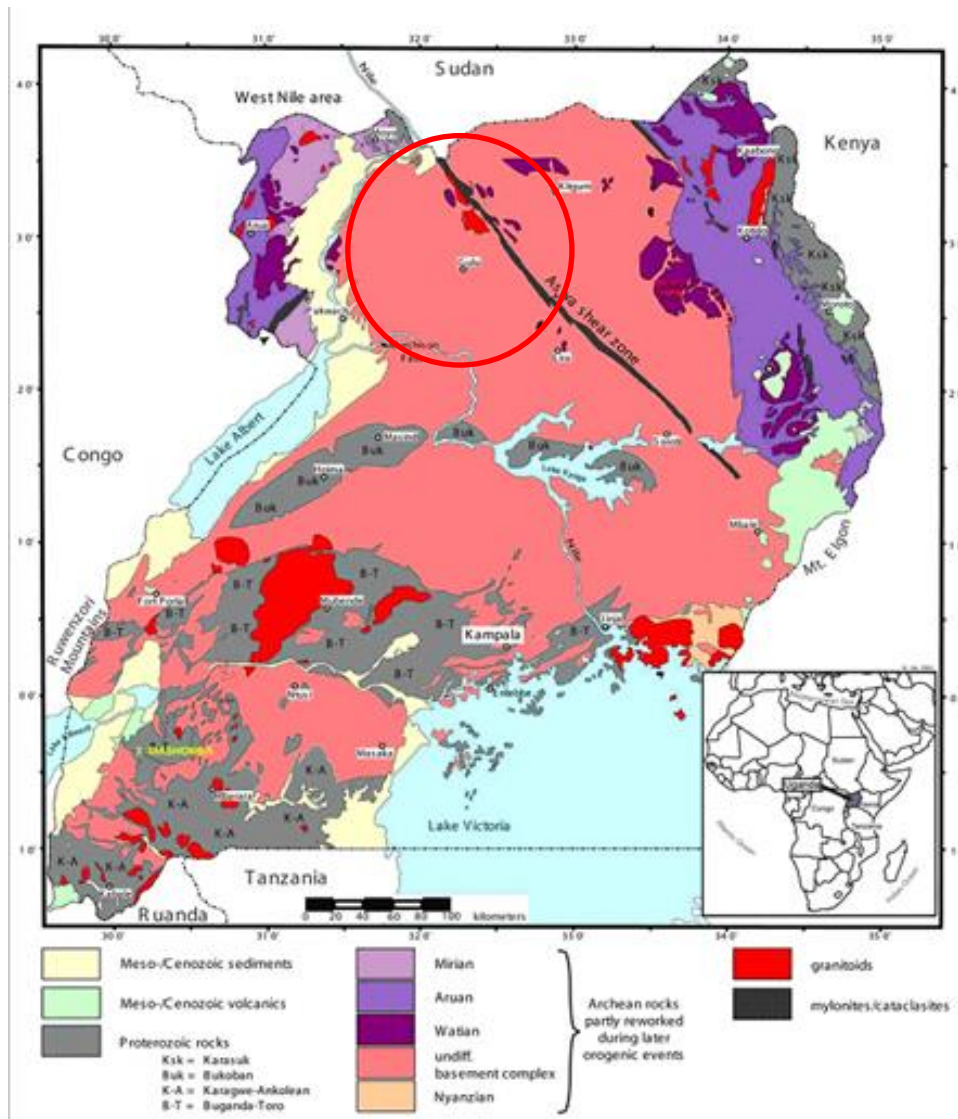


Figure 7-3 - Simplified Geological Map of Uganda.

Source: Report on the Mashonga exploration property, by Martin J. Taylor, 2007

Structurally, Uganda sits on two of the several fragments of African continental crust which have remained largely stable: the Tanzania Craton in the south and the Bomu-Kibalian or Northeast Congo-Uganda Shield in the north. These two areas of Archaean age crust are wrapped around by mobile belts of Proterozoic age.

More recently, as East Africa begins to split from the rest of the continent, the two arms of the East African Rift System have developed on either side of the country. The western arm of the rift system runs through western Uganda, where it is known as the Albertine Rift, whilst the eastern arm runs immediately east of its border with Kenya in the east. The two rifts define a tectonic block referred to as the Victoria Plate. Younger rocks are largely confined to the Cenozoic volcanic activity associated with the development of the two rift arms and sediments infilling the western rift.

Earthquakes and volcanic eruptions occur throughout the East African Rift system and are characterised by mainly shallow earthquakes due to the earth’s crust rupturing and tearing apart, and volcano-tectonic earthquakes. Western Uganda is a seismically active region. The Ethiopian Rift Valley runs through the western region of the country and occasionally produces devastating earthquakes, the most recent in 1994. Since 1900, there have been five severe earthquakes in the southwest. Seismic hazard decreases significantly in the central and eastern parts of Uganda. Figure 7-4 shows the risk of seismic hazard in Uganda.

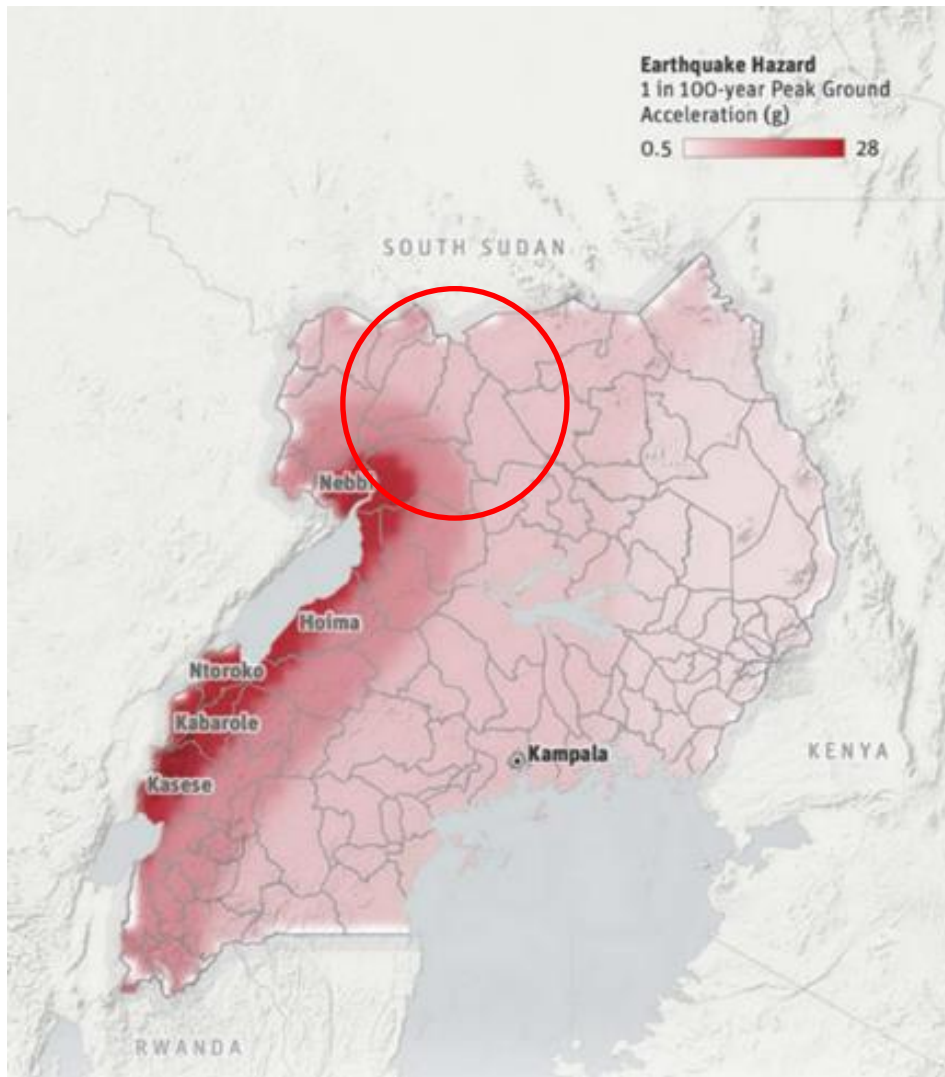


Figure 7-4 – Seismic risk of Uganda.

Source: Uganda disaster risk profile, International Bank for Reconstruction and Development, the World Bank Group, 2019

### 7.1.3. Soils

Most of the agricultural soils in Uganda consist of Ferrasols and Nitisols (Figure 7-5) that are in their final stages of weathering and as a result have very low nutrient reserves (Eswaran et al., 1997; Henao and Banaante, 1999; Stocking, 2003; NEMA, 2009). The predominant minerals in these soils are quartz, which has no cation exchange capacity (CEC), and kaolinite, which has a very low CEC. Ferrasols and Nitisols tend to be acidic, with low fertility and CEC. Nutrients such as phosphorus, which occur predominately in inorganic forms, are not readily available to crops because they are tightly bound to the surfaces of iron oxide minerals and gibbsite, and to the edges of aluminosilicates such as kaolinite (Buresh et al., 1997; Smeck, 1985, Palm et al., 2007).

In the project’s area the most common soils are Leptosols that are unattractive soils for rainfed agriculture because of their inability to hold water but may sometimes have potential for tree crops or extensive grazing. Leptosols are best kept under forest.

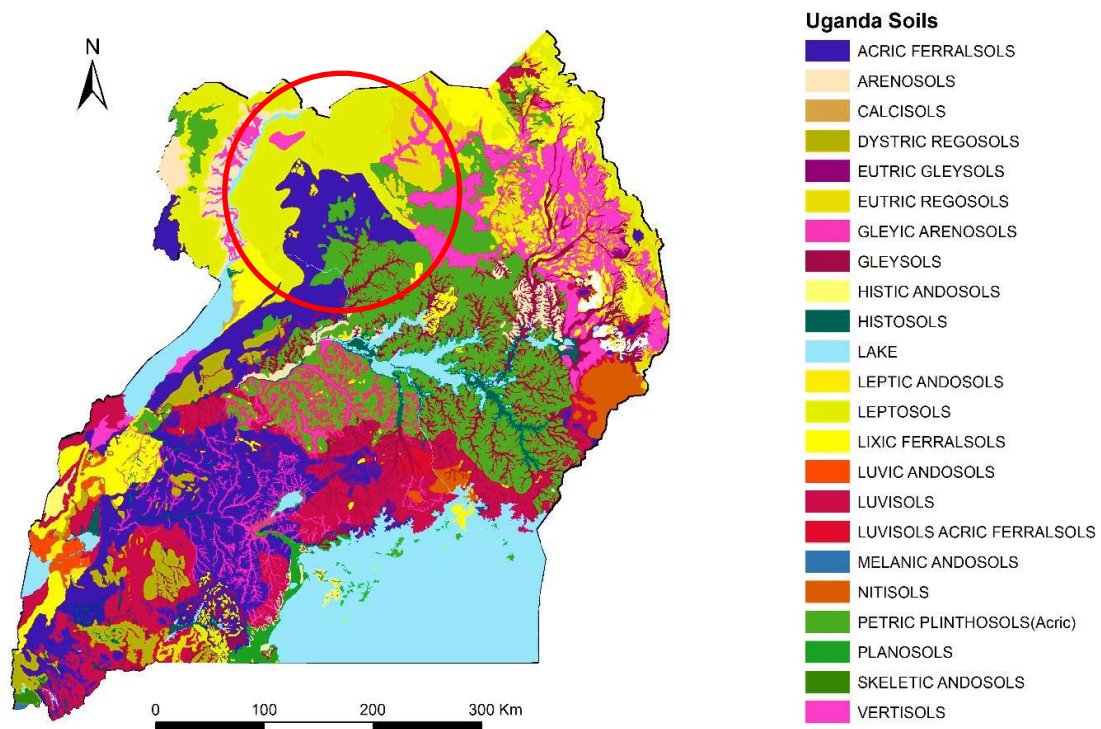


Figure 7-5 – Soil map of Uganda.  
 Source: FAO, 2006.

### 7.1.4. Land use

A total of 29 land use systems can be identified in Uganda. These land use systems fall into the following broad land use/cover classes: agricultural land, bushlands, forest and woodland, grasslands, impediments, open water, built-up areas and wetlands.

Agricultural Land: three major agricultural land use systems can be identified: subsistence, commercial without irrigation, and irrigated commercial agricultural land. Agricultural lands are arable and regularly tilled to produce crops, with or without irrigation. Commercial agricultural lands are characterized by large, uniform, well-managed field units, often mechanized, and more than 10 ha in size, with the aim of supplying both regional and national and export markets. Some use supplementary irrigation and others

are rain-fed. Subsistence farmlands are generally smaller in size, i.e., less than 10 ha in size (about 2 ha on average). Subsistence farmlands are generally rain-fed.

Bushlands represent dense, woody, semi succulent, and thorny vegetation types of an average height of 2–3 m which are relatively impenetrable in an unaltered condition. Bushlands are used for grazing and are found in or outside protected areas.

Forest and woodland: four land use systems are identified under forests in Uganda. These include forests consisting of tree plantations, forests with subsistence farming activities, forests with livestock activities, and protected forests. A forest is defined as an ecosystem that is dominated by trees (defined as perennial woody plants taller than 5 m at maturity), where the tree crown cover (or equivalent stocking level) exceeds 10% and the area is larger than 0.5 hectares.

All non-timber-based plantations, such as tea, sisal, and orchards, are excluded. Forest areas with partial or permanent livestock activities and those with farming activities were classified as forest with livestock activities and forest with subsistence activities, respectively. Protected forests included those found in national parks, forest reserves, bird sanctuaries, botanical gardens, and other conservation areas detectable at a mapping scale.

Grasslands are those areas where herbaceous plants dominate the vegetation and where woody plants and shrub cover less than 10% of the area. There are five land use systems under grassland areas, three of which involve livestock (grassland with high livestock density, grassland with medium livestock density, and grassland with low livestock density). Other land use systems include grassland protected and grassland unprotected.

Impediments Land comprises land covered by bare bedrock, rocky land, and cobble fields and which has less than 10% vegetated cover during any time of the year.

Open Water Land Use System consists of permanently open water (man-made or natural); static or flowing; salty, brackish, or fresh. This land use system includes lakes, lagoons, ponds, and big reservoirs (big dams).

Built-Up Areas Land Use System essentially comprises of all formal built-up areas, in which people reside on a permanent or near-permanent basis, identifiable by the high density of residential and associated infrastructure. It includes cities, towns, municipalities and rural clusters (trading centres).

Wetlands Land Use System are areas of land with a permanent mosaic of water and herbaceous or woody vegetation that covers extensive areas. The vegetation can be present in either salt, brackish, or fresh water, the depth of which does not exceed six meters.

As shown in Figure 7-6, in the project's area the land use is mainly grassland and subsistence farmland.

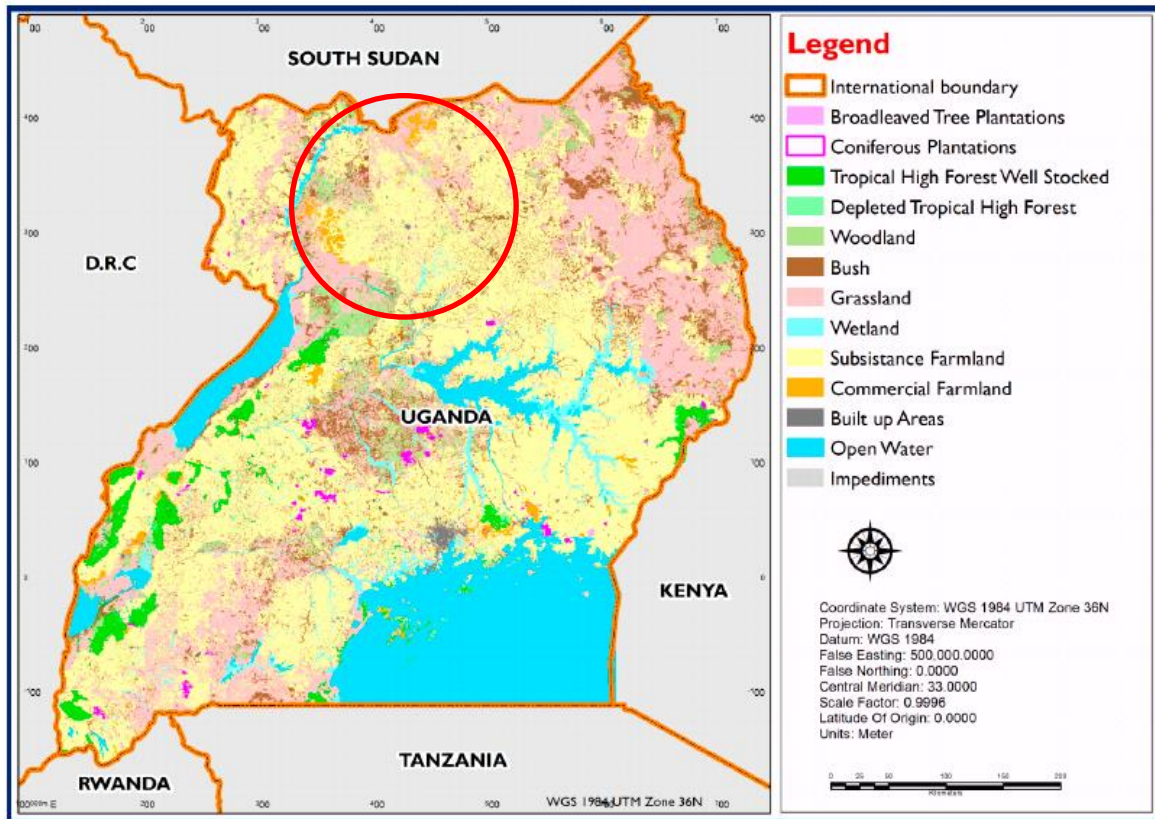


Figure 7-6 – Land use map of Uganda.

Source: “Assessing the Extent of Historical, Current, and Future Land Use Systems in Uganda” by Majaliwa Gilbert Jackson Mwanjalolo, Barasa Bernard, Mukwaya Isolo Paul, Wanyama Joshua, Kutegeka Sophie, Nakyeyune Cotilda, Nakileza Bob, Diisi John, Ssenyonjo Edward and Nakangu Barbara, 2018)

### 7.1.5. Hydrology

Northern Uganda hydrology is dominated by the presence of Lake Albert, originally known as Lake Mwitanzige and temporarily Lake Mobutu Sese Seko. It is Africa's seventh-largest lake, as well as the second biggest of Uganda's Great Lakes.

Lake Albert is located on the border between Uganda and the Democratic Republic of the Congo. It is the northernmost of the chain of lakes in the Albertine Rift, the western branch of the East African Rift. It is about 160 kilometres long and 30 kilometres wide, with a maximum depth of 51 metres, and a surface elevation of 619 metres above sea level.

Lake Albert is part of the complicated system of the upper Nile. Its main sources are the White Nile, ultimately coming from Lake Victoria to the southeast, and the Semliki River, which issues from Lake Edward to the southwest. The water of the Victoria Nile is much less saline than that of Lake Albert. The lake's outlet, at its northernmost tip, is the Albert Nile section of the White Nile. The river later becomes known as the Mountain Nile when its course enters South Sudan.

The project's area is located at the east of the Albert Nile where there is the Erudz River (located few kilometres west of Atiak) seems to be the only perennial stream.

### 7.1.6. Water Quality

The Nile Basin Initiative's 2021 State of the River Nile Basin report indicated that the quality of the Nile waters has generally deteriorated over the previous decades due to factors such as population growth, urbanization, agricultural intensification, and industrial development.

Available water quality data for point sources, non-point sources, rivers and streams, as well as for lakes, shows some extreme values, indicating that surface waters are threatened by pollution. Groundwater and shallow wells monitoring data also reveal a high risk of faecal bacteriological contamination at various sites (Baseline Study of the Status of Water Quality Monitoring in Uganda, NBI 2005).

The major sources of pollution include sewerage and municipal or urban effluents, industrial effluents, domestic effluents, agricultural runoff, changing land use leading to soil erosion, natural conditions, floating aquatic macrophytes, as well as atmospheric deposition of pollutants. The detection of pesticide residues and high nutrient loads into surface water bodies is also of concern.

The status of water quality in rivers and streams indicates that parameters of concern include TSS, TDS, EC, DO, BOD, COD, total coliforms, and *Escherichia coli*. Poor sanitary coverage is a concern, as surveillance results of water sources for drinking such as rivers, streams, boreholes, shallow wells, and protected springs indicate faecal contamination. Poor agricultural practices and ecosystem degradation are seriously contributing to siltation and sedimentation in rivers.

According to the Nile Basin Water Resources Atlas (UNDP), the percentage of the rural and urban population of Uganda with access to improved drinking water sources was 17% and 77%, respectively, in 2015. Moreover, the percentage of the population using improved sanitation was 65% in rural areas and 73% in urban areas.

#### 7.1.6.1. Water Quality Survey

Field studies on the rivers and streams traversed by the Project within the AoI were conducted in two campaigns:

- Six (6) sampling points (W01-01 to W01-06) were established along the SMEC footprint in April 2020; however, their GPS coordinates are not available from the previous study.
- Six (6) sampling points (W02-01 to W02-06) were established along the final project footprint by Dr. Vivian Michael Chambo (environmental scientist) and Dr. Violet Namakula (water quality specialist) from 31<sup>st</sup> January to 2<sup>nd</sup> February 2024. The dates and GPS coordinates (WGS84 UTM Zone 36N) for these points are summarized in the Table 7-1.

The locations of 2024 sampling points are shown in Figure 7-7. During both campaigns, each location was thoroughly examined, and detailed field notes and GPS coordinates were recorded.



*Table 7-1 – Station coordinates of water survey sampling points.*

ID	Coordinates (Decimal Degree, WGS84 UTM Zone 36N)		River/Stream	Survey Date
	Longitude	Latitude		
W02-01	379488	287789	Akago permanent stream	31/01/2024
W02-02	378212	285123	Loyokwong permanent stream	31/01/2024
W02-03	406072	316057	Oboo permanent stream	01/02/2024
W02-04	405574	317832	Coke permanent stream	01/02/2024
W02-05	405972	337277	Abera permanent stream	01/02/2024
W02-06	397737	379327	Bibia permanent stream	02/02/2024

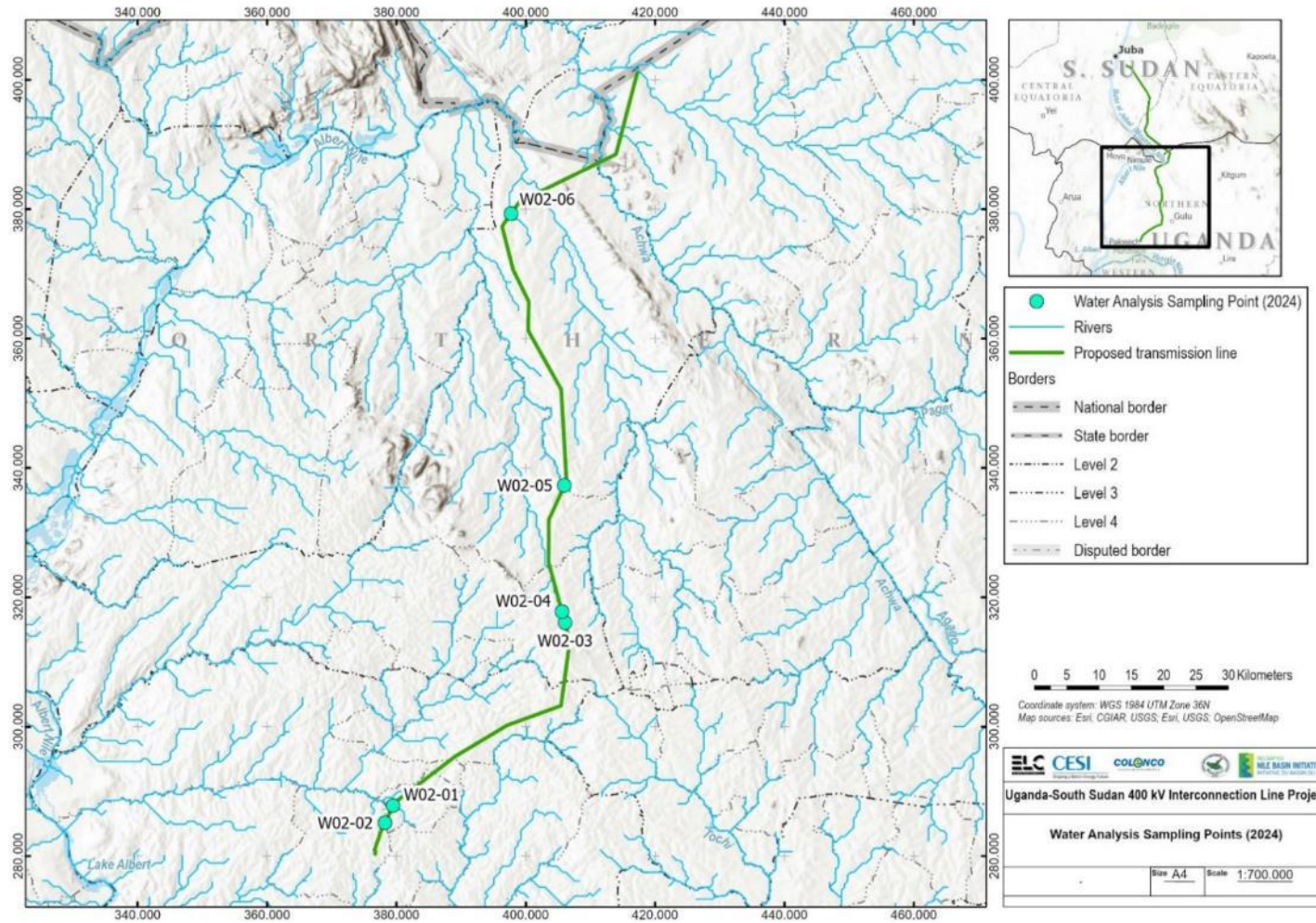


Figure 7-7 – Water Analysis Sampling Points (2024).

#### 7.1.6.1.1. Methodology

Sampling points were selected for each river that intersected the proposed transmission line, based on the following criteria:

- The river must be perennial;
- The river must be accessible by field personnel;
- The river must be safe for sampling.

Sampling points that were particularly difficult to reach were accessed using a sampling dip rod to ensure the safety of field personnel and to collect representative water samples. At each site, the rod was rinsed with flowing water before sample collection. Each sample was immediately transferred to a clean, labelled bottle that had been pre-rinsed with deionized water. The samples were then packed in a cooler with ice and transported to the laboratory under chain-of-custody procedures. Figure 7-8 and Figure 7-9 below illustrate the collection of water samples conducted in 2024.

Water samples underwent rigorous assessment for potability, adhering to all parameters outlined in the DEAS 12:2018 standards for natural potable water (see Table 7-2). Both physical-chemical and biological analyses were conducted in the laboratory using standard procedures, in accordance with DEAS 12:2018 and specific methods outlined in the Annex 9.

Table 7-2 – Maximum permissible standards for selected parameters for potable water according to DEAS 12:2018.

Parameter	Potable Water Standards (DEAS 12:2018)
Colour (apparent)	50
Turbidity (NTU)	25
pH	5.5-9.5
Electrical Conductivity (EC)	2500
Total Dissolved Solids (TDS)	1500
Total Suspended Solids (TSS)	Not Detectable
Hardness: Total as CaCO <sub>3</sub>	600
Calcium, as Ca <sup>++</sup>	150
Magnesium, as Mg <sup>++</sup>	100
Alkalinity, Total as CaCO <sub>3</sub>	-
Bicarbonate, as CaCO <sub>3</sub>	-
Fluorides, as F	1.5
Sulphate, SO <sub>4</sub>	400
Chlorides, as Cl <sup>-</sup>	250
Sodium, as Na <sup>+</sup>	200
Nitrates, as NO <sub>3</sub> <sup>-</sup>	50
Iron, as Fe	0.3
Aluminium, as Al <sup>+++</sup>	0.1
Bacteria: Faecal Coliforms	<1



Figure 7-8 – Sampling at Akago permanent stream (W02-01).



Figure 7-9 – Sampling at Coke permanent stream (W2-04).

#### 7.1.6.1.2. Results

The absence of GPS coordinates from the 2020 study hinders direct comparison of results, despite utilizing the same permanent river crossings were used in both surveys.

Analysis of the 2024 water samples revealed poor bacteriological quality, as indicated by high levels of faecal coliforms detected in all six samples. This suggests potential contamination from sources such as open defecation or shallow pit latrines in the nearby area, posing potential health risks to humans and disrupting aquatic ecosystems.

With the exception of two parameters, all physical-chemical parameters complied with the permissible limits set by DEAS 12:2018. The exceptions were colour and total suspended solids (TSS), likely caused by agricultural practices along the riverbanks.

Although the absence of 2020 data limits our understanding of long-term trends, the 2024 results underscore the need for further investigation and potential mitigation strategies to address the observed contamination.

Comprehensive results of the laboratory tests, including the parameters examined and their comparison to permissible standards, are detailed in Annex 9.

### **7.1.7. Air Quality**

The project area is characterized by sparsely populated rural areas with minimal anthropogenic activities contributing to air quality. Natural background levels dominate, with occasional dust arising from unpaved roads and windblown soil. Towns experience limited air pollution from local traffic, market activities, and wind; notably absent are major industrial sources. Particulate matter, primarily from traffic, elevates during dry seasons.

#### **7.1.7.1. Air Quality Survey**

Air quality assessment was evaluated at selected points along the transmission corridor to benchmark baseline air quality conditions prior to the implementation of the project. Field studies were conducted in two campaigns:

- 12 sampling points (AN01 to AN13), established along the SMEC footprint from 7th to 8th March 2020.
- 15 sampling points (AN01 to AN09, and AN14 to AN19), established along the final project footprint by Dr. Vivian Michael Chambo (environmental scientist with air quality specialization) from 31<sup>st</sup> January to 2<sup>nd</sup> February 2024.

The dates and GPS coordinates (WGS84 UTM Zone 36N) for these points are summarized in the Table 7-3. The locations of 2020 and 2024 sampling points are shown in Figure 7-10. During both campaigns, each location was thoroughly examined, and detailed field notes and GPS coordinates were recorded.

Table 7-3 – Station coordinates of air quality and noise survey sampling points.

ID	Coordinates (Decimal Degree, WGS84 UTM Zone 36N)		Survey Date
	Longitude	Latitude	
AN01	376702	280789	07/03/2020, 31/01/2024
AN02	397071	300195	07/03/2020, 01/02/2024
AN03	406814	313268	07/03/2020, 01/02/2024
AN04	403578	327936	07/03/2020, 01/02/2024
AN05	406122	340803	07/03/2020, 01/02/2024
AN06	405389	352129	08/03/2020, 01/02/2024
AN07	403873	355287	07/03/2020, 01/02/2024
AN08	398346	370790	08/03/2020, 02/02/2024
AN09	396764	377966	08/03/2020 02/02/2024
AN10	395425	394611	08/03/2020
AN11	395494	394635	08/03/2020
AN12	395512	394759	08/03/2020
AN13	397274	385994	08/03/2020
AN14	391802	297008	01/02/2024
AN15	405467	303410	01/02/2024
AN16	404435	333895	01/02/2024
AN17	400389	361606	02/02/2024
AN18	406354	384759	02/02/2024
AN19	380816	289086	31/01/2024

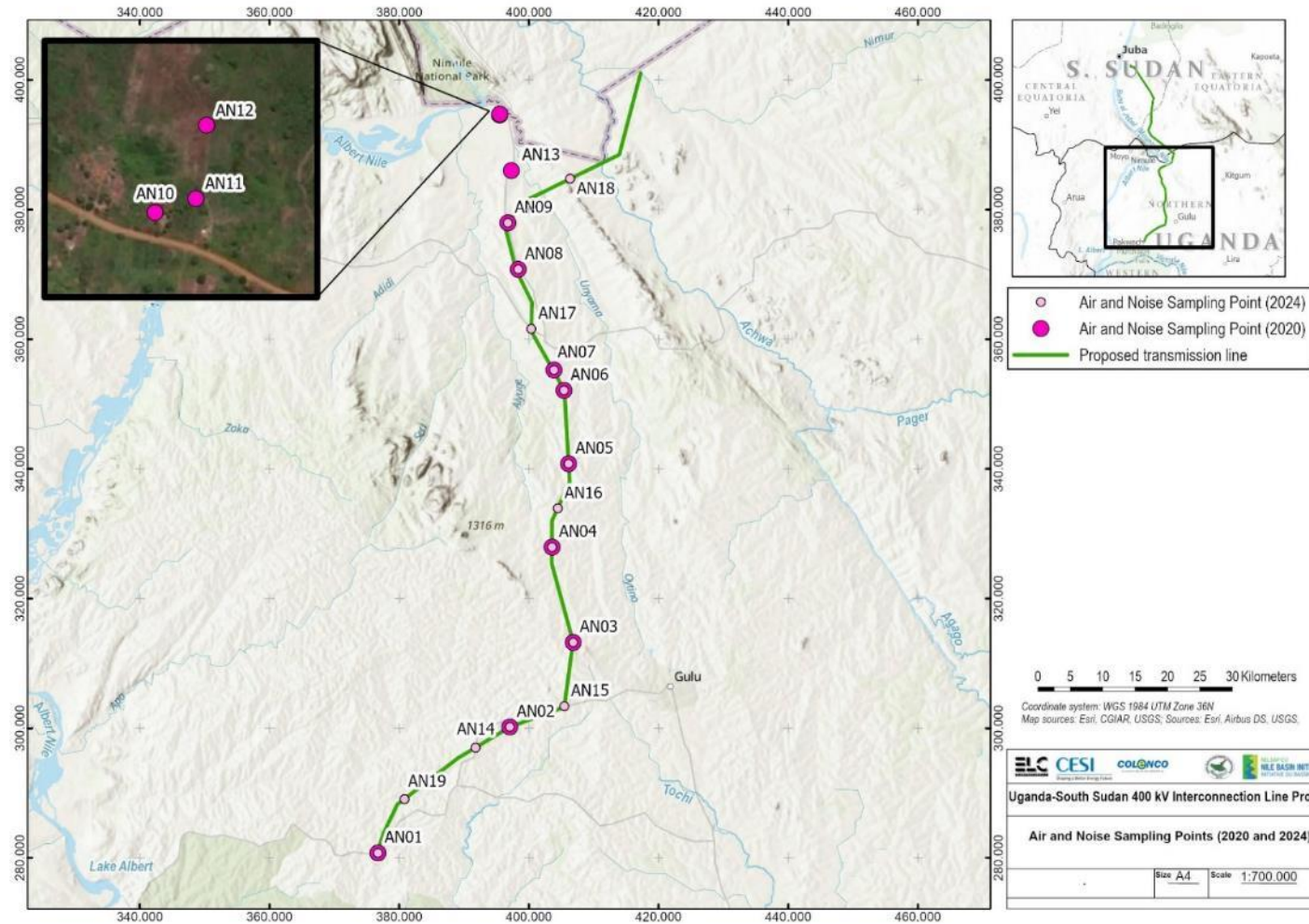


Figure 7-10 – Air Quality and Noise Sampling Points (2020 and 2024).



7.1.7.1.1. Methodology

**Ambient Gases Emissions**

In 2020, air quality assessment was conducted using a MultiRAE Lite Gas Monitor. This monitor detected concentrations of oxygen (O<sub>2</sub>), carbon monoxide (CO), hydrogen sulphide (H<sub>2</sub>S), LEL methane (CH<sub>4</sub>) and volatile organic compounds (VOC) in a specific environment at a given time.

In 2024, ambient gas levels were measured using an Aeroqual M 500 Series Gas Monitor equipped with sensor detectors for targeted gases, following the manufacturer's recommended operational procedures. Measured parameters included: carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), hydrogen sulphide (H<sub>2</sub>S), sulphur dioxide (SO<sub>2</sub>), LEL methane (CH<sub>4</sub>), and volatile organic compounds (VOC). Oxygen (O<sub>2</sub>) was measured using a gas detector.

**Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>)**

Particulate matter levels were determined using a portable dust sensor that employs a modulated infrared light beam projected into a measurement chamber. During measurements, sampling equipment was positioned at breathing height above ground at all designated stations, as specified in the scope of work. The instrument offers four real-time measurement ranges. Considering project sensitivity, a range of 0.001-999 µg/m<sup>3</sup> was chosen, which is appropriate for particulate matter measurements.

While Uganda's official air quality standards remain in draft form, they are recognized by the National Environment Management Authority (NEMA). This study used the East African air specifications (EAS 751:2010) to assess baseline air quality at the designated locations.

Figure 7-11 shows the air quality measurements taken at one of the sampling points in 2024.



Figure 7-11 – Noise level measurements at AN07

7.1.7.1.2. Results

**Field Survey 2020**

Air quality assessments across all 15 sampling points yielded similar results. Ambient oxygen concentrations remained consistent at 20.8% across all locations. Analysis did not detect emissions of CO, H<sub>2</sub>S, LEL, or VOCs. This likely reflects the low population density, absence of heavy industry, and minimal traffic in the area. Potential sources of air contaminants within the project area include vehicular emissions, grain milling machines, and household cooking and lighting powered by wood and kerosene. Detailed air quality data (gaseous emissions) for each location is presented in Table 7-5.

Table 7-4 – Results for air quality assessment performed in 2020 along selected points along the transmission corridor.

Parameter	O <sub>2</sub>	CO ppm	H <sub>2</sub> S ppm	CH <sub>4</sub> (LEL)	VOC mg/m <sup>3</sup>
<b>EA standards</b>	18-24	50	0.15	<5%	6
AN01	20.8	0	0	0	0
AN02	20.8	0	0	0	0
AN03	20.8	0	0	0	0
AN04	20.8	0	0	0	0
AN05	20.8	0	0	0	0
AN06	20.8	0	0	0	0
AN07	20.8	0	0	0	0
AN08	20.8	0	0	0	0
AN09	20.8	0	0	0	0
AN10	20.8	0	0	0	0
AN11	20.8	0	0	0	0
AN12	20.8	0	0	0	0
AN13	20.8	0	0	0	0

**Field survey 2024**

This survey expanded on the 2020 assessment by measuring VOCs, SO<sub>2</sub>, CO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub>. Gaseous emissions remained within established standards. However, PM<sub>2.5</sub> and PM<sub>10</sub> levels exceeded permissible limits at most locations. This could be attributed to proximity to main roads, bush burning for agricultural purposes, and dust generated during the dry season.

Detailed air quality data (gaseous emissions) for each location is presented in Table 7-5.

Table 7-5 – Results for air quality assessment performed in 2024 along selected points along the transmission corridor.  
 Values in bold indicate non-standard emissions.

Parameter	PM <sub>2.5</sub> µg/m <sup>3</sup>	PM <sub>10</sub> µg/m <sup>3</sup>	O <sub>2</sub>	CO ppm	H <sub>2</sub> S ppm	CH <sub>4</sub> (LEL)	VOC mg/m <sup>3</sup>	SO <sub>2</sub> ppm	CO <sub>2</sub> ppm
EA standards	75 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	18-24	50	0.15	<5%	6	0.19	1000
AN01	<b>85</b>	92	20.9	16	0	0	0.115	0	461
AN02	<b>113</b>	136	20.9	10	0	0	0.142	0	450
AN03	<b>80</b>	91	20.9	12	0	0	0.162	0	448
AN04	33	39	20.9	14	0	0	0.155	0	442
AN05	50	62	20.9	13	0	0	0.157	0	441
AN06	<b>79</b>	87	20.9	11	0	0	0.160	0	451
AN07	<b>77</b>	84	20.9	9	0	0	0.162	0	478
AN08	46	55	20.9	15	0	0	0.152	0	466
AN09	27	36	20.9	13	0	0	0.154	0	468
AN14	<b>185</b>	<b>197</b>	20.9	9	0	0	0.168	0	466
AN15	<b>87</b>	98	20.9	10	0	0	0.154	0	457
AN16	20	28	20.9	17	0	0	0.153	0	432
AN17	<b>88</b>	97	20.9	12	0	0	0.161	0	449
AN18	21	25	20.9	15	0	0	0.150	0	453
AN19	<b>72</b>	79	20.9	16	0	0	0.157	0	452

### 7.1.8. Noise

Noise levels along the transmission line corridor are primarily influenced by ambient sounds related to surrounding human settlement. Slightly elevated levels occur within markets and urban centres due to economic activities like workshops, businesses and entertainment venues. Road traffic, including cars, motorcycles, and human voices from traders and customers during business hours, contributes to the main noise pollution along the corridor.

In most sections, noise levels remain low, except near market areas where increased activity from people, vehicles, motorcycles, and businesses raises the noise level. Notably, some key sensitive points, such as schools located near the proposed alignments, could be potentially impacted during construction and operation phases.

#### 7.1.8.1. Noise Survey

Noise assessments were conducted at two field campaigns across the project site, coinciding with the air quality survey locations:

- Twelve (12) sampling points (AN01 to AN13) were established along the SMEC footprint on March 7<sup>th</sup> - 8<sup>th</sup>, 2020.
- Fifteen (15) sampling points (AN01 to AN09, and AN14 to AN19) were established along the final project footprint by Dr. Vivian Michael Chambo (environmental specialist), and Dr. Joseph Walumbe (assistant environmentalist specializing in noise evaluation), on January 31<sup>st</sup> - February 2<sup>nd</sup>, 2024.

Details including dates and GPS coordinates (WGS84 UTM Zone 36N) are provided in the Table 7-3, while Figure 7-10 shows the locations of both sets of sampling points. During each campaign, each location was thoroughly examined, and detailed field notes were taken along with GPS coordinates.

##### 7.1.8.1.1. Methodology

Baseline noise measurements along the Transmission Line were conducted in 2020 using a Casella 62x Sound Level Meter. In 2024, spot measurements were taken at designated points using an MS6701 meter. Both instruments were positioned 1.5 meters above ground before activation.

Noise levels were measured at both intervals of 5 minutes (2020) and 10 minutes (2024), repeated four times to ensure accuracy and obtain an average reading. The recorded data was then compared against the maximum permissible levels outlined in Ugandan noise standards (Figure 7-12).

Figure 7-14 to Figure 7-16 shows the noise assessment carried out at three sampling points in 2024.

For General Environment		
Facility	Noise Limits dB(A)	
	Day	Night
A. Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes for higher learning, conference rooms, public library, environment or recreational site	45	35
B. Residential building	50	35
C. Mixed residential (with some commercial and entertainment)	55	45
D. Residential + Industry or small scale production + Commerce	60	55
E. Industrial	70	60
Construction site		
(i) Hospitals, schools, institutions for higher learning, homes for the disabled, etc.	60	50
(ii) Buildings other than those prescribed in (i)		
From a factory or workshop		
Acceptable noise limit dB(A)	Duration (Daily)	Duration (weekly)
85	8 Hours	40 Hours
88	4 Hours	20 Hours
91	2 Hours	10 Hours
94	1 Hours	5 Hours
97	30 Hours	2.5 Hours
100	15 Hours	1.25 Hours
103	7.5 Minutes	37.5 Minutes
106	3.75 Minutes	18.75 Minutes
109	1.875 Minutes	9.375 Minutes
Accelerating vehicles		
Vehicle Category in dB(A)		Maximum sound level
Vehicle Category		
1	Vehicles intended for carriage of passengers and equipped with not more than nine seats, including the driver's seat	78
2	Vehicles intended for carriage of passengers and equipped with not more than nine seat including the drivers seat and having maximum permissible mass of more than 3.5 tonnes- (a) With an engine power of more than 150KW (b) With an engine power of less than 150KW	80 83
3	Vehicles intended for carriage of passengers and equipped with more than nine seats including drivers seat: Vehicles intended for carriage of goods- (a) With maximum permissible mass not exceeding 2 tonnes (b) With maximum permissible mass exceeding 2 tonnes but not exceeding 3.5 tonnes	79 80
4	Vehicles intended for the carriage of goods and having a maximum permissible mass exceeding 3.5 tonnes- (a) With an engine power of less than 75KW (b) With an engine power of not less than 75KW but less than 150KW (c) With an engine power of less than 150KW	81 83 84
Mines and quarries		
Facility	Limit value in dB(C)	
1	For any buildings used as a hospital, school, convalescent home, old age home or residential building	
2	For any building in area used for residential and one or more of the following purposes:	

Commerce, small scale production, entertainment, or any residential apartment in area that is used for purposes of industry, commerce, or small scale production, or any building used for the purpose of industry, commerce or small scale production.	14dB(C)
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Figure 7-12 – Standards for Maximum Permissible Noise Levels for various environments. Time frame: Day 6.00am - 10.00pm, Night 10.00pm - 6.00am. Source: The National Environment (Noise Standards and Control) Regulations, 2003.

**SCHEDULE 8**

**MAXIMUM PERMISSIBLE LEVEL FOR ROADS AND ROAD CONSTRUCTION**

*Regulation 10 (8)*

Days & Times	Leq dB <sub>A</sub>	Leq Max slow dB <sub>A</sub>
<b>Monday to Friday</b>	70	80
<b>07:00 to 19:00hrs</b>		
<b>Monday to Friday</b>	60	65
<b>19:00 to 22:00hrs</b>		
<b>Saturday</b>	65	75
<b>08:00 to 16:30hrs</b>		
<b>Sundays and Public Holidays</b>	60	52
<b>08:00 to 16:30hrs</b>		

Figure 7-13 – Maximum permissible noise levels for roads. Source: The National Environment (Noise Standards and Control) Regulations, 2003 (Schedule 8).



Figure 7-14 – Noise level measurements at AN04.



Figure 7-15 – Noise level measurements at AN07.



Figure 7-16 – Noise level measurements at AN19.

#### 7.1.8.1.2. Results

##### Field Survey 2020

The proposed transmission line primarily traverses through sparsely populated rural areas with limited human activity, resulting in generally low baseline noise levels. This aligns with the acceptable limits for both commercial and residential areas. These rural areas are characterized by remote villages surrounded by bushes, thickets, and gardens, with sections dedicated to active cultivation or fallow land. During the survey conducted on Saturday and Sunday, most baseline noise levels along the corridor fell within the range of 40-50 decibels (dB). This aligns with the acceptable limits as defined by the National Environment (Noise & Vibrations Standards and Control) Regulations, 2013, of Uganda. Table 7-6 presents detailed noise measurements at specific points along the corridor.

Table 7-6 – Noise assessment results (2020).

ID	Noise Measurements (dBA)			Background Environment
	Min	Max	Average (dBA)	
AN01	40.1	50.6	43.8	People, trees, wind and birds. Vehicles and motorbikes.
AN02	38.3	40.9	39.9	Wind and birds. Flying helicopter and motorbikes
AN03	34.8	55.3	38.1	Wind and birds. Vehicles and motorbikes.
AN04	38.5	47.7	40.2	Wind and birds.
AN05	35.2	61.0	43.5	People, wind and birds.
AN06	30.9	51.9	35.0	People, wind and birds. Motorbikes.
AN07	37.3	49.1	38.2	People, wind, birds and other animals. Motorbikes.
AN08	42.7	56.5	48.9	People, wind and water source (borehole). Vehicles, motorbike and bicycles.
AN09	36.7	51.0	40.4	Wind and birds. Vehicles and motorbikes.
AN10	35.3	46.3	42.6	People and wind. Vehicles and motorbikes.
AN11	38.8	55.7	44.2	Wind and birds. Vehicles and motorbikes.
AN12	36.2	57.1	38.8	Wind and birds.
AN13	36.6	60.3	39.6	Wind and birds. Vehicles and motorbikes.

**Field Survey 2024**

During the 2024 survey, baseline noise levels recorded along the transmission line corridor ranged from 38.5 to 70.6 dBA. The primary noise sources were identified as traffic on nearby roads, community activities and wind. It's important to note that measurements were taken between Wednesday and Friday, which may not fully represent typical weekend noise levels. Regardless, all recorded values remained within the permissible range as specified by relevant regulations.

Table 7-7 presents the detailed noise levels measured at specific points along the corridor.



Table 7-7 – Noise assessment results (2024).

ID	Noise Measurements (dBA)				Average (dBA)	Background Environment
AN01	50.4	55.9	52.3	51.2	52.5	Blowing wind, human being talking at their homesteads and noise backgrounds from vehicles and motorcycles along Olwiyo-Gulu road.
AN02	45.9	48.4	58.2	54.7	51.8	Human being talking and blowing wind.
AN03	49.1	47.9	54.2	60.5	53.0	Noise background from motorcycles, cars and blowing wind.
AN04	54.2	64.3	61.8	56.4	59.2	Noise background from vehicle movement, motorcycles.
AN05	39.4	40.2	38.9	42.2	40.2	Blowing wind, people talking.
AN06	38.2	37.0	40.1	39.4	38.6	Birds sound It is a natural environment with low noise levels.
AN07	40.9	41.2	40.5	39.8	40.6	Birds sound It is a natural environment with low noise levels.
AN08	58.0	60.0	61.1	54.4	58.4	Community members conversing.
AN09	73.6	65.5	69.1	74.0	70.6	Moving vehicles along Atiak-Nimule Road.
AN14	68.0	62.5	56.9	54.5	60.5	Noise background from motorcycle movement, blowing wind and birds' sound.
AN15	50.5	69.5	64.5	70.2	63.7	Noise background from vehicle movement and motorcycles.
AN16	41.0	40.9	39.9	43.6	41.4	Noise background from motorcycles, car movement and people speaking.
AN17	53.6	62.0	77.1	63.4	64.0	Vehicle movement, and motorcycles.
AN18	38.5	39.2	37.4	39.0	38.5	Natural environment with low noise levels.
AN19	52.0	54.5	49.0	53.1	52.2	Blowing wind and birds' sound.

## 7.2. Ecosystem and Landscape Diversity

Uganda is a country of exceptional biological diversity, encompassing a zone of overlap between the savannahs of East Africa and the rainforests of West Africa. Uganda is endowed with a wide variety of landscapes of incredible aesthetic beauty. Uganda's geographical features range from glacier-capped mountains, rainforests, savannahs and dry acacia scrubland to wetlands and open water. These, together with a wide range of climates and soils, give the country an impressive diversity of terrestrial and aquatic ecosystems. Natural forests and woodlands together cover an area of nearly 50,000 km<sup>2</sup>. Open water resources cover up to 17% of the country's surface area and include five major lakes - Victoria, Albert, Kyoga, Edward and George - some 160 smaller lakes and an extensive river system. Wetland ecosystems include areas of threatened drainage, swamp forests, papyrus and grass swamps. The coverage of wetland ecosystems is estimated to be about 10.9% of 13% (which was about 30,000 km<sup>2</sup>).

Uganda has the mighty Nile River, punctuated by various falls e.g. the Bujagali Falls (where white-water rafting is now conducted), Karuma Falls and Murchison Falls. The ecosystems range from the snow-capped peaks of the Rwenzori Mountains (Mountains of the moon), the Virunga Volcanoes and Mount Elgon to high altitude montane forests, to the open waters of Lakes Victoria, Albert and others, to the islands of Lake Victoria and Bunyonyi. There are several forest-fringed crater lakes that stud the rift valley floor and escarpment around Fort Portal and the Queen Elizabeth area. Uganda has a unique blend of semi-arid woodlands, savannah and forest communities as well as a wealth of montane and lake habitats.

In the previous ESIA study, Vegetative communities of the study area were characterized basing on criterion adopted by Langdale-Brown et al., (1964). This criterion utilizes plant community composition rather than just plant biomass, which is more relevant to the goal of characterizing vegetation and identifying sensitive habitats. The L-B system provides 26 major vegetative categories as opposed to 13 categories adopted by the National Biomass System. This allows us to assess the potential impacts of development activities on ecosystems at a finer scale.

### 7.2.1. Type of Ecosystems

Over time, a high proportion of the vegetation and ecosystems of Uganda has been modified by cutting, cultivation, burning, grazing and other anthropogenic actions, and many of these vegetation types have been significantly reduced in quality and range over time.

In terms of biodiversity conservation, it is the remaining naturally vegetated areas that contain the bulk of the species and ecosystems of particular concern. Many of these remaining natural areas are found only where they have been protected from human encroachment and other disturbances in officially designated protected areas or areas of protected private/public land. The remaining natural areas of Uganda include various subsets of forests, wetlands, grasslands/savannas and open water.

**Natural forest** types include those found at higher and lower altitudes and those with various plant compositions ranging from primarily evergreen to deciduous to bamboo forests. Various forest specialist species of conservation concern are associated with the various forest types. For instance, mountain gorillas are found only in the higher altitude evergreen forests of the Albertine Rift. The Albertine rift endemic fish *Varicorhinus ruwenzori* has been recorded almost exclusively in aquatic habitat within forested sites of Bwindi Impenetrable National Park. A variety of endangered and rare bird species are forest specialists that are closely associated with only one particular forest type.

As more and more forested land is converted to plantations such as the palm plantations on the Bugala Islands in Lake Victoria, more and more forest specialist species disappear. An analysis of tree species distribution in the Albertine Rift found that most tree species were geographically widespread and management strategies should therefore favour the landscape rather than site specific approaches.

**Wetlands** originally occupied about 13% of the land surface area of Uganda. Wetlands in Uganda are classified as lakes and estuarine wetlands, riverine swamps and flood plains. The lakes and estuarine wetlands comprise Lakes Victoria, George, Edward, Albert, Wamala, Bisina, Opeta, Kyoga, Kwania and Bunyonyi. The riverine swamps and flood plains include the Okole, Kafu and Nile systems. Uganda's wetlands contain significant habitats, flora and fauna. Many are under threat of degradation and loss. According to the Ramsar Convention, wetland loss is defined as "the disappearance of wetland areas due to its conversion to a non-wetland area". Within this diversity of wetland types are many specialists. It has been estimated that 159 species of birds are wetlands specialists. Papyrus and other wetland plants have commercial value, at least 22 species of plants are edible, and many other plants are used for medicinal purposes. Most wetlands in Uganda occur outside of protected areas, and their range and quality are rapidly being eroded for agricultural land. Recent estimates indicate that wetlands now cover only 484,037 hectares or about 2% of Uganda's total area.

**Grasslands/savannas** cover more than 50% of the land area of Uganda and are dominated in different locations by species as diverse as grasses, palms or acacias. Savannas throughout Uganda were once the home to large populations of rhinoceroses, elephants, giraffes, antelopes, lions, wild dogs and the like. A diversity of other plant and animal species are also closely associated with various natural savanna types. Much of this habitat has been converted to human use for agriculture and grazing and a few of these large mammals, such as black and white rhinos and wild dogs, are considered to be extinct in the country. The remaining pockets of natural savannas and grasslands are primarily found in various protected areas in Uganda. Although large mammal populations are still relatively low following decades of over-hunting when Uganda was in turmoil, the numbers of many of these species are gradually making a come-back. The small numbers of large ungulates and elephants, however, has enabled a diversity of vegetation types once subject to high grazing pressure to thrive, and various birds, butterflies and small mammal populations in these parks are now better off. Some natural habitat and wildlife species also remain in areas in northern Uganda (i.e. Gulu and Kitgum Districts) where rebels have been a problem and the local people live in Internally Displaced People's Camps (IDPCs).

**Open water** is a category that includes major lakes such as Lake Victoria, Lake Kyoga, Lake Edward, Lake Albert, Lake George, and Lake Mburo and many smaller lakes, various stretches of the Nile River and rivers, streams and water bodies throughout the country. Collectively, these water bodies contain one of the largest assemblages of diverse freshwater fish species in the world. In Lake Victoria alone more than 600 species of cichlid fish have been found, with as many as 102 species found in a single study of southern lake waters in the early 1990s. The natural state of some of these water bodies was greatly impacted by the introduction of exotic species, including Nile perch, other fish species and water hyacinth. The hyacinth seems to be now under control. However, agricultural runoff, and clearing of the forest on the Lake Victoria Islands threaten the survival of species in the lake. In 2005-2006, drought reduced the water level in Lake Victoria adversely affecting Hydro Electric Power generation at the Owen Falls Dam. This reduction is partly attributed to destruction of natural forest on the Lake Victoria Islands and the resulting increase in runoff and siltation.

**Modified ecosystems and habitats** include areas that have been altered and no longer have their original natural characteristics. They may contain a high proportion of plant and/or animal species of non-native origin and/or where human activities have significantly altered the primary ecological functions and species composition of an area. Modified habitats may include, for example, areas managed for agriculture, forest plantations, large monoculture farms, farm forests and reclaimed wetlands etc.

**7.2.2. Agro-ecological Zones**

Climate and soils are primary determinants of the type of agricultural occupations that can be undertaken and how, where and when they occur. Uganda is divided in 10 main agro-ecological zones (Figure 7-17-17). The zones are characterized by different farming systems; determined by soil types, climate, and socio-economic and cultural factors. The AEZs experience varying levels of vulnerability to climate-related hazards; which include drought, floods, storms, and pests and diseases.

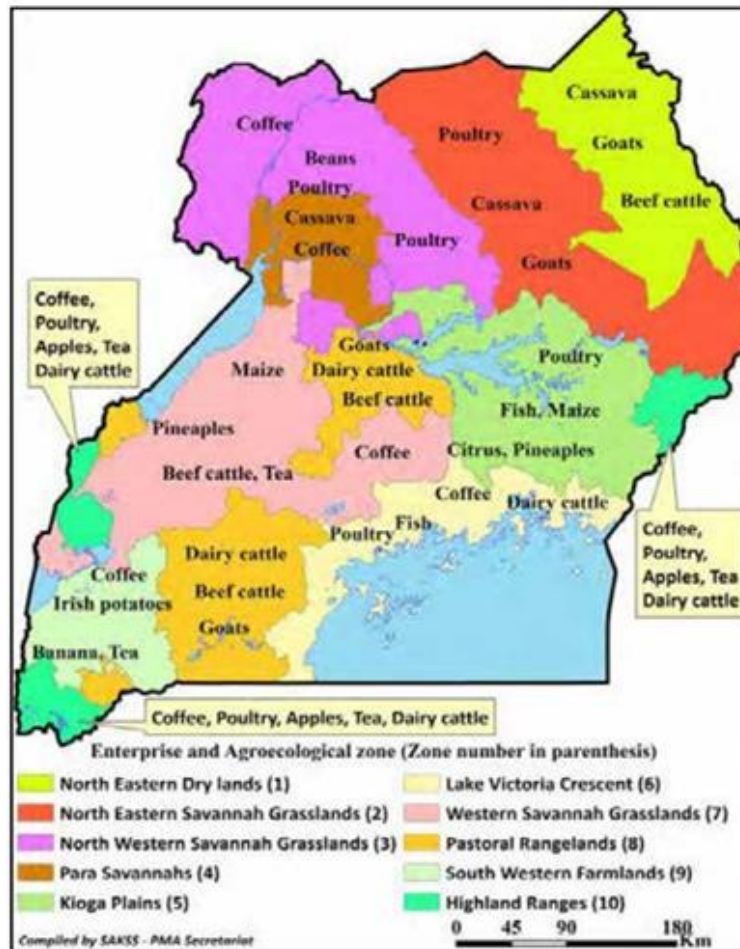


Figure 7-17 – Agro-Ecological Zones of Uganda.

Source: National Adaptation Plan for the Agricultural Sector, Ministry of Agriculture, animal industry and fisheries, 2018

**7.2.3. Ecoregions**

In 2017, RESOLVE and One Earth published the updated Ecoregion Snapshots, a concise guide to the world's terrestrial ecoregions that reflects 'recent advances in biogeography'. Ecoregions are defined as areas of land that contain a distinct set of natural communities and species that are distinct from their nearest neighbouring ecoregions. Ecoregions essentially represent the natural boundaries on Earth, with each area representing land containing a distinct geography, vegetation and natural communities that distinguish it from neighbouring ecoregions. Ecoregions are formed by biotic and abiotic conditions: geology, landforms, soils, vegetation, land use, wildlife, climate and hydrology. The Terrestrial Ecoregions dataset (<https://www.gislounge.com/terrestrial-ecoregions-gis-data/>) contains several attributes, including the name of the ecoregion, biome and realm, and also lists the NNH (Nature Needs Half) designation for each ecoregion. Nature Needs Half is an effort by a coalition of scientists,

conservationists, non-profits and public officials to protect 50% of the planet by 2030 in order to conserve biodiversity. The NNH categories are defined as follows:

- **Half Protected:** More than 50% of the total ecoregion area is already protected.
- **Nature Could Reach Half:** Less than 50% of the total ecoregion area is protected but the amount of remaining unprotected natural habitat could bring protection to over 50% if new conservation areas are added to the system.
- **Nature Could Recover:** The amount of protected and unprotected natural habitat remaining is less than 50% but more than 20%. Ecoregions in this category would require restoration to reach Half Protected.
- **Nature Imperiled:** The amount of protected and unprotected natural habitat remaining is less than or equal to 20%. Achieving half protected is not possible in the short term and efforts should focus on conserving remaining, native habitat fragments.

According to the classification of Dinerstein et al. (2017)<sup>2</sup>, Uganda is home to several ecoregions (Figure 7-18), namely Albertine Rift montane forests, East African montane forest, East African montane moorlands, East Sudanian savanna, Northern Acacia-Commiphora bushlands and thicket, Northern Congolian Forest-Savannah, Rwenzori-Virunga montane moorlands and Victoria Basin forest-savannah. Most of the proposed project area is covered by the East Sudanian savanna, categorised as “Nature Could Recover” and by Victoria Basin forest-savannah, categorised as “Nature Imperiled”.

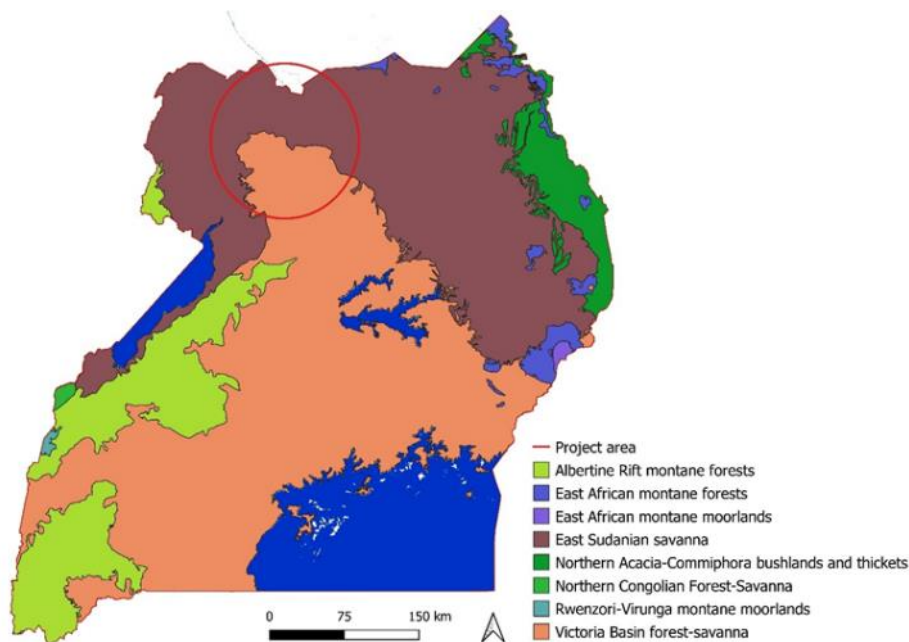


Figure 7-18 – Ecoregion of Uganda (Dinerstein et al. 2017) and the location of the proposed project area.

In general, the ecoregion East Sudanian savanna is a hot, dry and wooded savannah. It is recognisable by the tall elephant grass, which is home to many large mammals. The ecoregion is mostly flat, with elevations ranging from 200 m to 1,000 m. The climate is tropical and highly seasonal. Annual rainfall is as high as 1,000 mm in the south, but decreases to 600 mm in the north, on the border with the Sahelian acacia savannah. The main threats to the ecoregion's habitats are seasonal shifting cultivation, overgrazing by livestock, felling of trees and shrubs for timber, burning of wood for charcoal and

<sup>2</sup> Dinerstein, E., Olson, D., Joshi, A., Vynne, C., Burgess, N. D., Wikramanayake, E., ... & Saleem, M. (2017). An ecoregion-based approach to protecting half the terrestrial realm. *BioScience*, 67(6), 534-545.

uncontrolled forest fires. Climate change is a further threat, exacerbating the impact of human activities by reducing the ability of the ecosystem to recover from overexploitation when rainfall is low. The Victoria Basin forest-savannah is centred on Lake Victoria; however, the ecoregion encompasses most of south-central Uganda. The climate is tropical humid savanna with annual mean maximum temperatures ranging from 24° to 27°C and mean minimum temperatures ranging from 15° to 18°C. A great variety of savanna types occupy areas where rainfall is too low for forest. Outside protected areas, years of overexploitation have left only remnant patches of these savanna habitats, in a matrix of secondary habitat and farmland.

**7.2.4. Landscape**

The Republic of Uganda is stratified into seven Forest Landscapes, namely: (i) Afro-montane; (ii) Karamoja; (iii) Lake Victoria Crescent; (iv) Northern moist; (v) South-East L. Kyoga floodplains; (vi) Southwest rangelands; and (vii) Western mid-altitude (Figure 7-19-20). The proposed project is located in the Northern moist, that is the largest landscape covering ca. 24% of the national territory.

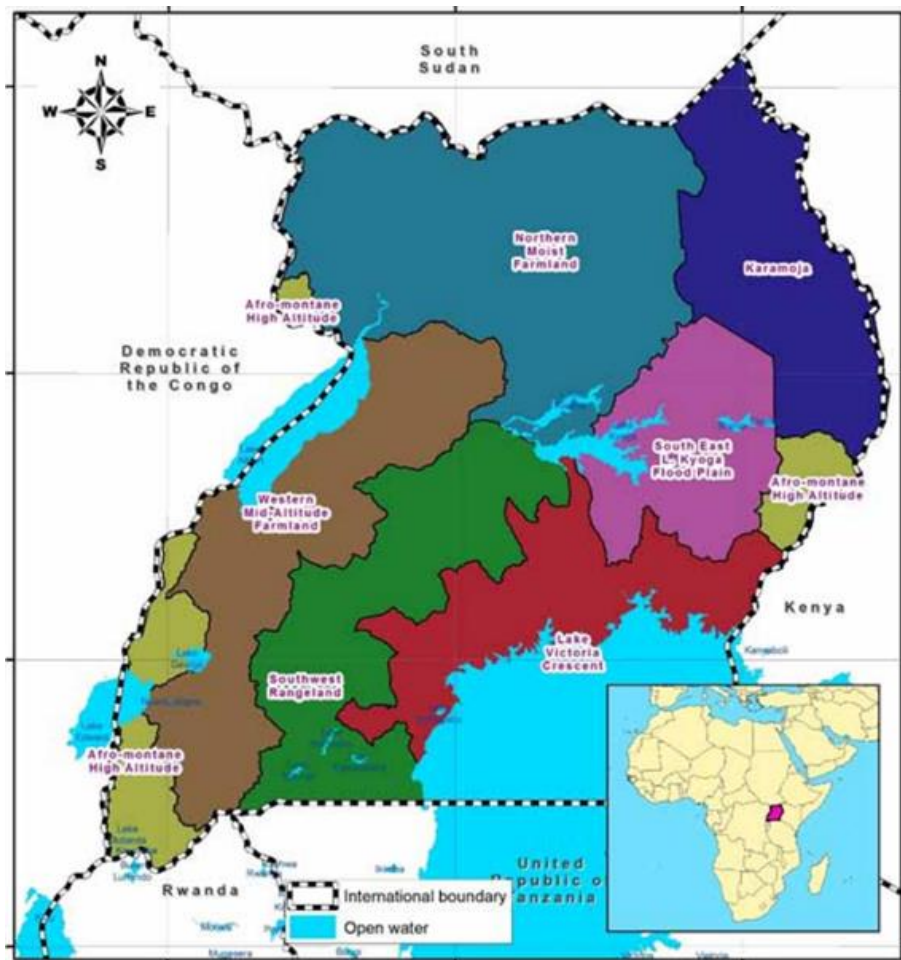


Figure 7-19 – Forest Landscapes of Uganda.  
 Source: MWE and IUCN (2016)

Deforestation and forest degradation occurred mainly in the Northern Humid Landscape, where forest cover decreased from 1.88 million ha to 336,737 ha. On the other hand, grassland and smallholdings increased from 821,700 to 1.30 million ha and from 2.62 to 3.15 million ha respectively. In 1990, the 1.88 million ha of forest cover in northern Uganda represented 47% of the country's total forest cover (3.97

million ha). The reduction in forest cover that occurred between 1990 and 2015 was equivalent to a 37% reduction in the country's forest cover. The expansion of small-scale farmland in the northern humid landscape reflected a consistent shift observed across the country. In 1990 and 2015 respectively, small scale farmlands in the Northern Moist increased steadily and were equivalent to 31% of the country's small-scale farmlands.

**7.2.5. Protected Areas**

Protected areas in Uganda include national parks, wildlife reserves, wildlife sanctuaries, community wildlife management areas, central forest reserves, local forest reserves, wetlands, lakeshores and riverbanks.

Uganda has a total of 735 forest and wildlife Protected areas comprising 10 National Parks, 12 Wildlife Reserves, 10 Wildlife Sanctuaries, 5 Community Wildlife Management Areas, 506 Central Forest Reserves and 192 Local Forest Reserves (Figure 7-20 and Figure 7-21). This Protected Area Network covers 18% of Uganda' total land surface. Several wetlands are also protected and to date 12 Ramsar sites have been designated as wetlands of internal importance and 34 Important Bird Areas (IBAs) that in most cases overlap the named protected areas.

Uganda's protected areas are divided into wildlife protected areas under the mandate of the Uganda Wildlife Authority (UWA), Central Forest Reserves (CFRs) under the mandate of the National Forestry Authority (NFA), and now wetlands under the management of the Ministry of Water and Environment and also covered under the National Environment Act (2017).

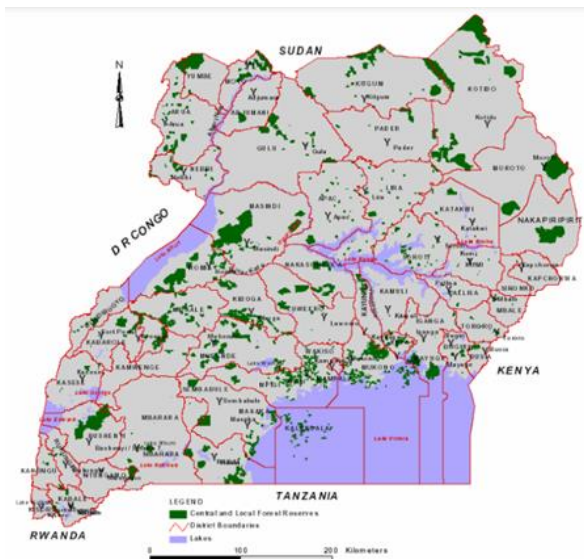


Figure 7-20 - Forest Reserve in Uganda.

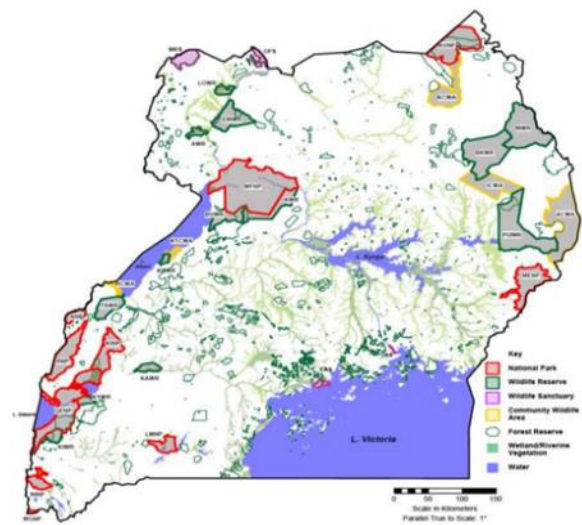


Figure 7-21 - Protected areas and wildlife reserves in Uganda.

The proposed project area overlaps the Keyo Forest reserve and lies in the vicinity of other protected areas (Figure 34). In addition to Keyo Forest reserve, the other closest PAs are some Forest Reserve, such as the Otze Forest Wildlife Sanctuary in the border with South Sudan, the East Madi Wildlife Reserve, approximately 33 km from the project area, and, in the Southern part, with Murchison Fall National Park, approximately 6.5 km from the project area.

The importance of these PAs is recognized nationally and internationally, particularly the National Parks, for their high biodiversity and conservation values and for hosting fundamental and unique biological processes.

In addition to the Keyo FR that is crossed by the transmission line, other forest reserves are close:

- Gwengdiya FR distant 1.5 km;
- Anaka 2 km;
- Olwal 4.4 km;
- Got - Gweno 9 km;
- Labala 12 km;
- Kilak 13.8 km;
- Wiceri 22 km.

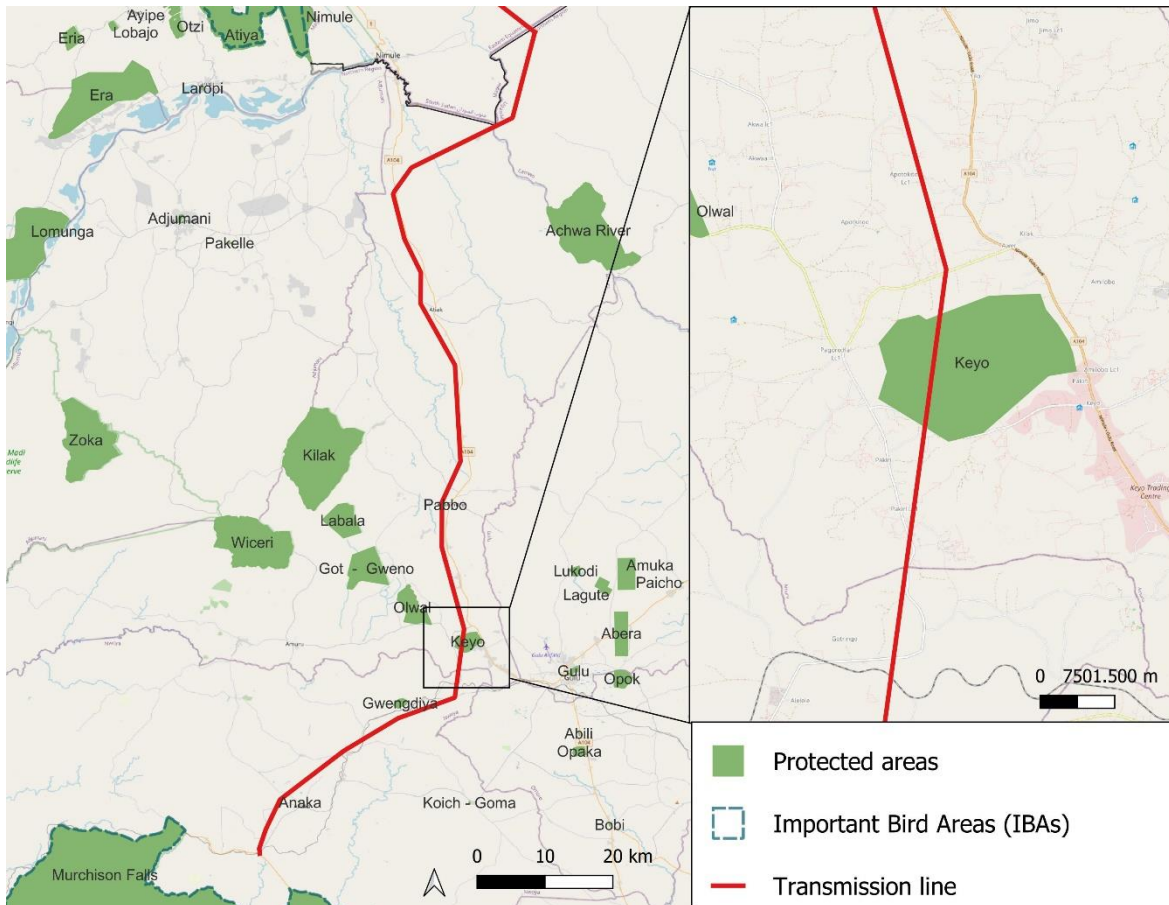


Figure 7-22 – Location of protected areas and the transmission line alignment. To the left a zoon on the Keyo Forest reserve.

### 7.3. Biological Environment

The environmental conditions of Uganda support a very rich diversity of animal and plant species throughout the country, as well as several important biological processes and ecosystem services. Uganda's rich biodiversity is found in both terrestrial and aquatic habitats. Most of the biodiversity is found in natural forests, but a significant amount is also found in other natural ecosystems such as mountains, savannahs, wetlands, lakes and rivers. Agricultural biodiversity in modified human-made ecosystems is also abundant; however, biodiversity limited to natural ecosystems is of great interest because it contains most of the rare or uncommon species in their more favoured pristine states. The following sections provide details on the current status of the biological environment in Uganda and the potential impacts of the project. Several direct and indirect impacts of the project could potentially



affect biodiversity and ecosystems at different spatial scales, therefore a multi-scalar approach, from the regional level to the project area, was used to assess the baseline information and the impacts of the project on the biological environment. In particular, the biological components within a 50 km buffer around the proposed transmission line route were considered to assess the baseline information and impacts at the landscape scale. Therefore, a more detailed assessment was performed using a 1 km buffer to obtain information at local scale.

The information presented is based on previous studies, official documents, published scientific literature and open access data sources obtained through a review of available reports, studies and global, African and national databases.

The International Union for Conservation of Nature (IUCN) products were used to gather general information on the conservation status, management and threats to species and protected areas that could be affected by the implementation of the project.

A fundamental tool for species conservation is the IUCN Red List of Threatened Species. It has become the world's most comprehensive source of information on the global extinction risk status of animal, fungal and plant species. Much more than a list of species and their status, it is a powerful tool for informing and catalysing biodiversity conservation action and policy change, which is essential to protect the natural resources that need to be conserved. Red Lists classify species into the following 9 categories of threat (Figure 7-23):

- EX - EXTINCT. A species is assessed as Extinct when there is no reasonable doubt that the last individual has died.
- EW - EXTINCT IN THE WILD. Species occurring only in captivity or as naturalized populations.
- RE - REGIONALLY EXTINCT. Species disappeared from a nation or region and there is no doubt that the last individual has died there. However, such species may occur in other parts of the world.
- CR - CRITICALLY ENDANGERED. Species that face an extremely high risk of extinction and fulfil the criteria A-E for Critically Endangered.
- EN - ENDANGERED. Endangered species face a high risk of extinction and fulfil criteria A-E for Endangered.
- VU - VULNERABLE. Species considered Vulnerable face a high risk of extinction and fulfil criteria A-E for a Vulnerable species.
- NT - NEAR THREATENED. This category applies to species that do not currently qualify for a threatened category but is close to qualifying and is likely to qualify in the near future.
- LC - LEAST CONCERN. Least Concern species are usually common and face no serious threats. Species in this category do not qualify for a threat category and face little or no threat of extinction.
- DD - DATA DEFICIENT. A species is Data Deficient when there is not sufficient available information to assess the species against the criteria.

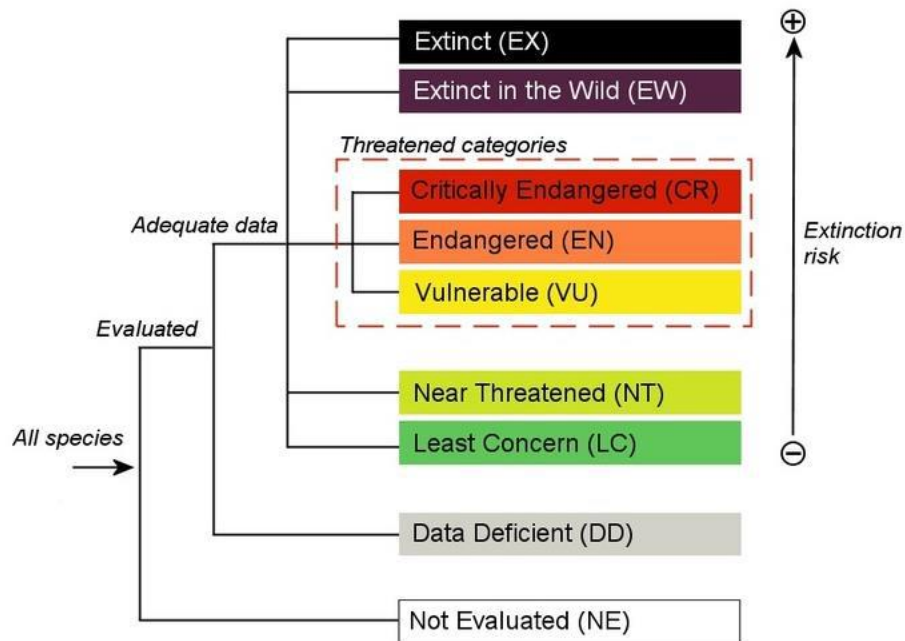


Figure 7-23 – IUCN Red List Categories. Source: <https://www.iucnredlist.org/>

The status of species according to IUCN have been taken from the Global Red List (<https://www.iucnredlist.org/>).

From the same source, spatial data of species potentially present in the project and its surrounding areas were downloaded and analysed. The IUCN Red List spatial data consists of georeferenced distribution ranges for each species. Major taxa were assessed including mammals, birds, reptiles, amphibians and arthropods.

Each species range was assigned a weight from 1 to 10 and the weighting was based on the IUCN categories. The lowest score (i.e., 1) was given to Least Concern species because they are considered to be common and not threatened. Critically Endangered species, on the other hand, were given a score of 10, reflecting their high conservation priority. Scores of 8, 6 and 4 were given to species classified as Endangered, Vulnerable and Near Threatened respectively. Once the conservation values had been assigned, the distribution ranges of all species were summed up to produce a single map. In this way, the spatial distribution of species was weighted by their conservation status to produce a conservation value map, showing how the different species are distributed and highlighting sensitive areas with high numbers of species and threatened species.

This spatial analysis was carried out for each species and only for threatened species (VU, EN and CR) in each taxon. The ranges were considered in the 50 km buffer around the project area to allow for a broader scale assessment (see Annex 3). The 1 km buffer was then used to determine which species ranges overlapped with the proposed project area.

### 7.3.1. Forest Diversity

#### 7.3.1.1. Generality

Uganda is a land locked country, located in an area where seven of Africa’s distinct biogeographic regions or phytochoria converge. Given Uganda’s location in a zone between the ecological communities that

are characteristic of the drier East African savannas and the moister West African rain forests, combined with high altitude ranges, the country has a high level of biological diversity.

Forest land in Uganda is presently estimated at 3.3 million hectares or 16% of the total country area declining from 4.9 million hectares or 20% in 2001. Of the total area of forests, 30% are in protected areas (forest reserves, national parks and wildlife reserves) while 70% is found on private and customary land. Uganda is estimated to be losing its forest cover at a rate of 200,000 hectares per year implying a loss in forestry biodiversity as well. The size of forest and woodlands has significantly declined from 45% to 20% of total land surface between 1890 and 1990. The majority of the forest loss has occurred outside of protected areas largely due conversion of forest lands into agriculture and over-harvesting wood for energy supply in form of firewood and charcoal (NFA, 2011). Threats to forests and its biodiversity include the following:

- a) Deforestation: Due to high population growth rate and the rapid development in Uganda, the forest sector faces a huge problem of over harvesting through deforestation to satisfy the high demand for forest land for agriculture and forest products like charcoal, fuel wood and timber. Deforestation of the widely abundant woodlands is very rampant for the production of charcoal and conversion to agriculture and grazing land.
- b) Diseases and pests have also attacked some of the tree species reducing their quality in ecological functions and production for timber products yet it's difficult to prevent spread; very costly and tasking to spray affected areas for their area coverage and irregularities in forests.
- c) Urbanization and Industrialization have exerted great pressures on mainly peri-urban forest reserves for expansion of urban and industrial centers. For instance, Namanve Forest near Kampala (1000 ha) and Wabisi-Wajala in Nakasongola District (8,744 ha) were degazetted for industrial expansion. The drive to modernization has also witnessed a dramatic increase in construction of residential, commercial and institutional buildings. Hence the demand for burnt bricks has translated into increased use of firewood. Timber for construction is also in high demand.
- d) Encroachment especially in the savanna woodland for the purpose of agricultural expansion and pastures for livestock grazing. For example, in the forest's reserves of Kiboga, Mubende, Luwero, Nakasongola, Bundibugyo, Soroti and Iganga, the reserves' boundaries in question were re-opened and demarcated especially in search of grazing grounds and at times farm land.
- e) Alien species introduction: Several tree and other plant species were introduced during the colonial period for example the eucalyptus, that have adapted quite well, colonizing and replacing indigenous species such as *Lantana camara*.
- f) Poor policies have also contributed to the loss of forest cover.

### 7.3.1.2. Forest Distribution

For the whole Uganda, a Land Cover map retrieved by the Copernicus project was used. The Copernicus is the European Union's Earth observation programme built on a constellation of satellites (<https://www.copernicus.eu/en>). In particular, the Copernicus Global Land Service (CGLS) is earmarked as a component of the Land service to operate "a multi-purpose service component" that provides a series of bio-geophysical products on the status and evolution of land surface at global scale. The CGLS delivers an annual global Land Cover product at 100 m spatial resolution with a three classification levels with class definitions according to the UN-FAO's Land Cover Classification System (LCCS) scheme (Buchhorn et al. 2019). Such layer is developed from PROBA-V satellite observations and organized into millions of Sentinel-2 equivalent tiles of 110x110km (with UTM projection). The latest (2019) Land Cover product was downloaded at <https://lcviewer.vito.be/download> to visualise the distribution of forests in Uganda, subdivided into closed and open forests (Figure 7-24).

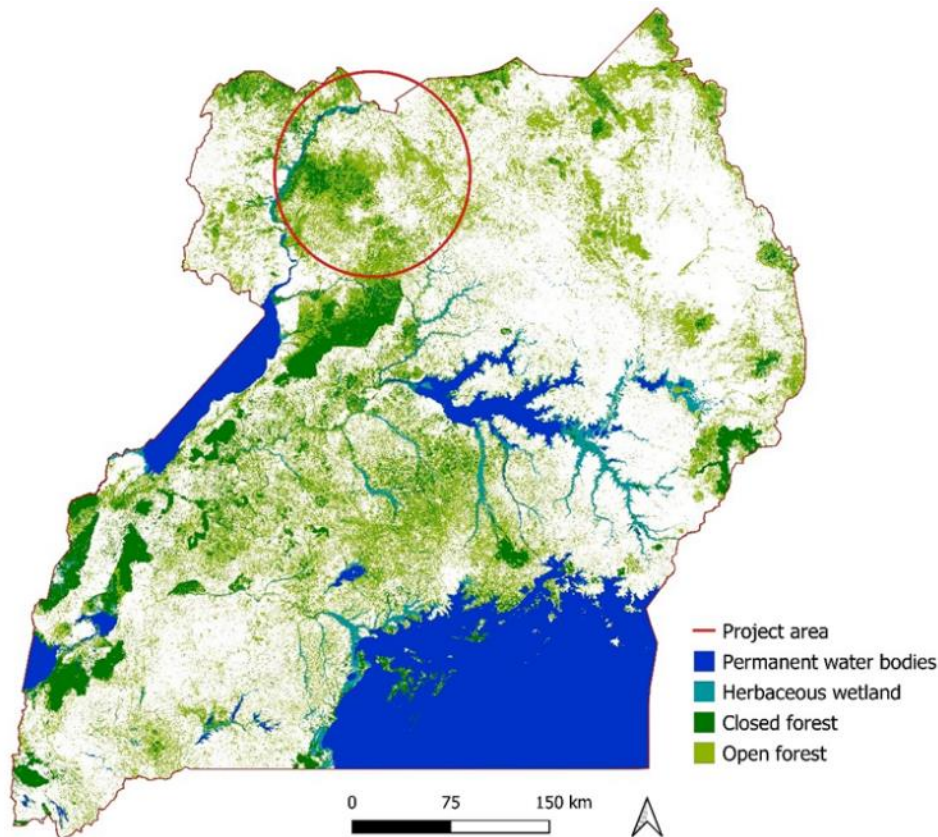


Figure 7-24 – Forest classification of the Copernicus Global Land Service Dynamic Land Cover Map at 100 m (level 3) in Uganda

### 7.3.1.3. Timber Production

Forests and savannah woodlands supply well over 90 per cent of Uganda’s energy requirements. It is expected that wood fuel will continue to be the dominant source of energy in Uganda for the foreseeable future, supplying at least 75 per cent per cent of total energy consumption. Other key features are that:

- wood is the main source of energy in rural areas;
- extraction and supply of firewood is an income and employment generator;
- use of firewood is vital for food security;
- wood is widely used in many industrial processes;
- firewood and charcoal are important in households, and majority of institutions and commercial establishments;
- Use of firewood and charcoal saves on imported fossil fuels.

The main primary wood processing operation in Uganda is sawmilling. The precise origin of sawlog supplies in Uganda is not well documented, but coniferous plantations and tropical high forests in both reserves and from public and private lands are the main sources.

Over 90 per cent of sawn timber from natural forests is pitsaw; most of the plantation timber is sawmilled.

An estimated 200,000 m<sup>3</sup> of sawn timber (equivalent to 800,000 m<sup>3</sup> of roundwood) was consumed by the formal sector in 2010.

The Forest Department currently earns over US\$ 600 million a year from timber sales. Poles are needed for buildings, fencing, and power and telephone lines. There is growing demand for poles and with the ongoing expansion of electrification, this demand is likely to get higher. There is a growing interest in

planting Eucalyptus for poles and much of the demand for building poles is now met from private woodlots.

Environmental services provided by forests include the maintenance of soil, water and climate quality that support productive agriculture and fisheries.

- Forests protect watersheds – Uganda has many watershed areas e.g. the Rwenzoris and Mt Elgon alone represent the primary water source for 3.2m people - forests are crucial for maintaining this water supply. Intact watersheds also support productive agriculture and the fisheries industry.
- Forests protect soils and therefore crops – Forest and vegetation help avoid or reduce soil erosion. Forests help reduce runoff, topsoil loss and sedimentation, which means that soil fertility and productivity is retained.
- Forests improve local, regional and global climates – The impact of forests on local climate in Uganda (in terms of moderating or helping rainfall and thus supporting agriculture) is not known. Forests absorb carbon, and there is growing interest in the role Uganda’s forests can play in helping the carbon balance in the atmosphere.
- Forest resources in Uganda also provide ecosystem services that underpin most human settlement and economic activity. They also have a potential future value, and an intrinsic value, irrespective of any use. These are all indirect benefits of a well-managed and intact forest resource. For example:
- If intact, watersheds are worth 70% of the value of the fisheries industry in Lake Edward and Lake George. Then their value is US\$ 13.8million/ year.
- In terms of avoiding negative effects on crop production, the overall value of Uganda’s forests in controlling erosion is estimated at US\$ 70 – 208 billion, or US\$ 70,000 – 250,000 / ha / year.
- The carbon value of Uganda’s forested land is US\$ 500 million, in terms of carbon lost if forests were converted.

As a result of the wide range of ecological communities in Uganda, including lakes and rivers, wetlands, dry bushlands and grasslands, moist woodlands, tropical high forest and montane vegetation, the country contains internationally significant biodiversity. The biodiversity contained within Uganda’s border is virtually priceless given the potential value of unknown genetic resources. Nonetheless, an attempt has been made to estimate value. The total quantifiable direct and indirect benefits of all biological resources in Uganda have been estimated to be worth more than US\$ 1,112 billion per year, while economic costs have been estimated at US\$ 506 billion.

In addition:

- the pharmaceutical value of Uganda’s forests was estimated at \$ 0.4 per ha per year, or \$ 404,000 for protected areas and \$ 1.2 million for all forests.
- the importance of wild coffee as a genetic pool supporting the country’s coffee industry, calculated like an insurance premium of 5 per cent of total coffee export earnings, is well over \$ 15million per year. Having begun from a low base and negative growth rates, Uganda’s economy has made a remarkable turnaround since 1986. The country’s gross domestic product (GDP) has been growing at an average annual rate in excess of 5 per cent, outperforming most countries in Sub-Saharan Africa (SSA). According to the Background to the Budget 2000/2001 data of the Ministry of Finance, forests, as conventionally defined in national accounting systems, contributed 1.8 per cent of GDP in 1999. A significant part of income generated from forests is in the informal sector, which is non-traded products and services.

- The forest sector is also important for the employment situation in Uganda, especially in rural areas. Total employment generated by the forest sector is estimated at about 850,000 jobs (actual or equivalent). In addition:
  - o employment effects of forest-based activities in the formal sector are 100,000 person years: 89,000 person years in firewood and charcoal production; 1,400-plantation establishment and management; 3,200 in the forest industry; and 2,600 in institutions.
  - o present employment in the informal sector is roughly 747,000 person years distributed by main activities: firewood production – household (710,000), firewood production -commercial / industrial (36,000), and poles (1,000).

#### 7.3.1.4. Non-Timber Forest Products

Many rural livelihoods are based on the collection and sale of products derived from forest resources, including fruits, nuts, fibre and resins. Trade in NTFPs can act as an incentive for forest conservation by providing a source of income from resources that might otherwise appear to have little financial value. In addition, the environmental impact of harvesting NTFPs is generally much lower than typically results from timber harvesting. As a consequence, many rural development initiatives are now supporting the commercialization of NTFP resources. Non-timber forest products offer an important example of how such goals may be achieved in practice. Many rural livelihoods are based on the collection and sale of products derived from forest resources, including fruits, nuts, fibre and resins. Trade in NTFPs can act as an incentive for forest conservation by providing a source of income from resources that might otherwise appear to have little financial value. In addition, the environmental impact of harvesting NTFPs is generally much lower than typically results from timber harvesting. As a consequence, many rural development initiatives are now supporting the commercialization of NTFP resources.

NTFPs, broadly defined as any forest-derived tradable products other than commercial timber, have been widely regarded as a potential meeting point between conservation and rural development priorities. Common examples of NTFPs in Uganda include medicinal plants, handicrafts, musical instruments, honey and light construction material. Their production is usually less destructive than timber harvesting, and offers good opportunities for improving livelihoods as NTFPs are generally easily accessible to the rural poor and little capital investment is needed for collection, processing and marketing. Several studies have demonstrated the success of NTFPs in providing this so-called 'win-win' solution to development and conservation. Despite difficulties in assessing the total economic value of this sector, the Forestry Department of Uganda estimates that NTFP commercialization contributes approximately US\$33 million per year to national income, worth 17 per cent of the forest sector's contribution to gross domestic product (GDP). It is therefore suggested that policies geared towards increasing the economic return of NTFPs will lead to an internalization of forest resource values and an increased incentive for conservation through local resource management. Three NTFPs are among the most important at the national and local level: basketry products, gum arabic and shea butter.

1) Basketry products are one of the main handicrafts produced in Uganda. The main forest or woodland species used include raffia (*Raphia farinifera* (Gaertn.) Hylander), sisal (*Agave sisalana* Perr.) and bamboo (*Arundinaria alpina* K. Schum.). Products include baskets (US\$2 500-6 000), mats (US\$10 000-20 000), table mat sets (US\$4 000-20 000), hats (US\$4 000-7 000), chairs (US\$35 000), tables (US\$40 000) and lampshades (US\$5 000-10 000) (there are approximately US\$2 000 to one US dollar). The products are sold locally as well as more widely to tourists.

2) Gum Arabic: the main source of gum arabic is three-thorned acacia (*Acacia senegal* (L.) Willd.) although gum arabic can also be extracted from white-galled acacia (*Acacia seyal* Del.), woman's tongue tree (*Albizia lebbek* (L.) Benth.) and saman tree (*Albizia saman* F. Muell.). It is obtained by tapping or exudation, a process with minimal environmental impact if properly managed.

Gum arabic is used in confectionery, soft and alcoholic drinks, pharmaceuticals, and in the printing, ceramics and textile industries. It is also used locally as an adhesive or as an ingredient of traditional medicines. It has an established international market, fetching up to US\$5 000 per tonne. A travel-time threshold of ten hours was used for development domain computation. In addition, Acacia is an excellent plant for afforestation of arid tracts and soil reclamation, and so planting gum arabic trees could serve the dual purposes of environmental restoration and income generation.

3) Shea Butter: it is derived from the nuts of the shea tree (*Vitellaria paradoxa* C.F. Gaertn.), found in the savannah of eastern and northern Uganda. It is used in Europe, Japan and Russia primarily in cosmetics as a basis for soaps, creams, moisturizers, hair conditioners and shampoos, and also as an ingredient in chocolate products.

### **7.3.2. Vegetation, Habitat and Plant Communities**

The vegetation map made in the 1960s by Langdale-Brown et al. (1964) shows the distribution of the forest and vegetation types through Uganda (Figure 7-25). This criterion utilizes plant community composition rather than just plant biomass, which is more relevant to the goal of characterizing vegetation and identifying sensitive habitats. The Langdale-Brown et al. (1964) system provides 26 major vegetative categories.

One of the sensitive habitats in Uganda is wetland, that are known to support some 43 species of dragon flies (of which 20% are known to occur in Uganda only), 9 species of molluscs, 52 species of fish (which represent 18% of all fish species in Uganda), 48 species of amphibians, 243 species of birds, 14 species of mammals, 19 species of reptiles and 271 species of macrophytes. Papyrus and other wetland plants have commercial value, and many other plants are used for medicinal purposes.

The project area is characterized mainly by agricultural areas; however, natural areas are present mainly in the vicinity of the major rivers. Woodland areas, savanna and forest/savanna mosaic characterize the proposed project area. Furthermore, some important riverine habitats and wetlands are in the proximity of the project proposed area, including both permanent and temporary rivers.

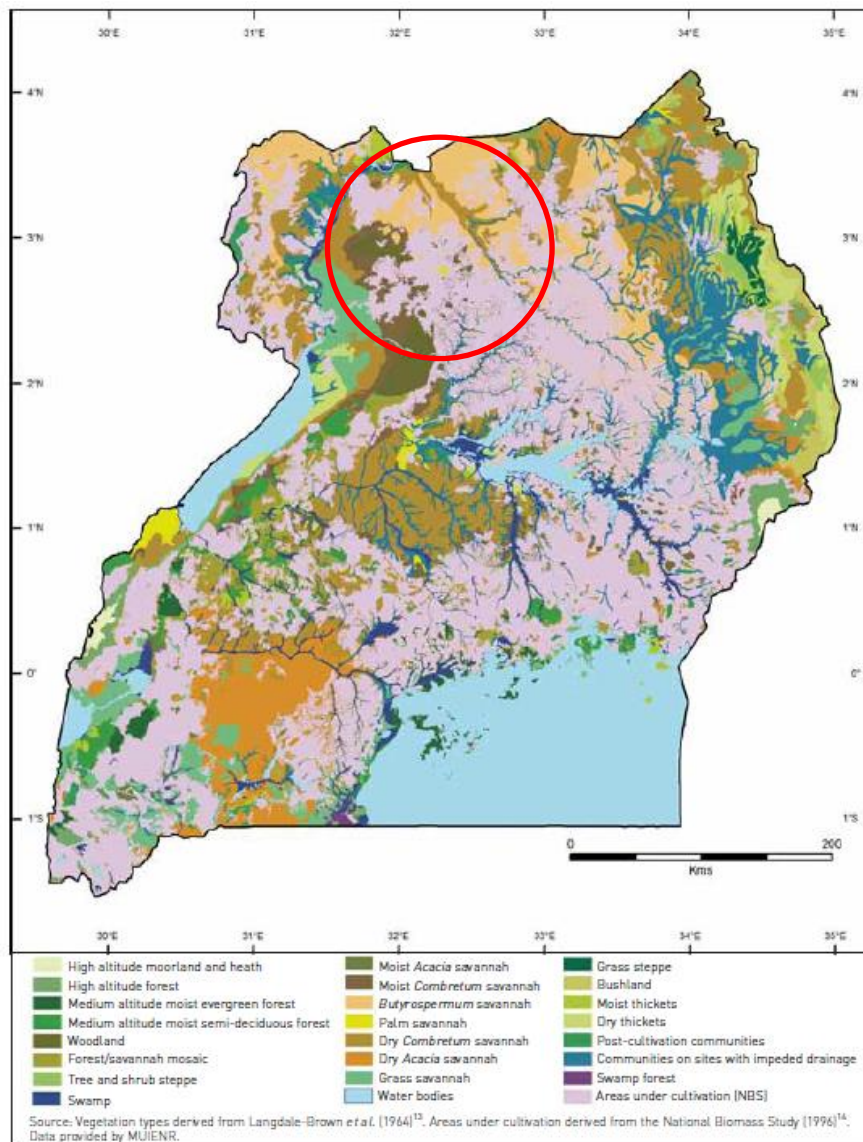


Figure 7-25 – Vegetation types and areas under cultivation, modified by Langdale-Brown *et al.* 1964

### 7.3.3. Native Flora, Endemism and Protected Species

There are approximately 5,000 species of higher plants in Uganda, of which 70 are endemic and mainly concentrated in tropical forests in the western region. 58 Ugandan taxa of higher plants are listed on the Global Red Data List by IUCN. There is concern that more of Uganda's plant taxa will appear under the Red List due to habitat changes or loss unless immediate remedial measures are taken (NBI, 2010). The lower plants are generally poorly documented in Uganda. They fall under three main types: Algae (115 species), Bryophytes and Pteridophytes (ferns) (386 species). Bryophytes (mosses (500 species), liverworts (250 species) and hornworts) represent the most ancient lineage of land plants (UNESCO, 2012).



### **Invasive Species**

Invasive alien species (IAS) pose a global threat to the conservation of biodiversity through their proliferation and spread, displacing or killing native flora and fauna and affecting ecosystem services, including water and nutrient cycles and food chains. In Uganda, the water hyacinth (*Eichhornia crassipes*) had a profound impact on the socio-economic development of Uganda in terms of curtailment of water transport, reduction of hydropower output, interference with urban water supply and reduction in fish production from Lake Victoria in the 1990's. The cost of controlling and managing water hyacinth was estimated to be in millions of dollars.

Species such as *Lantana camara*, *Broussonetia papyrifera*, *Mimosa pigra* and *Senna* spp. threaten native species considerably. For example, *Senna spectabilis* has invaded over 1,000 ha of the Budongo Forest Reserve and vast areas of the Matiri Forest Reserve (Kyenjojo District) while *Broussonetia papyrifera* has covered vast areas of the Mabira Forest Reserve. Control strategies for these species are still being investigated. Examples of IAS introductions include the following:

- The present tree planting activities of NFA are focused on introduced species (*Eucalyptus* spp., *Pinus* spp. and *Grevillea robusta*). Although useful to meet short term needs for timber, they could threaten the survival of native species if there are no guidelines for private tree planting.
- Lakes and rivers might be the ecosystems most affected by the introduction of exotic species and the consequent ecological changes in species and community composition. For example, the introduction of the Nile perch and the Water hyacinth has been extremely damaging to biodiversity in Lake Victoria.
- The Water hyacinth (*Eichhornia crassipes*), an invasive IAS, also known as the waterweed and arguably the most noxious aquatic weed in the world, was first reported in Lake Victoria in December 1989, having entered the Lake from River Kagera. The plant is native to South America where it occurs harmlessly in streams and seasonally flooded environments. Given its high proliferation rate, the weed has spread rapidly over the years to the shores of Lake Kyoga, the banks of River Nile and most of the northern tip of Lake Albert impacting negatively on fish and other aquatic species.
- Invasive plant species have also been reported in several forest reserves e.g., in Mabira, Budongo and Matiri forest reserves whereby paper mulberry and *Senna* Cassia species have been recorded. Within Wildlife Conservation areas, changes in vegetation due to invasive species of *Acacia* and other pasture grasses have been reported in Lake Mburo and Queen Elizabeth National parks.
- *Parthenium hysterophorus*, a native of Central America, is believed to have entered Uganda less than 10 years ago. It was first identified at Bugembe, near Jinja in 2008. Since then, it has been seen in most towns and trading centers along the Busia-Kampala-Masaka-Mbarara-Kasese highway. In 2010, it was observed in Queen Elizabeth National Park, in Ibanda town and in Pader district, northern Uganda. In 2013, UWA reported that it was spreading in Queen Elizabeth National Park, and was anxious to get it under control. *Parthenium* has the potential to dominate and eradicate most grass species and other short perennial shrubs in open land. It has also been reported to be poisonous to cattle, buffalos and antelopes and causes allergic reactions in humans after prolonged contact.

#### **7.3.4. Wildlife diversity**

Uganda is exceptionally rich in biodiversity with surveys reporting occurrence of over 18,783 species of flora and fauna (Table 7-8). It has a wide range of habitats that support a rich diversity of wildlife and global important ecological and biological processes within and outside protected areas. Knowledge of the species present is confined to the more known taxa such as birds, mammals, butterflies, higher

plants, reptiles, amphibians and fish. This is because of their relative conspicuousness and economic importance. Little is known about the less conspicuous ones including important forms such as belowground biodiversity.

Table 7-8 – Recorded flora and fauna species in Uganda. Source: NEMA 2009.

Taxon	Total number of species	% of global species	No. of globally threatened spp
Amphibians	86	1.7	10
Birds	1,012	10.2	15
Butterflies	1,242	6.8	-
Dragon flies	249	4.6	-
Ferns	389	3.2	-
Fish	501	2.0	49
Flowering plants	4,500	1.1	40
Fungi (poly pore)	173	16	-
Liverworts	275	46	-
Mammals	345	7.5	25
Molluscs	257	0.6	10
Mosses	445	3.5	-
Reptiles	142	1.9	1
Termites	93	3.4	-
Other invertebrates	-	-	17

#### 7.3.4.1. Animal communities

The key fauna and flora biodiversity resources in Uganda may be described under the following categories: mammals, birds, fishes, reptiles, amphibians, plants and insects.

- Mammals: Uganda has approximately 380 mammal species and is ranked 13 in the world in terms of mammal species richness (IUCN RED Data List 2008). The number of mammal species has been changing due to local extinctions and introductions (UWA, 2010).
- Birds: Uganda has approximately 1,016 species of birds (10% of world total). There are over 2,250 species recorded on the African continent and the total list of Uganda species represents nearly half (47%) of all species recorded on the continent. There are 143 palaeartic migrants, 56 afro-tropical migrants and 25 Albertine endemics. A total of 189 species are forest specialists while 160 species are water dependent (Byaruhanga et al., 2001; NBI, 2010).
- Amphibians: There are 98 species of amphibians recorded in Uganda, representing 1.65% of global species. Most of the amphibian species in Uganda have an IUCN category of Least Concern because they either have a wide distribution, tolerant to broad range of habitats or presumed to have large populations. However, a few species are recorded as restricted, 5 species vulnerable, 1 specie is near threatened, 1 species critically endangered and 1 specie (Northern clawed frog) is extinct while 3 species are data deficient. Overall, little is known or documented about this taxon.
- Reptiles: There are an estimated 150 reptile species in Uganda which represent approximately 1.5 % of total global species. Very little is currently known or documented about these taxa (NBI, 2010).

The following sections provide information on the animal communities of mammals, reptiles, amphibians and arthropods in the area included in the 50 km buffer around the proposed project. This baseline information and species distribution has been obtained from the IUCN Spatial Data (<https://www.iucnredlist.org/resources/spatial-data-download>). The data used include the known

ranges of the species, but the accuracy of these ranges is approximate and sometimes incomplete. For this reason, this initial assessment has been carried out to determine the potential presence of priority species and to highlight the spatial distribution of areas of high conservation value, but field-based sampling is required to assess the presence of the species.

In these sections, after the preliminary evaluation of the potentially present species in and around the project proposed area, an assessment of the potential impacts of the project on wildlife was carried out.

Mammals

The distribution of mammal species as determined by the IUCN spatial data indicates that 195 species are distributed within a 50 km buffer around the proposed project area (the complete checklist is in Annex 3). Of these, 169 are Least Concern, 8 Near Threatened, 7 Vulnerable and 3 Endangered. Eight species are in the Data Deficient category, meaning that no information is available on their conservation status. The conservation values map (Figure 7-26) shows areas of higher conservation status in the southern side.

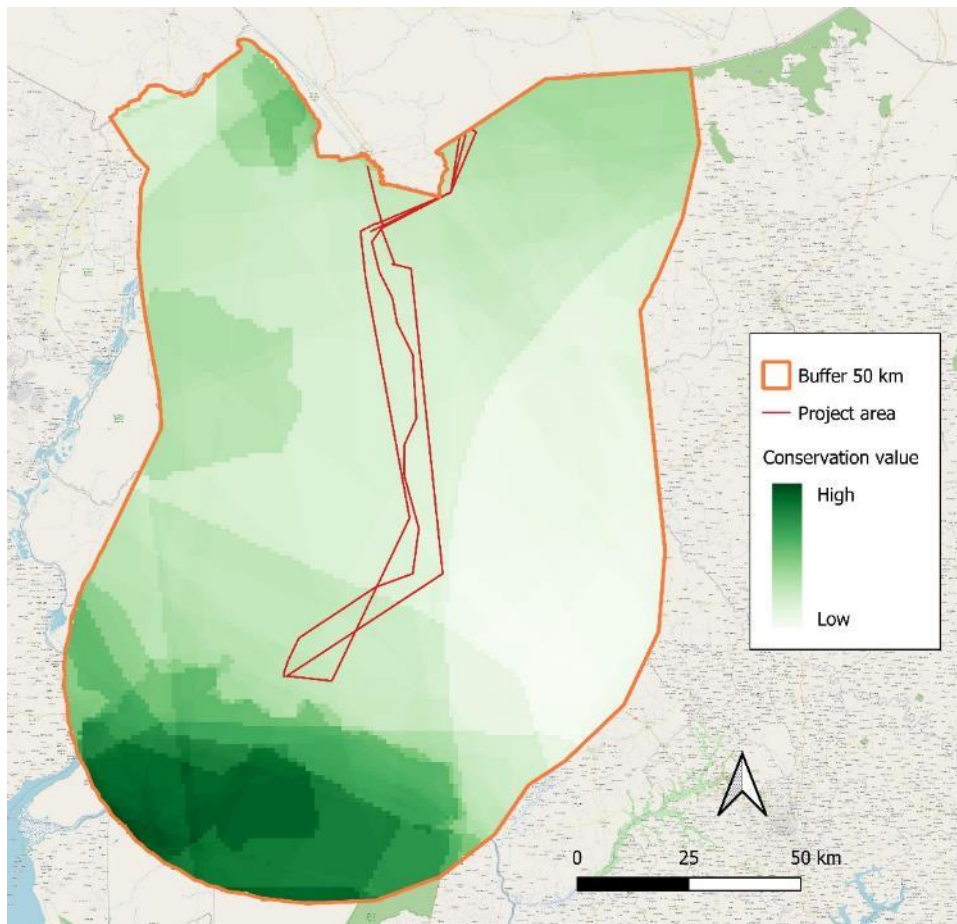


Figure 7-26 – Mammals species distribution within 50 km buffer around project proposed area weighted by their conservation value.

Reptiles

According to the IUCN spatial data assessment, there are 92 reptile species (the complete checklist is in Annex 3) within 50 km of the proposed project area. Of these, 88 are listed as Least Concern, two as Near Threatened, and two as Vulnerable. The distribution map (Figure 7-27) shows a higher conservation value in the southern and western sides of the area.

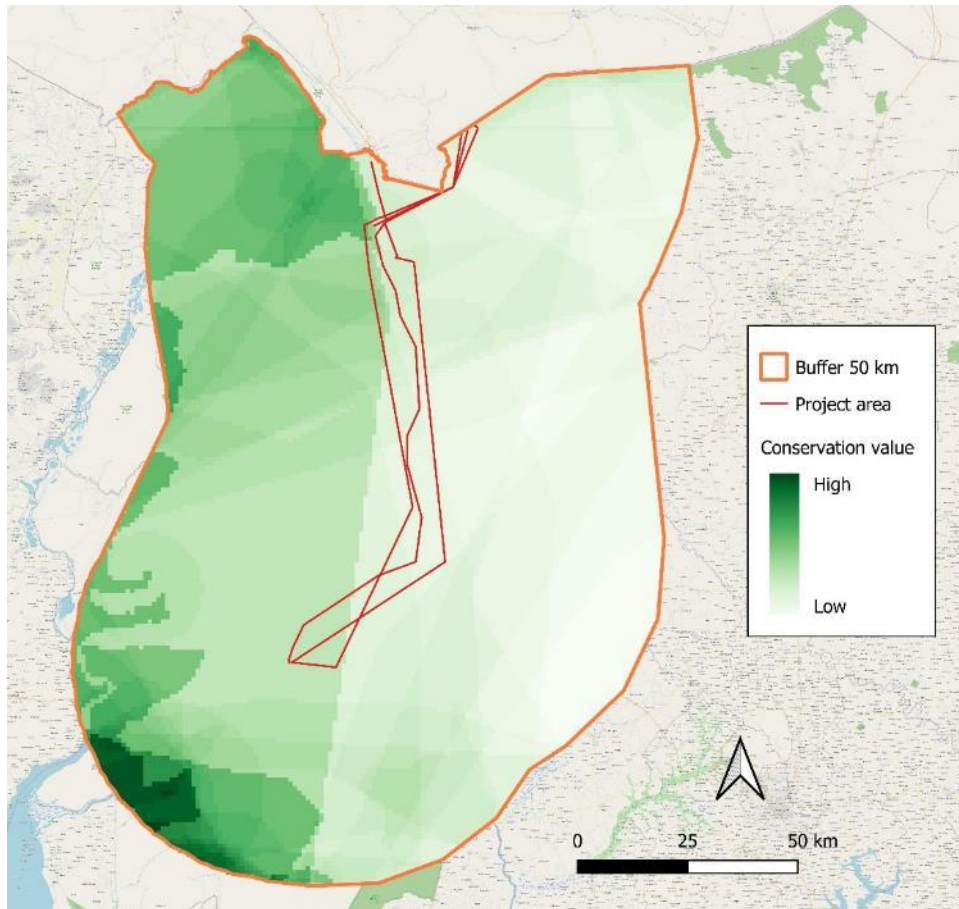


Figure 7-27 – Reptile species distribution within 50 km buffer around project proposed area weighted by their conservation value.

### Amphibians

There are 22 amphibian species (the complete checklist is in Annex 3) within 50 km of the proposed project area mainly distributed in the southern side of the area (Figure 7-28). All the species are listed as Least Concern.

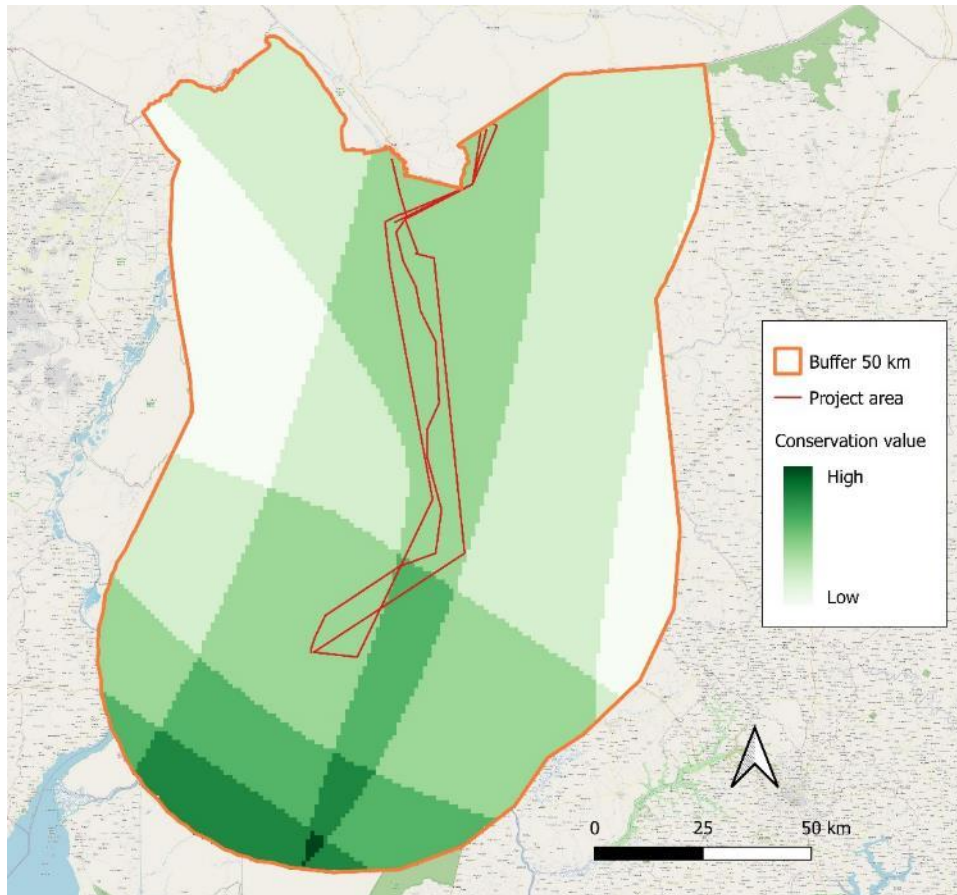


Figure 7-28 – Amphibians species distribution within 50 km buffer around project proposed area weighted by their conservation value.

Arthropods

The distribution of arthropod species as determined by the IUCN spatial data indicates that 234 species are distributed within a 50 km buffer around the proposed project area (the complete checklist is in Annex 3). Of these 230 are Least Concern, three are Data Deficient and one is Vulnerable. The southern part of the area is the richest in terms of species diversity (Figure 7-29).

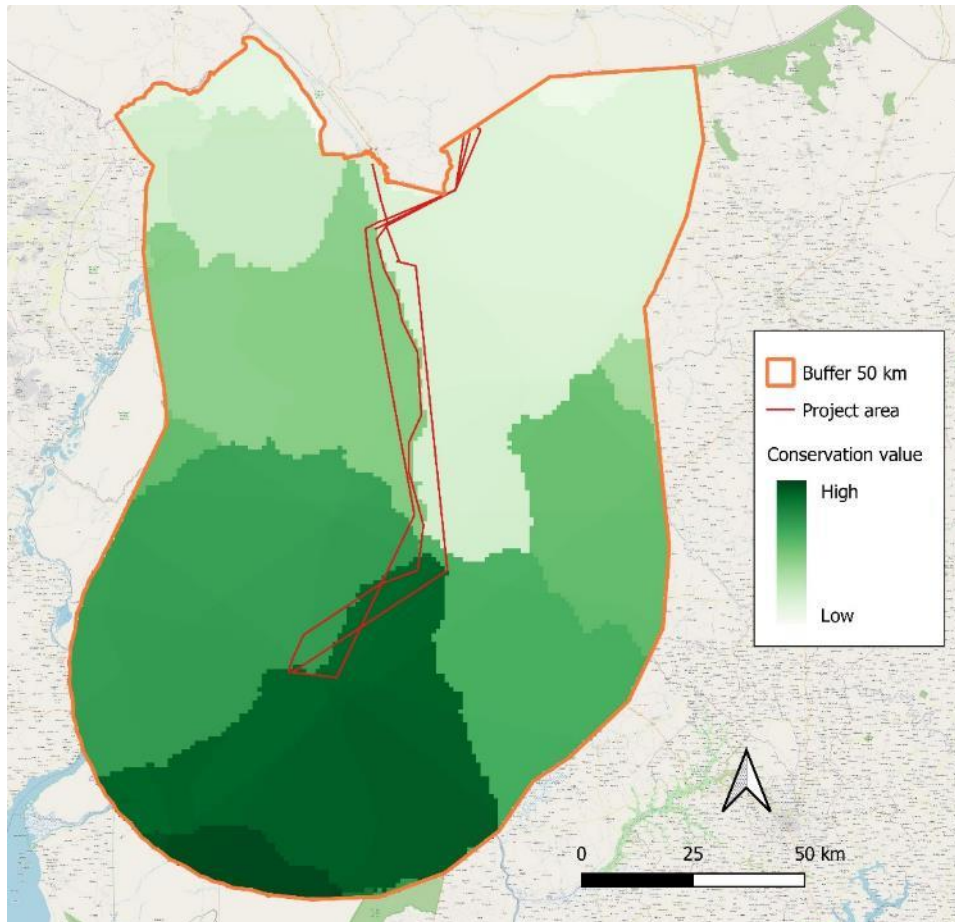


Figure 7-29 – Arthropods species distribution within 50 km buffer around project proposed area weighted by their conservation value.

#### 7.3.4.2. Birdlife

A separate section for birds was necessary as they will be the most affected taxon of project implementation. Uganda has 1007 bird species, of which 7 are Endangered, 11 Vulnerable and 26 Near threatened. A total of 190 species are listed in the East Africa Regional Red List. The categories of birds according to their habitat include forest specialists (FF), forest generalists or forest edge species (F), forest visitors (f), species restricted to wetlands/open waters (W), water bird non-specialist, often found near water (w) and grassland species (G). Uganda has 134 are Palearctic migrants (species that breed in Europe and Asia during summer and migrate to Africa during winter season). It is also a range state for 56 species that are Afro-tropical migrants (birds that migrate within the African continent). Specifically for bird conservation, BirdLife International has developed an IBA programme to ensure the long-term conservation of sites of significant importance for birds and biodiversity. There are several IBAs in the proposed project area and its surroundings, which indicate bird hotspots, most of which overlap with National Parks or other protected areas (Figure 7-30).

## IMPORTANT BIRD AREAS IN UGANDA

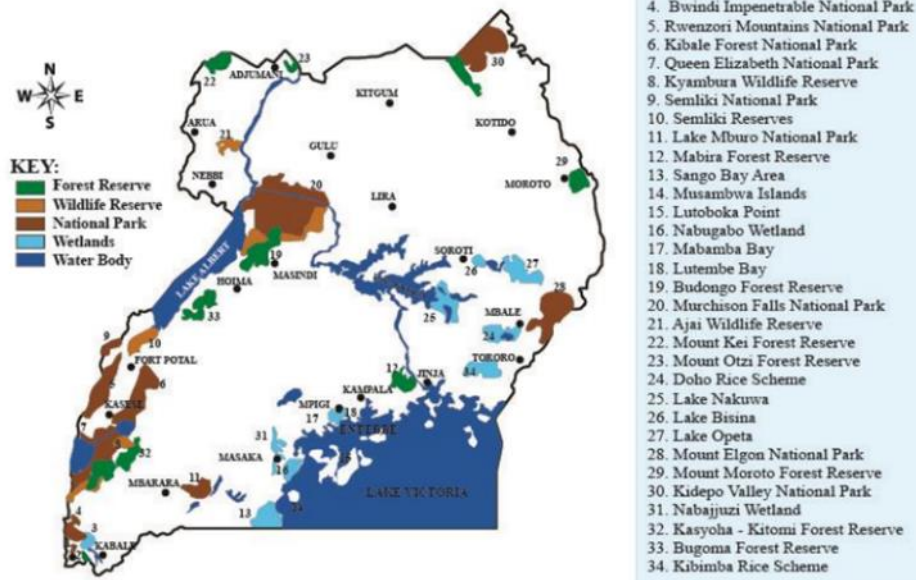


Figure 7-30 – IBAs of Uganda. Source: Fifth National Report to the Convention on Biological Diversity.

Given the significance of birds for conservation planning and environmental assessments, there is a need for a better ecological understanding of the role of avian community structure in conservation decision-making. Thus, they are widely used in conservation and population trends in farmland are one of the 15 'Quality of Life' indicators. In addition, small land birds in particular have often been proposed as potential indicators for the presence of other unrelated taxa or as environmental change indicators to be integrated into broader monitoring schemes.

Birds are good indicators of general biodiversity i.e. areas very rich in bird species have been found to also be rich in other biodiversity. Birds have been found useful as bioindicators because they are:

- Widespread, they occur in all habitats (forest, grassland, water, cultivation)
- Relatively large, conspicuous- easily surveyed with simple methods like observations, use of calls to record presence or absence
- Mostly active during the day (compared to many mammals and amphibians)
- Specialized in their habitats in some cases e.g. forest or water bird specialist. The disappearance of such specialist species in an ecosystem can be used to assess the health of that particular ecosystem or the extent of degradation

The distribution of bird species as determined by the IUCN spatial data indicates that 656 species (the complete checklist is in Annex 3) range overlap the 50 km buffer around the proposed project area. According to the IUCN spatial data, there appears to be no obvious difference in conservation value in the 50km buffer around the project area (Figure 7-31).

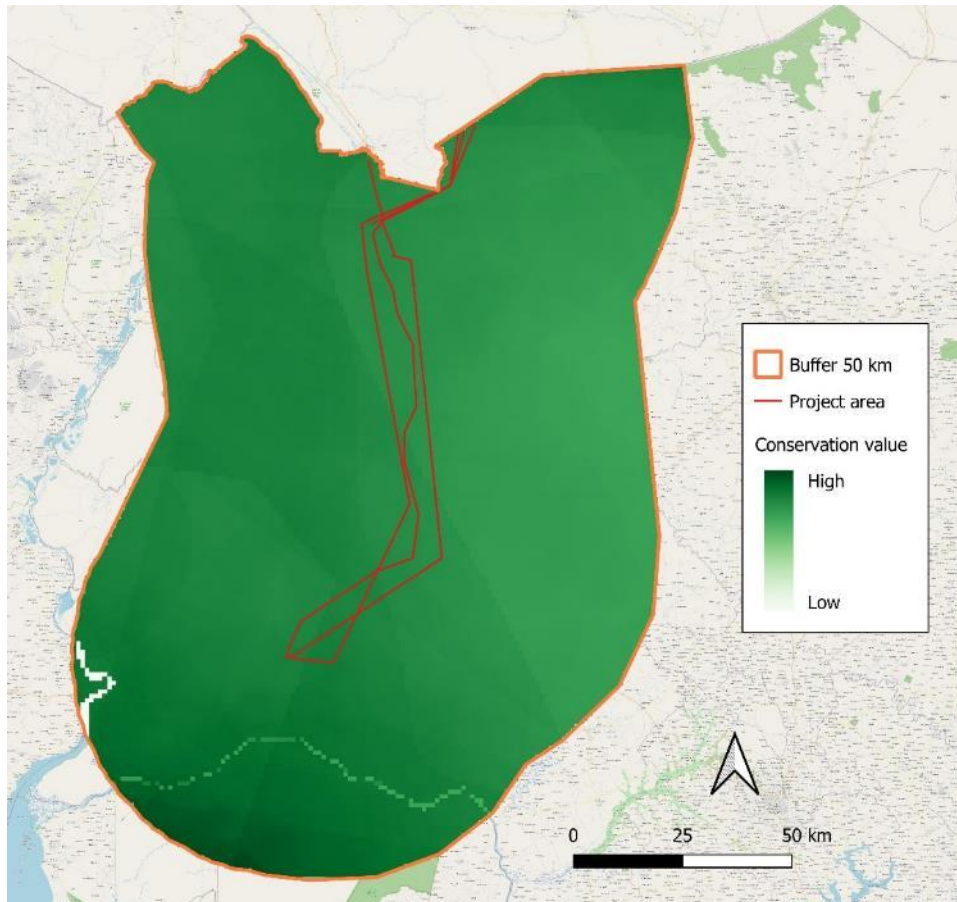


Figure 7-31 – Birds species distribution within 50 km buffer around project proposed area weighted by their conservation value.

7.3.4.3. Protected animal species

The protected species in Uganda are listed in the Uganda Wildlife Act 2020. The main objective of the Uganda Wildlife Act, Cap 200 of 2000 is to protect wildlife resources and enable derivation of benefits. In Uganda, wildlife is protected by the Government on behalf of, and for the benefit of, the people of Uganda (The Uganda Wildlife Act, 2019). The Government of Uganda established Uganda Wildlife Authority (UWA) under the Uganda Wildlife Act, Cap 200 to manage wildlife in protected areas including National Parks, Wildlife Reserves, Community Wildlife Management Areas, Wildlife Sanctuaries among other areas following strict conservation procedures that limit or entirely exclude human activities.

Mammals

The mammal species classified by IUCN as Vulnerable, Endangered and Critically Endangered within the buffer of 50 km buffer are ten, seven Vulnerable and three Endangered (Table 7-9-9). Their range, weighted by their conservation status, shows that they are mainly distributed in the southern side (Figure 7-32).



Table 7-9 – List of threatened mammals within 50 km buffer around project proposed area. CR: Critically Endangered, EN: Endangered, VU: Vulnerable.

N	Family	Species name	Seasonality	Red List category	Trend
1	FELIDAE	<i>Caracal aurata</i>	Resident	VU	Decreasing
2	FELIDAE	<i>Panthera leo</i>	Resident	VU	Decreasing
3	FELIDAE	<i>Panthera pardus</i>	Resident	VU	Decreasing
4	GIRAFFIDAE	<i>Giraffa camelopardalis</i>	Resident	VU	Decreasing
5	HIPPOPOTAMIDAE	<i>Hippopotamus amphibius</i>	Resident	VU	Stable
6	MANIDAE	<i>Smutsia temminckii</i>	Resident	VU	Decreasing
7	CERCOPITHECIDAE	<i>Lophocebus albigena</i>	Resident	VU	Decreasing
8	MANIDAE	<i>Phataginus tricuspis</i>	Resident	EN	Decreasing
9	HOMINIDAE	<i>Pan troglodytes</i>	Resident	EN	Decreasing
10	ELEPHANTIDAE	<i>Loxodonta africana</i>	Resident	EN	Decreasing

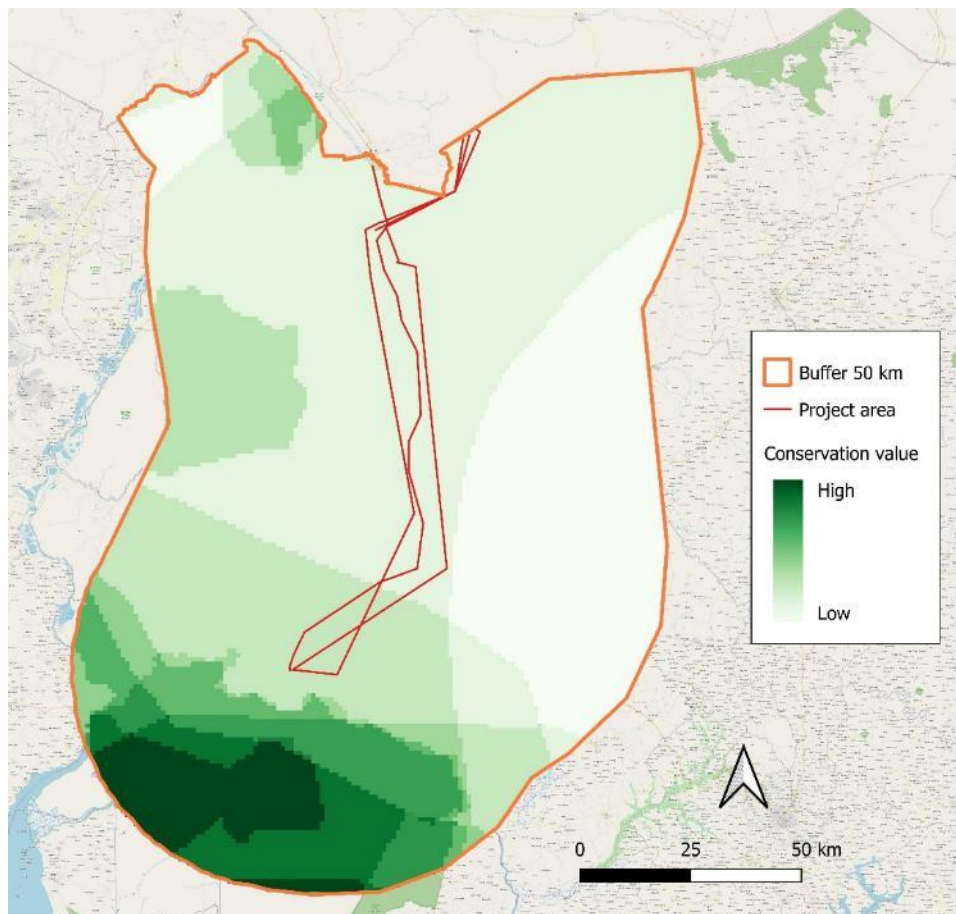


Figure 7-32 – Threatened mammals (CR, EN and VU) distribution within 50 km buffer around project proposed area weighted by their conservation value.

In more detail, there are three mammal species range that overlap the 1 km buffer around the proposed project area, all of which are classified as Vulnerable (Table 7-10).

Table 7-10 – List of threatened mammals within 1 km buffer around project proposed area. VU: Vulnerable.

N	Species name	RedList category	Trend
1	<i>Smutsia temminckii</i>	VU	Decreasing
2	<i>Giraffa camelopardalis</i>	VU	Decreasing
3	<i>Panthera pardus</i>	VU	Decreasing

Birds

The threatened bird species by the IUCN spatial data within the buffer of 50 km buffer are 16, six are Vulnerable, six are Endangered and four are Critically Endangered (Table 7-11).

Table 7-11 – List of threatened birds within 50 km buffer around project proposed area. CR: Critically Endangered, EN: Endangered, VU: Vulnerable.

N	Family	Scientific name	Seasonality	Red List category	Trend
1	ACCIPITRIDAE	<i>Polemaetus bellicosus</i>	Extant (resident)	EN	Decreasing
2	SAGITTARIIDAE	<i>Sagittarius serpentarius</i>	Extant (resident)	EN	Decreasing
3	ACCIPITRIDAE	<i>Terathopus ecaudatus</i>	Extant (resident)	EN	Decreasing
4	ACCIPITRIDAE	<i>Circaetus beaudouini</i>	Extant (resident)	VU	Decreasing
5	ACCIPITRIDAE	<i>Aquila rapax</i>	Extant (resident)	VU	Decreasing
6	ACCIPITRIDAE	<i>Gyps africanus</i>	Extant (resident)	CR	Decreasing
7	ACCIPITRIDAE	<i>Gyps rueppelli</i>	Extant (resident)	CR	Decreasing
8	ACCIPITRIDAE	<i>Necrosyrtes monachus</i>	Extant (resident)	CR	Decreasing
9	ACCIPITRIDAE	<i>Torgos tracheliotos</i>	Extant (resident)	EN	Decreasing
10	ACCIPITRIDAE	<i>Trionoceph occipitalis</i>	Extant (resident)	CR	Decreasing
11	ACCIPITRIDAE	<i>Aquila nipalensis</i>	Extant (non-breeding)	EN	Decreasing
12	ANATIDAE	<i>Aythya ferina</i>	Extant (non-breeding)	VU	Decreasing
13	BUCEROTIDAE	<i>Bucorvus abyssinicus</i>	Extant (resident)	VU	Decreasing
14	FALCONIDAE	<i>Falco vespertinus</i>	Extant (passage)	VU	Decreasing
15	BALAENICIPITIDAE	<i>Balaeniceps rex</i>	Extant (resident)	VU	Decreasing
16	PSITTACIDAE	<i>Psittacus erithacus</i>	Extant (resident)	EN	Decreasing

The conservation values map (Figure 7-33) indicates that the central part is the most sensitive for threatened species richness.

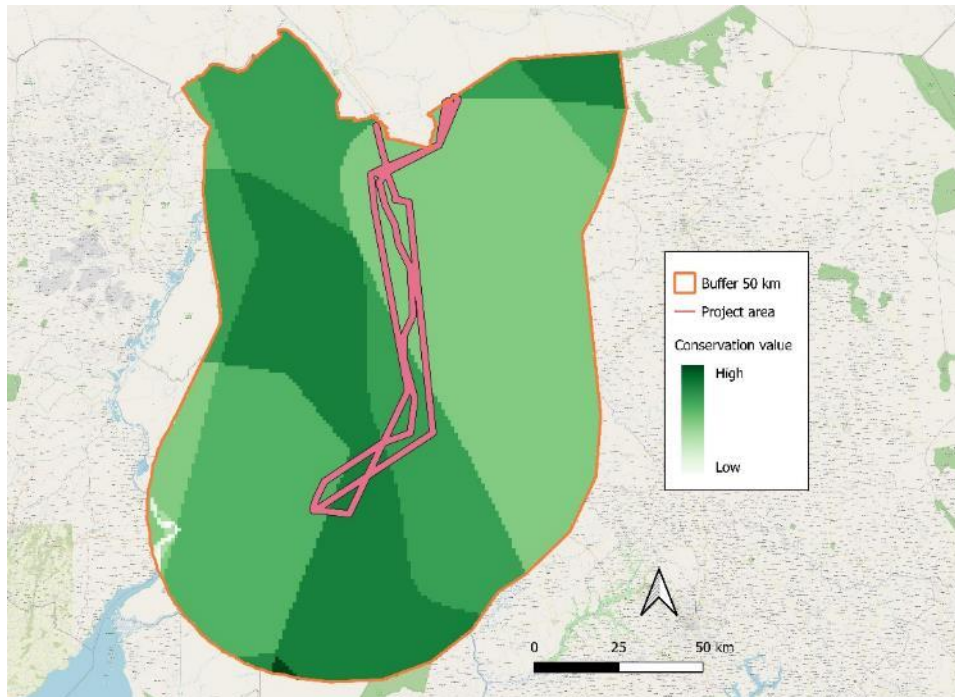


Figure 7-33 – Threatened birds (CR, EN and VU) distribution within 50 km buffer around project proposed area weighted by their conservation value.

In the 1 km buffer around proposed transmission line routes 14 species range are present, six are Vulnerable, six are Endangered and four are Critically Endangered (Table 7-12).

Table 7-12 – List of threatened birds within 1 km buffer around project proposed area. VU: Vulnerable, EN: Endangered, CR: Critically Endangered.

N	Scientific name	Red List category	Trend
1	<i>Polemaetus bellicosus</i>	EN	Decreasing
2	<i>Sagittarius serpentarius</i>	EN	Decreasing
3	<i>Terathopius ecaudatus</i>	EN	Decreasing
4	<i>Circaetus beaudouini</i>	VU	Decreasing
5	<i>Aquila rapax</i>	VU	Decreasing
6	<i>Gyps africanus</i>	CR	Decreasing
7	<i>Gyps rueppelli</i>	CR	Decreasing
8	<i>Necrosyrtes monachus</i>	CR	Decreasing
9	<i>Torgos tracheliotos</i>	EN	Decreasing
10	<i>Trigonoceps occipitalis</i>	CR	Decreasing
11	<i>Aquila nipalensis</i>	EN	Decreasing
12	<i>Bucorvus abyssinicus</i>	VU	Decreasing
14	<i>Falco vespertinus</i>	VU	Decreasing
15	<i>Balaeniceps rex</i>	VU	Decreasing

Reptiles

The threatened reptile community assessed by the IUCN spatial data and potentially present in the 50 km buffer area includes two Vulnerable species (Table 7-13). Only one species, *Trionyx triunguis*, is present in the 1 km buffer around the project area.

Table 7-13 – List of threatened reptiles within 50 km buffer around project proposed area. CR: Critically Endangered, EN: Endangered, VU: Vulnerable.

N	Family	Scientific name	Seasonality	Red List category	Trend
1	TRIONYCHIDAE	<i>Trionyx triunguis</i>	Resident	VU	Decreasing
2	VIPERIDAE	<i>Bitis gabonica</i>	Resident	VU	Decreasing

The distribution map of these species weighted by their conservation status shows that the most sensitive areas are in the southern side (Figure 7-34).

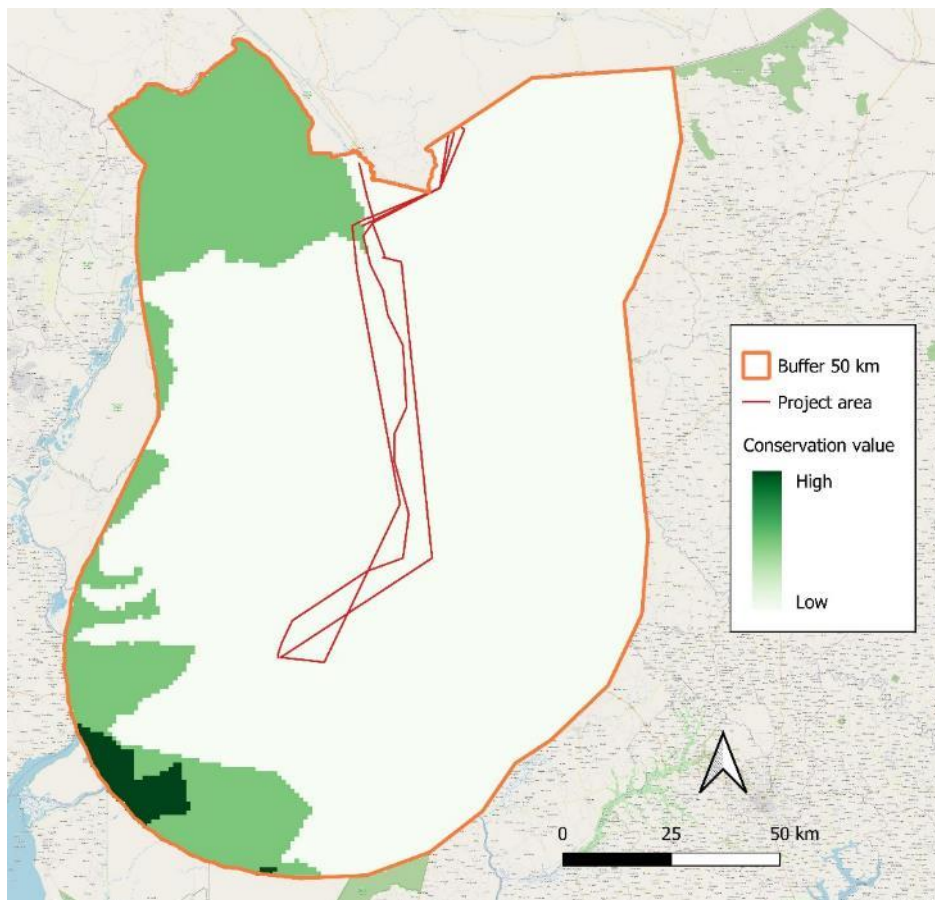


Figure 7-34 – Threatened reptiles (CR, EN and VU) distribution within 50 km buffer around project proposed area weighted by their conservation value.

All animal species

In general, the distribution of all threatened animal species is represented in Figure 7-35. In the 50km buffer around the project area, following the IUCN spatial data, four species are Critically Endangered, nine Endangered and 16 Vulnerable (Table 7-14). More in detail, the number of species in 1km buffer around project area are four Critically Endangered, six Endangered and 11 Vulnerable (Table 7-15).

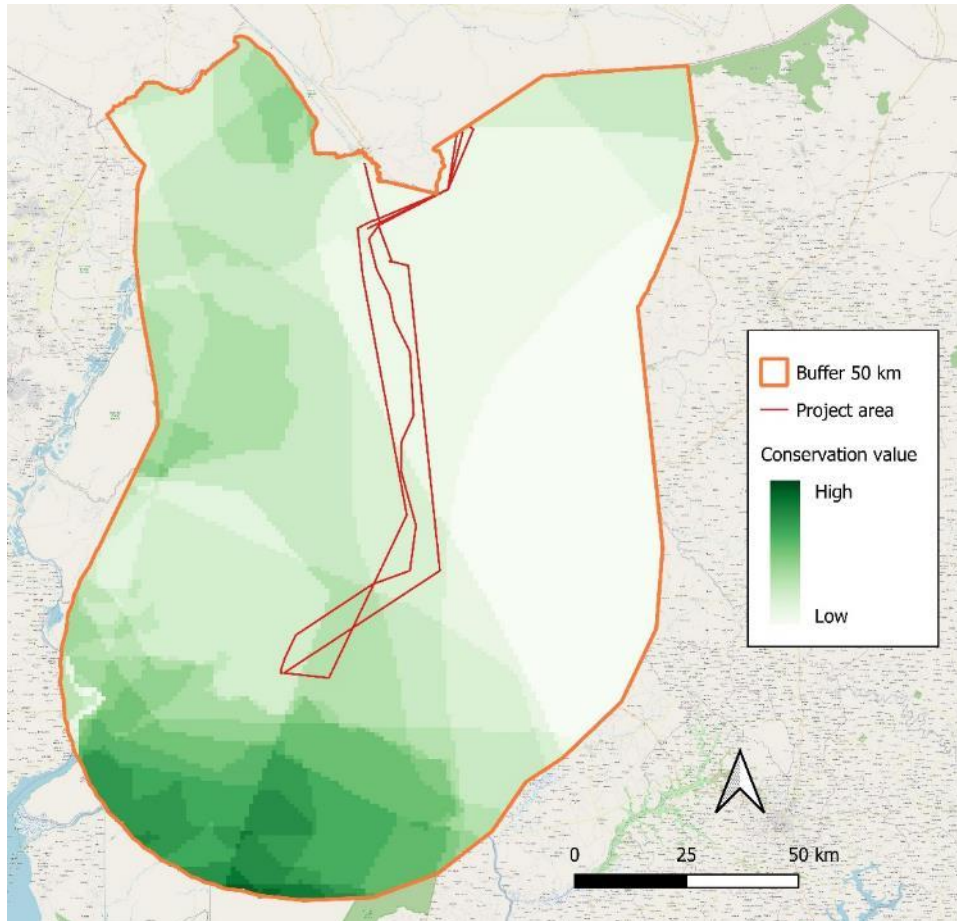


Figure 7-35 – Distribution of threatened species (CR, EN and VU) within 50 km buffer around project proposed area weighted by their conservation value.

Table 7-14 – Number of Vulnerable, Endangered and Critically Endangered species for each taxon in the 50 km buffer around project proposed area.

Taxa	VU	EN	CR
Mammals	7	3	-
Birds	6	6	4
Reptiles	2	-	-
Amphibians	-	-	-
Arthropods	1	-	-

Table 7-15 – Number of Vulnerable, Endangered and Critically Endangered species for each taxon in the 1 km buffer around project proposed area.

Taxa	VU	EN	CR
Mammals	3	-	-
Birds	6	5	4
Reptiles	1	-	-
Amphibians	-	-	-
Arthropods	-	-	-

### 7.3.5. Baseline data surveys – Biological Environment

#### 7.3.5.1. Surveys aims and methods

Field surveys of biological environment play a pivotal role in furnishing essential information about the prevailing biodiversity within the project area. The primary objectives of biodiversity surveys encompass the following:

1. **Baseline Assessment:** The foundational aim is to comprehensively assess and document the existing biodiversity in the project area before any development or human activities are undertaken. This baseline information serves as a vital reference point for evaluating the potential impacts of the proposed project on the local ecosystems.
2. **Species Presence and Distribution:** Through meticulous observation and data collection, biodiversity surveys seek to identify and map the presence and distribution patterns of various species residing within the project area. This includes plants, mammals, birds, herptiles (reptiles and amphibians), and arthropods.
3. **Rare and Endangered Species Identification:** The surveys are geared towards identifying the presence and distribution of rare and/or endangered species. Accurate documentation of these vulnerable populations helps inform conservation efforts and enables better-informed decision-making regarding project development.
4. **Habitat Assessment:** Detailed assessments of the habitats within the project area are conducted to comprehend their ecological significance and the role they play in supporting local biodiversity. Understanding the intricate relationships between species and their habitats aids in devising appropriate conservation strategies.
5. **Biodiversity Hotspots and Sensitive Areas:** The surveys aim to pinpoint areas of exceptional biodiversity significance, known as biodiversity hotspots, as well as regions that are particularly sensitive to environmental changes. By identifying such areas, appropriate measures can be devised to safeguard their unique ecological value.

To achieve these objectives, distinct sampling methodologies were deployed for each taxonomic group of interest, encompassing plants, mammals, birds, herptiles, and arthropods. These scientifically sound sampling techniques ensure the collection of robust baseline data, fostering a rigorous and comprehensive assessment of the biodiversity within the project area.

Several factors were considered in determining the location of the sampling units, encompassing ecological aspects and the practical feasibility of conducting sampling activities. By employing this approach, the survey aims to encompass a wide range of species and ecological communities within the project area. However, due to certain areas in Uganda being inaccessible or challenging to reach, the

sampling design has been adapted to prioritize areas that are easily accessible, such as those near existing roads.

**Methods**

**Transects, point counts (birds) and vegetation plots** (Figure 7-35). These field survey activities involved the surveyor sampling vegetation and wildlife in the field, walking a predetermined transect to collect vegetation, habitat and wildlife data, recording bird data using the point count technique, and collect vegetation data inside 10x10m plot.

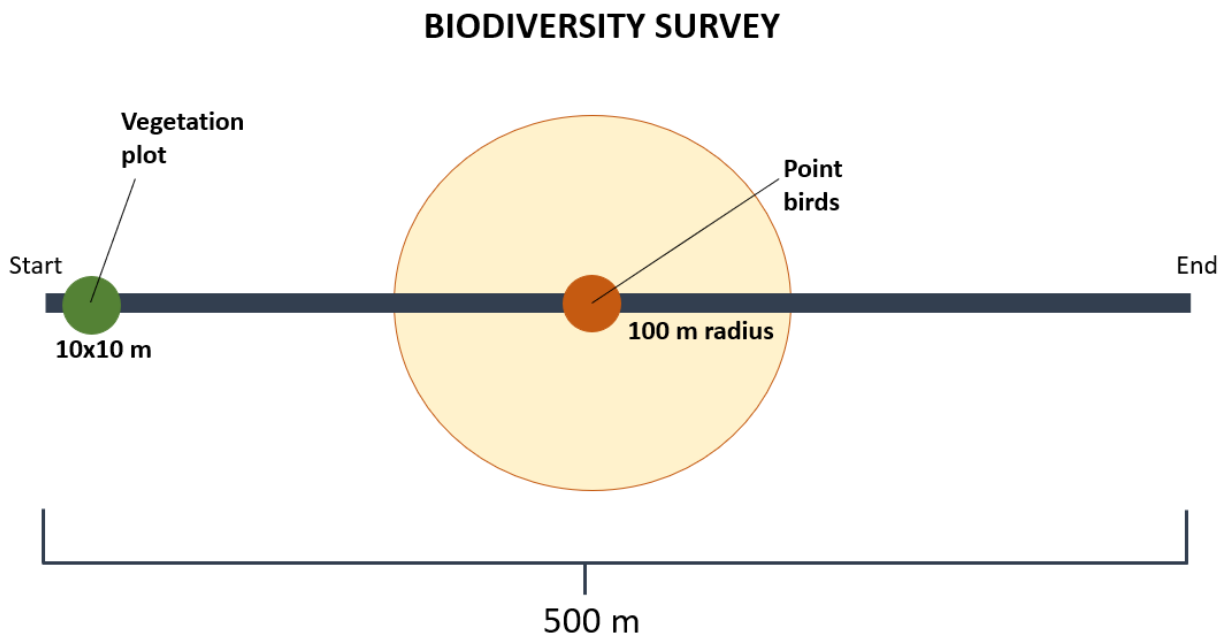


Figure 7-36 – Scheme of the sampling design for biodiversity surveys.

The proposed methodology involves conducting **transect** surveys (Figure 7-36), where surveyors systematically assessed habitat, plant, and wildlife species along designated paths. This approach provides valuable insights into the distribution, abundance, and diversity of species across different habitats and landscapes.

To determine the location of the transects, careful consideration will be given to habitat diversity, with special attention to sensitive habitats such as wetlands and riverine areas. Additionally, accessibility will be factored in, and each transect was situated in proximity to roads to facilitate ease of implementation. Transects of 500 m was surveyed by different team of experts. Bird survey points were positioned at the centre of each transect (refer to the point count section for further details), and vegetation plot at the starting point.

During the transect surveys, surveyors collected data on wildlife and vegetation. The experts involved meticulously recorded the following information:

1. All Plant Species: This includes trees, shrubs, and herbaceous species encountered along the transect. While the precise location of each plant species may not be feasible, the surveyors documented their presence and estimate their abundance within the transect.
2. Wildlife: The surveyors recorded the presence and abundance of wildlife species (direct observation and/or presence signs) encountered along the transect.

3. Length of Habitats: The surveyors taken into account the length of each habitat type encountered within each transect. This information provided insights into the extent and distribution of different habitats along the transects and along the transmission line alignment.
4. Abundance: For both wildlife and plant species, standardized abundance classes were used to document their relative abundance within each transect.
5. Main Habitat and Dominant Species: Observations regarding the primary habitat type and any dominant species within each transect was recorded.

By meticulously implementing this comprehensive data collection, the biodiversity surveys aimed to provide a thorough understanding of the plant and wildlife communities across different habitats within the project area.

### WILDLIFE AND VEGETATION SURVEY ALONG TRANSECTS

**Wildlife:**

Mammals, birds, reptiles, amphibians, and invertebrates.  
 To detect all direct or indirect sign of presence of animals.  
 Estimates of abundance.

**Vegetation and habitat:**

Main habitat and land use.  
 Main and dominant species.  
 % of cover and distribution of habitats.

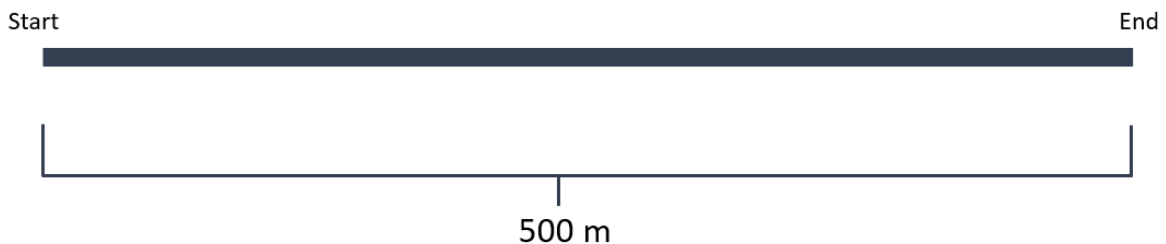
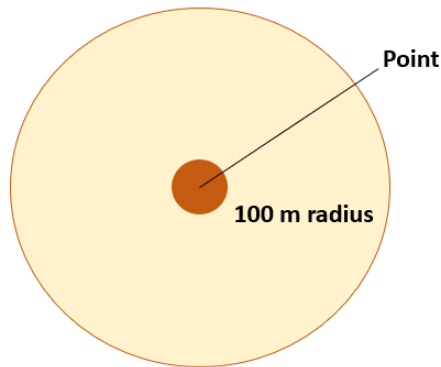


Figure 7-37 – Scheme of the transects to collect data on wildlife and vegetation.

The **point count** method (Figure 7-37) is a widely used bird survey method in ornithology and ecological research. It involves stationary observations of birds from specific points, during which bird species and their behaviours are recorded. The primary objective of point counts is to estimate bird abundance, distribution, and diversity in a particular area, and it provides valuable data for studying bird populations and community composition. The protocol requires to reach the survey point quietly and calmly to avoid disturbing the birds. Once at the point, the observer usually stands or sits quietly, and start the observation for 10 minutes. In this period the surveyor has to record all bird species seen or heard, using binoculars and field guides for accurate identification, count all individuals of each species seen/heard and record the location and distance from the point count (in a buffer of 100 m). Points were located in the middle of each 500m transects, obtaining in this way also the habitat characterization around the points and along the transmission line route and substation location.



## BIRD POPULATION SURVEY



### Birds:

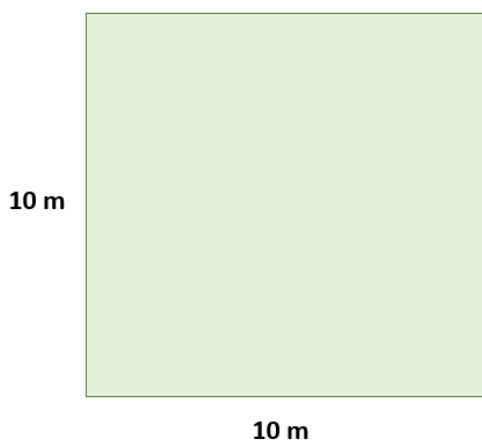
In the middle of each 500 m transect.  
To detect bird species and estimate abundance and density.

Once at the point, the observer usually stands or sits quietly, and start the observation for 10 minutes. In this period the surveyor has to record all bird species seen or heard, using binoculars and field guides for accurate identification, count all individuals of each species seen/heard and record the location and distance from the point count (in a buffer of 100 m).

*Figure 7-38 – Scheme of the bird point count to collect data on birds' population.*

**Vegetation plot** (Figure 7-38) sampling is a systematic method used in ecology and environmental science to study and analyse plant communities in a particular area. At the beginning of each transect a vegetation plot of 10x10m will be placed. The botanist collected vegetation data including species name, abundance (% cover of the 10x10 m plot), habit, DBH and Hight for trees, and the use of the plants by locals.

## VEGETATION PLOT



### Vegetation:

At the starting point (or in the proximity) of each 500 m transect.

To collect vegetation data estimate abundance.

*Figure 7-39 – Scheme of the vegetation plot to collect data on vegetation.*

### Equipment

The experts used different equipment for surveys to facilitate the successful execution of all field activities:

1. Camera: for capturing photographs during sampling activities, allowing for the meticulous documentation of various habitats and the presence or abundance of different species. By

visually recording these crucial aspects, the camera enables accurate and thorough analysis, aiding in comprehensive assessments and conclusive findings.

2. Binoculars: Specifically designed for enhanced visibility, binoculars play a pivotal role in the identification of bird species and other fauna. The capability to observe distant wildlife and closely inspect their distinctive features greatly contributes to accurate species identification, thereby enriching the overall data collection process.

3. GPS (Global Positioning System): Employing advanced GPS technology, this essential device is instrumental in registering and precisely tracking survey points, transects, and species locations within the designated project area. The accurate geospatial data acquired through the GPS ensures the creation of reliable maps.

4. Field Guides: Field guides serve as an invaluable resource for the team of ecologists and biologists. These guides provide comprehensive information on the local flora and fauna, enabling accurate species identification and aiding in the classification of various ecological components encountered during the survey.

6. Field forms: A structured data sheet is an essential element of the equipment, meticulously designed to systematically capture and organize vital information gathered during field activities. This includes details on species encountered, their habitat characteristics, abundance, and any other relevant ecological observations.

### 7.3.5.2. Surveys results – Vegetation

#### Introduction

Overall, site visits and field vegetation surveys have been conducted, along with literature reviews and stakeholder consultations involving central (National Forestry Authority – NFA) and local government technocrats (municipal Environment and CDO officers, respectively) in Nwoya, Amuru, Gulu, and Lamwo, as well as direct resource users affected by the proposed project.

From a methodological standpoint, the following approaches were employed:

- a) To examine the plant community structure and diversity along the transmission line, we conducted field observations. Plots were identified and recorded using high-precision GPS along the right-of-way, both at the water source (BH) and reservoir (Tank).
- b) Given that the project area is situated in a human-modified landscape dominated by farmlands and road networks, we measured a selection of encountered trees for DBH at 1.3m breast height. Height was determined with the assistance of a hypsometer and estimation techniques. Identification keys and guidebooks (refer to Kalema and Hamilton, 2020; and Namaganda et al., 2004) were utilized to determine plant species at the Genus and Species taxonomic levels whenever possible.
- c) Although quadrats yielded reasonable data on the distribution, diversity, and abundance of various plant strata, a species list was compiled from those within the project footprint and opportunistic encounters recorded as they were encountered along the project area. The complete plant species list (total gamma diversity) was generated and analyzed based on presence, and cross-referenced against the IUCN Red List of threatened species and ecosystems.

The abundance of flora species was assessed using the DAFOR scale (Table 7-16), a tool enabling the visual evaluation of species abundance on a semi-quantitative or qualitative level.

Table 7-16 – DAFOR scale.

Species abundance percentage	DAFOR term	Abbreviation
51-100%	Dominant	D
31-50%	Abundant	A
16-30%	Frequent	F
6-15%	Occasional	O
1-5%	Rare	R
0%	Not present	X

Sensitive/critical habitats were identified based on definitions provided by the IFC (2012) and The National Environment Act (2019). The conservation status of plant species was assessed using criteria from the IUCN Red List (2023) and the National Red List (MTWA, 2018). To determine invasiveness, encountered species were cross-referenced with the 'Global Register of Introduced and Invasive Species for Uganda' (Ogwang et al., 2020), with additional attention to species not listed in Ogwang et al., 2020 but recognized as invasive.

#### Results

The coordinates of transects (Table 7-17) and plot (Table 7-18) locations analyzed during field surveys are provided below. A map illustrating their positions in relation to the RoW (Right of Way) is presented in Figure 7-39, 7-40, 7-41.

Table 7-17 – Station coordinates of flora and vegetation transects.

Transect ID	Coordinates (Decimal Degree, WGS84 UTM Zone 36N)			
	Start Point		End Point	
	Longitude	Latitude	Longitude	Latitude
FT01	376660	280825	376744	281388
FT02	377191	282680	377377	283185
FT03	377594	283818	377952	284567
FT04	379778	288350	380534	289222
FT05	382669	290674	383158	290945
FT06	384700	291984	384935	292145
FT07	385846	292747	386327	293063
FT08	387090	293576	387594	293900
FT09	388838	294731	389275	295019
FT10	391784	296681	392242	295019
FT11	397079	300194	397676	300418
FT12	402024	302025	402516	302187
FT13	405479	303463	405562	302187
FT14	405777	305592	405844	306070
FT15	406009	307329	406094	306070
FT16	406414	310349	406500	310887
FT17	406784	313273	406686	313808
FT18	405961	316459	405839	313808
FT19	403891	324035	403756	324497
FT20	404433	333917	404592	334247
FT21	406124	340814	406065	341812
FT22	403192	356693	402965	357173
FT23	401631	360995	401521	361550
FT24	401303	362736	401213	363215
FT25	399775	367111	399507	367640
FT26	397980	367111	397879	371161
FT27	398574	380986	399067	371161

Table 7-18 – Station coordinates of flora and vegetation plots/sampling points.

Plot ID	Coordinates (Decimal Degree, WGS84 UTM Zone 36N)	
	Longitude	Latitude
FP01	376967	280349
FP02	377191	282680
FP03	377594	283818
FP04	379778	288350
FP05	382669	290674
FP06	387090	290674
FP07	389181	290674
FP08	397079	300194
FP09	405494	303385
FP10	405777	305592
FP11	405961	316459
FP12	404433	333917
FP13	406124	340814
FP14	406065	341812
FP15	405922	344081
FP16	405652	349012
FP17	405385	352212
FP18	403192	356693
FP19	401929	359301
FP20	401631	360995
FP21	397980	370685
FP22	397609	372354
FP23	396614	376172
FP24	396288	377831
FP25	398574	380986
FP26	409185	385009

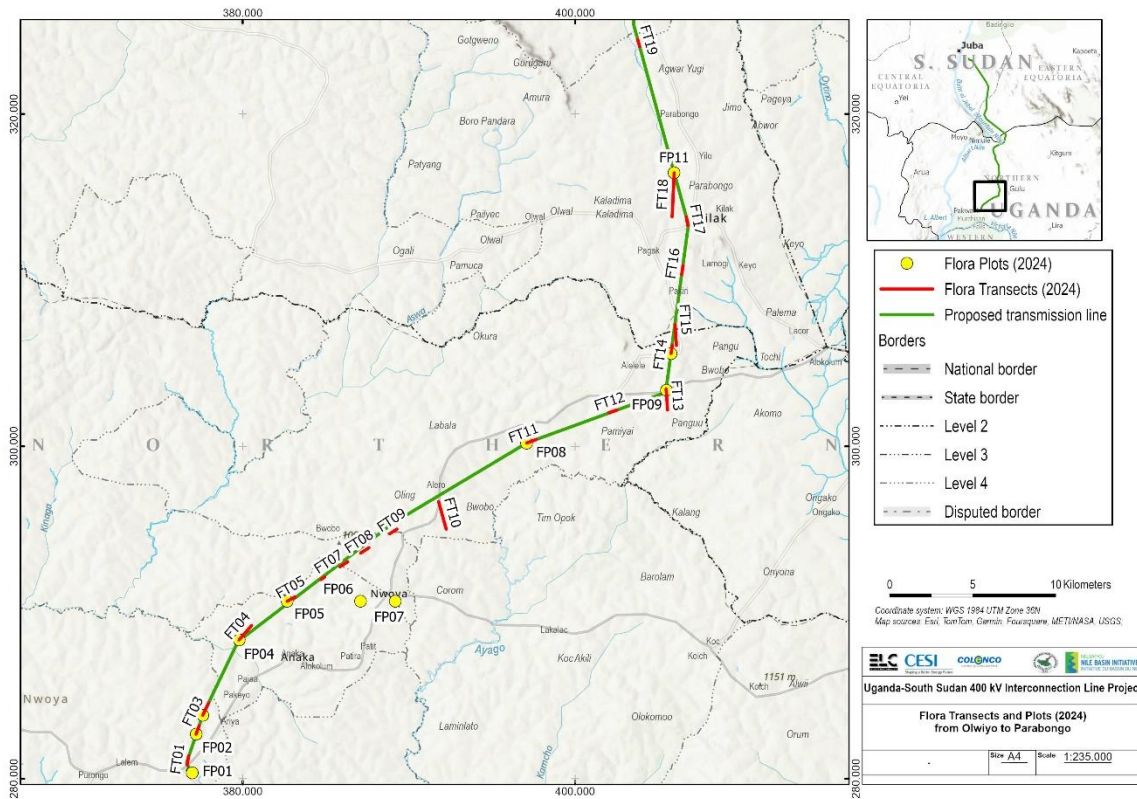


Figure 7-40 – Flora transects and plots sampling points (2024) from Olwiyo to Parabongo.

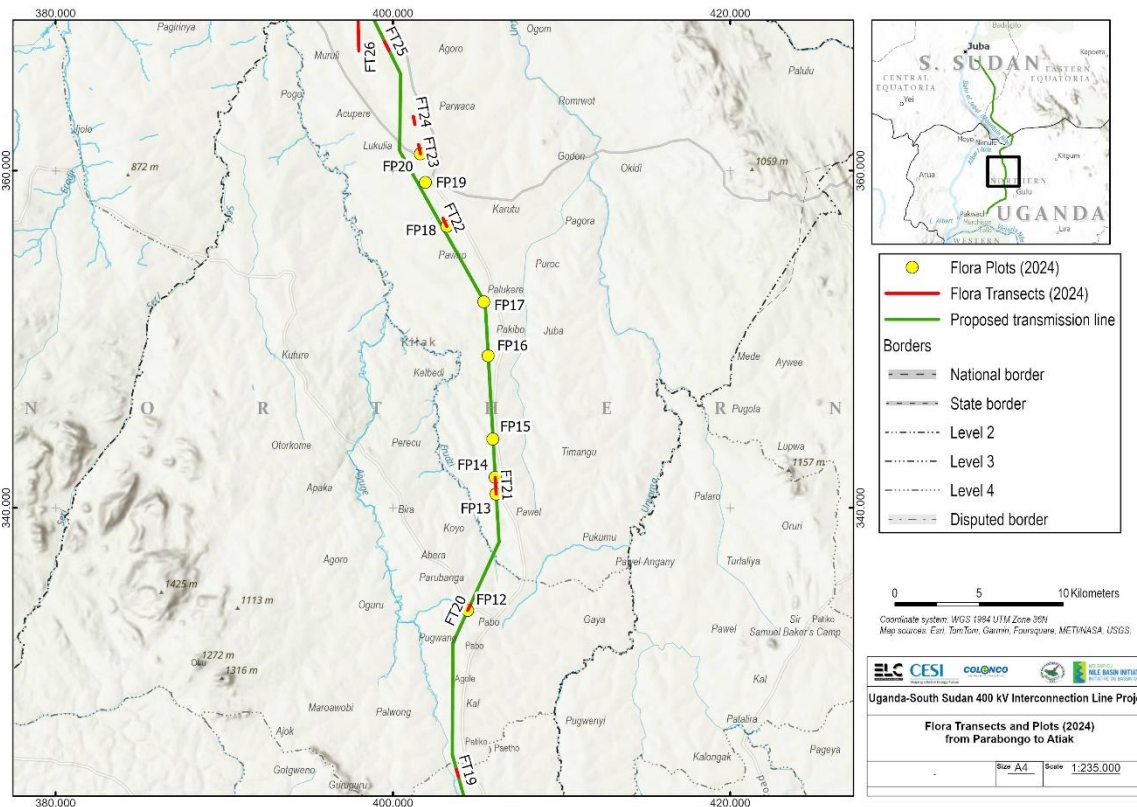


Figure 7-41 – Flora transects and plots sampling points (2024) from Parabongo to Atiak.

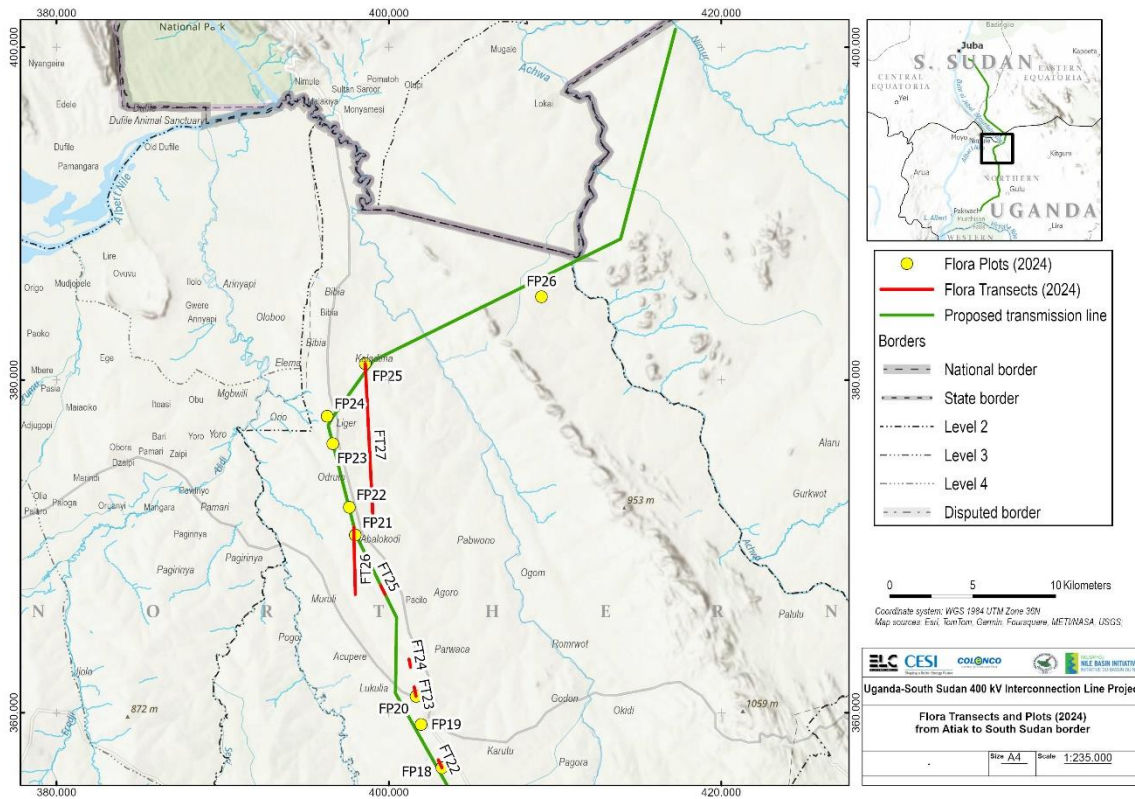


Figure 7-42 – Flora transects and plots sampling points (2024) from Atiak to South Sudan border

The surveyed locations in Lamwo, Amuru, and Nwoya districts present diverse ecological landscapes and land use patterns, as evidenced by the collected data. In Lamwo, bushed woodlands dominate, hosting a variety of plant species such as *Combretum molle*, *Erythrina abyssinica*, and *Vitellaria paradoxa*. These areas serve as suitable habitats for amphibians, reptiles, and occasional stray mammals, amidst sporadic cultivation and grazing practices. Similarly, Amuru exhibits a blend of cultivated fields with dense tree cover and active gardens, fostering a mix of species including *Albizia zygia* and *Mangifera indica*. Notably, the terrain in Amuru features relatively flat lands with ridged characteristics, influenced by small rock fragments. In Nwoya, the landscape is characterized by cultivated fields interspersed with woodlots, settlements, and riverside vegetation. *Eucalyptus* woodlots and dense cultivation mark the region, with significant human settlements nearby. This survey underscores the importance of understanding the intricate relationship between land cover, land use, and biodiversity distribution in these regions, crucial for effective conservation and management strategies. A detailed description of the environmental, ecological, and degree of anthropization characteristics found in the areas surveyed in the study is presented in the table 7-19 below.

Table 7-19 – Description of different points along the power line.

Section	Coordinates (Decimal Degree, WGS84 UTM Zone 36N)		Vegetation description	Dominant species	Land uses	Percentage land cover	Notes
	Longitude	Latitude					
Lamwo	420165.8	385950.3	Bushed woodland	<i>Combretum molle</i> , <i>Erythrina abyssinica</i> , <i>Vitellaria paradoxa</i> , <i>Acacia sieberiana</i> , <i>Hyperthelia dissoluta</i> , and <i>Hyparrhenia cymbaria</i>	Sporadic cultivation and grazing	Bushed woodland 95%, gardens 5%	Suitable habitat for Amphibians and Reptiles, and waterpoint for stray mammals
Lamwo	419981.8	387815.2	Bushed woodland approx 5.3km away from power line <i>This landcover is also crossed by stream Manyaju covered by mainly bushed woodland</i>	<i>Combretum molle</i> , <i>Combretum collinum</i> , <i>Philenoptera laxiflora</i> , <i>Hyparrhenia cymbaria</i> , <i>Annona senegalensis</i>	Sporadic cultivation and grazing	Bushed woodland 90%, gardens 10%	Land cover suitable for both medium sized and small mammals with Kobs, Bush duikers, Bush bucks, African civet, Mongoose, Gennet cat, cane rat, Giant rat reported and Lion sighted around 2021
Amuru	405934.6	307791.9	Fields of cultivation with <b>dense tree cover</b>	<i>Albizia zygia</i> , <i>Albizia grandibracteata</i> , <i>Mangifera indica</i> , <i>Imperata cylindrica</i> , <i>Hyparrhenia cymbaria</i> , <i>Setaria sphacelata</i> , <i>Pine</i>	Cultivation, grazing, settlement, Marram road network	Gardens 60% Fallows 40% but tree cover projects over 50% to ground cover	Relatively flat land but ridged due to some small rock fragments on short hills



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Amuru	406271.3	310161.1	Fields of cultivation including active gardens of Cassava, Pine and upland rice. There are scattered trees	<i>Ficus sycomorus</i> , <i>Mangifera indica</i> , <i>Borassus aethiopicum</i> , <i>Hyparrhenia diplandra</i> , <i>Khaya anthotheca</i> , <i>Tectona grandis</i> , <i>Pinus pinus</i> , <i>Shirakiopsis elliptica</i> , <i>Spathodea nilotica</i>	Cultivation, grazing, settlement, Marram road network	Gardens 60% Fallows 40%	Relatively flat topped hill but with undulating slopes on either sides. This area is contiguous with Keeyo hill on which sits Keyo CFR which was at the survey time covered with Fields of cultivation, an extensive Pine woodland as well as bushlands and fallows. The FR is approx. 100Hectares. Suitable habitat for Amphibians and Reptiles
Amuru	406603.2	313079.2	<b>Apotogitor wetland</b> with flowing stream of water within fields of cultivation	Sugarcane ( <i>Sacharrum officinale</i> ), <i>Phoenix reclinata</i> , <i>Echinochloa pyramidalis</i> , <i>Echinochloa colona</i> , <i>Leersia hexandra</i>	Cultivation, grazing, settlement, Marram road network	Gardens 60% Fallows 20%, riverine vegetation 20%	Low land area, with stream crossing approx 40m. Suitable habitat for Amphibians and Reptiles
Amuru	404588	320776.2	Fields of cultivation with settlements and bushlands near <b>Ayugi stream</b>	<i>Hyperthelia dissoluta</i> , <i>Acacia polyacantha</i> , <i>Grewia trichocarpa</i> , <i>Annona senegalensis</i>	Cultivation, grazing, settlement, Marram road network	Gardens 70% Fallows 20%, bushes 10%	The fields are crossed by Ayuge stream at 3870 with crossing of 20m. Covered by <i>Pennisetum purpureum</i> , <i>Alchornea cordifolia</i> and <i>Echinochloa pyramidalis</i> . Suitable habitat for Amphibians and Reptiles
Amuru	397602.2	373108.7	Bushed grassland with sporadic gardens	<i>Acacia hockii</i> , <i>Vitellaria paradoxa</i> , <i>Acacia polyacantha</i>	n	Bushed grassland 80%, Gardens 20%	This is on Flat lands with sporadic trees mainly <i>Ficus</i> spp and <i>Shirakiopsis elliptica</i>
Amuru	397107	374774.7	Bushed grassland with sporadic gardens	<i>Acacia hockii</i> , <i>Vitellaria paradoxa</i> , <i>Acacia polyacantha</i>	Cultivation	Bushed grassland 80%, Gardens 20%	This is on Flat lands with sporadic trees mainly <i>Ficus</i> spp and <i>Shirakiopsis elliptica</i>

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Amuru	396745.9	376260.5	Bushland	<i>Acacia hockii, Philenoptera laxflora, Hoslundia opposita, Combretum spp</i>	Cultivation and grazing	Bushland 95%, Gardens of sorghum 5%	This is on Flat lands with sporadic trees mainly <i>Pseudocedrella kotschy, Sclerocarya birrea, Balanites aegyptiaca</i> and <i>Tamarindus indica</i> . Area suitable for stray wild mammals
Amuru	396637.1	377796.9	Bushland	<i>Acacia hockii, Philenoptera laxflora, Hoslundia opposita, Combretum spp</i>	Grazing	Bushland 100%,	This is on Flat lands with sporadic trees mainly <i>Pseudocedrella kotschy, Sclerocarya birrea, Balanites aegyptiaca</i> and <i>Tamarindus indica</i> . Area suitable for stray wild mammals
Amuru	401074.1	364665.9	Bushland with sporadic gardens and settlements	<i>Acacia hockii, Philenoptera laxflora, Hoslundia opposita, Combretum spp</i>	Cultivation and grazing	Bushland 95%, Gardens of sorghum 5%	This is on Flat lands with sporadic trees mainly <i>Mangifera indica, Senna siamea, Antiaris toxicaria</i>
Nwoya	376451.9	280578.7	Fields of cultivation with <b>woodlots of Eucalyptus</b> sp and settlements	<i>Eucalyptus sp, Ficus sur,</i>	Cultivation, grazing, settlement	Cultivations 60%, settlements 15%, woodlots 25%	This section is as well near Olwiyo substation and small urban community
Nwoya	377046.6	282422.8	Fields of cultivation with <b>woodlots of Eucalyptus</b> sp and settlements	<i>Eucalyptus sp, Mangifera indica</i>	Cultivation, grazing, settlement	Cultivations 70%, settlements 10%, woodlots 20%	
Nwoya	380348.6	289071.1	Fields of cultivation with <b>woodlots of Eucalyptus</b> sp and settlements.	<i>Hyperthelia dissoluta, Acacia polyacantha, Pluchea discoridis</i>	Cultivation, grazing, settlement	Cultivation 90%, settlement 5%, woodlots 5%	

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Nwoya	379682.3	289148.3	<b>Bidat a river</b> with natural flora, its approx 500m from the powerline	<i>Phragmites mauritianum, Mimosa pigra, Echinochloa pyramidalis, Cyperus difformis</i>	Cultivation, vehicle washing	Riverine begetation 70%, cultivation 20%, maram road network 10%	Suitable habitat for Amphibians and Reptiles
Nwoya	387056.4	293917.7	Fields of cultivation with bushed fallows and settlements.	<i>Lantana camara, Annona senegalensis, Hyparrhenia rufa, Hyperthelis dissoluta, Erythrina abyssinica</i>	Cultivation, grazing, settlement	Cultivation 90%, settlement 5%, woodlots 5%	
Nwoya	391651.3	296870	Fields of cultivation with <b>woodlots</b> of <b>Pinus sp</b> and settlements.	<i>Musa sp, Sorghum bicolor, Milicia excelsa, Albizia grandibracteata, Antiaris toxicaria</i>	Cultivation, grazing, settlement	Cultivation 80%, settlement 10%, woodlots 10%	
Nwoya	391618.1	297341.7	Fields of cultivation, settlements with dense tree cover	<i>Ficus natalensis, Ficus sycomorus, Mangifera indica, Markhamia lutea, Vitex doniana</i>	Cultivation, settlement	Cultivation with tree cover 90%, settlement 10%,	
Nwoya	403986.8	303017.4	<b>Woodland</b> with a riverine gallery <b>woodlot</b> along river Pamini-yai. There are two large woodlots within the woodland	<i>Terminalia schimperii, Acacia polyacantha, Vitex doniana, Piliostigma thonningii, Erythrina abyssinica. Pamini yai wetland is covered with Cyperus papyrus marsh for approximately 70 m</i>	Pine trees Cultivation	woodland 90%, woodlot 10%	Suitable habitat for birds and wild mammals

In term of species richness, a comprehensive checklist of all species encountered within the project area is provided in the Appendix 10. A total of 193 species, spanning 143 genera from 52 families, were documented along the power line and at selected sites within the corridor. Shrubs represented the most abundant growth habit, comprising 38% of the recorded species, followed by herbs, grasses, and trees at 19%, 18%, and 17%, respectively. Lianas accounted for the lowest proportion, constituting 8% of the total plant species documented within the project area. Among the shrubs, *Combretum collinum*, *Combretum molle*, *Acacia hockii*, *Bridelia scleroneura*, *Grewia trichocarpa*, *Vitellaria paradoxa*, and *Annona senegalensis* were the most common species encountered. Dominant grass species within the project area included *Hyparrhenia filipendula*, *Brachiaria brizantha*, *Eragrostis racemosa*, *Sporobolus africana*, *Hyperthelia dissoluta*, *Setaria sphacelata*, and *Pennisetum polystachion*. Different vegetation types, ranging from natural to modified, were documented within the project area during the survey. Among natural vegetation types, grasslands, shrublands, and wooded grasslands predominated, while gardens, plantations, and fallows were the most common among the modified vegetation types. Langdale Brown et al. (1964) reported dry *Combretum* and *Butyrospermum* – *Hyparrhenia* savannas as prevalent natural vegetation types in the area, consistent with our observations. However, human activities such as bush burning, farming, and charcoal production have significantly reduced natural vegetation cover in the project area, leading to widespread vegetation modification. Vegetation alterations are particularly pronounced near roads, villages, and accessible areas where human encroachment on natural habitats is evident, contrasting with less accessible areas where natural vegetation remains dominant. The primary vegetation types identified in the study area include grasslands, wooded grasslands, wetlands, riverine vegetation, shrublands, agricultural mosaic (comprising gardens, fallows, and plantations), and woodlots.

Grasslands (Figure 7-42), characterized by species like *Hyparrhenia* sp., *Hyperthelia dissoluta*, and *Imperata cylindrica*, were the most abundant vegetation type in the project area. In Amuru district, grasslands have been subject to burning by communities for vegetation clearance at the time of the survey. In the context of Uganda, the role of fire in shaping vegetation and biodiversity aligns with broader patterns observed in African savannas and grasslands. Uganda's diverse landscapes, including grasslands, woodlands, and wetlands, are subject to various natural and anthropogenic fire regimes. Several studies have highlighted the importance of fire as both a natural ecological process and a management tool in Uganda's ecosystems. For example, research conducted in Ugandan savannas and grasslands has shown that fire plays a crucial role in maintaining open habitats and promoting species diversity by suppressing woody encroachment and promoting the growth of grasses and herbs adapted to fire regimes (Bowman et al., 2011<sup>3</sup>; Plumptre et al., 2004<sup>4</sup>). However, the frequency, intensity, and timing of fires can vary across different regions and land use types in Uganda. In agricultural landscapes, fires are often used for land clearing and agricultural management, which can lead to changes in vegetation structure and composition (Plumptre et al., 2004<sup>4</sup>). In protected areas and natural habitats, wildfires and uncontrolled burning can pose threats to biodiversity, particularly in areas with sensitive or rare species (Bowman et al., 2011<sup>3</sup>). Therefore, while fire can be beneficial for maintaining certain vegetation types and ecological processes in Uganda, it is essential to consider the ecological context and potential impacts on biodiversity when managing fire regimes. Integrating traditional fire management practices with scientific knowledge and conservation objectives can help ensure the sustainable use of fire as a management tool while minimizing negative impacts on biodiversity and ecosystem health.

Wooded grasslands (Figure 7-43), prevalent within the project area, exhibit a unique combination of grass and woody species. Notably, *Hyparrhenia* sp., *Hyperthelia dissoluta*, and *Imperata cylindrica*

<sup>3</sup> Bowman, D. M., Balch, J. K., Artaxo, P., Bond, W. J., Carlson, J. M., Cochrane, M. A., ... & Swetnam, T. W. (2011). The human dimension of fire regimes on Earth. *Journal of Biogeography*, 38(12), 2223-2236.

<sup>4</sup> Plumptre, A. J., Behangana, M., Davenport, T. R., Kahindo, C., Kityo, R., Ndomba, E., ... & Eilu, G. (2004). The biodiversity of the Albertine Rift. *Biological Conservation*, 134(2), 178-194.

dominate the grass layer, while prominent woody species include *Combretum molle*, *Combretum collinum*, *Piliostigma thoningii*, *Grewia similis*, and *Annona senegalensis*. These wooded grasslands are likely subject to burning practices for vegetation clearance, reflecting common trends in the Amuru district and broader fire management practices in Uganda.



*Impereta cylindrica* grassland



*Hyperthelia* sp. Grassland



*Hyperthelia-Impereta* grassland



Burnt *Hyperthelia* grassland in Amuru

Figure 7-43 – Illustrative images of the grasslands collected during the sampling campaign.



*Erythrina – Hyperthelia wooded grassland*



*Combretum-Hyperthelia wooded grassland*

*Figure 7-44 – Illustrative images of the wooded grasslands collected during the sampling campaign.*

Wetlands (Figure 7-44), identified within the project area, constitute essential ecological features in Uganda's diverse landscape. Based on field observation, it can be highlighted the prevalence of seasonal wetlands, characterized by dominant species such as *Leersia hexandra*, *Cyperus* sp, and *Ficus* sp. These wetlands play a crucial role in supporting biodiversity, hydrological regulation, and providing ecosystem services (Mugisha et al., 2018<sup>5</sup>). In Uganda, wetlands are recognized as critical ecosystems that support a wide range of plant and animal species, including migratory birds, amphibians, and aquatic plants (Nabalegwa et al., 2020<sup>6</sup>). They serve as important habitats for numerous species and contribute to the overall ecological balance of the region. However, wetlands in Uganda face significant threats from human activities such as drainage for agriculture, urbanization, and pollution, leading to loss of biodiversity and degradation of ecosystem services (Mugisha et al., 2018<sup>5</sup>). Comparatively, observed pattern in studied vegetation align with broader patterns observed in wetlands across Uganda. Seasonal wetlands, like those documented in the study area, are often characterized by fluctuating water levels and diverse vegetation communities adapted to wet and dry cycles. Similar species compositions are observed in wetlands throughout the country (Nabalegwa et al., 2020<sup>6</sup>).



*Figure 7-45 – Example of a seasonal wetland in the study area dominated by Leersia hexandra.*

<sup>5</sup> Mugisha, S., Akol, A. M., & Ssekamatte, J. (2018). Wetland Management in Uganda: A Review of Policies and Practices. In Wetland Science Perspectives From South Asia (pp. 153-166). Springer, Cham.

<sup>6</sup> Nabalegwa, M., Naluwayiro, J., Egeru, A., & Kansime, M. K. (2020). Environmental Services and Livelihood Dependency on Wetlands in Uganda: Evidence from Mpigi Wetland, Uganda. Wetland Science, 18(2), 166-177.

Riverine vegetation (Figure 7-45), a feature recorded in the project area, thrives alongside streams or rivers and is characterized by the dominance of woody species. In some areas, cultivation encroaches upon the water stream, resulting in the clearance of natural riverine vegetation. Dominant plant species along the riverbanks include *Erythrina abyssinica*, *Vitex doniana*, *Syzygium guineense*, and *Ficus* sp. In Uganda, riverine habitats play a vital role in supporting biodiversity and maintaining ecosystem functions. They serve as critical corridors for wildlife movement, provide habitat for aquatic and terrestrial species, and contribute to water quality and regulation (Ongom et al., 2019<sup>7</sup>). However, riverine ecosystems in Uganda face numerous threats, including deforestation, agricultural expansion, and pollution, which compromise their ecological integrity and biodiversity (Ongom et al., 2019<sup>7</sup>). In comparative terms, riverine vegetation in Uganda is often dominated by a variety of woody species adapted to riparian conditions where *Erythrina abyssinica* and the other cited species are among the common plant species observed along riverbanks throughout the country (Nabalegwa et al., 2020<sup>6</sup>). In addition to supporting biodiversity, riverine habitats offer a range of ecosystem services that benefit local communities and broader society. These services include water filtration, flood regulation, erosion control, and provision of food and medicinal resources (Ongom et al., 2019<sup>7</sup>). Moreover, riverine areas often serve as focal points for cultural and recreational activities, enriching the lives and livelihoods of people who depend on them for sustenance and spiritual connection. Despite their ecological and cultural significance, riverine ecosystems face a myriad of threats in Uganda. Deforestation, agricultural expansion, urbanization, and pollution pose significant challenges to the integrity and resilience of these vital habitats (Ongom et al., 2019<sup>7</sup>). Encroachment of cultivation up to the water stream, as observed in some areas of the project site, exacerbates the loss of natural riverine vegetation and compromises the health of riparian ecosystems.



Figure 7-46 – Riverine Vegetation

Agricultural areas within the project site represent a mosaic of land use transformations, as depicted in Figure 7-46. The original wooded savanna has undergone significant modification, transitioning into an agroecological zone characterized by settlements and cultivated fields of cassava, maize, and sorghum. Fallows within the agricultural landscape are primarily dominated by species such as *Imperata cylindrica*, *Brachiaria brizantha*, *Panicum maximum*, and *Hyperthelia disoluta*. Sparse occurrences of *Ficus* sp., *Melia azedarach*, *Vitellaria paradoxa*, and *Mangifera indica* trees are scattered within the gardens, providing

<sup>7</sup> Ongom, E., Ziraba, R. B., & Abila, R. (2019). Riparian vegetation and its role in biodiversity conservation and livelihood support in East Africa: a review. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 15(1), 41-54.

limited canopy cover amidst the cultivated plots. Among the predominant food crops cultivated within the project area are *Zea mays* (maize), *Manihot esculenta* (cassava), *Cajanus cajan* (pigeon pea), and *Sorghum bicolor* (sorghum). These crops serve as staple foods and sources of livelihood for local communities, reflecting the agricultural practices and dietary preferences prevalent in the region. The transition from wooded savanna to agricultural land underscores the dynamic interplay between human activities and land use patterns in Uganda. While agriculture is essential for food security and economic development, it also poses challenges to ecosystem integrity and biodiversity conservation. Deforestation, soil erosion, pesticide use, and loss of natural habitats are among the environmental concerns associated with intensive agricultural practices. Sustainable agricultural practices, such as agroforestry, crop rotation, and soil conservation measures, can mitigate the adverse impacts of agriculture on the environment while promoting long-term productivity and resilience. Integrating traditional knowledge with modern agroecological approaches can enhance the sustainability of agricultural systems and contribute to the conservation of natural resources and biodiversity in Uganda's rural landscapes.



Cassava gardens



Sorghum garden



Cajanus cajan gardens



Banana and settlement

Figure 7-47 – Farmlands within the project area.

Shrublands (Figure 7-47), characterized by their dense growth of shrubs and grasses, are a prominent component of the project area's landscape. These habitats provide crucial ecological functions and serve as habitats for a variety of plant and animal species. Dominated by species such as *Combretum molle*, *Vitex doniana*, *Annona senegalensis*, *Bridelia sceroneura*, and *Grewia similis*, with scattered occurrences of *Ficus* sp., *Vitex doniana*, and *Vitellaria paradoxa*, shrublands contribute to the overall biodiversity and ecological balance of the region. Comparatively, studies in similar ecosystems have highlighted the importance of shrublands as key habitats for various wildlife species and as contributors to ecosystem



stability. For instance, research conducted by Smith et al. (2018)<sup>8</sup> in East African shrublands emphasized the role of shrublands in providing critical habitat for small mammals and birds, as well as promoting soil fertility and moisture retention. Similarly, studies by Johnson and Jones (2020)<sup>9</sup> underscored the significance of shrublands in supporting pollinator communities and enhancing ecosystem resilience to climate change impacts. Among the different types of shrublands observed, *Combretum molle* shrublands stand out for their unique characteristics and ecological functions. The presence of *Combretum* species indicates specific ecological preferences and habitat requirements, contributing to the overall diversity and complexity of plant communities within the project site.



*Combretum* sp. burnt shrubland.



*Combretum molle* shrubland

Figure 7-48 – *Combretum* shrubland within the project area

Woodlots (Figure 7-48), consisting of planted *Eucalyptus* sp., *Pinus* sp., and *Tectona grandis*, are located along the project's right of way. These woodlots serve multiple purposes, including timber production, erosion control, and wildlife habitat provision. By providing shelter and foraging opportunities for various fauna species, woodlots enhance the ecological resilience and biodiversity of the landscape.

<sup>8</sup> Smith, A. B., et al. (2018). The ecological role of shrubs in East African savannas: a review. *Journal of Ecology*, 106(2), 665-678.

<sup>9</sup> Johnson, C. M., & Jones, R. E. (2020). Shrubland biodiversity and ecosystem services: insights from global research. *Biological Reviews*, 95(6), 1831-1851.



*Eucalyptu ssp.* woodlot within the project area



*Pinus sp.* woodlot within the project area

Figure 7-49 – Some planted woody stands along the RoW.

### Species of conservation concern

Among the species encountered within the project area, *Afzelia africana* and *Vitellaria paradoxa* stood out as notable species of conservation concern, classified as vulnerable (VU) according to the IUCN Red List (2024). *Afzelia africana*, commonly known as African mahogany, and *Vitellaria paradoxa*, the shea tree, face significant threats to their populations due to habitat loss and overexploitation. In Uganda, *Afzelia africana* is known to occur in the savanna woodlands of the northern and eastern regions, with its population declining due to logging for timber and land conversion for agriculture. *Afzelia africana* is a vital component of savanna woodlands and dry forests across Africa, including Uganda. This large deciduous tree species thrives in well-drained soils and often coexists with other woodland species, contributing to the rich biodiversity of its habitat. African mahogany serves as a key provider of habitat and food for various wildlife species, playing an essential role in ecosystem functioning. However, its existence is threatened by habitat loss and overexploitation for its valuable timber. The rampant logging for commercial purposes and the conversion of land for agriculture pose significant challenges to the survival of *Afzelia africana*. The fragmentation of its natural habitat further intensifies the vulnerability of this species to extinction.

Similarly, *Vitellaria paradoxa* is found in the northern and northeastern parts of Uganda, primarily in the West Nile and Karamoja regions, where it is threatened by deforestation and unsustainable harvesting for its valuable shea nuts. *Vitellaria paradoxa*, or the shea tree, is a medium-sized deciduous tree species native to the savanna regions of West Africa, including Uganda. Thriving in semi-arid climates, it is commonly found in parklands and open woodlands. The shea tree is renowned for its valuable shea nuts, which are harvested for their rich oil content and hold significant economic and cultural importance for local communities. Despite its cultural and economic significance, *Vitellaria paradoxa* faces grave threats to its survival. Habitat loss due to deforestation for agricultural expansion and charcoal production, coupled with the unsustainable harvesting of shea nuts, jeopardizes the species' existence. Overexploitation of shea trees for commercial purposes has led to declines in *Vitellaria paradoxa* populations across its range, highlighting the urgent need for conservation efforts to protect this valuable species.

Furthermore, the distribution of species encountered in the project area revealed a notable proportion classified as least concern (LC), accounting for approximately 60% of the recorded species. However, in addition to the vulnerable status of *Afzelia africana* and *Vitellaria paradoxa*, it's important to note that many species encountered during the survey are categorized as NE, meaning they require further assessment and more information for their conservation status. This underscores the need for

precautionary measures and concerted conservation efforts to ensure the preservation of these species and their habitats.

In conclusion, while species like *Mangifera indica*, *Albizia zygia*, *Maesopsis eminii*, *Vitellaria paradoxa*, and *Ficus* sp. are listed on the national reserved species list and were observed within the project area, none of the recorded species of conservation concern are restricted to the habitat of the area. This highlights the interconnectedness of ecosystems and the importance of considering broader conservation strategies that extend beyond specific habitats or regions. It also underscores the need for comprehensive conservation efforts that address both local and regional challenges to biodiversity conservation. By prioritizing the protection of vulnerable species and their habitats, we can contribute to the resilience and sustainability of ecosystems, benefiting both wildlife and human communities.

#### *Invasive Alien Species in the project area*

Five species exhibiting invasive characteristics were documented during the survey: *Lantana camara*, *Chromolaena odorata*, *Senna siamea*, *Ricinus communis*, and *Solanum campylacanthum* (Figure 7-49). These invasive species originate from various regions and have established themselves in the project area, likely through human activities such as agriculture, trade, or intentional introduction for ornamental or medicinal purposes. *Lantana camara*, native to Central and South America, is known for its rapid spread and ability to form dense thickets, outcompeting native vegetation for resources. Similarly, *Chromolaena odorata*, originating from tropical America, is highly invasive, particularly in disturbed habitats, where it can quickly colonize open areas and displace native species. *Senna siamea*, native to Southeast Asia, is another invasive species found within the project area. Its fast growth rate and ability to regenerate from cuttings make it difficult to control once established. *Ricinus communis*, commonly known as the castor oil plant, is native in the Mediterranean region but has become naturalized in many parts of the world. Its seeds contain ricin, a highly toxic compound, posing risks to both humans and animals. *Solanum campylacanthum*, native to tropical Africa, is characterized by its vigorous growth and ability to outcompete native vegetation. These invasive species exhibit aggressive growth patterns and have the potential to disrupt ecosystem processes, reduce biodiversity, and alter habitat structure. Effective management strategies for these invasive species include mechanical control methods such as uprooting before flowering to minimize seed dispersal and spread. However, long-term management plans should also consider the prevention of new introductions, early detection and rapid response efforts, and restoration of native habitats to mitigate the impacts of invasive species on local ecosystems.



*Lantana camara*



*Senna siamea*



*Chromolaena odorata*

*Figure 7-50 – Three (out of five) invasive alien species encountered in the project area.*

#### 7.3.5.3. Surveys results – Wildlife

The wildlife survey was carried out by Dr. Byamukama James from 17<sup>th</sup> to 20<sup>th</sup> of January 2024. The survey was conducted on twenty-two (22) transects of approximately 500 metres each, giving a total survey length of approximately 10 kilometres. Wildlife sightings were recorded beginning from transect 15 onward. Within the administrative boundaries, wildlife presence was notably absent in Nwoya District, with discernible sightings only within Amuru District (see Figure 7-50, 7-51 and 7-52). This pattern was also reflected in bird observations, although occasional calls of doves were heard emanating from settlements.

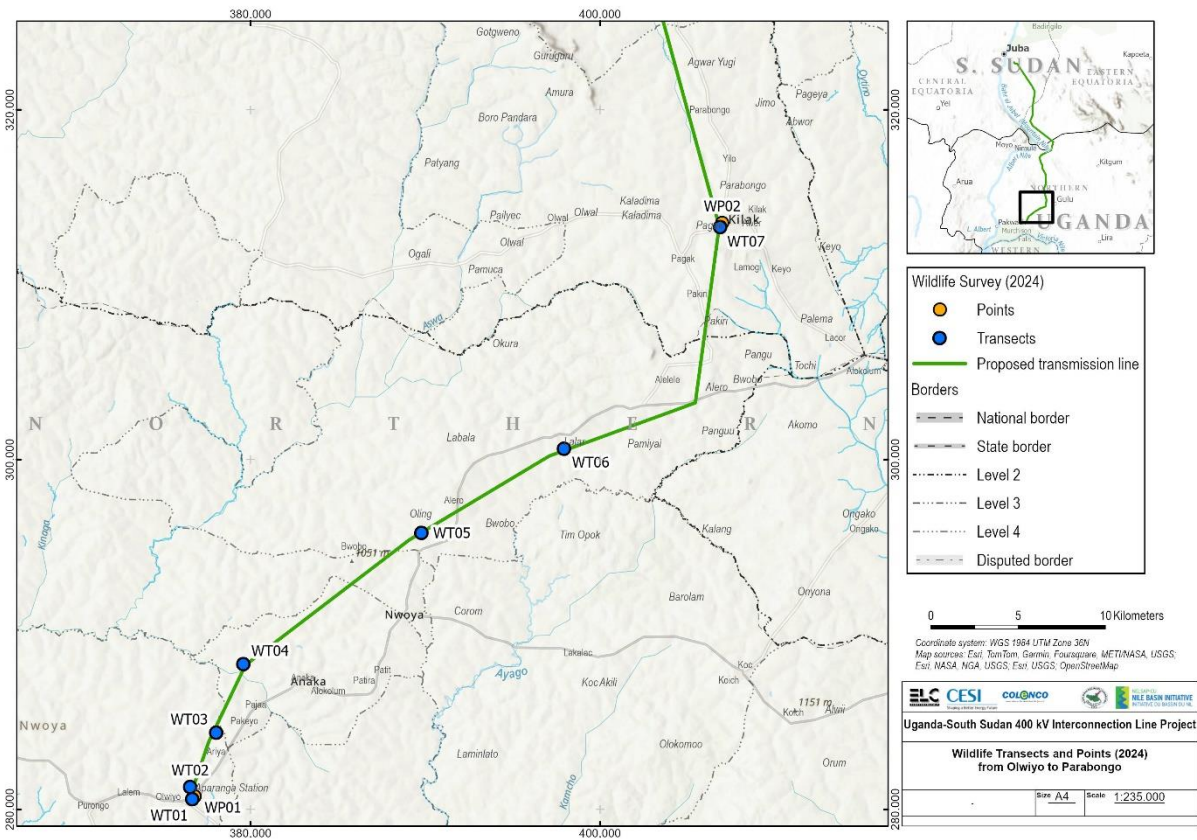


Figure 7-51 – Wildlife transects and sampling points from Olwiyo to Parabongo.

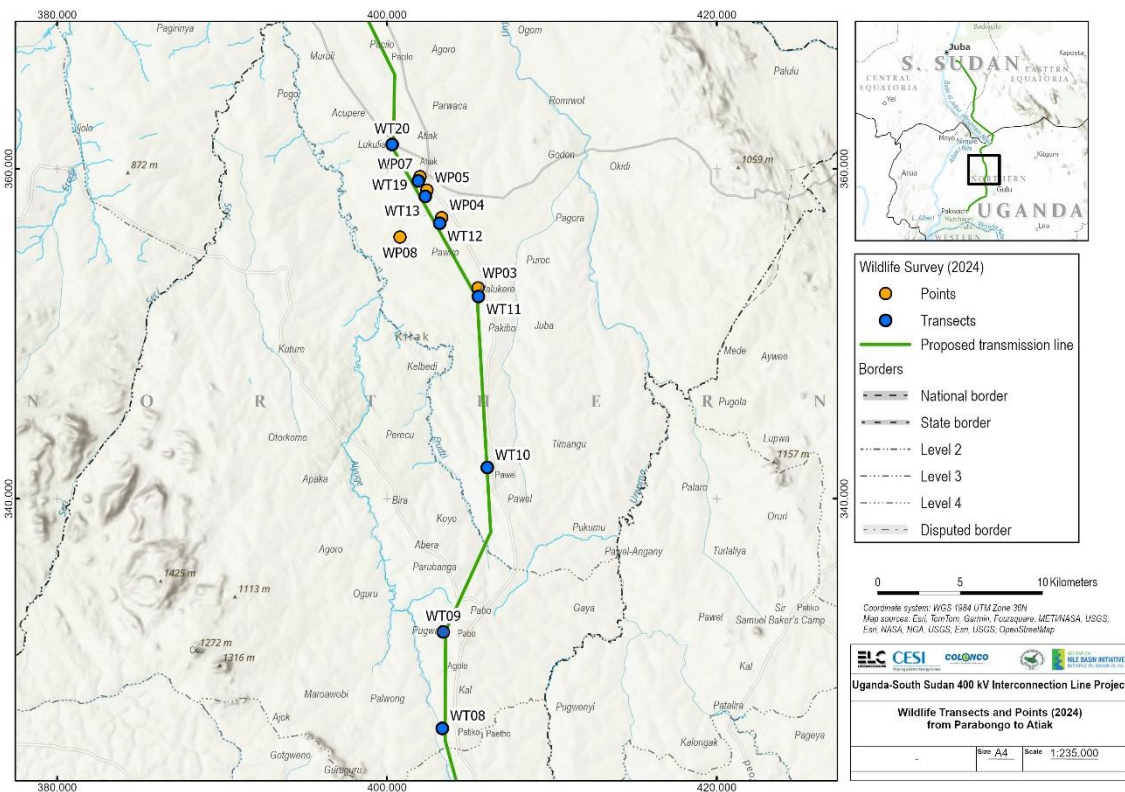


Figure 7-52 – Wildlife transects and sampling points from Parabongo to Atiak.

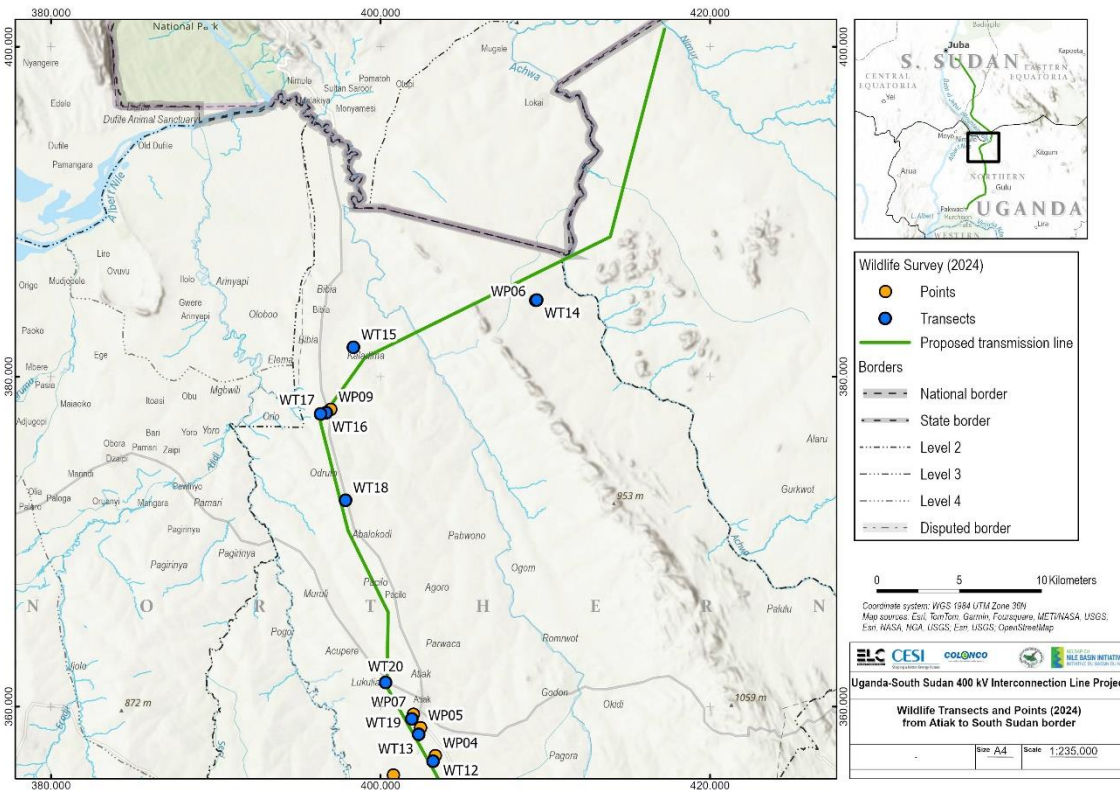


Figure 7-53 – Wildlife transects and sampling points from Atiak to South Sudan border.

Despite its proximity to Murchison Falls National Park, Nyowa District exhibited limited wildlife presence. Our observations revealed that the Nwoya section of the surveyed powerline traversed predominantly settled areas, characterized by extensive cultivation, drained wetlands, and grasslands dominated by spear grass (*Heteropogon contortus*). Wetland areas were often found to be converted to sugarcane plantations or utilized for out-of-season crop cultivation. Conversely, wildlife sightings were concentrated primarily within the Atiak Subcounty of Amuru District, characterized by woodland habitats and evidently receiving less precipitation compared to Nwoya. Human activity in this region predominantly revolved around cattle husbandry.

The survey took place during the dry season, coinciding with prevalent burn marks across most surveyed areas. Notably, burning practices were more commonly observed in Amuru District compared to Nwoya District.

Along the transects, the most common indirect sign of wildlife presence documented were fresh droppings attributed to the common duiker *Sylvicapra grimmia* and burrows indicative of giant rats *Cricetomys gambianus* (Figure 7-53). Their presence was consistently observed across some transects, particularly within recently burned zones where regenerating pastures were emerging.



Figure 7-54 – Burrow of giant rat. The identification was done by James Byamukama.

It is noteworthy that wildlife sightings are commonplace within pastoral communities in Uganda, where there exists a cultural tradition of refraining from consuming wild meat and avoiding the hunting or disturbance of grazing animals, barring instances of predation on their herds by wild animals. The species detected along the transects and their abundance are detailed in Table 7-20.

Table 7-20 – Details of the species detected in each transect and the estimate of their abundance.

Transect ID	No. of species	Common duiker ( <i>Sylvicapra grimmia</i> )	Bush Rat	Giant rat ( <i>Cricetomys gambianus</i> )	Savannah monitor ( <i>Varanus exanthematicus</i> )	Notes
WT01	0	-	-	-	-	-
WT02	0	-	-	-	-	-
WT03	0	-	-	-	-	-
WT04	0	-	-	-	-	-
WT05	0	-	-	-	-	-
WT06	0	-	-	-	-	-
WT07	0	-	-	-	-	-
WT08	0	-	-	-	-	-
WT09	0	-	-	-	-	-
WT10	0	-	-	-	-	-
WT11	0	-	-	-	-	-
WT12	0	-	-	-	-	-
WT13	0	-	-	-	-	-
WT14	3	Common	Occasional	Common	-	Bush rat sighted in sorghum garden
WT15	2	-	Occasional	Common	-	Observation in recent burnt area
WT16	3	Common	Common	Common	-	Observation in recent burnt area
WT17	3	Common	Common	Common	-	Observation in recent burnt area
WT18	3	Common	-	Common	Rare	Observation in recent burnt area
WT19	1	-	-	Common	-	Observation in recent burnt area
WT20	0	-	-	-	-	-
WT_21*	2	Common	-	Abundant	-	Observation in recent burnt area

\*Coordinates not available for this point.

The species detected along the transect are very common species and are classified as Least Concern by the IUCN Red List.

One roadkill of Central African rock python *Python sebae* (Figure 7-54) was observed along the Gulu-Nimule Highway near proposed Bira station at WP09. This is a road with heavy traffic that comprises mainly of transit good trucks.



Figure 7-55 – The roadkill of a Central African rock python *Python sebae* was observed along the Gulu-Nimule Highway.

A total of 9 point counts for bird species were done during the sampling period (Figure 7-50, 7-51 and 7-52) and a total of 14 species were detected (Table 7-21).

The birds most commonly observed during the survey predominantly comprised species associated with savanna grassland and woodland habitats, characterized by their reliance on insects, seeds, and fruits as primary dietary components. Among the noteworthy sightings were the Nubian woodpecker, helmeted Guinea fowl, cuckoo, red-eyed dove, African paradise flycatcher, African fire finch, and red-wing francolin, albeit encountered less frequently. As noted above, it is important to recognise that the survey was conducted in the aftermath of extensive bushfires, a factor that may have affected the composition and distribution of the bird species recorded. The species detected along the transects and their abundance are detailed in Table 7-21.

Table 7-21 – Details of the bird species detected in each point.

Point ID	No. of species	Scientific name	Common name	IUCN Red List Status	Trend
WP01	1	<i>Streptopelia semitorquata</i>	Red eyed dove	LC	Increasing
WP02	3	<i>Streptopelia capicola</i>	Ring-necked dove	LC	Increasing
		<i>Ploceus melanocephalus</i>	Black-headed weaver	LC	Stable
		-	Cuckoo	-	-
WP03	0	-	-	-	-
WP04	4	<i>Merops variegatus</i>	Blue-breasted bee-eater	LC	Stable
		<i>Streptopelia semitorquata</i>	Red eyed dove	LC	Increasing
		<i>Streptopelia capicola</i>	Ring-necked dove	LC	Increasing
		-	Sparrow	-	-



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WP05	5	<i>Lamprotornis caudatus</i>	Long-tailed Glossy Starling	LC	Stable
		<i>Colius striatus</i>	Speckled Mousebird	LC	Increasing
		<i>Terpsiphone viridis</i>	African Paradise-flycatcher	LC	Stable
		<i>Lagonosticta rubricata</i>	African firefinch	LC	Stable
		-	Sparrow	-	-
WP06	1	<i>Campethera nubica</i>	Nubian Woodpecker	LC	Stable
WP07	6	<i>Lamprotornis caudatus</i>	Long-tailed Glossy Starling	LC	Stable
		<i>Colius striatus</i>	Speckled Mousebird	LC	Increasing
		<i>Ploceus melanocephalus</i>	Black-headed weaver	LC	Stable
		<i>Numida meleagris</i>	Helmeted Guineafowl	LC	Stable
		-	Sparrow	-	-
		-	Nectar bird	-	-
WP08	4	<i>Lamprotornis caudatus</i>	Long-tailed Glossy Starling	LC	Stable
		<i>Terpsiphone viridis</i>	African Paradise-flycatcher	LC	Stable
		<i>Streptopelia capicola</i>	Ring-necked dove	LC	Increasing
		-	Sparrow	-	-
WP10*	3	<i>Lamprotornis caudatus</i>	Long-tailed Glossy Starling	LC	Stable
		<i>Scleroptila levaillantii</i>	Red-winged francolin	LC	Stable
		<i>Colius striatus</i>	Speckled Mousebird	LC	Increasing

\*Coordinates not available for this point.

The species detected during point count survey method are very common and all are classified as Least Concern by the IUCN Red List.

Habitat modification and degradation emerge as significant factors potentially influencing wildlife abundance in the project area. Our observations reveal extensive deforestation within the woodlands, primarily driven by activities such as charcoal production and the collection of firewood for brick kiln utilization (see Figure 7-55).



*Figure 7-56 – Brick Production seen during the wildlife survey.*

In addition, it was found that almost 100% of the wetlands within our transects had been drained and subsequently converted for agricultural purposes (see Figure 7-56), mainly for the cultivation of out-of-season crops or the establishment of perennial sugar cane plantations. Despite our deliberate efforts to survey these wetlands for wetland-associated wildlife, our efforts yielded no positive results.



*Figure 7-57 – Wetland degradation for production of sugar canes and out of season crops in the project area.*

Key informant interviews revealed that the route of the transmission line passes through areas that have been deeply affected by the Lord's Resistance Army conflict. In Nwoya in particular, the aftermath of this conflict resulted in the complete abandonment of the area, with subsequent resettlement characterised by livelihood activities such as hunting, charcoal production, wetland degradation and brick making. It is suggested that the cumulative impact of these activities over time may be a significant factor in the lack of wildlife observed along the Nwoya District section of the transmission line route.

In conclusion, some wildlife species were observed along the proposed route of the transmission line, but no endangered IUCN Red List species were documented and no significant hotspots were identified. However, the local wildlife population faces significant threats from habitat degradation, particularly

wetland drainage, and extensive deforestation for charcoal production and commercial brick making. These activities pose significant challenges to the conservation of the area's biodiversity.

### 7.3.6. Critical Habitats

Critical Habitat is a concept developed by the International Finance Corporation (IFC) in its Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Resources. The concept aims to identify areas of high biodiversity value where development would be particularly sensitive and require special attention. According to the International Finance Corporation (IFC, 2019) Guidance Note 6, Critical Habitats (CH) are areas of high biodiversity value that contain at least one or more of the five values identified in PS6 and/or other recognised high biodiversity values.

According to the AfDB's Environmental and Social Operational Safeguard 6 (OS6) the Critical Habitat (CH) is defined as a subset of both natural and modified habitat that has high biodiversity value and deserves particular attention. The CH is fundamentally based on the following seven criteria:

- (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent regional or national approaches.
- (b) Habitat of significant importance to endemic or restricted-range species.
- (c) Habitat supporting globally or nationally significant concentrations of migratory or congregatory species.
- (d) Highly threatened or unique ecosystems.
- (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d).

IFC PS6 will be considered to establish whether critical habitat requirements are triggered and, if so, measures will be set out to ensure compliance with these.

#### 7.3.6.1. Critical Habitat Assessment

An assessment using available data was undertaken to identify the possible existence of Critical Habitats (CHs) within the project area and in the Indirect Area of Influence (IAoI) in accordance with the criteria outlined in the International Finance Corporation (IFC) Performance Standard 6 (PS6).

**Criterion 1: Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent regional or national approaches.**

The evaluation considered the presence of species classified as Endangered (EN) or Critically Endangered (CR) based on global criteria established by the International Union for Conservation of Nature (IUCN). The assessment took into account data collected in the field by local experts and other data sources using open access global databases, the Global Biodiversity Information Facility (GBIF) and IUCN Red List spatial data.

During the field work, no species classified as Endangered (EN) or Critically Endangered (CR) were detected.

The screening carried out on the GBIF platform consisted to identify all species of plants and animals in the 1 km buffer around the transmission line route. Only georeferenced data with a maximum georeferencing error of 100 m have been selected.

No species classified as Endangered (EN) or Critically Endangered (CR) were recorded in the GBIF platform within project area and IAoI.

The IUCN Red List spatial data consists of georeferenced distribution ranges for each species. Major taxa were assessed including mammals, birds, reptiles, amphibians, arthropods and plants. Only endangered and critically endangered species whose range was within the 1km buffer around the transmission line route (IAoI) were considered.

As a result, nine bird species have been identified as potentially triggering CH based on the criterion 1:

- Martial Eagle *Polemaetus bellicosus* (EN)
- Secretarybird *Sagittarius serpentarius* (EN)
- Bateleur Terathopius *ecaudatus* (EN)
- Lappet-faced Vulture *Torgos tracheliotos* (EN)
- Steppe eagle *Aquila nipalensis* (EN)
- White-backed Vulture *Gyps africanus* (CR)
- Rüppell's Vulture *Gyps rueppelli* (CR)
- Hooded Vulture *Necrosyrtes monachus* (CR)
- White-headed Vulture *Trigonoceps occipitalis* (CR)

These species were not observed during field activities and are therefore considered potentially present based on literature review.

The assessment of the critical habitat for these species followed specific criteria outlined in Guidance Note 6 (GN72) of the IFC 2019 guidelines:

- a) areas that support globally important concentrations of an IUCN Red-listed EN or CR species (> 0.5% of the global population AND > 5 reproductive units of a CR or EN species);
- b) areas that support globally important concentrations of an IUCN Red-listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN70(a);
- c) as appropriate, areas containing nationally/regionally important concentrations of an IUCN Red-listed EN or CR species.

The thresholds outlined in Criterion 1 (a) were utilized to evaluate all fauna and flora species classified as Endangered (EN) or Critically Endangered (CR), as determined by IUCN criteria.

No Vulnerable (VU) wildlife species were observed during the wildlife survey, while 2 VU plant species are present in the IAoI. All of the Vulnerable (VU) species potentially present in the area have extensive ranges and are therefore unlikely to meet the criteria set out in Criterion 1 (b). This criterion refers to regions that support globally significant concentrations of an IUCN Red-listed Vulnerable (VU) species, where the loss of these populations would result in their Red List status changing to Endangered (EN) or Critically Endangered (CR).

In order to apply the thresholds identified in Criterion 1 (a) an "c" (EAAA) has been identified for bird species (Figure 7-57). The EAAA was identified to include the IBAs (Important Bird and Biodiversity Areas) and the protected areas near to the transmission line route:

- Murchison Falls National Park (IBA)
- Nimule (IBA in South Sudan)
- Achwa river (Forest reserve)
- Kilak (Forest reserve)
- Labala (Forest reserve)
- Got-Gweno (Forest reserve)
- Olwal (Forest reserve)
- Keyo (Forest reserve)
- Gwengdiya (Forest reserve)
- Lukodi (Forest reserve)
- Amuka (Forest reserve)
- Lagute (Forest reserve)
- Abera (Forest reserve)

- Opok (Forest reserve)
- Gulu (Forest reserve)
- Opaka (Forest reserve)
- Koich-Goma (Forest reserve)
- Abili (Forest reserve)

The defined EAAA reaches an extension of 13,436 km<sup>2</sup>.

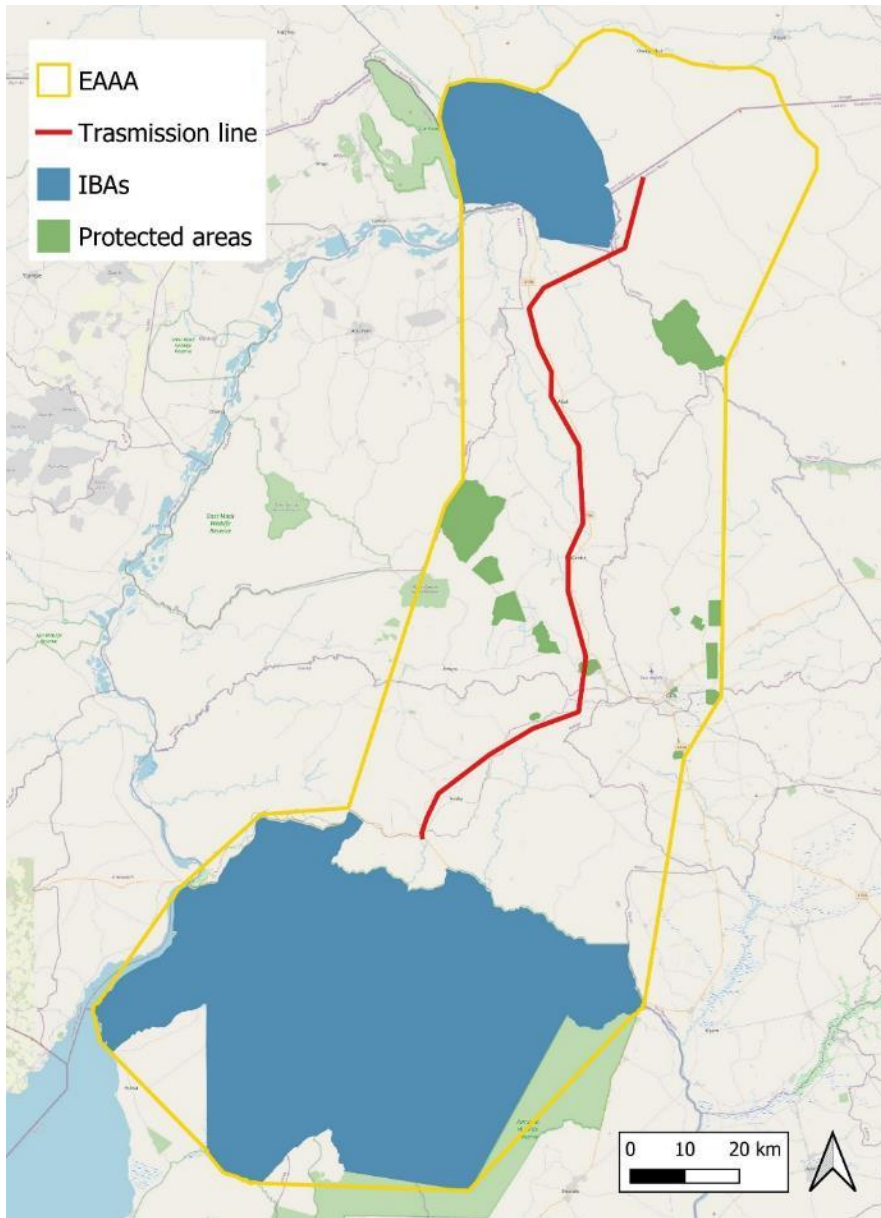


Figure 7-58 – Ecologically appropriate area of analysis (EAAA) for bird species.

The results of the critical habitat assessment for Criterion 1 are reported in Table 7-22. Species categorized as potentially present, as determined by literature data, are designated as triggering "Potential Critical Habitat".

Table 7-22 – Assessment for bird species potentially triggering Critical Habitat according to Criterion 1 (IFC, 2019).

N	Scientific name	Red List category	Trend	Estimated extent of occurrence EOO (km <sup>2</sup> )	EAAA (km <sup>2</sup> )	0.5% of EOO (km <sup>2</sup> )	EAAA is ≥ 0.5% of EOO	Critical Habitat
1	<i>Polemaetus bellicosus</i>	EN	Decreasing	26000000	13436	130000	No	No
2	<i>Sagittarius serpentarius</i>	EN	Decreasing	23200000	13436	116000	No	No
3	<i>Terathopius ecaudatus</i>	EN	Decreasing	23500000	13436	117500	No	No
4	<i>Torgos tracheliotos</i>	EN	Decreasing	34200000	13436	171000	No	No
5	<i>Aquila nipalensis</i>	EN	Decreasing	12600000	13436	63000	No	No
6	<i>Gyps africanus</i>	CR	Decreasing	23400000	13436	117000	No	No
7	<i>Gyps rueppelli</i>	CR	Decreasing	14200000	13436	71000	No	No
8	<i>Necrosyrtes monachus</i>	CR	Decreasing	22500000	13436	112500	No	No
9	<i>Trigonoceps occipitalis</i>	CR	Decreasing	21100000	13436	105500	No	No

**Criterion 2: Habitat of significant importance to endemic or restricted-range species.**

The presence of endemic or restricted-range species were considered, i.e., for terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO less than 50,000 km<sup>2</sup>. The threshold for Criterion 2 is the following: a) Areas that regularly hold ≥ 10% of the global population size AND ≥ 10 reproductive units of a species.

No endemic and restricted species were observed during the surveys, in the GBIF and in the IUCN spatial data screening.

**Criterion 3: Habitat supporting globally or nationally significant concentrations of migratory or congregatory species.**

An evaluation was conducted to consider the presence of habitat that supports significant concentration of migratory or congregatory species. The project is not situated within any formally Important Bird Areas (IBAs) but its proximity with some important IBAs was considered.

To gauge the significance of the project area for migratory and congregatory species, specific thresholds were applied, as outlined in Guidance Note 6 GN78 of the IFC 2019 guidelines. These thresholds included areas known to sustain a significant portion (≥ 1 percent) of the global population of migratory or congregatory species at any stage of their life cycle, as well as areas that reliably support at least 10 percent of a species' global population during periods of environmental stress.

Although the project area does not directly overlap with the identified IBAs, a precautionary approach was taken. All migratory or congregatory species associated with these IBAs were identified and evaluated according to the aforementioned thresholds. An Ecologically Appropriate Area of Analysis (EAAA) was delineated (see Figure 7-57) and compared with the extent of occurrence (EOO) of each species, representing the global population estimate. If the EAAA encompassed ≥ 1% of the EOO for a species, it was considered potentially triggering Critical Habitat status (Table 7-23).

The screening results indicated that no species met the criteria for potentially triggering Critical Habitat according to Criterion 3.

Table 7-23 – Assessment for bird species potentially triggering Critical Habitat according to Criterion 3 (IFC, 2019).

N	Scientific name	Red List category	Trend	Estimated extent of occurrence EOO (km <sup>2</sup> )	EAAA (km <sup>2</sup> )	1% of EOO (km <sup>2</sup> )	EAAA is ≥ 1% of EOO	Critical Habitat
1	<i>Glareola nuchalis</i>	LC	Decreasing	17100000	13436	171000	No	No
2	<i>Rynchops flavirostris</i>	LC	Decreasing	17200000	13436	172000	No	No
3	<i>Glareola nordmanni</i>	NT	Decreasing	5560000	13436	55600	No	No
4	<i>Circus macrourus</i>	NT	Decreasing	10900000	13436	109000	No	No
5	<i>Falco naumanni</i>	LC	Stable	24800000	13436	248000	No	No

**Criterion 4: Highly threatened or unique ecosystems.**

For this criterion, ecosystems that are at risk of significantly decreasing in area or quality, have a small spatial extent and protected areas were taken into consideration.

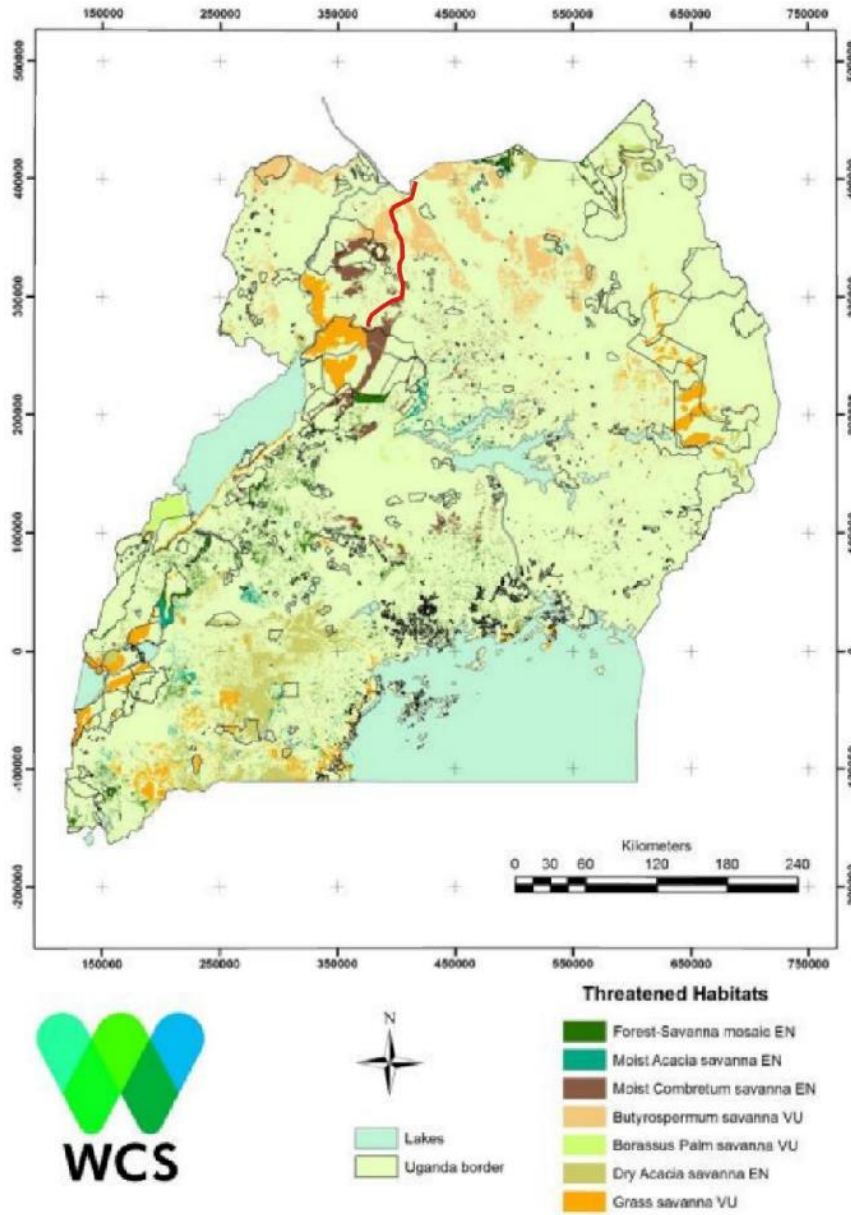
Criterion 4, as outlined in Guidance Note 79 of the International Finance Corporation's 2019 guidelines, suggests utilizing the "Red List of Ecosystems (RLE)" where formal assessments by the International Union for Conservation of Nature (IUCN) have been conducted. However, it was found that no such evaluations have been carried out in Uganda, as indicated by the absence of data in the IUCN RLE Database. Consequently, the RLE system cannot currently be applied. However, preliminary desktop assessments in Uganda have been conducted for terrestrial and some freshwater ecosystems, but the results of these preliminary assessments are still not completely available.

In Plumptre et al. (2017)<sup>10</sup>, the authors identify Key Biodiversity Areas (KBAs), crucial for global and national biodiversity conservation. Using mammals, birds, reptiles, amphibians, and plants as surrogates, 36 terrestrial/wetland KBAs and nine freshwater sites are identified. Their conservation planning highlights irreplaceable sites and trade-off options for prioritizing conservation efforts, particularly focusing on KBAs and underexplored wetland sites.

Using this information with assessed if the project area overlaps endangered habitat (Figure 7-58).

Two different threatened habitats were present in the project area: Moist *Combretum* savanna (EN) and *Butyrospermum* savanna (VU). Both *Butyrospermum* (i.e., *Vitellaria paradoxa*) and *Combretum* spp. were observed by botanists during the sampling campaign in the project area. These suggested that, potentially, the criteria for potentially triggering Critical Habitat according to Criterion 4 was met. However, figure 7-58 shows the Endangered habitat Moist *Combretum* savanna in the project area is present in the project area, but in a very punctual, fragmented way, with a limited spatial extension.

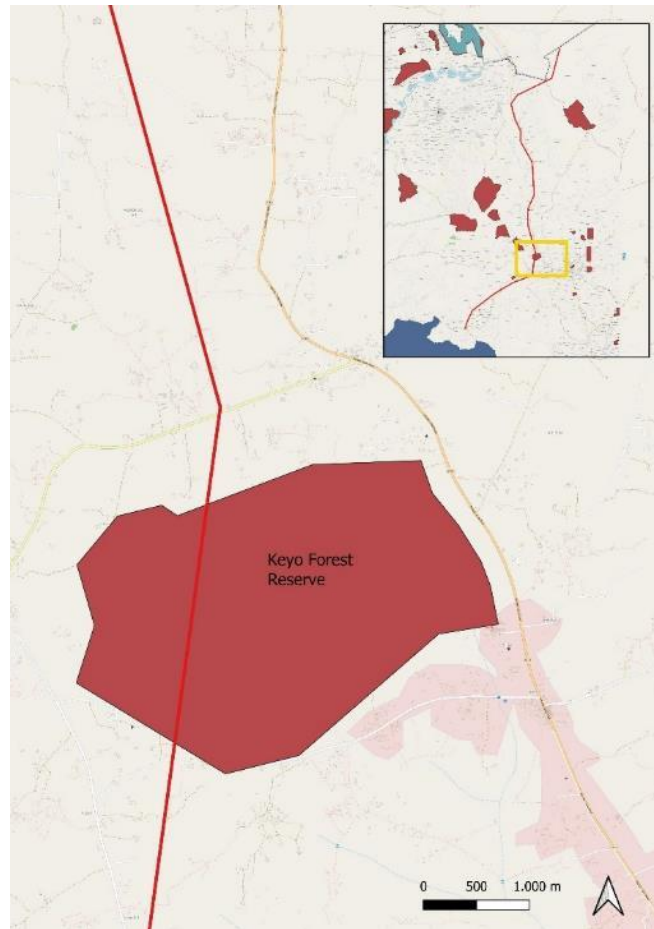
<sup>10</sup> Plumptre, A. J., Ayebare, S., Pomeroy, D., Tushabe, H., Nangendo, G., Mugabe, H., ... & Nampindo, S. (2017). Conserving Uganda's Biodiversity: Identifying critical sites for threatened species and habitats.



7-59 – Threatened habitats in Uganda and the location of the transmission line project area. Modified by Plumptre et al. (2017)

The transmission line route is located within a legally protected area, the Keyo forest reserve in Amuru district (Figure 7-59), legally managed by National Forest Authority. The alignment crosses the Keyo Forest Reserve for 2.2 km.





7-60 – Location of the Keyo Forest Reserve in Amuru district and the transmission line route.

The forest reserve is largely under *Pinus* sp. woodland, fields of subsistence farming and settlements, so encroached to report.

This reserve is not managed as strict protected area, but rather for the sustainable use of natural resources and ecosystems, largely under a mono crop woodlot of *Pinus* sp. (Figure 7-60).



Figure 7-61 – Part of the Keyo Central Forest Reserve in Lamogi Sub County, Amuru District.

As this reserve does not represent an area of national or international importance in terms of biodiversity, it was not considered triggering Critical Habitat.

***Criterion 5: Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in Criteria 1 to 4.***

This criterion encompasses the presence of areas with landscape features that may be associated with evolutionary processes, or with distinct species populations that warrant special conservation consideration due to their unique evolutionary lineage. However, the study area lacks landscape features known to influence evolutionary processes leading to the formation of regional species configurations and ecological characteristics. In particular, no species or subpopulations within the project area exhibit significant isolation, spatial heterogeneity, or an abundance of environmental gradients. In addition, the area is not recognised for its importance in climate change adaptation or as a biological corridor. Based on these considerations, it is concluded that the project area does not support critical evolutionary processes and, consequently, no Critical Habitat is expected to be present for this criterion.

## 7.4. Socio-Economic and Cultural Environment

The socio-economic environment was investigated through 400 social economic questionnaires aimed at deeply investigate the social profile of affected people and through checklists necessary to carry out the census of the affected landowners. The findings of the questionnaire were corroborated with data of Uganda Bureau of Statistics (UBOS) and previous data. The project will be located in Northern Region, in Acholi Sub Region, crossing the Districts of Nwoya, Amuru, Lamwo.

Table 7-24 Administrative units affected by the Project

District	County	Sub-County	Parish
AMURU	KILAK	ATIAAK	BIBIA*
			KAL
			PACILO
			PALUKERE
			PAWEL
			PUPWONYA
		LAMOGI	COKE
			OBOO
			PALEMA
		PABBO	KAL
			PALWONG
			PARUBANGA
LAMWO	LAMWO	PALABEK OGILI	PADWAT
NWOYA	NWOYA	ALERO	BWOBONAM
			KAL
			PAIBWOR
			PANGU
			PANYABONO
		ANAKA TOWN COUNCIL	CEKE WARD
			LABYEI WARD
		PURONGO	PAROMO
			PATIRA*
			PAWATOMERO

### 7.4.1. Demographic features

According to the central burau of Statistic, the projection of population in Uganda for 2023 is of 45,500,000 people. Based on 2014 census the Male population reaches 48.79% and Female Population 51.21%. Age dependency in Uganda was reported at 103,3 in 2014. High ratio means a high burden bare by the young population to manage the expenses of the dependent population through childcare, education, and pensions<sup>11</sup>. The total working population was estimated at 18.3 million persons in the year 2021; an increase from 15.9 million persons in 2019/20. The Employment to Population Ratio (EPR) in the year 2021 was 43 percent, implying that less than half of the Working Age Population was employed during that period There was a slight decrease in the proportion of working population in purely subsistence agriculture from 48 percent in 2019/20 to 40 percent in the year 2021. The highest

<sup>11</sup> Uganda Bureau of Statistics

percentage of the working population (61%) was engaged in Agriculture, forestry and fishing industry in the year 2021. The percentage of population in employment in Uganda increased from 8.3 million persons in 2019/2020 to about 10 million persons in the year 2021. The overall unemployment rate increased to 12 percent in the year 2021 from about nine percent in 2019/20. About 40 percent of children aged 5 – 17 years were involved in child labour in the year 2021<sup>12</sup>.

Northern Uganda and specifically Acholi sub-region was severely affected by the civil war that lasted for 20 years (1986–2006) between the Lord’s Resistance Army (LRA) and the Uganda People’s Defense Force (UPDF), which affected social, political, and economic service delivery and structures.

The war destabilized the entire northern region, displacing 90% of the population. Many people were forced into displacement camps and could not access their land. When the war ended and people returned to their home communities, numerous competing claims on land emerged. This is partly attributable to population increase in Acholi region, with a 100% increase within the 20 years of war, from 746,796 people according to the 1991 population census as compared to 1,511,614 in 2014, and half of this population is below 15 years of age (UBOS, 2007 and UBOS, 2014).

*Table 7-25 Population projection at district level (UOBS).*

District	2023			2024		
	Male	Female	Total	Male	Female	Total
<b>AMURU</b>	114.100	118.400	<b>232.500</b>	116.700	121.000	<b>237.700</b>
<b>LAMWO</b>	70.500	77.600	<b>148.100</b>	70.900	78.400	<b>149.300</b>
<b>NWOYA</b>	157.000	157.300	<b>314.300</b>	172.600	172.700	<b>345.300</b>

The family size in these regions ranged from 4 to 6 persons per household, and family labour stands out in all districts as the primary source of farm labour.

According to the National Youth Policy, in 2004 the youth constituted between 65 and 75% of Uganda’s total population and the majority of the youth live in rural areas. The number of youths that can be absorbed in urban employment sector is limited, while they often lack relatives in urban centres to receive them.

The figure below shows the gender distribution in the project area according to the results of socio-economic survey.

The transmission line project will affect over 600 households (HHs).

<sup>12</sup> Ibid

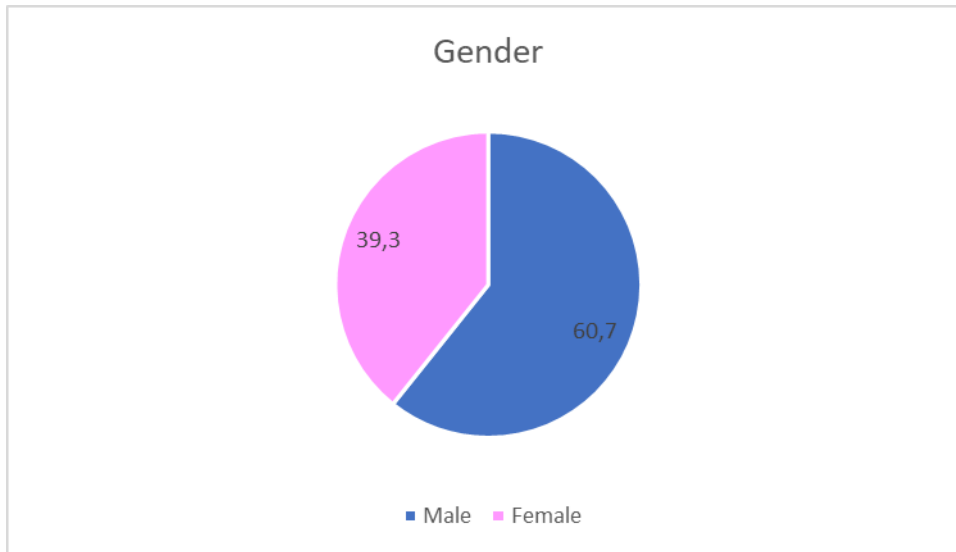


Figure 7-62 Project Population distribution by gender

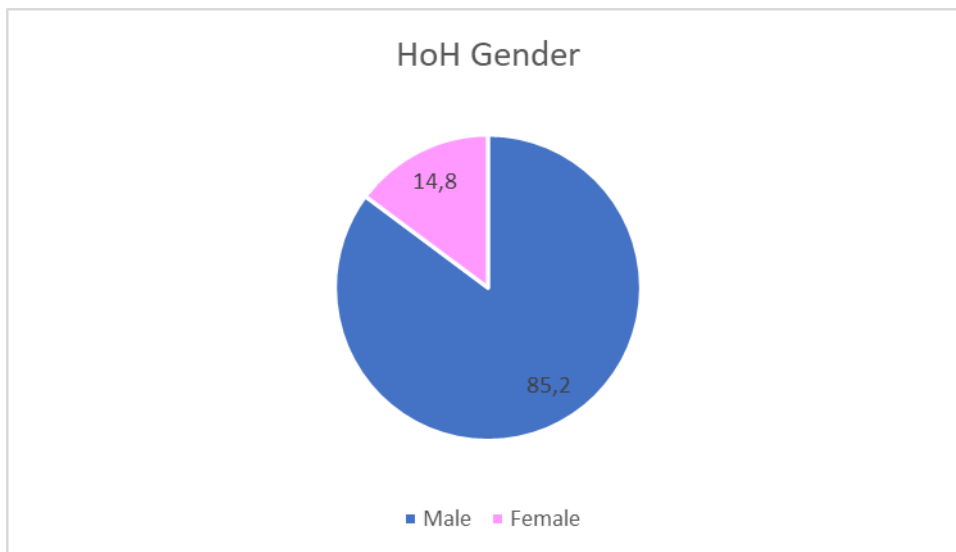


Figure 7-63 Household Head distribution by gender

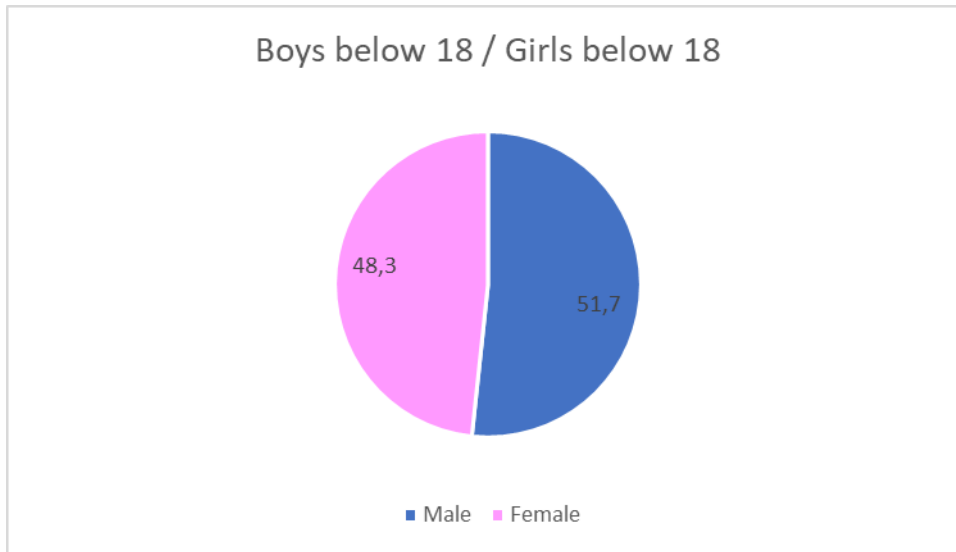


Figure 7-64 Project Population distribution below 18 by gender

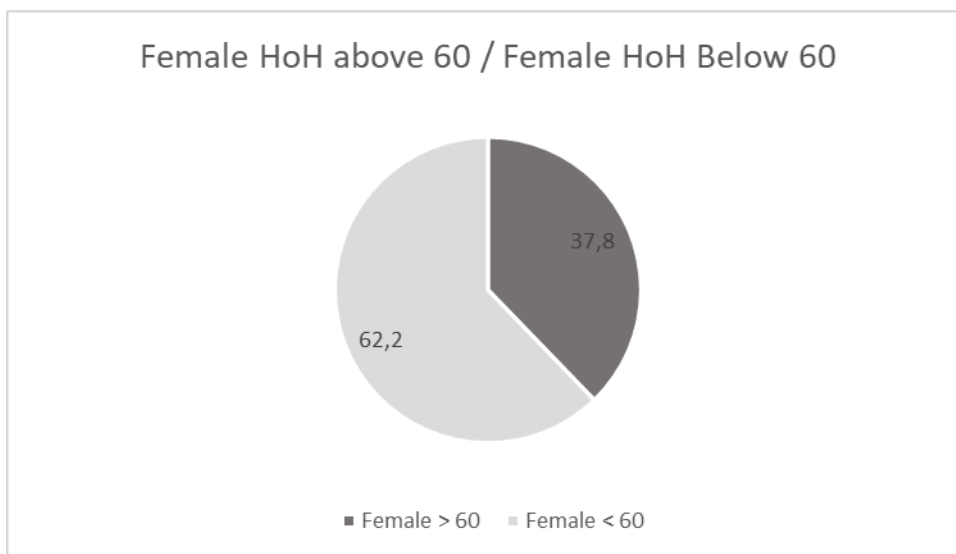


Figure 7-65 Household head distribution by gender and age

#### 7.4.2. Literacy and Education

Uganda’s education system is comprised of an early childhood programme that caters for children aged 3-5 years (pre-primary education), followed by seven (7) years of primary education, followed by four (4) years of Ordinary Level secondary education, two (2) years of Advanced Level secondary education and the final tier is three (3) to five (5) years of Tertiary education. Each level is nationally examined with certificates awarded.

Net Enrolment NER for Uganda in 2014 was at 80 percent. The Gross Enrolment Rate at pre-primary level increased from 10.2 in the year 2013 to 16.6 in the year 2017. Primary school enrolment was at 8.8 million in the year 2017. Secondary school enrolment stood at 1,371,583 in the year 2017. In the year

2017, more than two thirds of pupils attending primary school had adequate sitting space. 228,563 students were orphans in the year 2017<sup>13</sup>.

Figures below show the net enrolment rate at primary and secondary level, in the project area the secondary enrolment rate does not pass 21% of the population in schooling age.

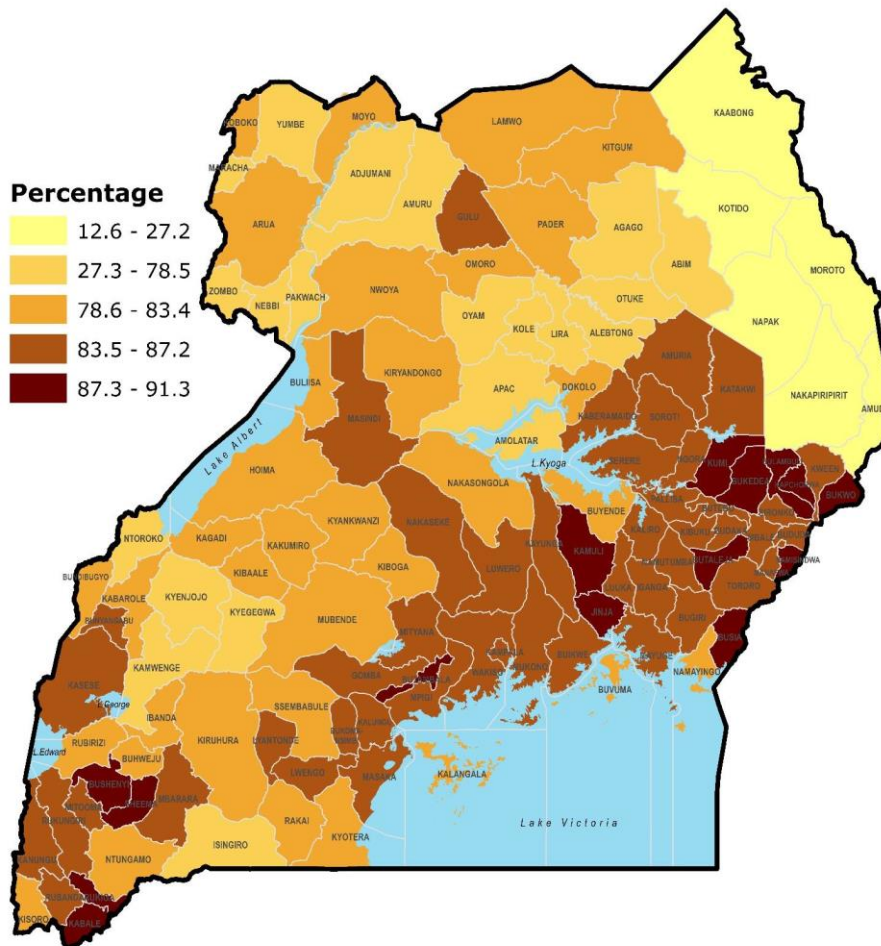


Figure 7-66 – Primary School Net Enrolment (NPH 2014).

<sup>13</sup> Ibid

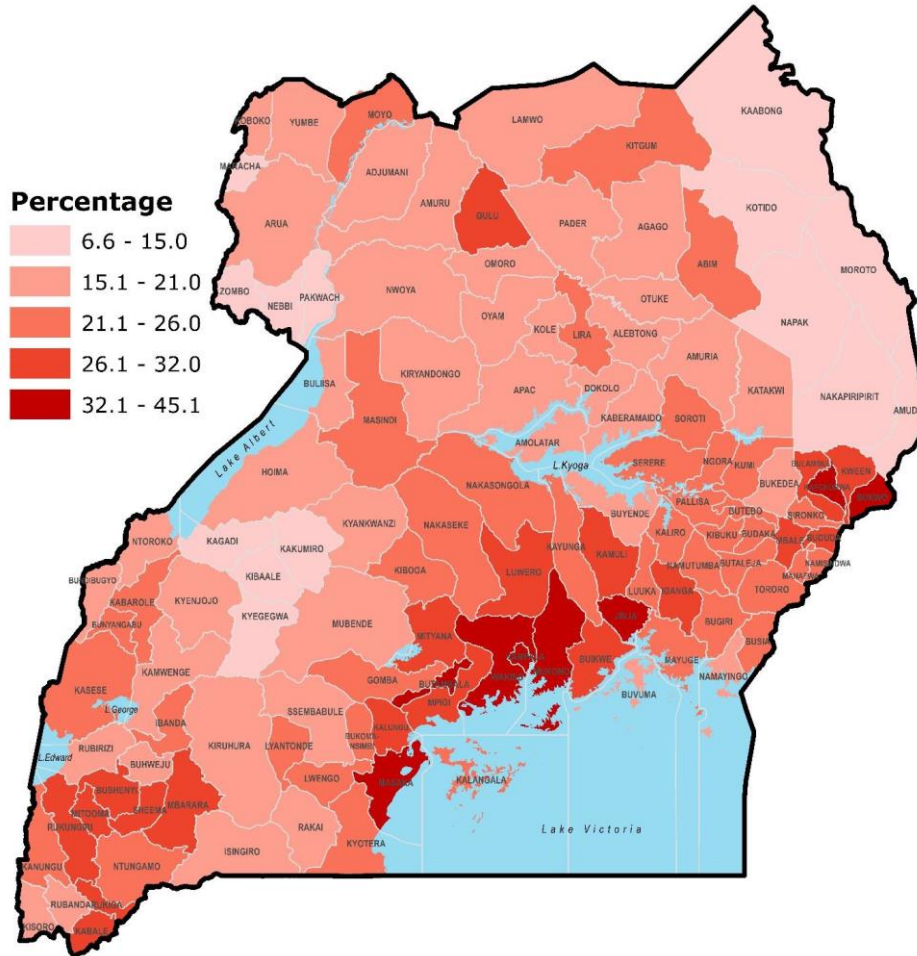


Figure 7-67 – Secondary School Net Enrolment (NPH 2014).

In the project area the drop out of schools have been investigated and as results 79% of respondents declare costs as major limit, ad distance as second more frequent constrains with 45% of answers

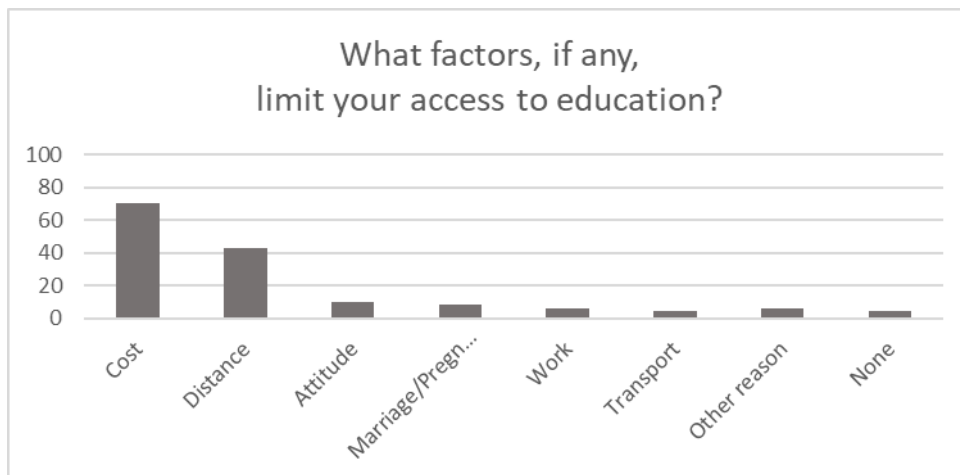


Figure 7-68 Constraints to Access to Education



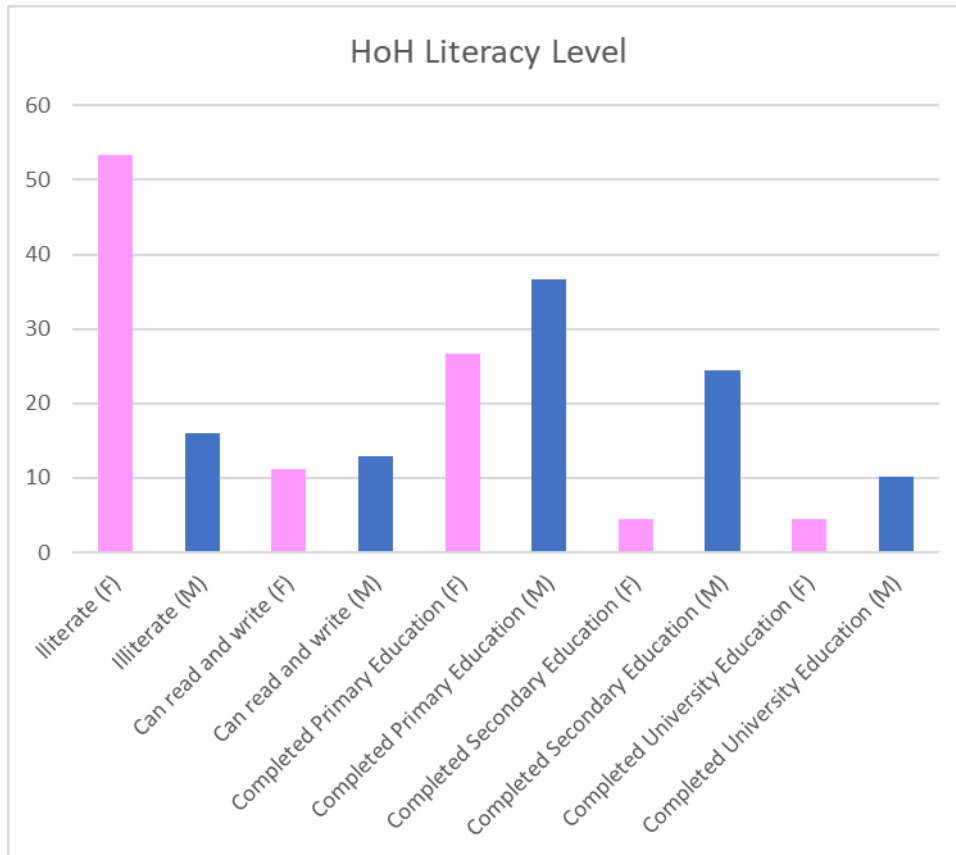


Figure 7-69 Households literacy level

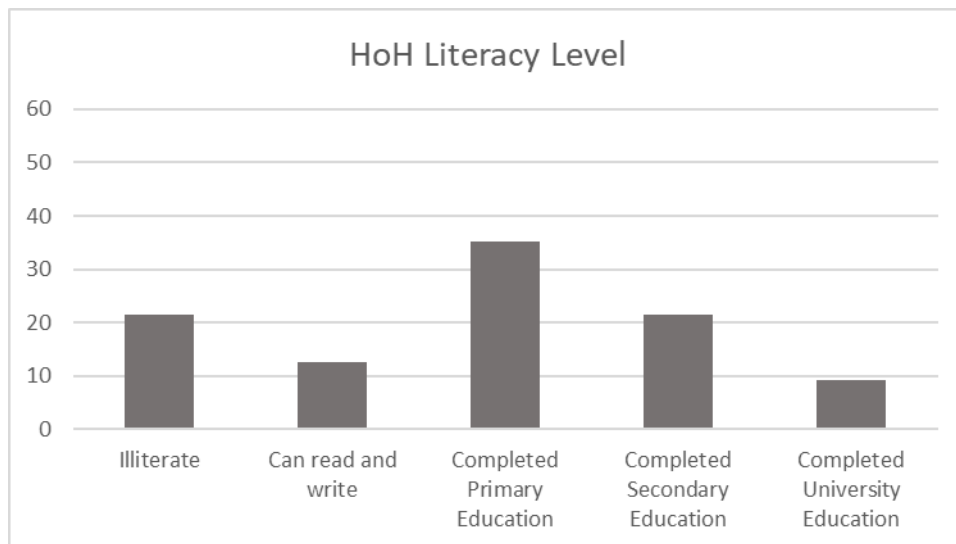


Figure 7-70 Households literacy level

**7.4.3. Health**

Uganda’s population of 47 million has always been heavily impacted by illness and disease, with communicable diseases accounting for over 50% of deaths in the country. Malaria, tuberculosis (TB) and HIV/AIDS are three of the top diseases impacting Uganda and are among the leading causes of death.

While over 80% of Ugandans have access to mosquito nets, Uganda is one of six countries that account for over half of global malaria cases (World Health Organization, 2019). Pregnant women are particularly vulnerable to malaria, due to increased susceptibility and reduced treatment options, making them a population of interest. Household ownership and use of mosquito nets (in particular, insecticide-treated nets, or ITNs) is a central strategy in malaria prevention. In 2016, 80% of households in Uganda had at least one mosquito net, while 78% had at least one ITN. On average, there are 2.0 ITNs per household. Half (51%) of households have achieved full household ITN coverage, meaning that the household had at least one ITN for every two persons who slept in the household the night before the survey. The remaining half of households either have no ITN (22%) or do not have enough ITNs for all household members. In Acholi Region 81% of households own nets as per National Health Census 2016.

In 2016, an estimated 1.4 million adults and children were living with HIV in Uganda. Nearly 9 in 10 women (87%) and men (88%) age 15-49 know that using condoms consistently can reduce the risk of HIV. Similarly, 94% of women and 92% of men recognize that limiting sexual intercourse to one uninfected partner who has no other partners can reduce the risk of HIV. More than 8 in 10 women (84%) and men (83%) are aware of both of these prevention methods. Seventy percent of women age 15-49 know that HIV can be transmitted during pregnancy, 91% know that it can be transmitted during delivery, and 88% know that it can be transmitted during breastfeeding.

The act of paying for sex introduces an uneven negotiating ground for safer sexual intercourse. Transactional sex is the exchange of money, favours, or gifts for sexual intercourse. This type of sexual intercourse is associated with a greater risk of contracting HIV and other sexually transmitted infections (STIs) because of compromised power relations and the likelihood of having multiple partners. The percentage of men who report paying for sex in the 12 months before the survey has remained stable over the 16 years prior the latest survey, at 1% in 2000-01, 3% in 2006, 2% in 2011, and 4% in 2016.

Uganda is designated by the World Health Organization to be a TB and HIV high-burden country, each year, approximately 91,000 people in Uganda get sick of TB with 32% of them being HIV-infected. TB is an infectious disease that mainly affects the lungs. It is caused by a type of bacteria and is spread through the air when TB-infected people cough. Every day, around 30 people die of TB, and 240 people fall sick with TB in Uganda.

In line with this trend, the graphics below show the condition of project affected people in 2024.

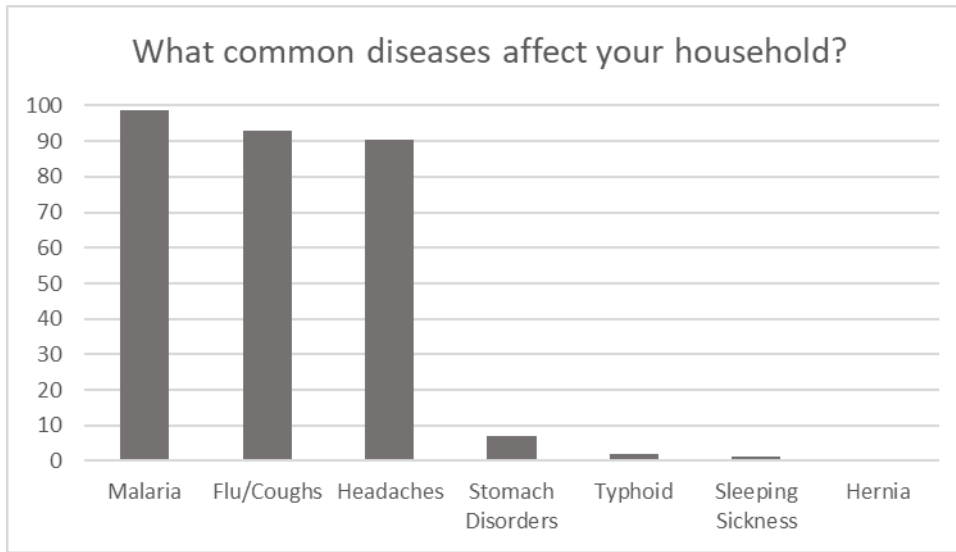


Figure 7-71 HHs Common Diseases in the project area

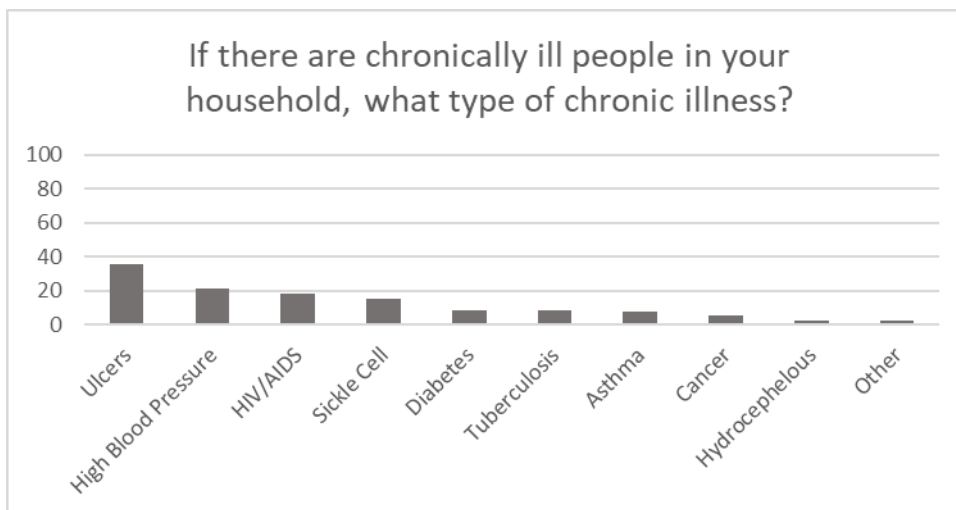


Figure 7-72 HHs Chronic illness in the project area

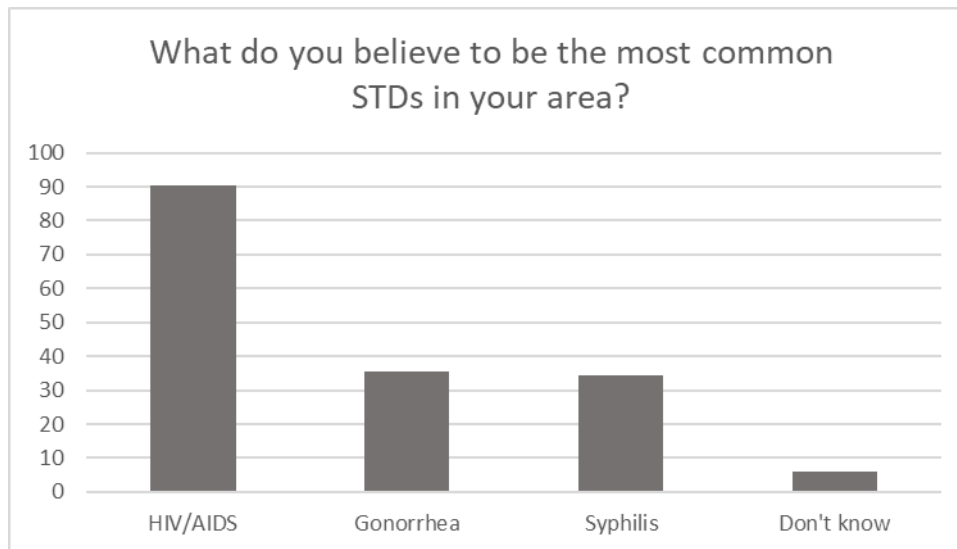


Figure 7-73 Most common STD in Project Area

#### 7.4.4. Ethnicity, Religion and Language

Ugandans can be classified into several broad linguistic groups: Bantu, Nilotic, Nilotic-Hamitic and Sudanic speakers. The Nilotics, who live in the north are from Luo groups, include the Lango, Acholi, Alur, Padhola, Lulya and Jonam. In the project area the main ethnic group is Acholi.

The Acholi society is traditionally organized into clans and sub-clans, each occupying specific areas in Acholiland, which provide identity, kinship, and communal land rights. However, this structure was disrupted when Acholi people were forcibly displaced from their ancestral lands during a period of rebellion, between approximately 1996 and 2007. This displacement led to nearly 90% of the Acholi population living in internally displaced persons (IDP) camps. As a result, younger generations were unable to learn traditional cultural knowledge, including practices related to land use and stewardship, which had significant implications for their cultural continuity and connection to their ancestral lands.<sup>14</sup>

According to 2014 Census the Catholicism is the largest group close to 40% of the population followed by Anglicans with 32% and Muslims with about 14%. Together these denominations account for more than 80% of the total population.

<sup>14</sup> Acholi Clan, Ethnic, and National Identities in PostConflict Northern Uganda: A Case Study in Koch Goma Sub-County, Nwoya District

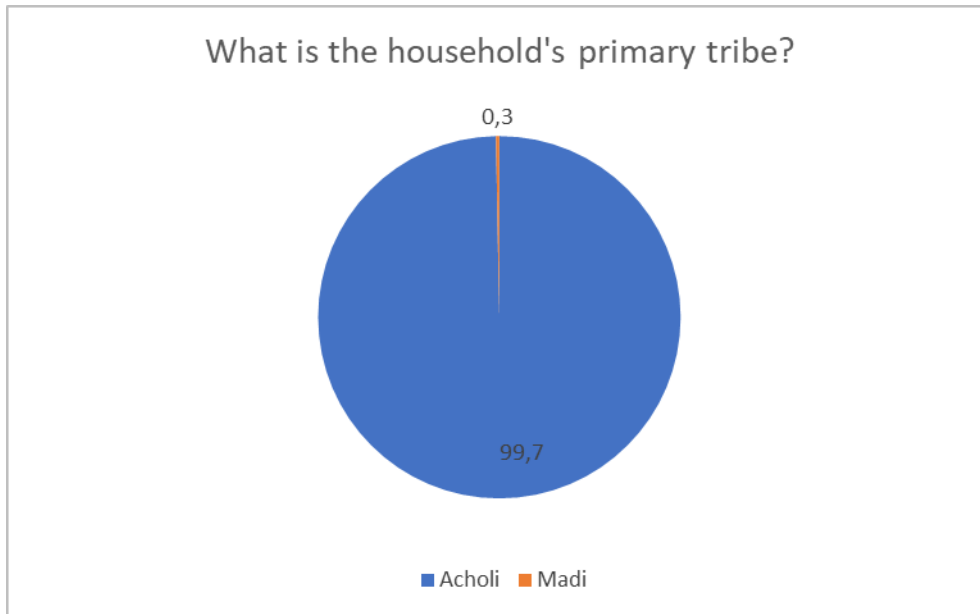


Figure 7-74 – Household's primary tribe in the project area.

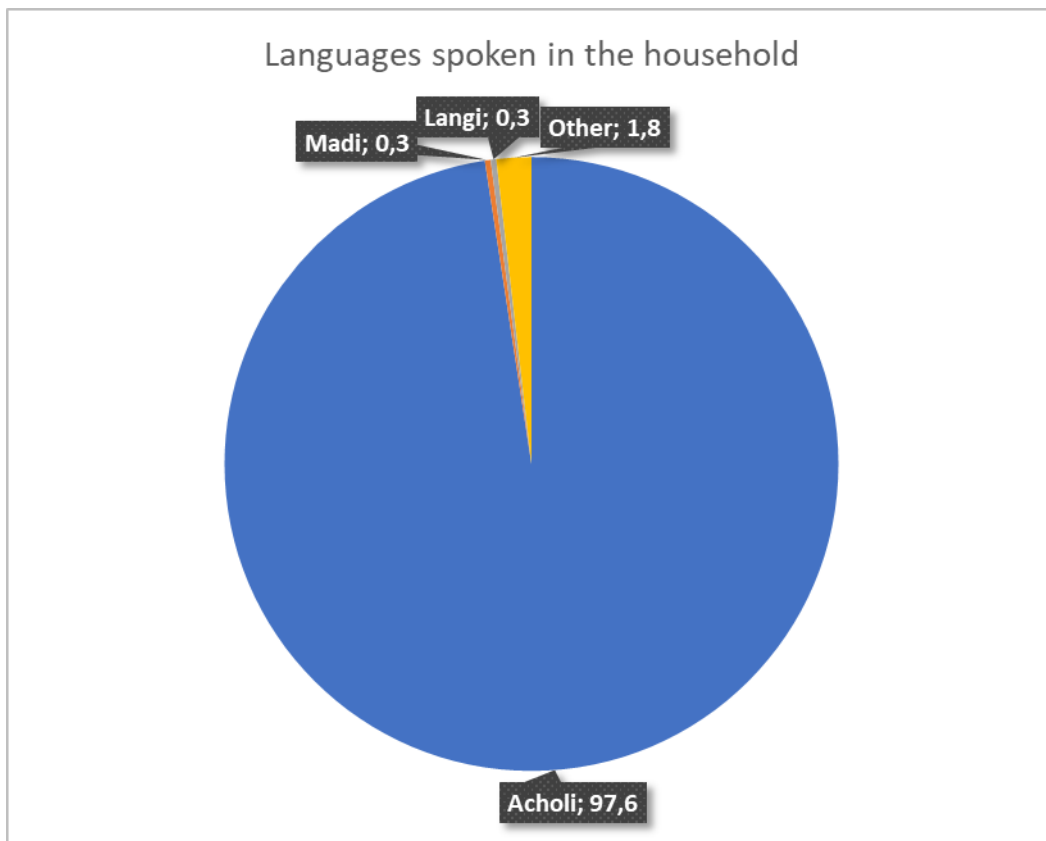


Figure 7-75 – Distribution of languages spoken across households.

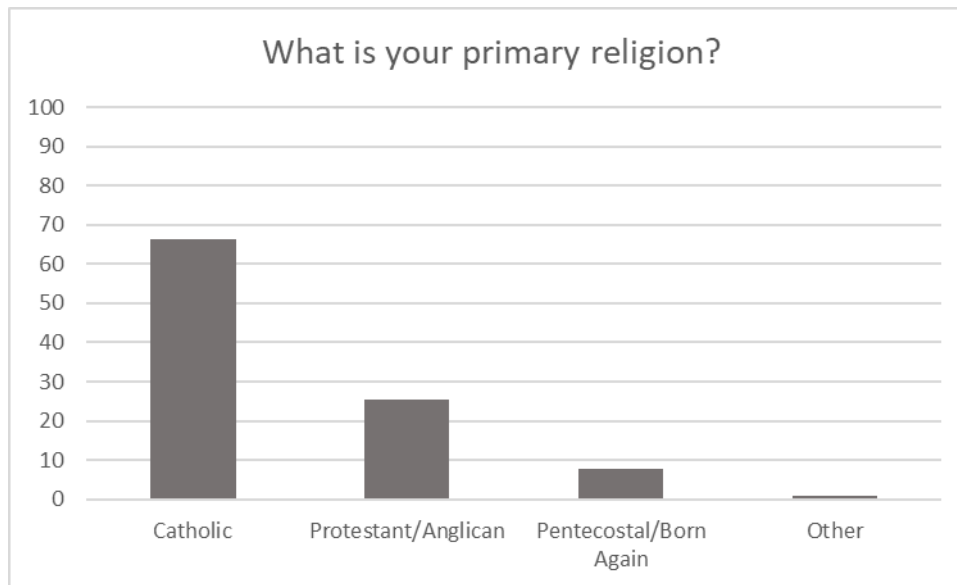


Figure 7-76 Professed religions in the project area

#### 7.4.5. Local Economy and Livelihood

The vast majority of rural Ugandans are primary producers, but it is impossible to find livelihoods, even in the most productive areas, where people live essentially as subsistence farmers and herders, simply eating the crops and drinking the milk they produce. They all produce partly with a view to home consumption, but they all also use the market as a fundamental part of their livelihoods.

In the project area we can identify two main livelihoods (FEWS livelihood mapping methods):

- Amuru-Gulu Rice, Groundnut, Sorghum, and Livestock livelihood zone,
- North Kitgum-Gulu-Amuru Simsim, Sorghum, and Livestock Zone Soils.

The Amuru-Gulu Rice, Groundnut, Sorghum, and Livestock livelihood zone is a region primarily dependent on rain-fed agriculture, receiving 1300-1400 mm of rainfall annually during two rainy seasons (March to May and July to November). Households in this area grow staples like sorghum, millet, pigeon peas, and cassava, while also cultivating cash crops such as rice, groundnuts, and simsim. They typically meet their food needs through a combination of own crop production and purchases. Livelihoods vary: wealthier households supplement food sources with livestock products (chickens, small ruminants, pigs, and cattle), while poorer households rely more on income from labor paid in kind. Cash income is generated from crop sales, particularly rice, groundnuts, and simsim, as well as from local labor opportunities. Better-off households additionally earn from selling livestock, while poorer households rely on natural products like firewood and charcoal. Other economic activities include apiculture, fishing, game hunting, and quarrying. Market access is generally good due to a decent feeder road network, although many roads are seasonal and challenging during the rainy season.

The North Kitgum-Gulu-Amuru Simsim, Sorghum, and Livestock Zone features clay soils that are fertile, supporting rain-fed agriculture. Key crops grown for consumption include sorghum, cassava, simsim, pigeon pea, and maize, with simsim and sorghum serving as major cash crops alongside cotton. Most households in this zone rely on their own crop production for food, while better-off households supplement this with purchases and income from livestock. Poorer households depend on purchases and gather wild foods like game, wild fruits, vegetables, and shea butter.

Cash income primarily comes from crop sales for most households. Better-off families also earn from livestock sales (chickens, small ruminants, pigs, cattle) and related products, as well as petty trading. Poorer households earn from selling labor (construction and brick making) and natural products such as firewood, thatching grass, and charcoal <sup>15</sup>.

The recent data from Fewws net June to January 2022/2023 show stress over the production due to the poor rainy season that resulted to be likely to be among the driest on record since 1981 in large parts of the northern region. Since 2018, northern Uganda was hit by the worst drought, which negatively impacted agriculture sectors and caused significant damage to crops and livestock.

A recent study carried out in the region confirms the trends, in fact 92% of the households in the district depend on subsistence farming as a main source of livelihood. The study shows that there are three main sources of livelihood for the households with majority (94%) of the households earning a living from farming, another 39% earned their livelihood from businesses, while only nine percent (9%) were formally employed. About 40% of the households had multiple sources of livelihood<sup>16</sup>. This is particularly evident among the youth, who do not want only to be farming, often because of a lack of land and the unpredictability of success. Of 69 participants, just two were only farming whereas 67 were simultaneously engaged in farming and non-farm activities. Young men and women were, on average, engaged in between two and six different economic activities, such as sand mining, building, charcoal burning, fishing, hunting, brewing, running a village store, trading produce, and riding a boda boda (motorbike). Wage labour included farm work, working as a porter, working in a small canteen or restaurant, and construction work in town. Many switches between economic activities during different seasons to increase income stability. Farming frequently serves as a strategy to start non-farm activities. Doing a non-farm activity allow to save some money so as to engage in a different and hopefully better non-farm activity, is reported to be common.

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<sup>15</sup> livelihood mapping and zoning exercise: Uganda a special report by the famine early warning system network (fewws net), USAID 2010 and Uganda Food Security Outlook June 2022 to January 2023, (fewws net), USAID

<sup>16</sup> Elolu et al., Household food security, child dietary diversity and coping strategies among rural households. The case of Kole District in northern Uganda, *Dialogues in Health*, Volume 3, 2023.

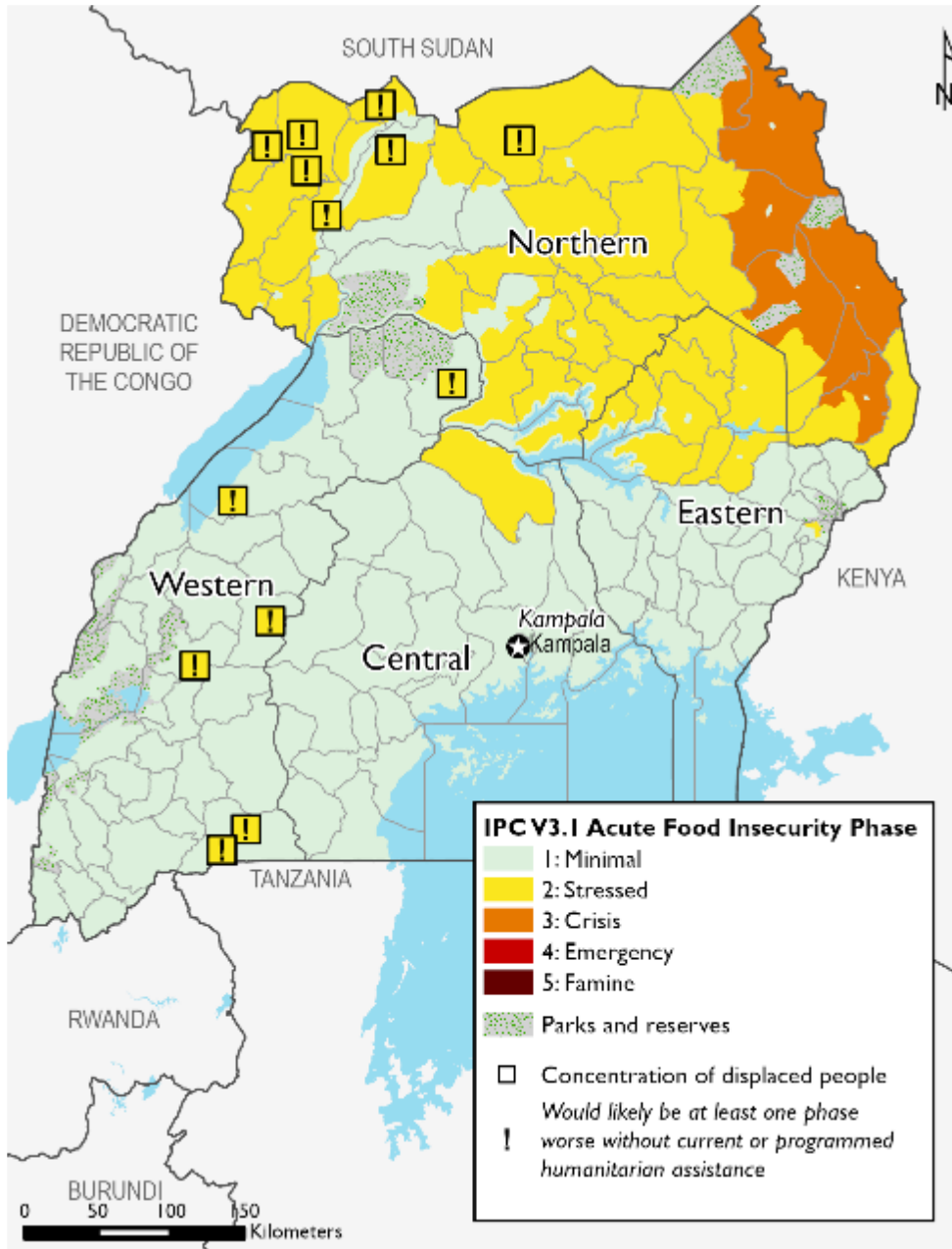


Figure 7-77 – Food insecurity phases in Uganda.

The results of socio-economic survey are in line with the regional profile as indicated in the charts below.

<sup>17</sup> livelihood mapping and zoning exercise: uganda a special report by the famine early warning system network (fews net), USAID 2010 and Uganda Food Security Outlook June 2022 to January 2023, (fews net), USAID



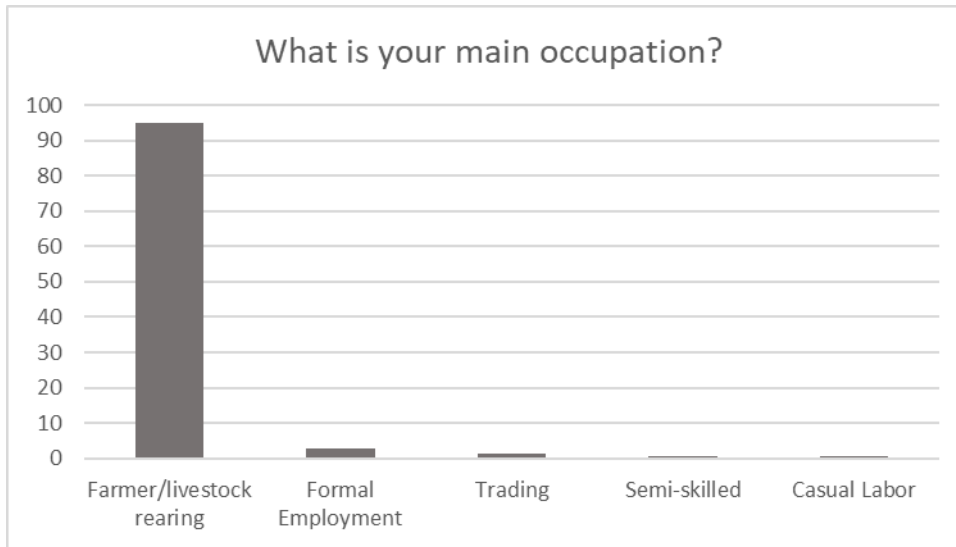


Figure 7-78 – Main occupation in the project area.

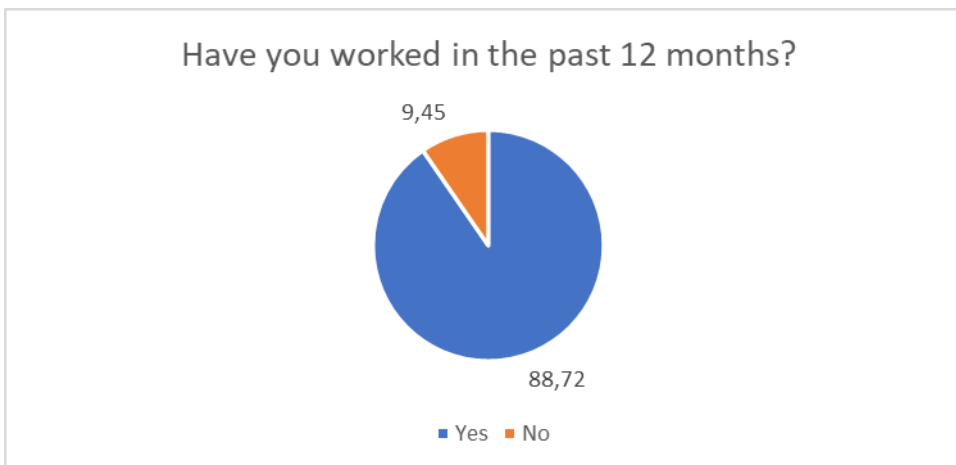


Figure 7-79 – People who have worked or not worked in the last 12 months.

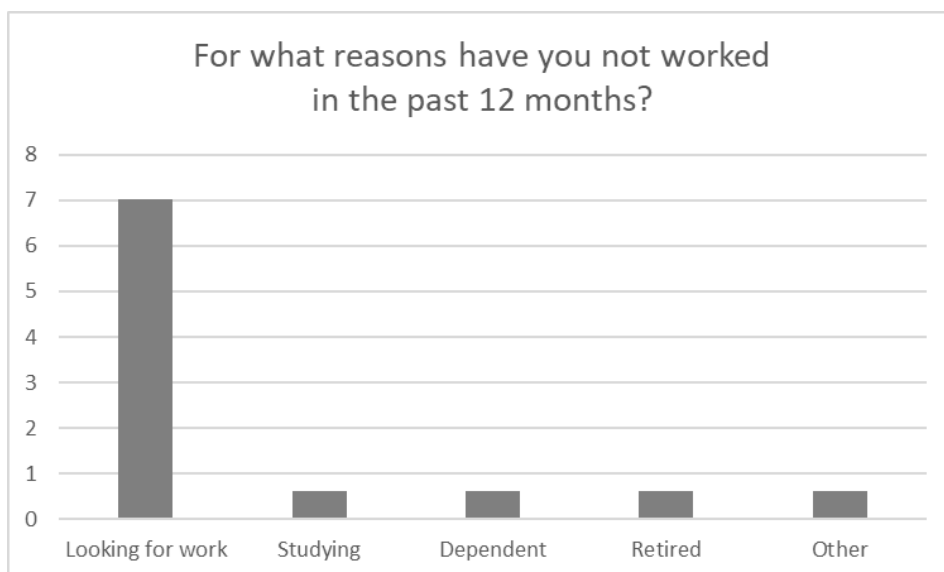


Figure 7-80 – Main reasons why people in the project area were unemployed in the past 12 months.

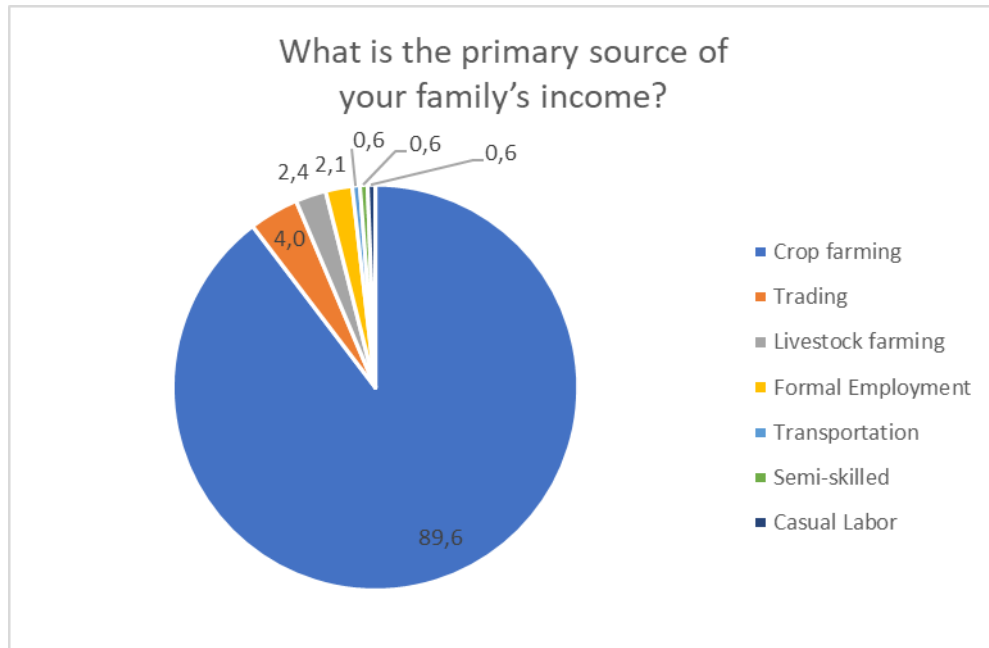


Figure 7-81 – Primary source of family's income in the project area.

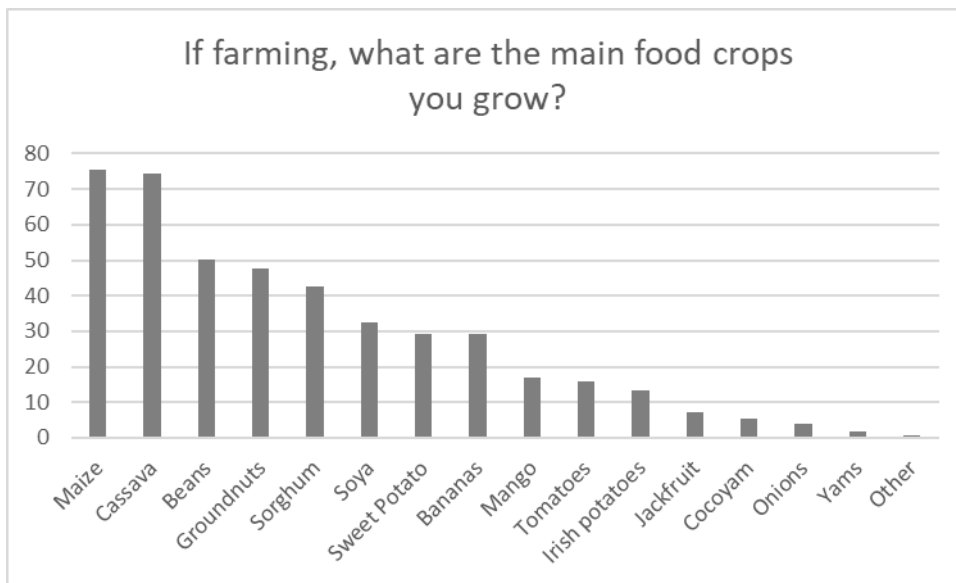


Figure 7-82 – Main food crops cultivated in the project area.

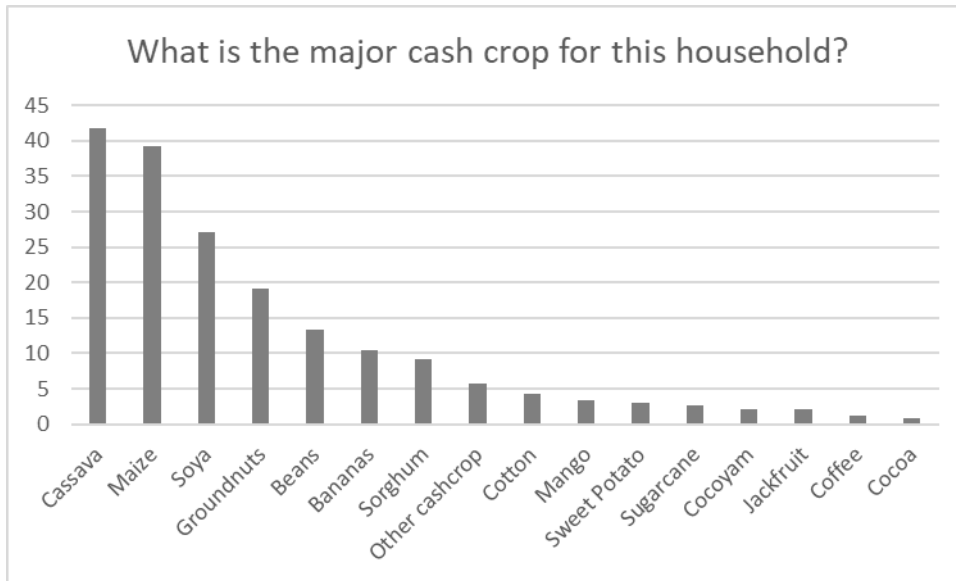


Figure 7-83 – Major cash crops cultivated in the project area.

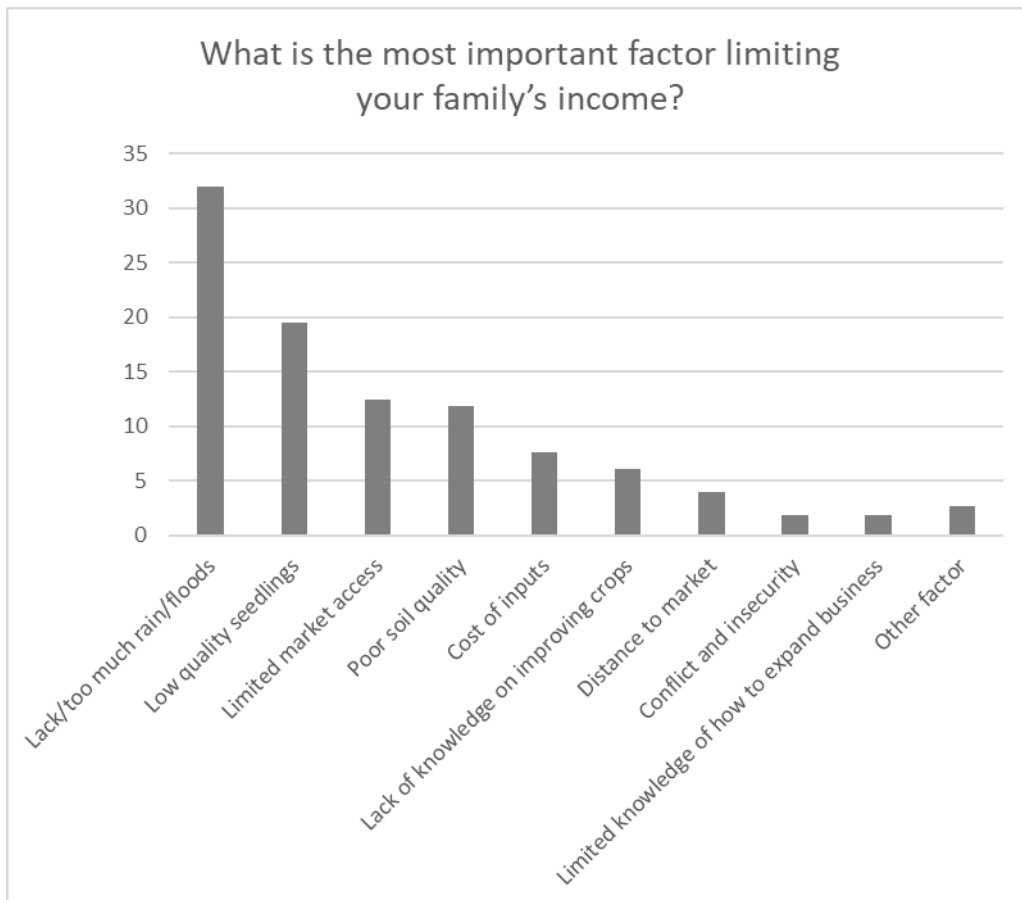


Figure 7-84 – Factors limiting the family's income in the project area.

#### **7.4.6. Food Security and welfare indicators**

The project's region is a flat plateau characterized by woody savannah vegetation with fertile arable land suitable for agriculture. Sorghum, finger millet, sesame, cotton, groundnut, and cassava are the main crops grown since they are drought-tolerant crops. Recently, maize, beans, sunflower, and soybean production has increased in the region, this can be attributed to the use of early maturing crop types and varieties.

A study in Kole (Lango sub-region) reports that 96% of the farmers are engaged in crop farming, the major crops being staples such as cassava, maize, and beans. The majority of the cultivated crops are associated with men and over 60% of the crops were grown for home consumption. Cassava, sesame, rice, and maize are the main cash crops cultivated. Overall cassava was more popular in Adjumani (West Nile) and Kitgum (Acholi) while groundnut and sesame were the major crops in Nwoya and Gulu. Vegetable crops were reported as grown for home consumption. A few commercial farms in Nwoya district are engaged in mono-cropping of maize and coffee.

A food security assessment in northern Uganda indicated that in 2014 about 24% of households were food insecure, and that only 12% of children aged 6 to 23 months had minimum acceptable diets, with only 26% of children fed as per recommended minimum dietary diversity. Representing a typical rural agrarian community, this study indicated a broad level relationship between household food insecurity, dietary diversity and associated coping strategies. It is evident that most of the diets in this area are largely staple based, mainly dominated by grains, roots and tubers, with evidence showing limited diversity of diets accessible for children.

Other regional studies show that variations in status of household food security is significantly associated with infant or child dietary diversity. Additionally, it is clear that nutritional training, household size and livelihood diversity are critical factors associated with household food security status and thus diversifying the livelihoods options. In this framework, provision of nutritional education as an integral part of livelihoods and social development initiatives would certainly contribute to better household food security.

In the post-conflict context of northern Uganda, land rights are the prerequisite for food security and recovery, and clearing land and growing food were the first priority on return from displacement. In 2016, a survey results carried out in rural areas gave evidence of the primary importance of crop production as the basis of a secure livelihood and of people's plans for the future.

The topic was investigated also among affected households, the situation of food security is an issue of vulnerability since 30% of affected HHs face sometimes difficulties to feed their family and 10% often.

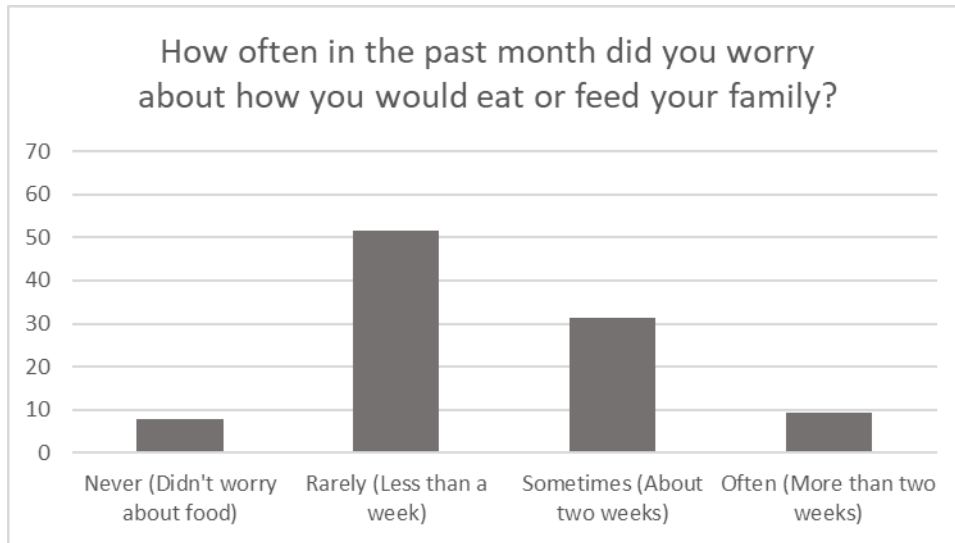


Figure 7-85 – Food security in the project area.

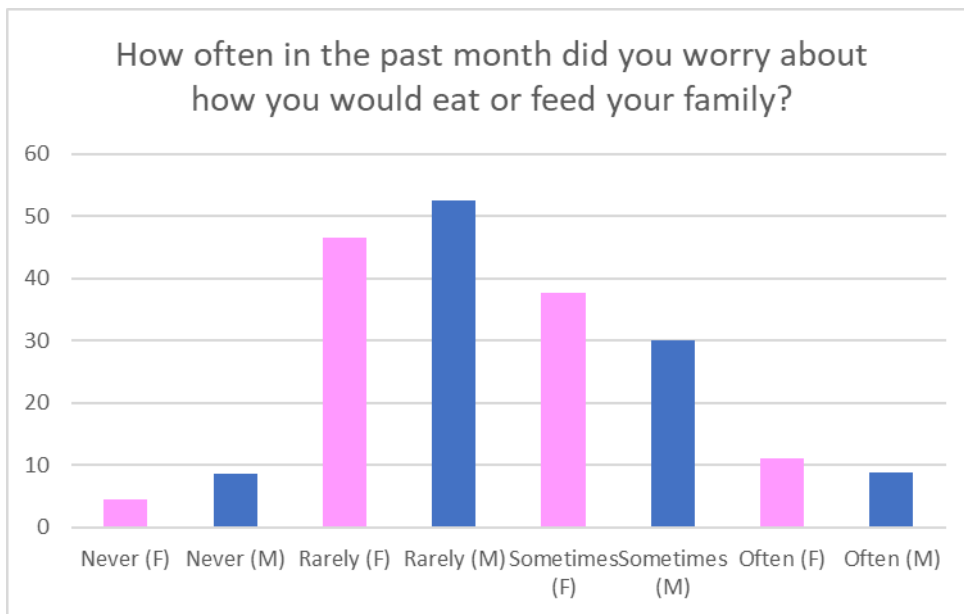


Figure 7-86 – Comparison between male and female households on the food security in the project area.

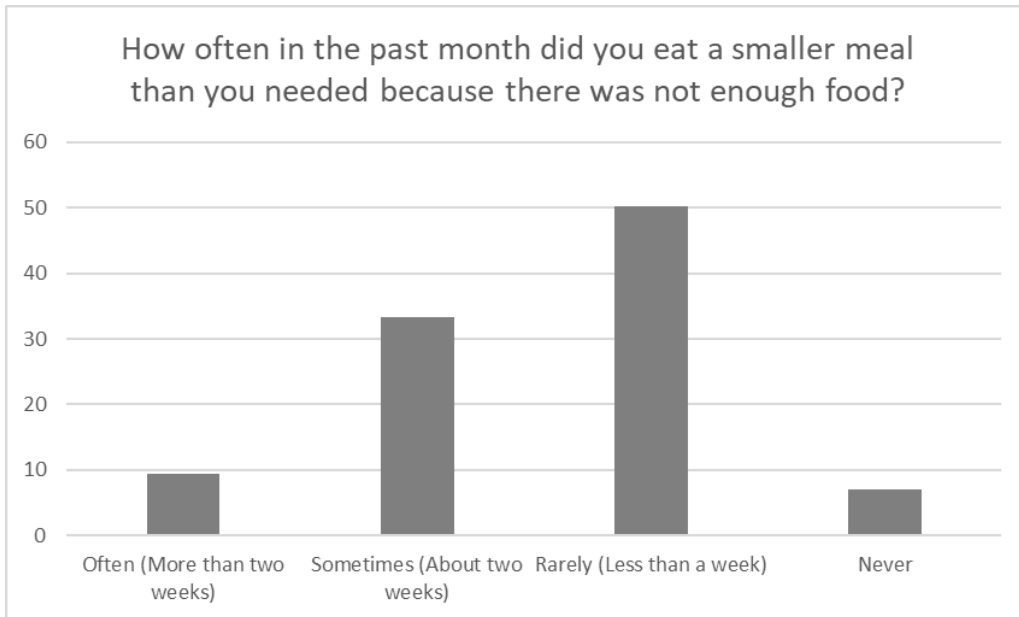


Figure 7-87 – Frequency of smaller meals eaten in the project area due to insufficient food.

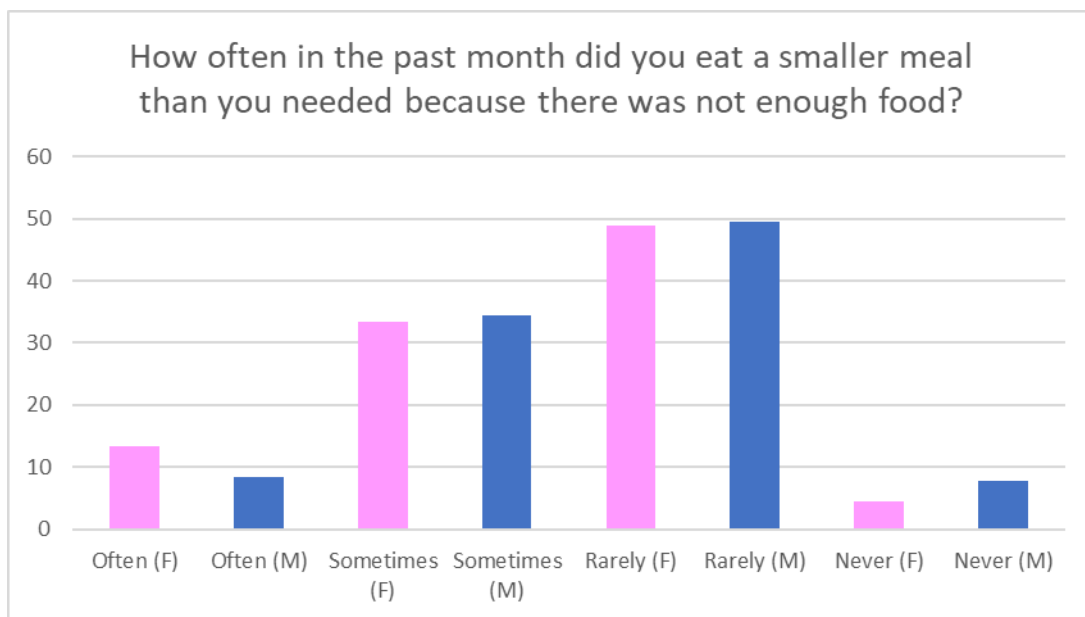


Figure 7-88 – Comparison between male and female households on the frequency of smaller meals eaten in the project area due to insufficient food.

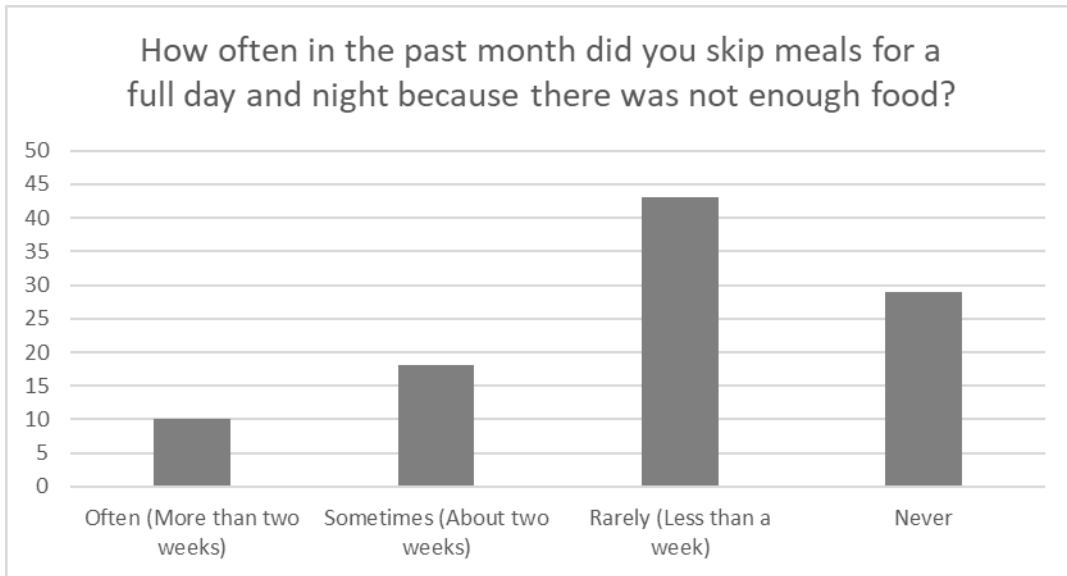


Figure 7-89 – Frequency of fewer meals eaten in the project area due to insufficient food.

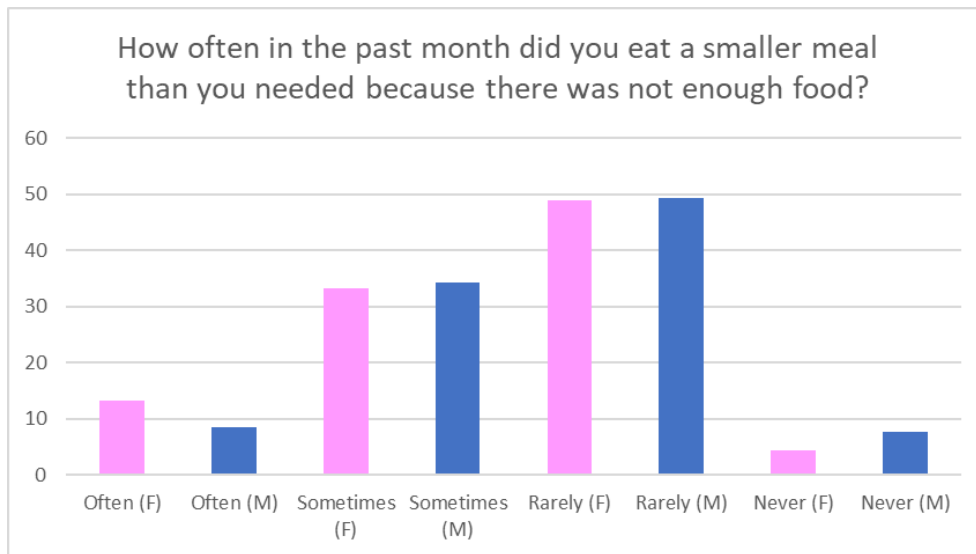


Figure 7-90 – Comparison between male and female households on the frequency of fewer meals eaten in the project area due to insufficient food.

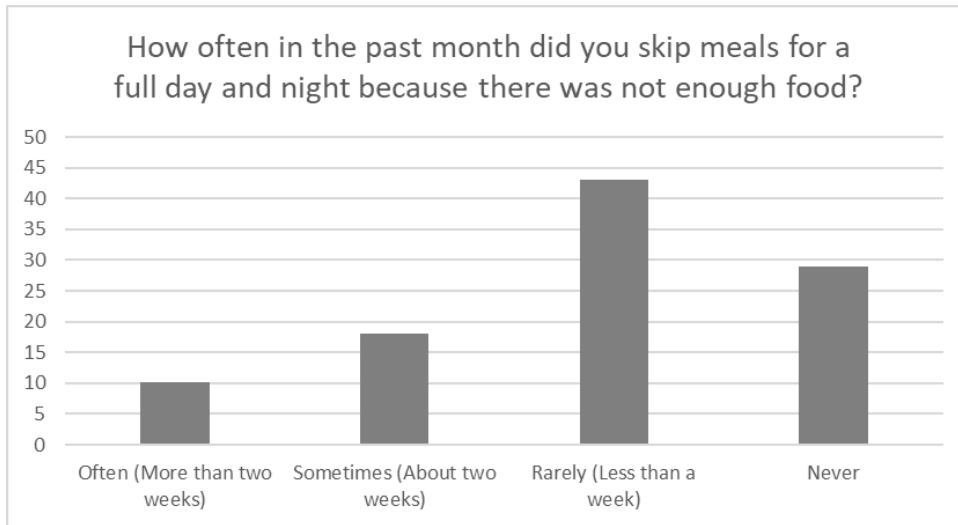


Figure 7-91 – Overall frequency of meals skipped for a full day in the project area due to insufficient food.

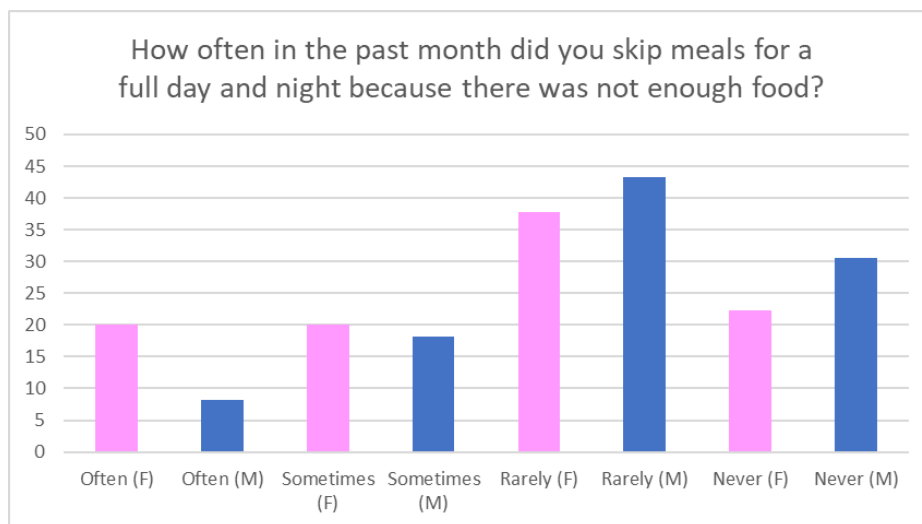


Figure 7-92 – Comparison between male and female households on the frequency of meals skipped for a full day in the project area due to insufficient food.



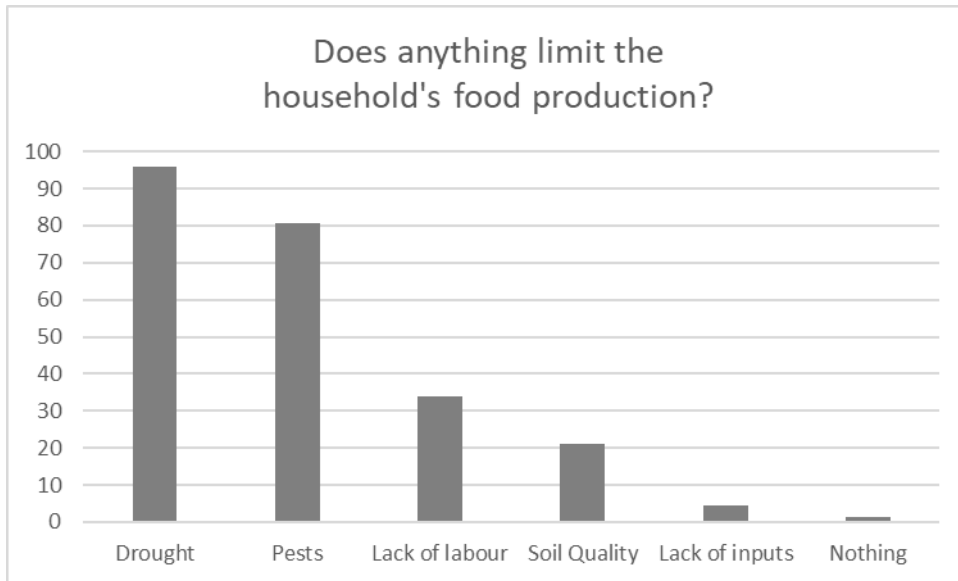


Figure 7-93 – Causes of household food production limitation in the project area.

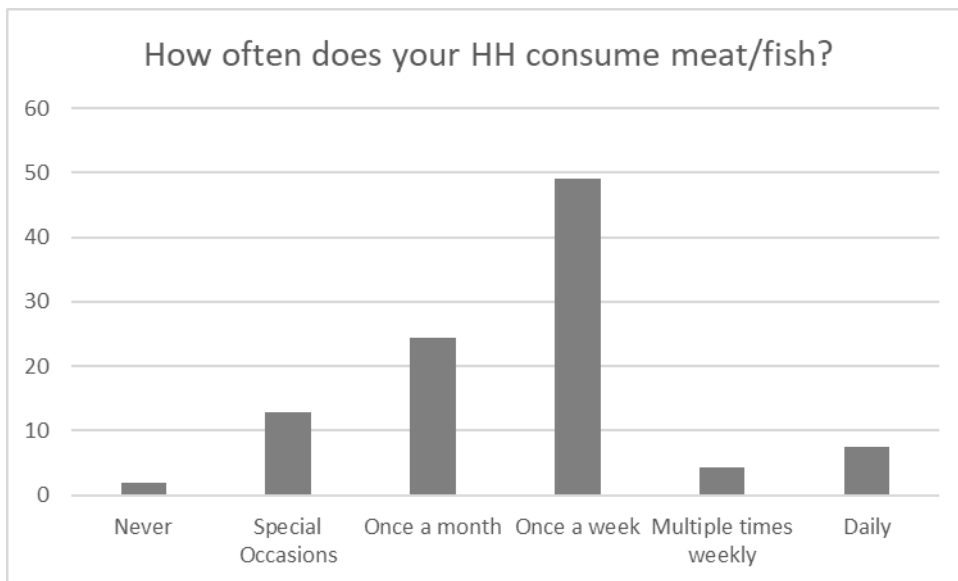


Figure 7-94 – Frequency of fish and meat meals in the project area.

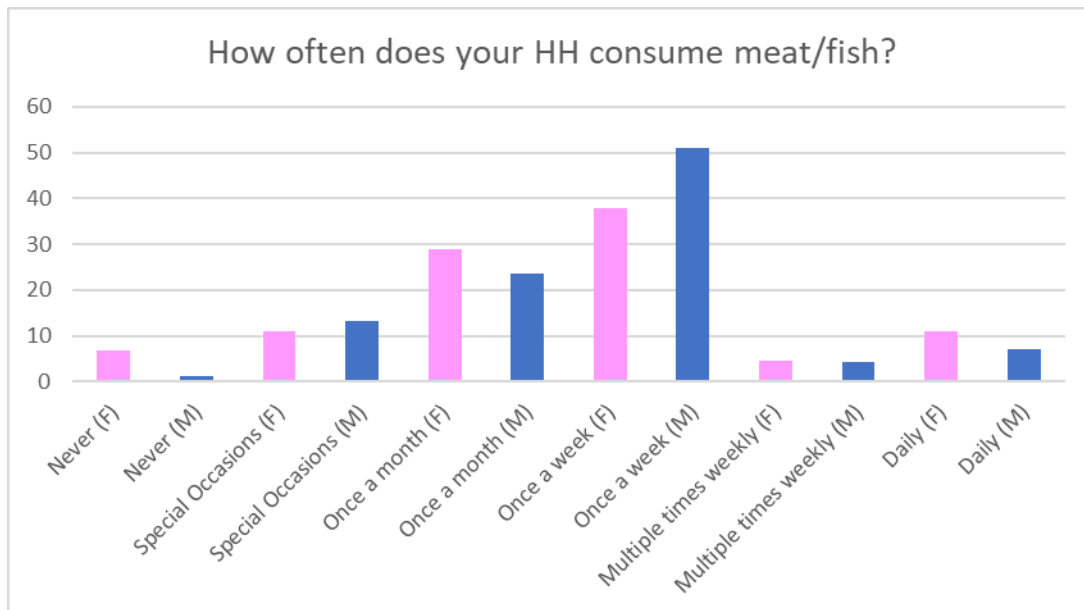


Figure 7-95 – Comparison between male and female households on the frequency of fish and meat meals in the project area.

#### 7.4.7. Gender, Disadvantaged and Vulnerable Groups

The Uganda Bureau of Statistics issued a monitoring report to show the progress to reach the targets of the National Development Plan 111, 2020/21-2024/25 and the United Nations (UN) Sustainable Development Goals (SDGs). According to it the SDG Five “Achieve gender equality and empower all women and girls” shows the following status:

- Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age is 39.6
- Proportion of women aged 20-24 years who were married or in a union before age 15 is 7.3
- Proportion of women aged 20-24 years who were married or in a union before age 18 is 34
- Proportion of girls and women aged 15-49 years who have undergone female genital mutilation/cutting, by age is 0.3
- Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care is 58.5

Early marriages result into social; health and economic challenges and the situation is made worse if the person loses a partner when still young. Widowed mature persons are at a disadvantage compared to their married counterparts in terms of economic security and health.

In Acholi society, gender inequality is evident through practices like polygamy, widow inheritance, and bride price payments. Traditionally, clans were close-knit with abundant livestock and land, and strong safety nets supporting women, who were crucial caregivers of heirs. Husbands and clan patriarchs bore significant responsibility for women's protection. Gender roles were clearly defined based on task location and intensity. However, these dynamics shifted dramatically post-war, with communities facing

food scarcity and resource competition. Alcoholism among men worsened living conditions, placing a heavier burden on women who increasingly became providers.<sup>18</sup>

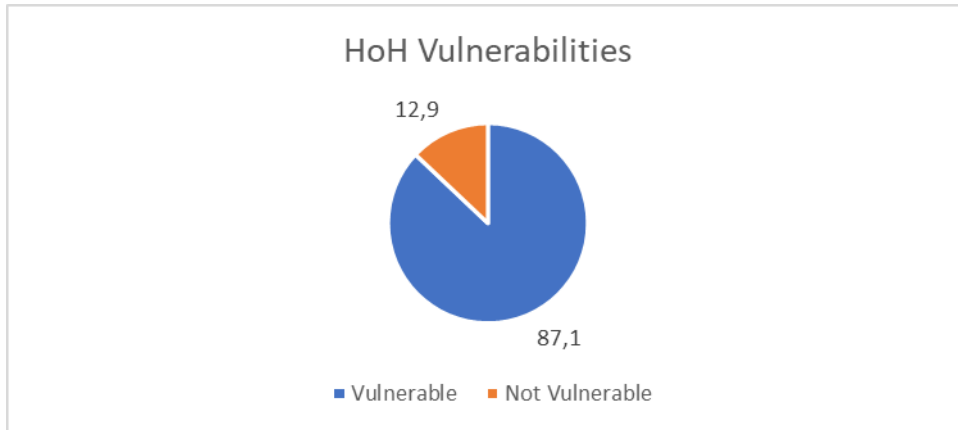


Figure 7-96 – Household vulnerabilities

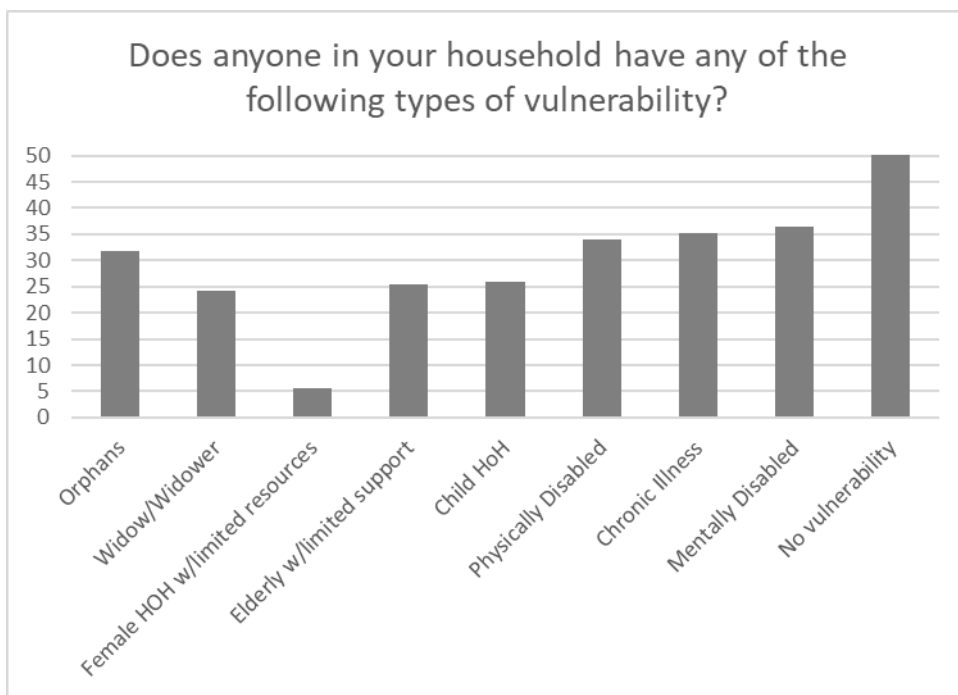


Figure 7-97 Types of Vulnerabilities of project population

<sup>18</sup> Acholi Clan, Ethnic, and National Identities in PostConflict Northern Uganda: A Case Study in Koch Goma Sub-County, Nwoya District

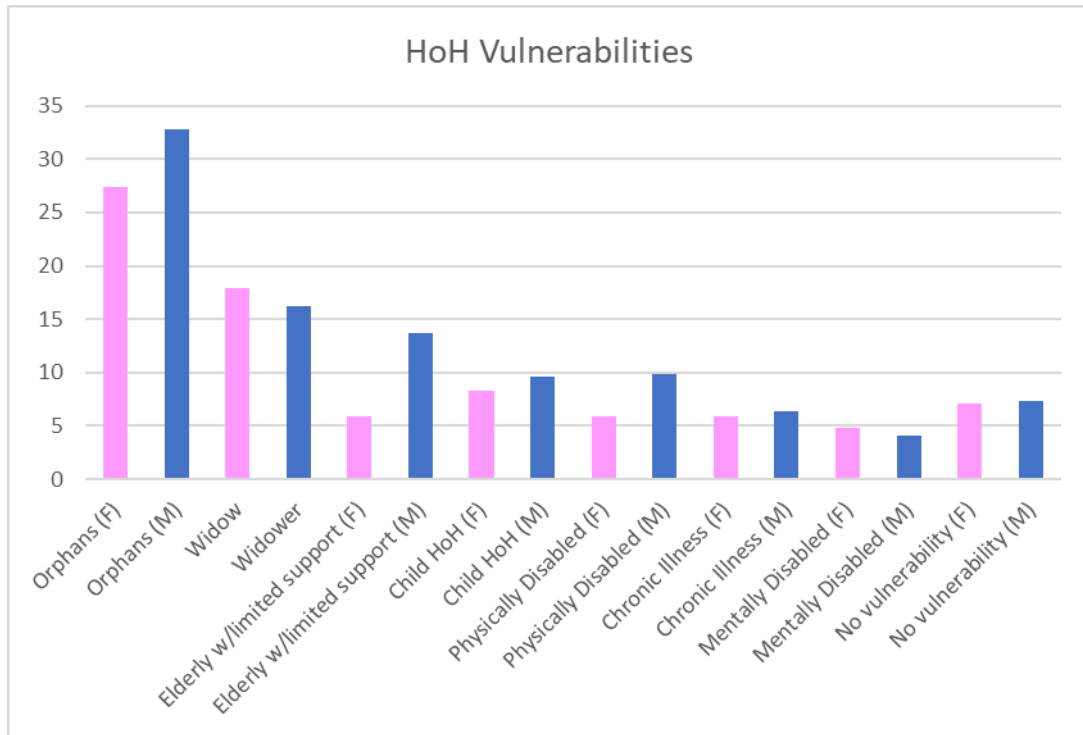


Figure 7-98 – Comparison between male and female households on the types of vulnerabilities of project population.

**7.4.8. House Ownership and Types**

The traditional housing is typically characterised by thatched roofs, mud walls, and open eaves, whereas more modern housing is built with metal roofs, concrete or brick walls, and closed eaves. Anecdotal evidence indicates that housing is being rapidly upgraded from traditional to modern styles in many communities alongside economic and population growth, although these changes have not been documented (John C Rek MBChB et al 2018).



Figure 7-99 – Examples of rural residential structures.

In the rural area the homestead property is often cleared of any vegetation except for some planted trees, often old mango trees. The tree is used to sit underneath for shade. On the area huts are built. There is often a building that is used as a kitchen. This is often the wife’s hut. A man has his own hut and in the case a man is married to more than one wife, the other women also have their own hut. In front of the hut that is also used as a kitchen the fireplace is found. Besides the huts also a small granary can be found. Some distance away of the homestead the toilet can be found, mostly a hole in the ground. Often a place to wash is also located outside the homestead. Piles of firewood can mostly be found behind the huts or leaning against a tree in or around the homestead. The agricultural field is often located near the homestead. Crops that are grown mostly are maize, groundnuts and cassava.

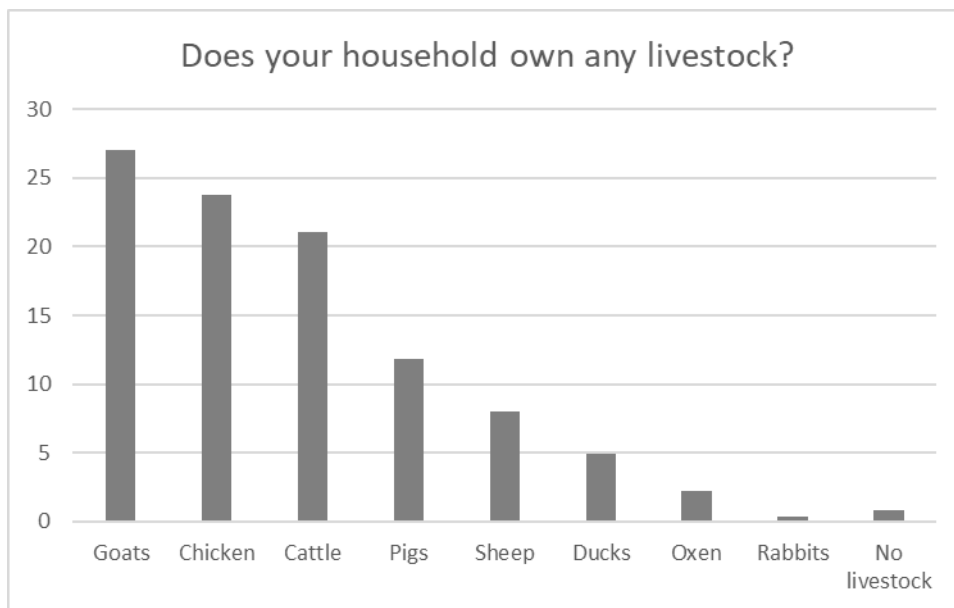


Figure 7-100 – Livestock ownership in the project area.

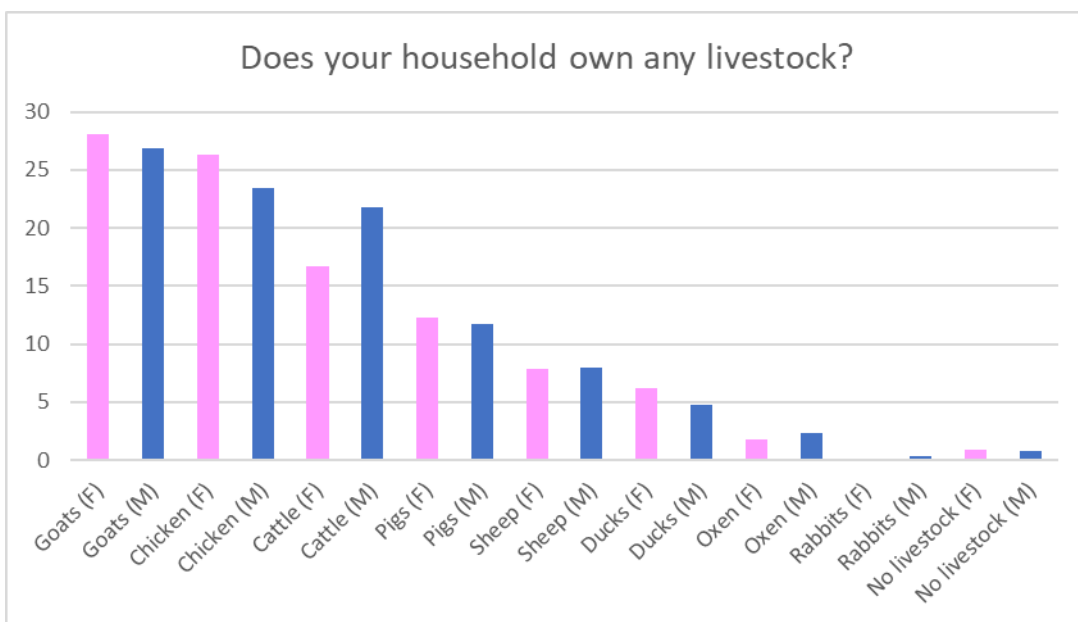


Figure 7-101 – Comparison between male and female households on livestock ownership in the project area.



Figure 7-102 – Families who do or do not sell products from the animals they keep in the project area.



Figure 7-103 – Distance of the mark in which families sell their products in the project area.

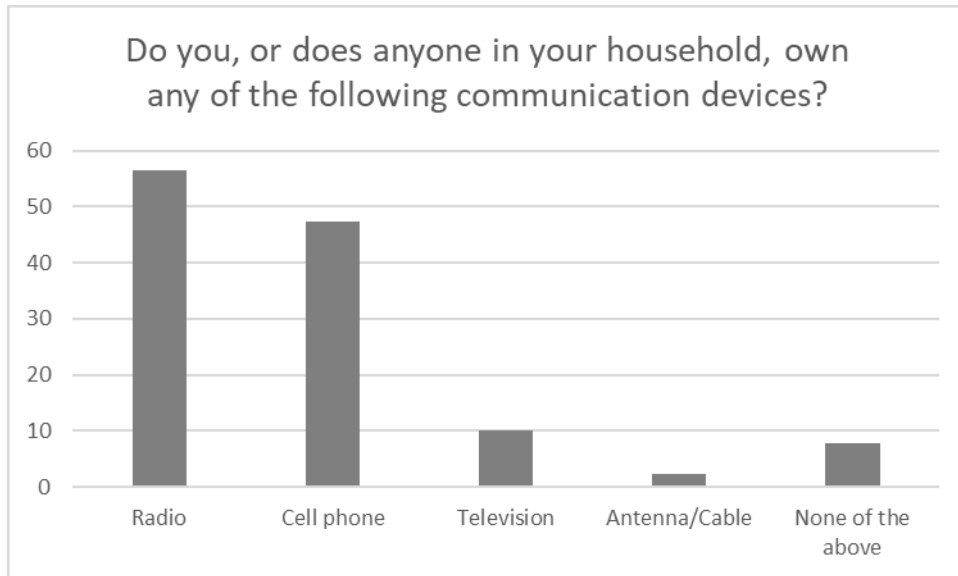


Figure 7-104 – Ownership of communication devices in the project area.

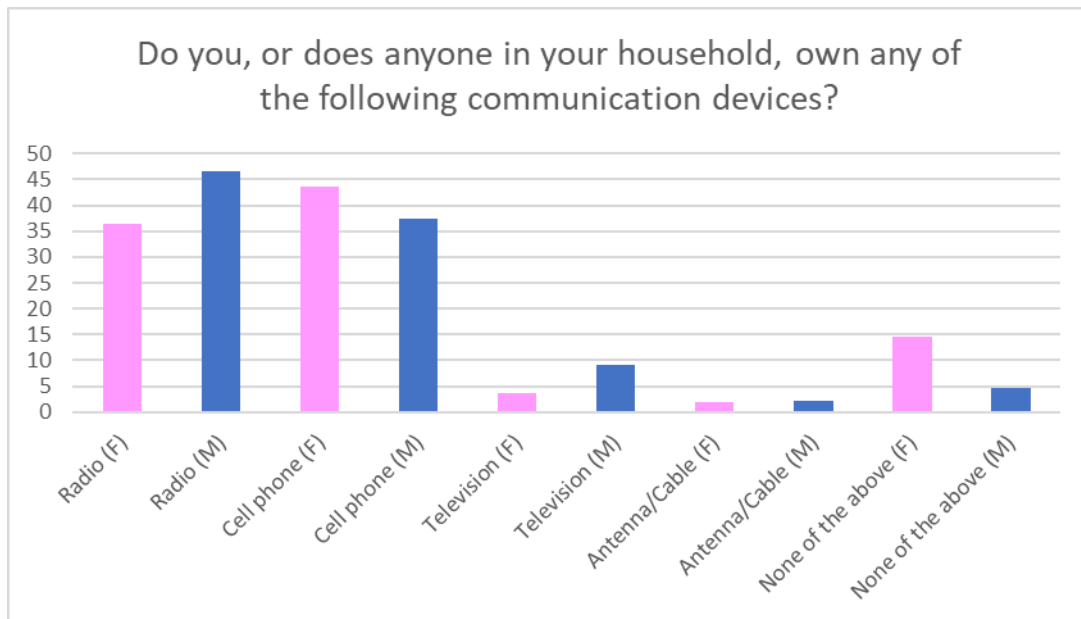


Figure 7-105 – Comparison between male and female households on the ownership of communication devices in the project area.

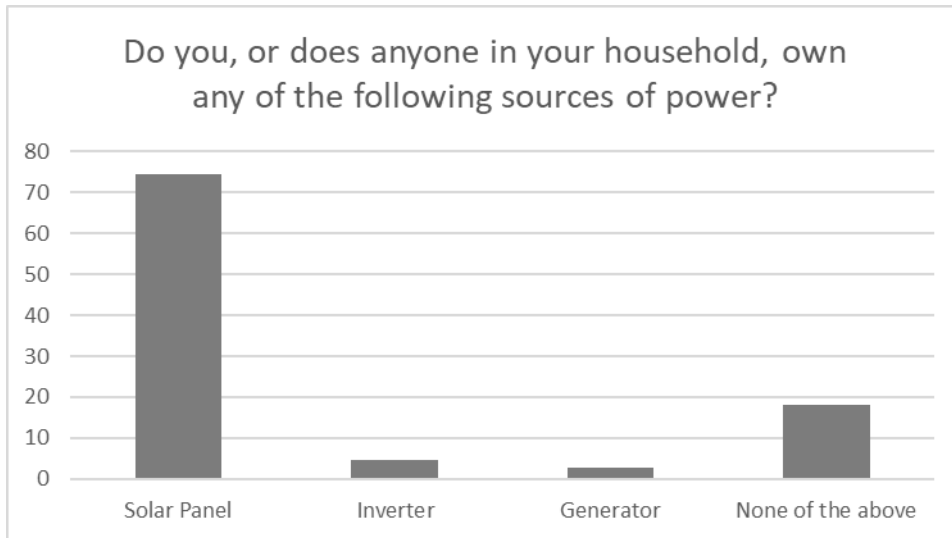


Figure 7-106 – Ownership of source of power in the project area.

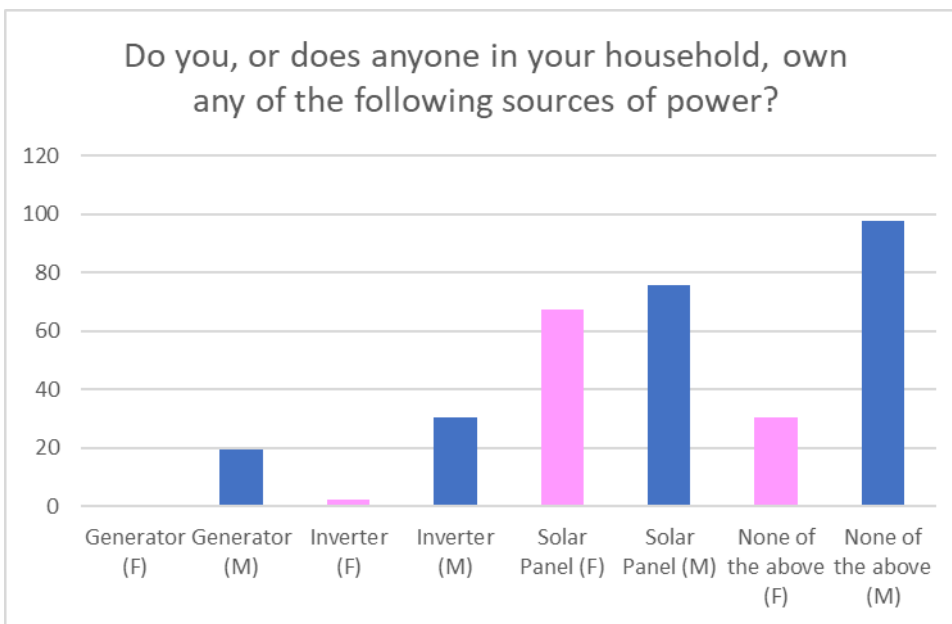


Figure 7-107 – Comparison between male and female households on the ownership of source of power in the project area.



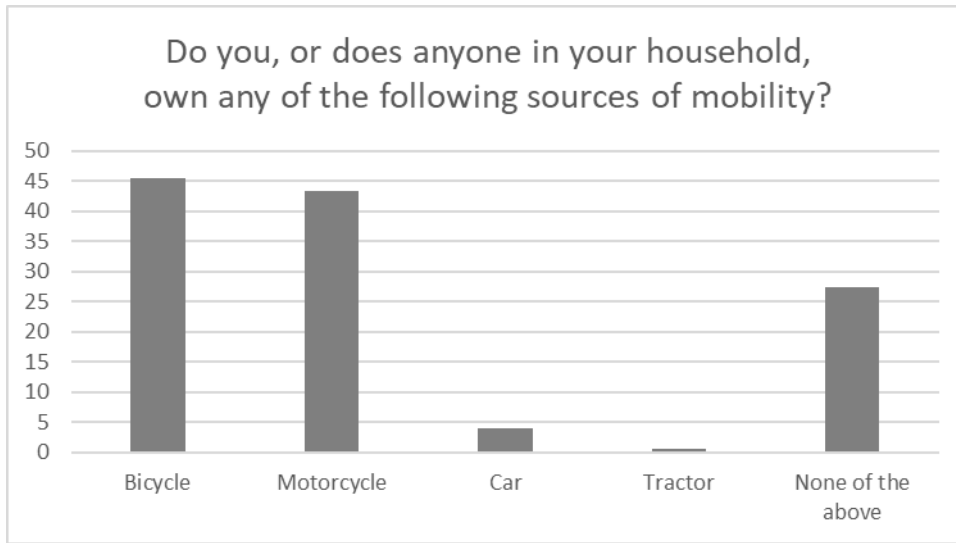


Figure 7-108 – Ownership of sources of mobility in the project area.

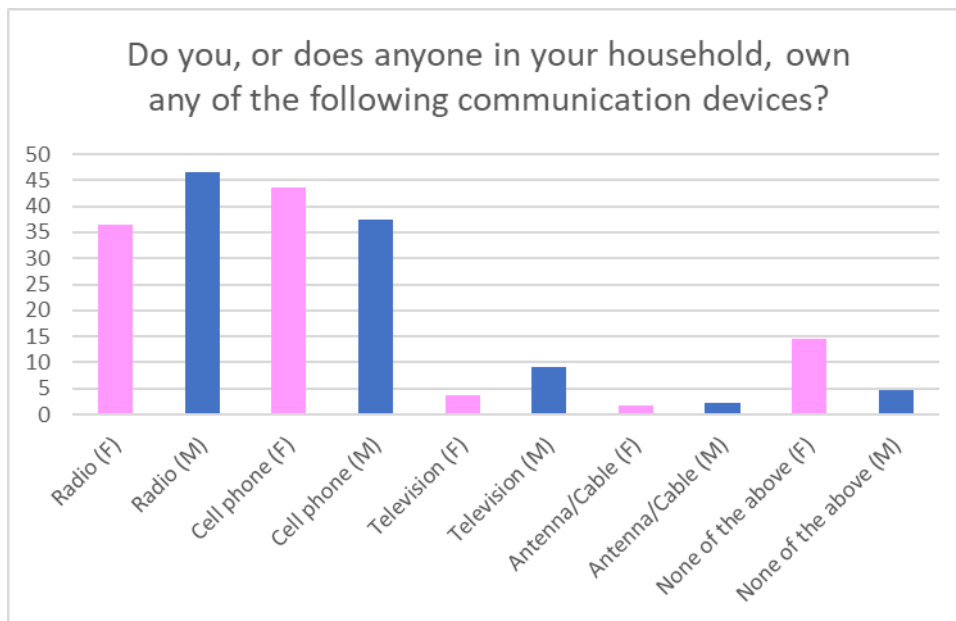


Figure 7-109 – Comparison between male and female households on the ownership of sources of mobility in the project area.

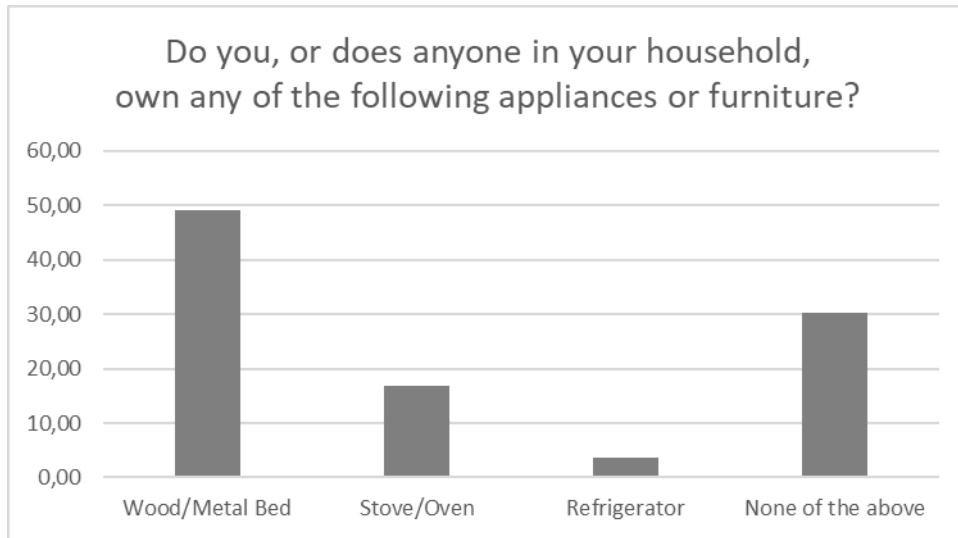


Figure 7-110 – Ownership of appliances or furniture in the project area.

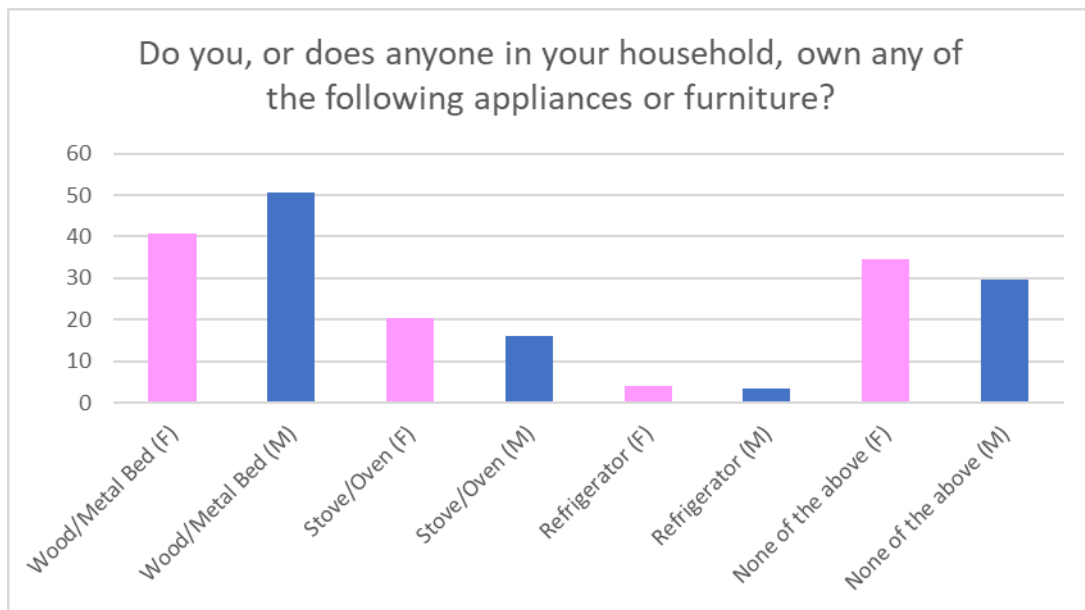


Figure 7-111 – Comparison between male and female households on the ownership of appliances or furniture in the project area.

**7.4.9. Landholding and land ownership**

According to Article 237 (3) of the 1995 Constitution of Uganda and Section 2 of the Land Act, the citizens of Uganda hold land under four 4 tenures namely:

- Mailo Land
- Freehold land
- Leasehold
- Customary land

**Mailo Land**

This type of tenure is predominantly in Buganda, with some minimal parts of Ankole, Bunyoro and Tooro sub-regions having it. Mailo tenure is one where permanent ownership of a large plot of land belongs to landlords who acquired it through the 1900 Buganda agreement and 1928 Busullu Envujjo Law, while at the same time tenants on the land are recognized and they also have rights to live on and utilize the land. In this context the tenant is Kibanja Holder/Customary tenant, a person who had settled on the land in Buganda as customary tenants with the consent of the mailo land owner under the Busuulu and Envujjo Law, 1928. A Kibanja holder holds an equitable interest in mailo land which can be transferred with consent of a registered owner. In the framework of compulsory acquisition of mailo land, the land owner, tenants by occupancy and Kibanja holders are entitled to adequate and fair compensation.<sup>19</sup> The Constitution states that mailo landowners are not allowed to use their powers against the interests of customary tenants, bona fide, or lawful occupants. This provision was introduced in 1998 and revised further in 2010 with the aim of inhibiting the possible eviction by landlords of people occupying mailo land as customary tenants or squatters. It is important to note that there are no more new titles issued for land under Mailo tenure because all titles were issued prior to 1928.

### Freehold Tenure

Freehold Tenure refers to land held/owned by an individual registered on the certificate of title as the land owner for life. Freehold land is the most popular for most Ugandans. Leasehold and customary land can be converted to freehold land. The Land Act specifies that the holder of land in freehold has the full power of ownership, which means they can use it for any lawful purpose and sell, rent, lease, dispose of it by will. Only citizens of Uganda are entitled to own land under freehold tenure, while non-citizens allowed only to lease the land for a period up to 99 years.

### Leasehold

According to the Land Act the Leasehold tenure is when a land owner allows another person to take exclusive possession for a specific period of three years or more in exchange for rent. A lease may be created either under a contract between the parties or by law. The person granted a lease must use the land for the specific purpose as agreed with the land owner. During the process of compulsory acquisition of leasehold land by the government, the law recognizes two interests over the property in question: i) The rights of the person granted a lease; and ii) The interest of the land owner. Therefore, both these parties are entitled to compensation from the government in the event of compulsory acquisition<sup>20</sup>.

### Customary Tenure

With the exception of Buganda which is mainly held under Mailo, land in other parts of Uganda is held mostly under the customary tenure. The Land Act describes customary tenure as land that can be owned communally, by a clan, or a tribe, a family.

- Customary communal land; where persons or communities share ownership or use of land for common purpose. A particular group of people in a particular area for purposes like grazing, water source, and firewood collection, wild fruits and vegetables, fishing, harvesting honey and white ants, cutting papyrus etc., communally owns the land. In most cases, rights to access this land are inherited.
- Customary family land; is where the head of the family or clan may be said to 'own' the land. Its utilization is usually controlled by family head, elders, clan heads or a group in its own well-

<sup>19</sup> Handbook On Land Ownership, Rights, Interests And Acquisition In Uganda

<sup>20</sup> Ibid

defined administrative structures. The heads are responsible for protecting the land and ensuring that every family member gets rights to use some part of the land.

- Family land is inherited within the family and the management of the land is passed on from parents to children and their family members but kept within the family.
- Individual customary land; is where an individual is said to 'own' land because the land was allocated to them, to use or own permanently, or they inherited the land, or purchased the customary land as an individual. This will include the right to allocate portions of the land to the next generation.

In 2015, the government of Uganda introduced Certificates of Customary Ownership (CCOs) for owners of customary land. A customary land owner can apply for a CCO as proof of ownership of the land.<sup>21</sup> The process of getting customary ownership certificates needs to pass through the community acceptance of the transfer of the land that act as witness.

**7.4.10. Income, Expenditure and Savings**

In Acholi counties, the majority of farmers are part of groups that have a social and practical purpose for carrying out agricultural work, as well as of savings groups. These are common institutions that enshrine Acholi values and pre-date the war. Group membership was believed to prevent 'idleness' and demonstrate that one is a community member.

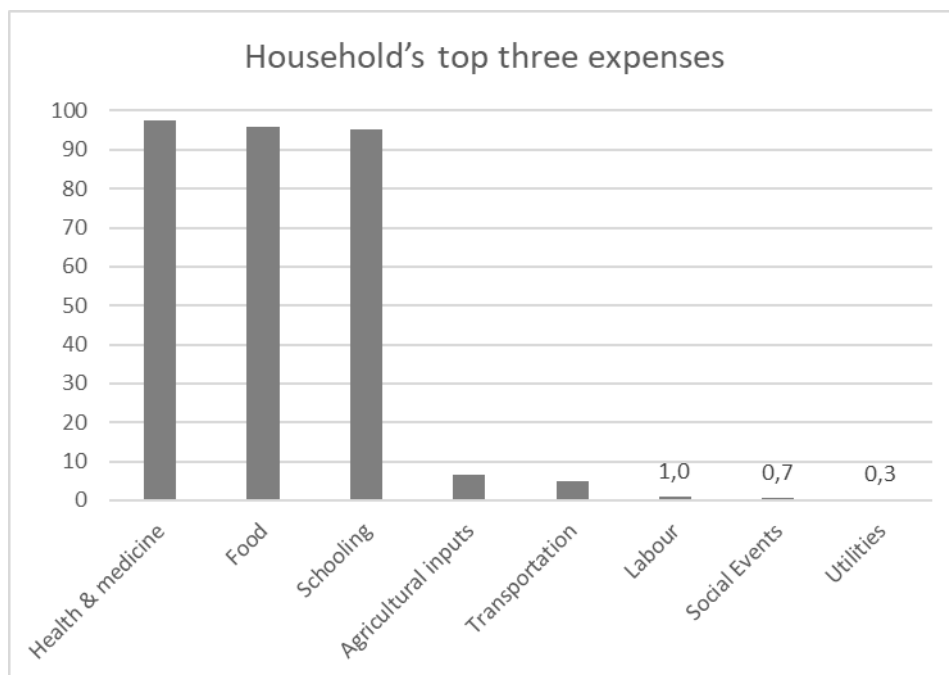


Figure 7-112 – Household's top three expenses in the project area.

<sup>21</sup> Ibid

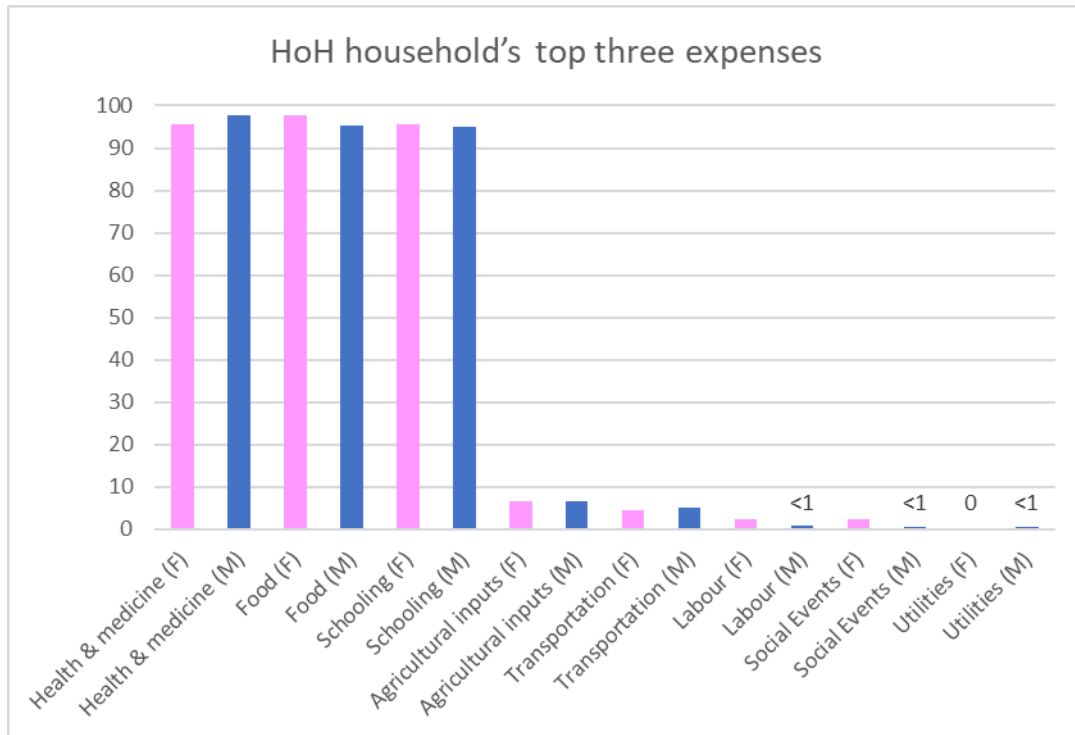


Figure 7-113 – Comparison between male and female households on the top three expenses in the project area.

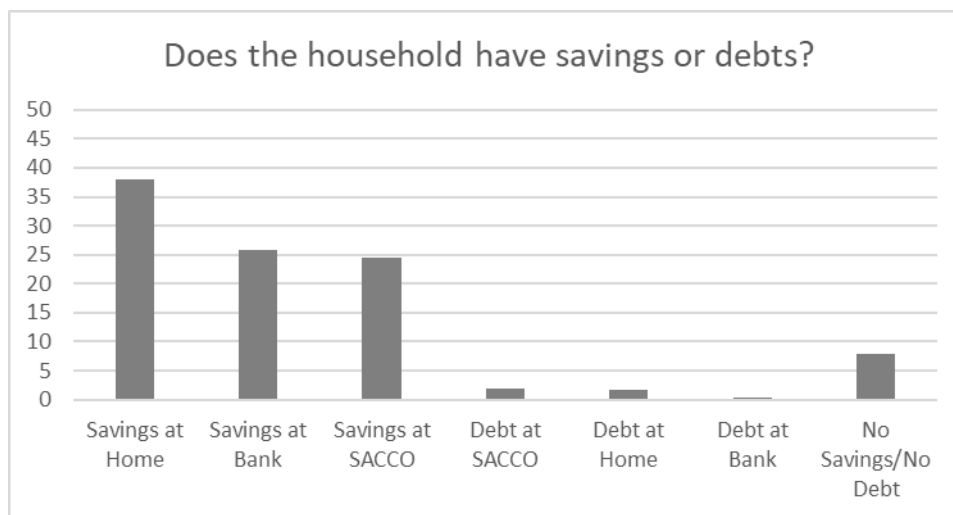


Figure 7-114 – Household's savings or debts in the project area.

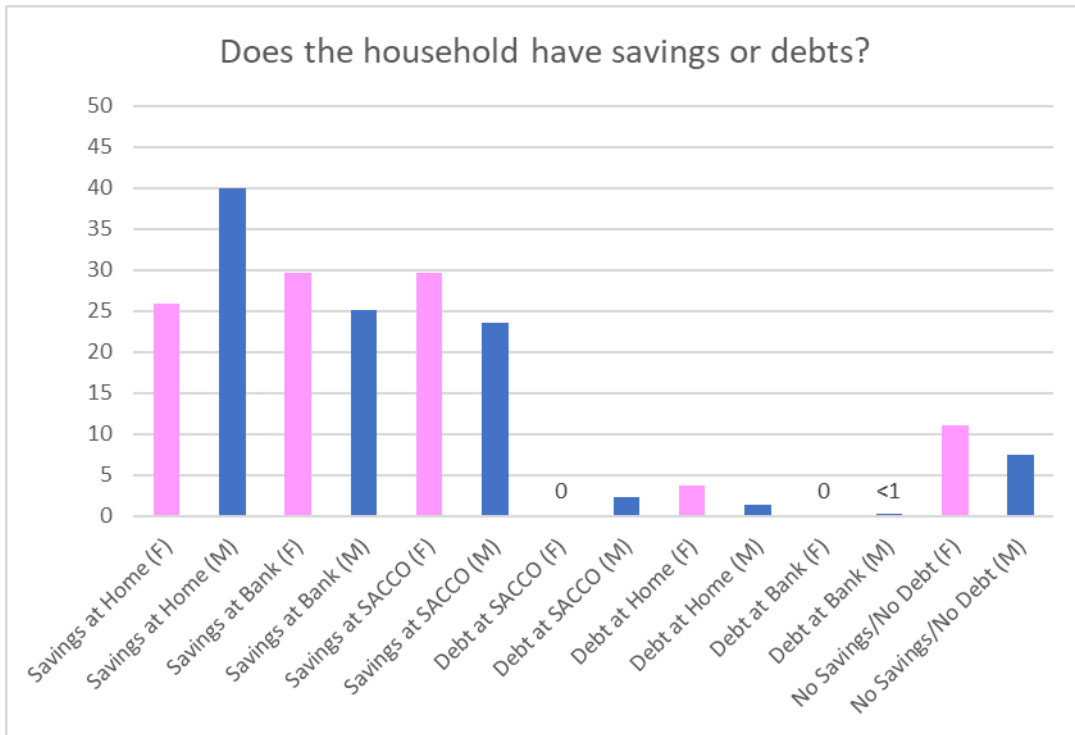


Figure 7-115 – Comparison between male and female households on the savings or debts in the project area.

### 7.5. Physical Cultural Resources

At the time of the first exploration of Uganda, there were three main kingdoms, each ruled by a monarch and laws and customs of their own. The kingdoms of Buganda, Kitara (sub-divided into Bunyoro and Toro) and Karagwe are all well documented. It is believed that these kingdoms originated around the 16th century, the land before that probably being occupied by Bushmen. The Bantu originated from the west coast of Africa, migrating along the Niger River, and occupied the northern, central and western parts of Uganda. The eastern part of Uganda, occupied some 250 years ago by the Nilo-Hamitic tribes, never formed a kingdom because the people were nomadic and the area was not well suited to agriculture.

For what concern-built heritage there are no indication of monuments or major heritage site in the project areas, though it is clear from the analysis of previous studies that in the project area the main evidence of remains refers to family burial sites as common practice in north of Uganda in Acholi sub region. Kaiser (2008) describes how the Acholi people typically bury family members on the family compound, maintaining a shrine to the family ancestors nearby.

## 8. ENVIRONMENTAL AND SOCIAL IMPACTS

The impact assessment phase generates the baseline (pre-project) environment, assesses the significance of the potential impacts (direct and indirect, secondary, cumulative, short medium and long term, permanent and temporary, reversible and irreversible, beneficial and adverse) identified during scoping, and identifies mitigation measures that could minimize negative impacts and/or enhance benefits.

### 8.1. Methodology for Impact Assessment

The impact evaluation method is based on the careful analysis and classification on a qualitative/quantitative scale.

The impact factors identified during the analysis of the project and through the definition of the project phases and project actions are assessed in their relevance, using a scoring system.

- **Duration (D):** is the duration of the impact factor and can vary from short to long according to the following definitions:
  - o Short: when the duration is shorter than a month;
  - o medium-short: when the duration is between one and six months;
  - o medium: when the duration is between six months and one year;
  - o medium-long: when the duration is between one and three years;
  - o long: when the duration is over three years.
- **Frequency (F):** is the frequency with which the impact factor manifests itself:
  - o sporadic;
  - o moderately frequent: if it consists of a few events evenly or randomly distributed over time;
  - o frequent: if it consists of numerous events evenly or randomly distributed over time;
  - o highly frequent: if it consists of a high number of events evenly or randomly distributed over time;
  - o continuous: if the event has no interruption over time.
- **Spatial extent (E):** is the geographical area within which the impact factor can exert its effects:
  - o project footprint: the impact factor is confined within the facilities owned or exclusively controlled by the project;
  - o local: the impact factor extends to the areas or communities neighboring the project site (within 1 km);
  - o regional: the impact factor extends to an area beyond the surroundings of the project site and to regional physical (airshed – watershed, etc.) or administrative boundaries (within 10 km);
  - o beyond regional: the impact factor extends throughout several regions or to the entire country (within 100 km);
  - o global: the impact factor has a global reach
- **Intensity (I):** is a measure of the physical, biological, economic or social severity of the impact factor:
  - o negligible: the impact factor is generated in quantities that cannot be easily detected or perceived and that are unlikely to be able to cause any detectable change in the target environmental or social components;
  - o low: the impact factor is generated in quantities that can be detected or perceived but whose effects are unlikely to cause tangible changes in the target environmental or social components;

- medium: the impact factor is generated in quantities that are well within legal standards or accepted practices and/or whose effects are likely to cause tangible changes in the target environmental or social components;
- high: the impact factor is generated in quantities that are at the limit of legal standards or accepted practices and/or whose effects are likely to cause serious impairment in the target environmental or social components;
- very high: the impact factor is generated in quantities that are at risk of exceeding the limits of legal standards or accepted practices and/or whose effects are likely to cause very serious to catastrophic damage to the target environmental or social components
- **Sensitivity (S):** The sensitivity of an environmental or social component is typically evaluated on the basis of the presence/absence of some features which define both the current degree of the environmental or socio-economic quality and the susceptibility to environmental or social changes of the component:
  - Low
  - Medium-low
  - Medium
  - Medium-high
  - High
- **Reversibility (R):** is the property of an impact to diminish its magnitude over time and to eventually recede entirely:
  - Reversible in the short term: if the initial condition of the component will be restored within one week after the end of the impact factor and/or the restoration activities;
  - Reversible in the short-mid-term: if the initial condition of the component will be restored within one month after the end of the impact factor and/or the restoration activities;
  - Reversible in the mid term: if the initial condition of the component will be restored within one year after the end of the impact factor and/or the restoration activities;
  - Reversible in the long term: if the initial condition of the component will be restored within 10 or more years after the end of the impact factor and/or the restoration activities;
  - Irreversible: if it is not possible to predict the restoration of the initial conditions.

Each of the parameters listed above can have a value between 1 and 5. The severity of the impact is determined through an Impact Factor Score (IFS) which is the sum of the 4 initial parameters (Duration, Frequency, Spatial Extent and Intensity), hence it can assume a value between 5 and 20.

The **Impact Value (IV)**, which represents the impact magnitude or significance, is then calculated by multiplying the Impact Factor Score by the Sensitivity (S) and by the value of the Reversibility (R), i.e.  $IV = IFS \times S \times R$ .

The additional step consists in assessing the effectiveness of the mitigation measures to reduce or eliminate the negative impact. The mitigation measures will be defined with reference to the mitigation Hierarchy. The effectiveness of the mitigation measures defined in the environmental and social management plan should be assessed using expert judgement and the findings from the previous application of the measures to similar projects. The definitions of the **mitigation effectiveness** are:

- None: the impact cannot be mitigated
- Low: the measures can reduce the impacts up to 20% of the expected magnitude
- Medium: the measures can reduce the impacts up to 40% of the expected magnitude
- Medium-high: the measures can reduce the impacts up to 60% of the expected magnitude
- High: the measures can reduce the impacts up to 80% of the expected magnitude

The Mitigation effectiveness is measured on a scale 1 – 0,2 (1 = minimum effectiveness; 0,2 = maximum effectiveness).



The assessment of positive impacts is based on the same parameters of the assessment of the negative impacts, with the only difference that the mitigation measures are replaced by enhancement measures, or measures to maximize the potential positive impacts.

The **residual impact** is obtained multiplying the impact value (IV) by the mitigation effectiveness (or the enhancement effectiveness in the case of positive impacts).

The scale of the residual impact resulting from the calculation described above ranges from 0,8 to 500. The impact value is then scaled in 5 levels by dividing the entire distribution of values obtained in 5 homogeneous classes of values.

The negative impacts and residual negative impacts are classified in 5 levels using the table below.

Residual impact score	Residual impact definition	
0,8 - 33,0	Negligible	
33,1 - 76,0	Low	
76,1 - 136,0	Medium	
136,1 - 228,0	High	
228,1 - 500,0	Very High	

The positive impacts and the residual positive impacts are classified in 5 levels using the table below.

Residual impact score	Residual impact definition	
0,8 - 33,0	Negligible	
33,1 - 76,0	Low	
76,1 - 136,0	Medium	
136,1 - 228,0	High	
228,1 - 500,0	Very High	

The methodology described above allows for an analytical assessment of impacts caused by individual impact factors over individual components, based on expert judgement and defined scoring system. Impacts are therefore presented in separate tables for negative and positive impacts.

Impact assessment is provided for the physical, biological and socio-cultural environment and is also differentiated between the two phases of project development (construction and operation phase).

As the characteristics of some impacts are different, the impact assessment of transmission line and substation components on the physical environment are presented in separate chapters. The impacts on the biological and socio-cultural environment, instead, are evaluated considering the project as a whole.

### 8.1.1. Social Impact Assessment

The assessment refers to the following indicators:

1. Introducing community defined indicators of project impact  
 The assessment will consider the perception of the project impact among local communities by looking at community defined indicators. This is because project's impact may differ depending on the socio-economic profile and wealth status, livelihood system and productive specialization of the affected population. Other criteria may come into play in shaping local perceptions of

project's impact, such as residents' background and status as victims of war, or their historical residency.

2. Using quantitative and qualitative indicators to develop a compensation and relocation plans  
Beyond qualitative community impact indicators, quantitative data will be collected to appreciate local opinions, perceptions and feeling related to the project activities that can be expressed numerically using participatory ranking or scoring methods. This approach will be useful to evaluate the appropriateness of non-monetary compensation measures (such as the procurement or delivery of inputs, the construction of schools or health centers), for example by referring to increase of school attendance and access to basic services in other areas where similar measures have been already introduced. In case of relocation, these indicators will consider whereas houses and other improvements were made to the property, as well as the length and degree of the occupation, in order to introduce adequate compensation according to these criteria.

### **8.1.2. Carbon Sequestration and Climate Change Assessment**

The methodology for estimating carbon stock as described in Inception Report relies on the combined use of the Invest software and R software, along with the use of Sentinel II imagery.

The choice of Sentinel II imagery is driven by its suitability for land cover and vegetation analysis. Imagery with the appropriate resolution (10 meters) will be selected to ensure accurate delineation of different land cover types and vegetation densities.

Spatial and Temporal Segmentation: the analysis will indeed be segmented into distinct periods, capturing variations in carbon dynamics throughout the year and focusing on key seasons, aligning with significant seasonal changes in vegetation growth and land cover patterns. This segmentation will enhance the precision of carbon stock estimation. For imagery and GIS Scripts, the GIS Specialist will be provided with detailed softcopies of the imagery, including metadata information. This will allow to assess the accuracy of the image classification and verify the spatial distribution of land cover types. Additionally, the scripts used for data preprocessing, image classification, and carbon stock calculation will be shared. These scripts will be well-documented and structured to ensure transparency and reproducibility.

In terms of the modelling and calculation process:

- a. **Image Preprocessing**: we will perform radiometric and atmospheric corrections on the Sentinel II imagery to ensure accurate reflectance values for subsequent analysis.
- b. **Land Cover Classification**: Using the sen2r R package, we will employ machine learning algorithms to classify land cover types in each seasonal image. This step involves training the algorithm with labelled data and then applying it to classify the entire image.
- c. **Carbon Stock Calculation**: Carbon stock will be estimated using established relationships between land cover types and carbon content. we will leverage existing studies and databases to assign carbon density values to each land cover class. By overlaying the classified images with these values, we will calculate carbon stock for both above-ground and below-ground vegetation. The Invest software will be used to manage this task.
- d. **GIS Analysis**: Spatial analysis tools in GIS will help validate the accuracy of the classified imagery, assess changes in land cover over time, and calculate the spatial distribution of carbon stock.

Detailed provisions to mitigate GHG emissions will be included in ESMP, with a specific reference to PCBs (Polychlorinated Biphenyls) and SF6 (Sulphur hexafluorides), even if PCBs are banned by Stockholm International Convention since 2001 and the convention entered into force in Uganda in 2004.

## 8.2. Potential Positive Impacts on the Physical Environment

### 8.2.1. Reduction of Greenhouse Gases (GHG) emissions

The project is expected to cause as a positive impact the reduction of Greenhouse Gases (GHG) emissions associated to electricity generation from fossil fuels in Uganda. It is expected that the interconnection project will increase the reliability of electricity supply and promote the use of energy from renewable resources, with particular regard to hydropower generation. This perspective is aligned with national commitment under the Paris Agreement (2015), the 3<sup>rd</sup> National Development 2020/21 – 2024/25 and the Sustainable Development Goals (SDGs) related to Africa Union Vision 2063.

As a matter of fact, the presence of the interconnection can have a positive impact on the Ugandan hydropower generation fleet, since the power surplus can be exchanged towards South Sudan reducing the system over-generation associated to the hydropower plants. Moreover, the interconnection is expected to represent a boost for hydroelectric development also in South Sudan in the near future. This scenario opens to the possibility for Uganda to import the excess hydroelectric power from South Sudan rather than using its costly thermal generating units.

An additional potential co-benefit of the rural electrification associated to the project is the possibility to provide rural households the opportunity to use electricity for their energy needs as an alternative to firewood and charcoal. Firewood harvesting is responsible for much deforestation, and the project could help reduce the deforestation rate in the areas to be connected to the line and their surroundings.

The illustrated aspects represent a positive impact with very high significance, producing direct and permanent benefits at regional level and contributing to reduce GHG emissions on a global scale. The detailed evaluation of this positive impact is provided in the following matrix.

Table 8-1 – Matrix of positive impacts on physical environment

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Reduction of GHG emissions from electricity consumption	Duration (D):	Long	Medium-high	Long term	Very High	Low	Very High
	Frequency (F):	Continuous					
	Spatial extent (E):	Global					
	Intensity(I):	Medium					

## 8.3. Negative Impacts on the Physical Environment

### 8.3.1. Negative Impacts during the Construction stage – Transmission line component

#### 8.3.1.1. Climate

The project construction activities likely to cause negative impact on climate are:

- The greenhouse gases (GHGs) emissions due to fuel consumption in construction equipment, vehicles and construction camps;
- The permanent clearance of vegetation along transmission line corridor, new SS area and access roads.

#### Greenhouse gases emission

The emissions of greenhouse gases (GHGs) derive from fuel consumption in equipment, vehicles and construction camps during the construction activities. This can be considered in the context of contribution to global climate change, with a medium-long term duration. However, the intensity of such

impact is deemed negligible, since the total amount of GHG emissions expected in the construction of the transmission line is considered low.

The GHG emission is therefore evaluated as an impact with low significance, given that it will contribute with an extremely moderate degree to global climate change.

Moreover, this impact can be successfully reduced by adopting appropriate mitigation measures, such as proper maintenance of vehicles and construction machinery, periodical monitoring of engine emissions, reduction of vehicle velocity, etc. The residual impact value is negligible.

#### Reduction of carbon sinks

The vegetation clearing in the transmission line right of way / wayleave and in other permanent and temporary works areas will result in a loss of vegetation biomass and consequent loss of carbon sequestration capacity. Based on land cover classification from satellite imagery (Par. 8.6.2.2), it is estimated that approx. 192 ha of forest will be cleared in the transmission line 60m RoW and Wayleave. Calculations of cleared biomass and corresponding carbon stock are carried out according to the methodology described in Par. 8.1.2 and are provided in Annex 5. The loss of total carbon stock attributable to project implementation is estimated in 33036.75 tons.

Since the cleared forested area represents approx. 18% of the overall extent of transmission line RoW and Wayleave, this impact is judged of medium intensity. The project area is characterized mainly by agricultural areas and the vegetation clearing affects scattered portions of woodland areas, savanna and forest/savanna mosaic, which sensitivity is deemed low.

The reduction of carbon sinks due to vegetation clearance is rated as an impact with low significance, overall. However, the loss of biomass is almost irreversible, given that vegetation growth will not be allowed in the transmission line right of way and limited to a height of 1.8 m in the wayleave.

#### *8.3.1.2. Geology and Soils*

Project activities with the greatest potential to affect geological features and soils of the area include land-clearing and vegetation removal, and excavation for tower foundations and the substation. Specific activities and potential effects include:

- Erosion and topsoil loss due to land clearing and vegetation removal along roads, at tower foundations/excavations, at construction staging areas, along new roads, and at the substation: exposing the soil to precipitation and run-off makes it subject to erosion, which in turn leads to loss of topsoil and less fertile soils, and erosion can smother areas where the eroded material comes to rest. Loss of fertile topsoil may impact agricultural productivity, causing loss in livelihoods. If proper care is not taken valuable topsoil could be lost and this in turn could affect the success of the program to restore vegetation. Depending on weather conditions, permanent or temporary measures to ensure proper drainage may need to be taken. If proper care is not taken, some areas could become more susceptible to landslides and mudslides.
- Erosion and topsoil loss due to excavation: to install the tower foundations, it will be necessary to remove topsoil from an area of about 1.5-2 meters square at each of the four corners of each tower and then dig through soil and rock to a depth of 1-2 meters. At the substation site, the substation will be built on top of the current ground surface, but some excavation may be required. Excavations will generate up to several cubic meters of topsoil and spoil at each tower location and some amount at the substation. If not properly stored and protected, soil and spoil can erode and damage other land where it is deposited, and topsoil can be lost.
- Opening borrow pits or other excavations to acquire fill material: if spoil generated at individual sites is not enough for site stabilization and restoration, the contractor may need to

buy rock and spoil or to exploit suitable deposits. It is likely that little or no additional spoil will be needed. However, without proper management and closure, quarries or borrow pits lead to significant erosion and, in steep terrain, landslides or mudslides.

- Machinery operations: movement of vehicles and equipment can compact soil, leading to losses in fertility and hinder the re-establishment of vegetation; particularly in wet weather conditions, it can also cause rutting, disturb soil, and increase the potential for erosion. The risk is higher in areas that have not been disturbed and in lowlands with clay soils.

Some minor maintenance of roads will be needed during operation, especially to maintain proper drainage and prevent erosion, but such minor works will not cause significant impacts.

Occasionally, towers or conductors may need to be replaced, in which case many of the same risks would apply but on a smaller scale.

The main impacts generated by all the foregoing activities, that would take place during construction, are illustrated in the following.

#### Changes in local morphology

Changes in local morphology, direct and permanent, are expected, but limited to the points of implantation of each of the tower pillars and the substations' areas. The extent of the impact is local since it is likely to occur in a well-defined area within the RoW. Given that the project area is generally flat or gently sloped, this impact is considered to have negligible intensity and low sensitivity. Changes in local morphology are therefore rated as an impact of low significance.

#### Disposal of excavation materials

It is probable that the construction works will generate residual excavation soil, not used for backfilling. This impact may be mitigated if the excavated soils are used for the project's embankments demands or on other engineering works that are being carried out in the surroundings. Also important to mitigate the excess of soils that cannot be used on local embankments is their use on quarries requalification located around the project influence area. This impact is anyway rated of low significance.

The application of mitigation measures allows to reduce the residual impact to a negligible value.

#### Soil erosion and slope instability

Clearance of vegetation and earthworks for the camps, substations, access roads and the tower foundations during the construction phase would result in loss of vegetation and removal of topsoil and subsoil to varying depths, as well as soil compaction.

This would result in these limited areas of ground becoming exposed, thus being vulnerable to erosion by wind and water; stockpiles would be also vulnerable to erosion. Compaction of soils in areas heavily utilised by machinery (e.g. at the camps, access tracks and around the towers) reduces permeability and results in decreased infiltration and increased runoff. Removal of the topsoil horizon changes the soil profile, which may inhibit soil rehabilitation which may, in turn, increase the erosion potential of the soil.

The impact is considered of medium importance, since the potential for soil erosion in the project area is medium. The extent of the impact is limited to the project footprint and its duration is medium-long, as it could occur throughout and beyond the entire construction phase.

The application of general mitigation measures (soil and erosion management plan, proper drainage throughout construction and on permanent works, revegetation program after construction, etc.) will reduce soil vulnerability to erosion or compaction. As a matter of fact, the residual impact is deemed low.

### 8.3.1.3. Hydrogeology – Groundwater contamination

Construction sites involve the handling and management of a number of pollutants, namely hazardous materials including fuel, solid waste, wastewater, as well as concrete / cement runoff.

Possible negative impacts may result from on-site accidents during the works, especially with the spillage and leakages of oil tanks, vehicles or machinery used. Spills and leaks of fuel; leachate from waste management practices or from hazardous solid waste (such as solvent bottles, oily rags etc.) being disposed of incorrectly, sewage from ablution facilities (with the potential to spread waterborne diseases and change the dissolved oxygen content of the water as organic wastes are decomposed); and runoff from concrete batching areas all pose a risk to the groundwater environment and could potentially contaminate the aquifer.

The negative impact of an accident contaminating groundwater quality is considered of low intensity, even if generally having medium-long duration and affecting potentially the regional scale. Sensitivity is judged medium, depending on the local depth of water table. The impact as a whole is rated of medium importance, but it can be significantly mitigated adopting appropriate mitigation measures (proper storage and handling of oil, fuel and lubricants; satisfactory disposal of solid and liquid waste generated by campsites; safety procedures; implementation of water management system; etc.). the residual impact value is rated low.

### 8.3.1.4. Surface water resources

Surface water and groundwater could be affected by construction activities near rivers or other surface water, excavations in areas of shallow groundwater, and spills of fuel or other materials into or near water as briefly described below. Specific activities and potential effects include:

- Construction activities would include land clearing at towers, construction sites, roads, and the substation site as well as vehicle fueling or maintenance that is undertaken near water bodies. Disturbing the ground surface will allow soil run-off into nearby surface waters, thus increasing total solids and turbidity in surface water, which could affect its use by humans or wildlife and affect fisheries. Compaction of roads and land clearing could increase surface runoff, which could reduce infiltration, and this in turn could affect groundwater. Eventually, working near rivers or streams and crossing small streams with vehicles and equipment could contaminate water with petroleum products.
- Excavations for tower foundations could intercept shallow groundwater, which may have to be pumped out until foundations are installed.
- Pollution: Accidental spillage or leakage of fuel, lubricants, paints or other materials could contaminate surface water and/or groundwater directly or could contaminate soils that are then eroded into surface water. Improper disposal of used oil and inadequate provision of sanitary and waste facilities would have adverse effect to the ground and surface water quality. Concrete works can also contaminate water and contribute excess alkalinity, which would make it less useful by people or wildlife. Herbicides used for vegetation control could contaminate water.
- Withdrawal of water for construction purposes (for washing equipment, for use in cement, etc.) could reduce availability of water for other purposes.
- Interruption of floodwaters: generally, towers are not located in drainageways or occupy a significant portion of floodplains, so there is limited or no risk of towers interfering with floodwaters and making floods worse. However, a higher risk will be where roads cross small streams; such streams may be ephemeral in nature, and disturbance of drainageways could lead to erosion when water flows through the drainage way following rainfall or could lead to contamination from materials carried or o in the vehicles. In addition, stringing conductors

between towers will require heavy equipment to cross some streams and drainage ways and to be near riverbanks of larger rivers, and this disturbance could lead to erosion and present the risk of spills.

The main impacts generated by all the foregoing activities, that would take place during construction, are illustrated in the following.

#### Increased turbidity and total suspended solids in rivers and streams

Land clearance and excavation activities allow soil run-off into nearby surface waters, thus increasing total solids and turbidity in surface water, which could affect its use by humans or wildlife and affect fisheries.

The impact is considered of medium importance, since the potential for soil erosion in the project area is medium. The extent of the impact is considered local and its duration is medium-long, as it could occur throughout and beyond the entire construction phase.

The application of general mitigation measures (soil and erosion management plan, proper drainage throughout construction and on permanent works, revegetation program after construction, etc.) will reduce soil vulnerability to erosion or compaction and, consequently, also increase of turbidity and suspended solids in affected water courses. The residual impact is considered negligible.

#### Pollution of rivers and streams

Contaminated run-off from spill sites could have an adverse impact on water quality if it is drained into surface water bodies or infiltrated in the groundwater. The extent of this impact will vary depending on the size, frequency, and timing of spills (if any) and leaks in relation to conditions in the receiving surface water bodies, soil properties at the point source, and the nature of the materials involved, including their toxicity.

The extent of this potential impact will also vary depending on the location and properties of soil at discharge points and the dilution/mixing regime possible in the receiving waters.

The negative impact of an accident contaminating surface water quality is considered of medium intensity, generally having medium-long duration and affecting the local scale. Sensitivity of existing water bodies is judged medium-low. The impact is rated of medium importance as a whole, but it can be significantly mitigated adopting appropriate mitigation measures (proper storage and handling of oil, fuel and lubricants; satisfactory disposal of solid and liquid waste generated by campsites; safety procedures; implementation of water management system; etc.). The residual impact value is judged low.

#### 8.3.1.5. Air Quality

During the construction phase, several construction activities will be conducted simultaneously at separate locations around the work sites (e.g.: excavations, off-road equipment operation, traffic along the RoW and on unpaved roads, etc.). These activities will generate dust and exhaust emissions, which will lead to temporary air quality deterioration and disturbances to neighbouring populations.

Specifically, the primary activities that could generate air pollution include:

- Movement of vehicles and equipment on unpaved roads and construction zones will create dust. The amount of dust will depend on vehicle speed (higher speeds and larger size vehicles generate more dust), silt content (smaller particle size of silt vs sand will increase dust generation), and moisture content of the ground surface (wet vs dry). Very small particles can be carried relatively long distances by high winds, but usually dust settles within a few tens of meters of where it is created.

- Earthworks (clearing and grubbing) and excavations at construction sites will also create dust. Again, the distance dust is carried would depend on particle size and wind; most dust would settle within a short distance of the site except under windy conditions.
- Open piles of topsoil and spoil, and areas of bare earth at construction sites can generate dust in windy conditions.
- Operation of combustion engines in vehicles, heavy equipment, generators, and other equipment will generate exhaust gases that contain air pollutants, including particulates (soot), sulphur dioxide, nitrogen oxides, and volatile organic compounds. These pollutants can affect visibility, create smog, and damage health.

The main impacts generated by all the foregoing activities, that would take place during construction, are illustrated in the following.

#### Exhaust gases emissions

Construction activities will likely entail the use of vehicles, machinery and equipment (such as generators, compressors, etc.) which are expected to be a source of gaseous pollutant emissions (such as SO<sub>x</sub>, NO<sub>2</sub>, CO<sub>2</sub>, CO, etc.) which would also have minimal direct impacts on ambient air quality.

The intensity of the impact is judged medium. The extent is regional since exhaust emissions are likely to be generated along the road network and within the RoW and construction sites. The duration of the impact is medium-long since air quality deterioration is likely to be experienced throughout the entire construction phase. The project area is mainly located in rural areas where atmospheric pollution is low, therefore the sensitivity is judged medium-low. The application of appropriate mitigation measures (maintenance of vehicles and construction machinery, periodical monitoring of engine emissions, reduction of vehicle velocity, etc.) will help reducing significantly exhaust emissions. The impact on air quality during the construction phase is thus considered of minor importance.

#### Particulate matter and dust emissions

Site preparation activities which are to take place onsite by the Contractor for the OHTL transmission towers and the various Project components to include foundations, cables, access roads, etc. are expected to include land clearing activities, levelling, excavation, grading, etc. Such activities are limited to the relatively small individual footprints of these facilities and the actual area of disturbance is relatively minimal. Nevertheless, such activities will likely result in an increased level of dust and particulate matter emissions, which in turn will directly and temporarily impact ambient air quality. If improperly managed, there is a risk of nuisance and health effects to construction workers onsite.

Each of these operations has its own duration and potential for dust generation and therefore the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations and the prevailing meteorological conditions.

The intensity of the impact is considered potentially high. The extent is regional since dust and particulate matter emissions are likely to be generated in all construction sites, including access roads and local road network, and can spread in nearby areas, according to meteorological conditions. The duration of the impact is medium-long since air quality deterioration is likely to be experienced throughout the entire construction phase. The dust impact is rated as an impact with medium importance.

The application of appropriate mitigation measures (dust suppression, locate dust causing activities and soil stockpiles away from sensitive receptors, introduction of speed limits, regular maintenance of vehicles and machinery, etc.) will help to reduce significantly dust and PM emissions, lowering the residual impact to low value.



#### 8.3.1.6. Increase of noise and vibration levels

Noise and vibration levels are likely to be increased at the construction phase during site preparation, tower erection, construction of substations and access roads. In some locations, work will be done in close proximity to residences, farms or businesses located along the RoW and near substations. Traffic, as well as the use of construction equipment and machinery, will lead to temporary noise emissions that may disturb neighbouring communities and local fauna. If not managed properly, they can lead to a risk of nuisance and adverse health effects for construction workers on site, given that construction activities can produce sound levels superior than what is recommended by the IFC Guidelines.

Noise levels measurements that have been conducted revealed no significant noise stress in the project area.

The intensity of the impact is considered medium and the extent is local. The duration is medium-long, since increase of noise and vibration is likely to be experienced throughout the entire construction phase. The impact is highly frequent but is not continuous, since noise level would vary substantially from day to day depending on the level of activity, the specific operations, and the topographical and atmospheric conditions.

The noise and vibration impact is rated as an impact with low importance, overall. Moreover, noise resulting from the construction work will only be experienced during a limited time frame and can be significantly reduced with the implementation of general mitigation measures. These measures include maintaining machinery and equipment in good running conditions and restricting noise-generating activities to daytime hours.

The residual impact is rated negligible.

#### 8.3.1.7. Waste production

Construction activities will result in the generation of a number of different waste streams including domestic waste, rubble, hazardous waste and sewage. These are from the presence of construction workers (domestic waste and sewage), the generation of rubble and spoil from earthworks as well as the use of hazardous chemicals and by-products thereof, such as fuel and concrete/cement.

Contractors and sub-contractors will be required to develop and implement waste management plans that comply with relevant AfDB/IFC waste management guidelines in order to ensure that various types of waste to be produced during the construction phase are adequately recovered, stored and disposed of. With adequate management and disposal of solid waste and effluents, the impact is expected to have negligible significance.

#### 8.3.1.8. Summary of negative impacts on the physical environment during the construction phase of transmission line

The potential negative impacts expected to arise from the construction of the transmission line on physical environment are summarized in the following matrix.

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Table 8-2 – Matrix of negative impacts on physical environment during the construction phase of transmission line.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
	Duration (D):	Medium-long					
Increased emission of GHG	Frequency (F):	Continuous	Low	Irreversible	Low	Medium-high	Negligible
	Spatial extent (E):	Global					
	Intensity(I):	Negligible					
	Duration (D):	Long					
Reduction of carbon sinks (due to vegetation clearance)	Frequency (F):	Continuous	Low	Irreversible	Low	None	Low
	Spatial extent (E):	Project footprint					
	Intensity(I):	Medium					
	Duration (D):	Long					
Changes in local morphology	Frequency (F):	Continuous	Low	Irreversible	Low	None	Low
	Spatial extent (E):	Local					
	Intensity(I):	Negligible					
	Duration (D):	Long					
Soil disposal	Frequency (F):	Highly frequent	Medium-low	Mid term	Low	Medium-high	Negligible
	Spatial extent (E):	Project footprint					
	Intensity(I):	Negligible					
	Duration (D):	Medium-short					
Soil erosion and slope instability	Frequency (F):	Moderately frequent	Medium	Mid term	Medium	Medium-high	Low
	Spatial extent (E):	Project footprint					
	Intensity(I):	Medium					
	Duration (D):	Medium-long					
Groundwater contamination	Frequency (F):	Sporadic	Medium	Long term	Medium	Medium-high	Low
	Spatial extent (E):	Regional					
	Intensity(I):	Low					
	Duration (D):	Medium-long					
Increased turbidity and total suspended solids in river and	Frequency (F):	Frequent	Medium	Short-term	Low	Medium	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	Medium					
	Duration (D):	Medium-long					
Pollutants contamination in rivers and streams	Frequency (F):	Moderately frequent	Medium-high	Short-mid-term	Medium	Medium	Low
	Spatial extent (E):	Local					
	Intensity(I):	Medium					
	Duration (D):	Medium-long					
Exhaust gas emissions	Frequency (F):	Continuous	Medium-low	Short-term	Negligible	Medium	Negligible
	Spatial extent (E):	Regional					
	Intensity(I):	Medium					
	Duration (D):	Medium-long					
PM and dust emissions	Frequency (F):	Continuous	Medium-high	Short-mid-term	Medium	Medium-high	Low
	Spatial extent (E):	Regional					
	Intensity(I):	High					
	Duration (D):	Medium-long					
Increase of Noise and vibration levels	Frequency (F):	Highly frequent	Medium	Short-term	Low	Medium-high	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	High					
	Duration (D):	Medium-long					
Waste production	Frequency (F):	Continuous	Medium	Short-term	Low	Medium-high	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	Medium					
	Duration (D):	Medium-long					

### **8.3.2. Negative Impacts during the Operation stage – Transmission line component**

#### **8.3.2.1. Landscape - Visual and Aesthetic Impact**

Visual impacts associated typically concern the OHTL towers themselves (e.g., colour, height and number) and impacts relating to their interaction with the character of the surrounding landscape and the visual receptor which might be present.

The landscape and visual resources of an area, which include both natural and man-made features, are of great importance to people living in and passing through the area. The overall aesthetic impact of a transmission line is likely to be negative for most people, especially where proposed lines would cross natural landscapes and private property. However, some people may not notice transmission lines or may not find them aesthetically objectionable. Aesthetic effects depend on the physical relationship between the viewer and the transmission line, the activity of the viewer and the contrast between the transmission structures and the surroundings.

The visual and aesthetic impact of the transmission line is permanent, irreversible, affecting the regional scale and of high intensity. Since the project area is mainly a rural area with few infrastructures, the sensitivity of the environment to this impact is deemed high. Therefore, the visual and aesthetic impact of the project is rated very high and not mitigable.

#### **8.3.2.2. Water resources**

##### Reduction of aquifer's recharge

The construction of substation and transmission line foundations will lead to an increase of impervious surfaces in the project footprint, reducing locally the infiltration rate of rainfall and potentially affecting the recharge of aquifers. However, it must be considered that the expected reduction of recharge area is very small and will therefore represent a negligible impact.

#### **8.3.2.3. Increase of noise levels**

During the operation phase, overhead transmission lines can be sources of noise, due to the wind effect on the conductor cables and the corona effect (noise from electrical discharges). However, the project mostly lies in rural areas and most of the sensitive receptors are at a safe distance from the source. Furthermore, these noise sources are weather related and during dry weather the lines are usually quieter. During periods of wind and rain, ambient noise levels also tend to increase, so the noise generated in the power lines is also considered negligible.

#### **8.3.2.4. Electromagnetic field**

All equipment that generates, distributes or uses electricity produces electromagnetic fields (EMFs). Transmission lines generate EMFs around the conductors. Electric field depend on the operating voltage of the equipment, which is a relatively constant value, and are measured in V/m (volts per meter). Magnetic fields depend on the electrical currents flowing, which vary according to the electrical power requirements at any given time and are measured in  $\mu\text{T}$  (microteslas).

Most electric power systems operate at a frequency of 50 or 60 Hz (50 Hz in the case of Uganda) and the associated EMF is therefore classified in the range of extremely low frequency (ELF) fields, i.e. comprised in the range >0 to 100 kHz.

Since the late 1970s, questions have been raised whether exposure to these extremely low frequency (ELF) electric and magnetic fields (EMF) produces adverse health consequences. Since then, much research has been done, successfully resolving important issues and narrowing the focus of future research. For example, there are established biological effects from acute exposure at high levels (well above 100  $\mu$ T) that are explained by recognized biophysical mechanisms.

Much of the scientific research is examining long-term risks from ELF magnetic field exposure. In 2002 the International Agency for Research on Cancer (IARC) published a monograph classifying ELF magnetic fields as “possible carcinogenic to humans”, based on some limited evidences of correlation (childhood leukemia). However, there is no agreement among the scientific community about certain chronic effects of EMFs. The World Health Organization (WHO) states that no adverse health effects from low level, long-term exposure to electromagnetic fields have been confirmed to date, but scientists are actively continuing to research this area.

The recommendations and guidelines of the European Union for limiting the exposure of the general public (EU recommendation 1999/519/EC) or workers (EU Directive 2013/35/EU, which replaced the former EU Directive 2004/40/EC) are a common basis for legislation in many countries in Europe. In both guidance documents, the limits are derived in large part from the recommendations of the “*ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz)*”, published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in 1998.

The recommended exposure limits to ELF fields are defined so that the threshold at which the interactions between the body and the external electric and magnetic field causes adverse effects is never reached inside the body. The exposure limits outside the body, called reference levels, are derived from the basic restrictions using worst-case exposure assumptions, in such a way that remaining below the reference levels (in the air) implies that the basic restrictions will also be met (in the body).

ICNIRP has issued new guidelines for EMF with frequencies between 1 hertz and 100 kilohertz in 2010 (“*ICNIRP Guidelines for Limiting Exposure to Time-varying Electric and Magnetic Fields (1 Hz – 100 kHz)*”), but these have not yet led to changes in the EU recommendation. The reference levels for general public and occupational exposure, according to ICNIRP guidelines published in 1998 and 2010, are provided in the following table.

*Table 8-3 – Reference (threshold) levels for public and occupational exposure to extremely low frequency (ELF) electromagnetic fields (EMFs) from ICNIRP Guidelines.*

	Frequency (Hz)	General public Exposure		Occupational Exposure	
		Electric Field (V/m)	Magnetic Flux Density ( $\mu$ T)	Electric Field (V/m)	Magnetic Flux Density ( $\mu$ T)
ICNIRP 1998 and EU guidelines	50	5,000	100	10,000	500
	60	4,150	83	8,300	415
ICNIRP 2010	50	5,000	200	10,000	1,000
	60	4,150	200	8,300	1,000

Both electric fields and magnetic fields decrease rapidly as the distance from the source increases. Therefore, in order to maintain safety of the general public and minimize exposure to EMFs, a suitable RoW / wayleave distance from the transmission line is adopted so that the EMFs would effectively attenuate at the edge of this RoW. The proposed 10m for the Right of Way (RoW) and additional 25m of Wayleave to each side of the RoW is considered sufficient to mitigate any perceived health effect from the transmission line.

Electric and magnetic field profiles under a 400 kV transmission line (at 1 m from ground) are reported in Figure 8-1 and Figure 8-2, respectively.

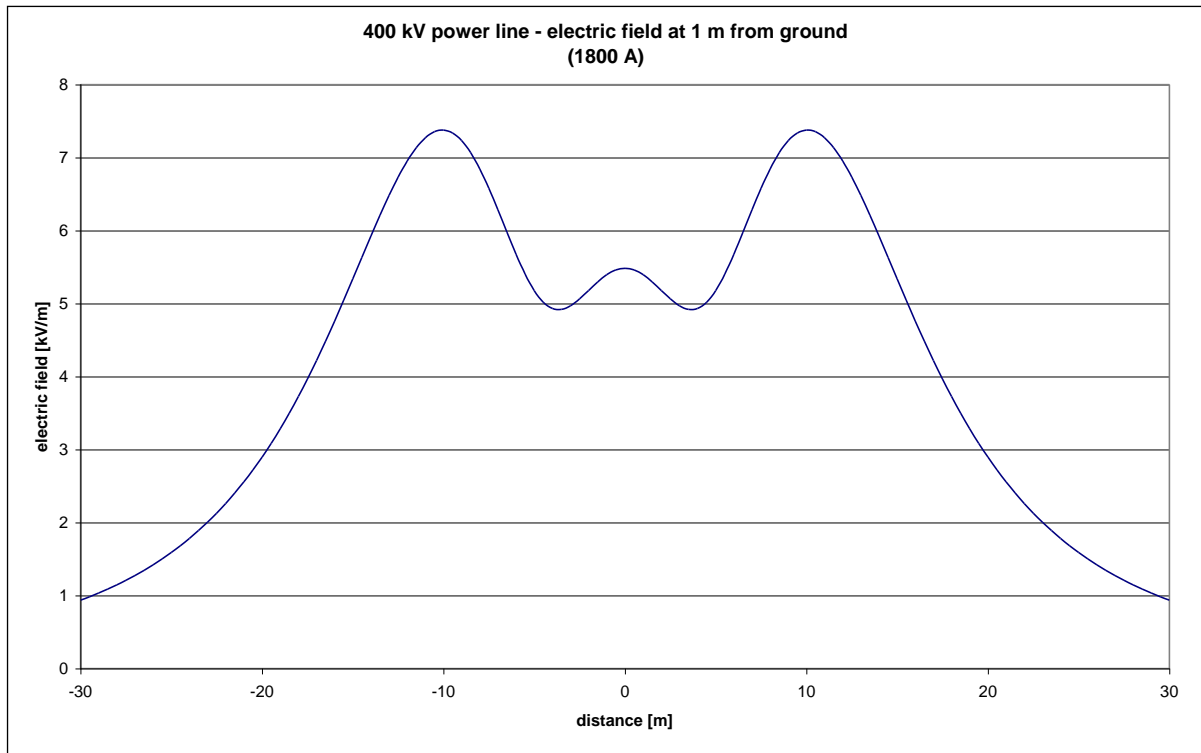


Figure 8-1 – Electric field [kV/m] at 1 meter from ground generated from a 400 kV power line (1,800 A).

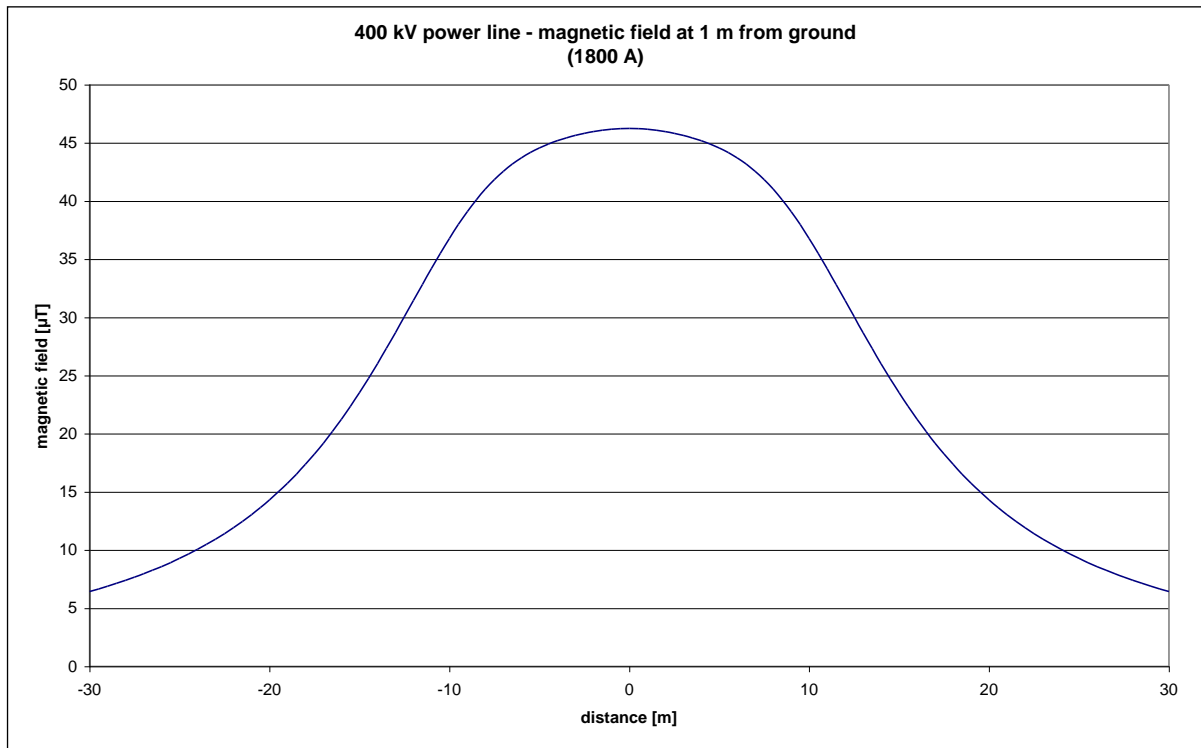


Figure 8-2 – Magnetic field [μT] at 1 meter from ground generated from a 400 kV power line (1,800 A).

Calculation shows that outside a belt of about 16 + 16 m width on both sides of the power line, unperturbed electric field levels are lower than 5 kV/m. Moreover, calculated magnetic field values are always well under 100 μT for locations that can be attended by general public.

As far as general public exposure is concerned, it is to be noted that the ground-level electric field is often reduced due to the screening effect produced by objects such as trees, buildings, fences, vehicle, etc. As far as buildings are concerned, it is important to recall that, in addition to the attenuation of the ground-level electric field they determine in their vicinity, they also act as good screens for their interiors. Indeed, due to the considerable screening effect of walls, the electric field generated by external sources undergoes a ten- to hundred-fold reduction.

The impact due to EMF field during project lifetime is a permanent, long-term and continuous impact, limited to the project footprint. According to the expected levels of electric and magnetic fields, the impact is considered of low intensity. Since transmission line passes through rural areas, with low population density, the sensitivity to this impact is judged medium-low. As previously stated, the expected levels of electric and magnetic fields are abundantly below the general public exposure limits outside the transmission line Right of Way and Wayleave. Therefore, the residual impact is rated negligible.

**8.3.2.5. Summary of negative impacts on the physical environment during the operation phase of transmission line**

The potential negative impacts expected to arise from the operation of the transmission line on physical environment are summarized in the following matrix.

*Table 8-4 – Matrix of negative impacts on physical environment during the operation phase of transmission line*

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Visual and aesthetic impact	Duration (D):	Long	Medium-high	Irreversible	Very High	None	Very High
	Frequency (F):	Continuous					
	Spatial extent (E):	Regional					
	Intensity (I):	High					
Reduction of aquifer's recharge area	Duration (D):	Long	Low	Irreversible	Low	Medium-high	Negligible
	Frequency (F):	Continuous					
	Spatial extent (E):	Local					
	Intensity (I):	Negligible					
Noise - Wind effect on cables and corona discharge	Duration (D):	Long	Medium-low	Short-term	Negligible	None	Negligible
	Frequency (F):	Moderately frequent					
	Spatial extent (E):	Project footprint					
	Intensity (I):	Negligible					
Increase of Electromagnetic field	Duration (D):	Long	Medium-low	Irreversible	Medium	High	Negligible
	Frequency (F):	Continuous					
	Spatial extent (E):	Project footprint					
	Intensity (I):	Low					

**8.3.3. Negative Impacts during the Construction stage – Substation component**

**8.3.3.1. Climate**

Greenhouse gases emission

The GHG emission is evaluated as an impact with low significance, given that it will contribute with an extremely moderate degree to global climate change.

Moreover, this impact can be successfully reduced by adopting appropriate mitigation measures, such as proper maintenance of vehicles and construction machinery, periodical monitoring of engine emissions, reduction of vehicle velocity, etc. The residual impact value is negligible.

#### Reduction of carbon sinks

Vegetation clearance in the substations area is limited and therefore the reduction of carbon sinks due to vegetation clearance is rated as an impact with low significance. However, the loss of biomass is almost irreversible, given that vegetation growth will not be allowed in the substation area. The residual impact is equally low.

#### *8.3.3.2. Geology and Soils*

Project activities with the greatest potential to affect geological features and soils of the area include land-clearing, vegetation removal and excavation for the substations. Specific activities and potential effects include:

- Erosion and topsoil loss due to land clearing and vegetation removal at the substation sites;
- Erosion and topsoil loss due to excavation at substation sites: earthworks will be performed to make the substation land suitable for installation of supporting structures and equipment, for erection of control building and related dependencies, with drainage to evacuate water in all conditions and of sufficient size to allow access to maintenance equipment;
- Machinery operations: movement of vehicles and equipment can compact soil, leading to losses in fertility and hinder the re-establishment of vegetation in the surrounding of the substation sites; particularly in wet weather conditions, it can also cause rutting, disturb soil, and increase the potential for erosion. The risk is higher in areas that have not been disturbed and in lowlands with clay soils.

The main impacts generated by all the foregoing activities, that would take place during construction, are illustrated in the following.

#### Changes in local morphology

Changes in local morphology, direct and permanent, are expected in the substations' areas. The extent of the impact is limited to project footprint since it will occur in a well-defined area. This impact is considered to have negligible intensity and low sensitivity. Changes in local morphology are therefore rated as an impact of low significance.

#### Disposal of excavation materials

It is probable that the construction works will generate residual excavation soil, not used for backfilling, that will require proper disposal. This impact is judged having low importance.

It may be mitigated if the excavated soils are used for the project's embankments demands or on other engineering works that are being carried out in the surroundings. Also important to mitigate the excess of soils that cannot be used on local embankments is their use on quarries requalification located around the project influence area. The residual impact is rated of negligible significance.

#### Soil erosion and slope instability

Clearance of vegetation and earthworks for the substations during the construction phase would result in removal of topsoil and subsoil to varying depths, increase of erosion potential as well as soil compaction.

The impact is considered of low importance, given the limited extensions of substation sites. The extent of the impact is limited to the project footprint and its duration is medium-long, as it could occur throughout and beyond the entire construction phase.

The application of general mitigation measures (soil and erosion management plan, proper drainage throughout construction and on permanent works, etc.) will reduce soil vulnerability to erosion or compaction. The residual impact is deemed negligible.

#### 8.3.3.3. *Hydrogeology – Groundwater contamination*

Impacts on groundwater would arise due to activities that cause soil erosion, discharge of sanitary water, contaminant spills (especially oil) and leaching of accumulated/dumped wastes at the event of rainfall or runoff water. Soil contamination could also occur by merely the contact between the waste and the soil.

The negative impact of an accident contaminating groundwater quality is considered of low intensity, generally having medium-long duration and affecting the local scale. Sensitivity is judged medium-low. The impact as a whole is rated of low importance, but it can be significantly mitigated adopting appropriate mitigation measures (proper storage and handling of oil, fuel and lubricants; satisfactory disposal of solid and liquid waste generated by campsites; safety procedures; implementation of water management system; etc.). The residual impact value is rated negligible.

#### 8.3.3.4. *Surface water resources*

Regarding the potential pollution of surface water, it is not expected that the construction of the substations will have significant impacts, as there are no surface water bodies as well as drinking water facilities at the substation sites. Only a small stream is present in the proximity of Olwiyo substation, but it is not foreseen to be affected by construction activities due to its distance (approximately 300-350 m) from the substation.

The possible impacts on surface water (increased turbidity and total suspended solids, pollution of rivers and streams) are deemed negligible.

#### 8.3.3.5. *Air Quality*

Construction of the SS and installation of the equipment will include several activities such as excavation, land clearing, earthworks, stock piling transportation of construction material and equipment, burial of cables and pipes, etc. Those activities in consequence are expected to emit air pollutants to the ambient air, however it will be conducted for a short periods. The following air pollutants are foreseeable for most of the construction activities:

- Dust and particulate matter emissions (PM<sub>10</sub>, PM<sub>2.5</sub>)
- Exhaust of vehicles or equipment such as temporary generators, trucks, trolley, etc.

#### Particulate matter and dust emissions

In the vicinity of project site, dust emissions will slightly negatively impact ambient air quality, particularly during the initial phases of construction.

Site preparation activities which are to take place onsite by the Contractor for the substations are expected to include land clearing activities, levelling, excavation, grading, etc. Such activities are limited to the relatively small substation areas and the actual area of disturbance is limited. Nevertheless, such



activities will likely result in an increased level of dust and particulate matter emissions, which in turn will directly and temporarily impact ambient air quality. If improperly managed, there is a risk of nuisance and health effects to construction workers onsite.

Each of these operations has its own duration and potential for dust generation and therefore the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations and the prevailing meteorological conditions.

The intensity of the impact is considered high. The extent is local since dust and particulate matter emissions will be generated in substation construction sites and can spread in nearby areas, according to meteorological conditions. The duration of the impact is medium since air quality deterioration is likely to be experienced throughout the substation construction phase. The dust impact at substations is rated as an impact with low importance.

The application of appropriate mitigation measures (dust suppression, locate dust causing activities and soil stockpiles away from sensitive receptors, introduction of speed limits, regular maintenance of vehicles and machinery, etc.) will help to reduce significantly dust and PM emissions, lowering the residual impact to negligible value.

#### Exhaust gases emissions

Construction activities will likely entail the use of vehicles, machinery and equipment (such as generators, compressors, etc.) which are expected to be a source of gaseous pollutant emissions (such as SO<sub>x</sub>, NO<sub>2</sub>, CO<sub>2</sub>, CO, PM, etc.) which would also have low direct impacts on ambient air quality.

The intensity of the impact is judged medium. The extent is local since exhaust emissions are likely to be generated at the substation construction sites. The duration of the impact is medium. The project area is mainly located in rural areas where atmospheric pollution is low, therefore the sensitivity is judged medium. The application of appropriate mitigation measures (maintenance of vehicles and construction machinery, periodical monitoring of engine emissions, reduction of vehicle velocity, etc.) will help reducing significantly exhaust emissions. The impact on air quality during the construction phase is thus considered of minor importance.

#### *8.3.3.6. Increase of noise and vibration levels*

Noise and vibration levels are likely to be increased at the construction phase during site preparation, and construction activities at substations. Traffic, as well as the use of construction equipment and machinery, will lead to temporary noise emissions that may disturb neighbouring communities and local fauna. If not managed properly, they can lead to a risk of nuisance and adverse health effects for construction workers on site, given that construction activities can produce sound levels superior than what is recommended by the IFC Guidelines.

Construction activities will also result in varying degrees of ground-borne vibration depending on the stage of construction, the equipment and construction methods employed, the distance from the construction locations to vibration-sensitive receptors and soil conditions. According to the proposed activities during the construction phase of substations, the concern of vibration comes from the truck movements and construction of the infrastructures and installation of the equipment.

Noise levels measurements that have been conducted revealed no significant noise stress in the project area.

The intensity of the impact is considered high and the extent is local. The duration is medium, since increase of noise and vibration is likely to be experienced throughout the substation construction phase. The impact is highly frequent but is not continuous, since noise level would vary substantially from day

to day depending on the level of activity, the specific operations, and the topographical and atmospheric conditions.

The noise and vibration impact is rated as an impact with low importance, overall. Moreover, noise resulting from the construction work will only be experienced during a limited time frame and can be significantly reduced with the implementation of general mitigation measures. These measures include maintaining machinery and equipment in good running conditions and restricting noise-generating activities to daytime hours.

The residual impact is rated negligible.

#### *8.3.3.7. Waste production*

Construction activities will result in the generation of a number of different waste streams including domestic waste, rubble, hazardous waste and sewage. These are from the presence of construction workers (domestic waste and sewage), the generation of rubble and spoil from earthworks as well as the use of hazardous chemicals and by-products thereof, such as fuel and concrete/cement.

Contractors and sub-contractors will be required to develop and implement waste management plans that comply with relevant AfDB/IFC waste management guidelines in order to ensure that various types of waste to be produced during the construction phase are adequately recovered, stored and disposed of. With adequate management and disposal of solid waste and effluents, the impact is expected to have negligible significance.

#### *8.3.3.8. Summary of negative impacts on the physical environment during the construction phase of substations*

The potential negative impacts expected to arise from the construction of the transmission line on physical environment are summarized in the following matrix.

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Table 8-5 – Matrix of negative impacts on physical environment during the construction phase of the substation.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
	Duration (D):	Medium					
Increased emission of GHG	Frequency (F):	Continuous	Low	Long term	Low	Medium-high	Negligible
	Spatial extent (E):	Regional					
	Intensity(I):	Negligible					
	Duration (D):	Long					
Reduction of carbon sinks (due to vegetation clearance)	Frequency (F):	Continuous	Low	Irreversible	Low	None	Low
	Spatial extent (E):	Project footprint					
	Intensity(I):	Negligible					
	Duration (D):	Long					
Changes in local morphology	Frequency (F):	Continuous	Low	Irreversible	Low	None	Low
	Spatial extent (E):	Project footprint					
	Intensity(I):	Negligible					
	Duration (D):	Long					
Soil disposal	Frequency (F):	Moderately frequent	Medium-low	Mid term	Low	Medium-high	Negligible
	Spatial extent (E):	Project footprint					
	Intensity(I):	Low					
	Duration (D):	Medium-short					
Soil erosion and slope instability	Frequency (F):	Moderately frequent	Medium-low	Mid term	Low	Medium-high	Negligible
	Spatial extent (E):	Project footprint					
	Intensity(I):	Low					
	Duration (D):	Medium-long					
Groundwater contamination	Frequency (F):	Sporadic	Medium-low	Long term	Low	Medium-high	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	Low					
	Duration (D):	Medium-long					
Increased turbidity and total suspended solids in river	Frequency (F):	Moderately frequent	Medium-low	Short-term	Negligible	Medium	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	Low					
	Duration (D):	Medium					
Pollutants contamination in rivers and streams	Frequency (F):	Sporadic	Medium-low	Short-mid-term	Negligible	Medium	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	Low					
	Duration (D):	Medium					
Exhaust gas emissions	Frequency (F):	Highly frequent	Medium	Short-term	Low	Medium	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	Medium					
	Duration (D):	Medium					
PM and dust emissions	Frequency (F):	Highly frequent	Medium	Short-term	Low	Medium-high	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	High					
	Duration (D):	Medium					
Increase of Noise and vibration levels	Frequency (F):	Highly frequent	Medium	Short-term	Low	Medium-high	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	High					
	Duration (D):	Medium					
Waste production	Frequency (F):	Continuous	Medium	Short-term	Low	Medium-high	Negligible
	Spatial extent (E):	Local					
	Intensity(I):	Medium					
	Duration (D):	Medium					

### **8.3.4. Negative Impacts during the Operation stage – Substation component**

#### **8.3.4.1. Climate – Greenhouse gases emission**

In operation phase, other GHG emission sources are related to possible fugitive emissions of Sulphur hexafluorides (SF<sub>6</sub>). Sulphur hexafluorides is a gas typically used as an insulator for electrical switching equipment and in cables, tubular transmission lines and transformers. If gas-insulated equipment is installed and used at the substation, SF<sub>6</sub> may escape as fugitive emissions during manufacturing, use, maintenance and disposal. SF<sub>6</sub> is a powerful greenhouse gas that must be managed carefully to avoid leaks and emissions. The scale of SF<sub>6</sub> emissions will be dependent on the type of and number of equipment used during operation as well as the maintenance and recycling procedures employed during operation and decommissioning.

This impact can be considered in the context of contribution to global climate change, with a medium-long term duration. However, the operational emissions are unlikely to be significant, if appropriately managed and proper maintenance practices are implemented to ensure emissions are kept to a minimum. Therefore, the GHG emission during operation is evaluated as an impact with low significance, given that it would contribute with an extremely moderate degree to global climate change.

Detailed provisions to avoid and mitigate SF<sub>6</sub> emissions are included in ESMP. The residual impact value is negligible.

#### **8.3.4.2. Water resources**

##### Reduction of aquifer's recharge

The construction of substation will lead to an increase of impervious surfaces (control building, foundations for electrical equipment and paved areas), reducing locally the infiltration rate of rainfall and potentially affecting the recharge of aquifers. However, it must be considered that the expected reduction of recharge area is very small and will therefore represent a negligible impact.

##### Groundwater and surface water contamination

Sources of soil and water contamination during the operations phase will result from spillage of fuels, lubricants and other toxic materials from project equipment such as transformers at substation sites and maintenance vehicles. This could lead to groundwater contamination, in proportion with the magnitude of these accidental events. Regarding the potential pollution of surface water, it is not expected that the operation of the substations will have significant impacts, as there are no surface water bodies as well as drinking water facilities at the substation sites.

It must be underlined that the use of insulating oil containing Polychlorinated Biphenyls (PCBs) shall be avoided, since PCBs are banned by Stockholm International Convention since 2001 and the convention entered into force in Sudan in 2006.

Domestic and sanitary waste will also be generated during operations and maintenance of the substation even though there will be a limited number of project personnel at the site.

The negative impact of an accident contaminating groundwater quality is considered of medium intensity, generally having medium-long duration and affecting the local scale. Sensitivity of existing groundwater table is judged medium-low. The impact is rated of medium importance as a whole, but it can be significantly mitigated adopting appropriate mitigation measures (proper storage and handling of oil, fuel and lubricants; satisfactory disposal of solid and liquid waste; safety procedures; implementation of water management system; etc.). The residual impact value is judged negligible.

### *Increase of noise levels*

During the operation phase, substations comprise several sources of noise emissions, the most significant being the continuous radiation of audible discrete tones. The noise of this type is primarily generated by power transformers, reactors, emergency generators, etc. Despite this, the expected noise levels are low and thus the impact is negligible.

#### *8.3.4.3. Electromagnetic field*

As far as general public exposure is concerned, it is to be noted that the ground-level electric field is often reduced due to the screening effect produced by objects such as trees, buildings, fences, vehicle, etc. As far as buildings are concerned, it is important to recall that, in addition to the attenuation of the ground-level electric field they determine in their vicinity, they also act as good screens for their interiors. Indeed, due to the considerable screening effect of walls, the electric field generated by external sources undergoes a ten- to hundred-fold reduction.

The reference levels for general public and occupational exposure, according to ICNIRP guidelines published in 1998 and 2010, are provided in Table 8-3.

With respect to substations, in general, the strongest EMF around a substation comes from the power lines entering and leaving the substation. The strength of the EMF from equipment within the substations, such as transformers, reactors and capacitor banks, decreases rapidly with increasing distance. Calculation shows that outside a belt of about 16 + 16 m width on both sides of the power line, unperturbed electric field levels are lower than 5 kV/m. Moreover, calculated magnetic field values are always well under 100  $\mu$ T for locations that can be attended by general public.

Beyond the substation fence or wall, the EMF produced by the substation equipment is typically indistinguishable from background levels.

The impact due to EMF field during project lifetime is a permanent, long-term and continuous impact, limited to the project footprint. According to the expected levels of electric and magnetic fields, the impact is considered of low intensity. Since substations are located in rural areas, with low population density, the sensitivity to this impact is judged medium-low. As previously stated, the expected levels of electric and magnetic fields are abundantly below the general public exposure limits outside the substation area. Therefore, the residual impact is rated negligible.

#### *8.3.4.4. Summary of negative impacts on the physical environment during the operation phase of substations*

The potential negative impacts expected to arise from the operation of the transmission line on physical environment are summarized in the following matrix.

Table 8-6 – Matrix of negative impacts on physical environment during the operation phase of transmission line

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
GHG emissions	Duration (D):	Medium-long	Low	Irreversible	Low	Medium-high	Negligible
	Frequency (F):	Sporadic					
	Spatial extent (E):	Global					
	Intensity(I):	Negligible					
Reduction of aquifer's recharge area	Duration (D):	Long	Low	Irreversible	Low	Medium-high	Negligible
	Frequency (F):	Continuous					
	Spatial extent (E):	Local					
	Intensity(I):	Negligible					
Risk of groundwater and surface water contamination	Duration (D):	Medium-long	Medium	Long term	Medium	High	Negligible
	Frequency (F):	Sporadic					
	Spatial extent (E):	Local					
	Intensity(I):	High					
Noise - Operation of the substations	Duration (D):	Long	Low	Short-term	Negligible	None	Negligible
	Frequency (F):	Sporadic					
	Spatial extent (E):	Project footprint					
	Intensity(I):	Negligible					
Increase of Electromagnetic field	Duration (D):	Long	Medium-low	Irreversible	Medium	High	Negligible
	Frequency (F):	Continuous					
	Spatial extent (E):	Project footprint					
	Intensity(I):	Low					

### 8.4. Negative Impacts on the Biological Environment

Transmission lines might cause significant impacts on the environment both during the construction and operation phases (Figure 8-3). The most obvious impacts of transmission lines on the environment are associated with the Right of Way (RoW), the zone below the cables where vegetation is cleared and managed to avoid interference and risk to line structures and/or to energy transmission.

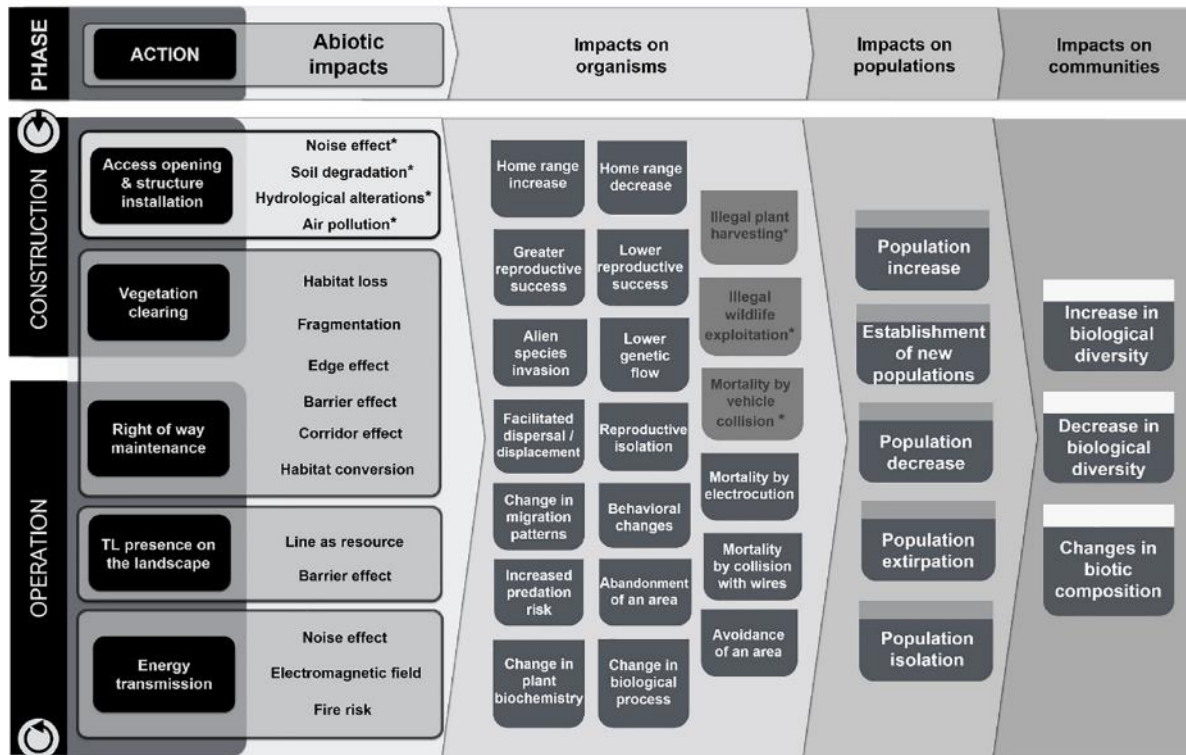


Figure 8-3 – Framework summarizing abiotic and biotic impacts documented in the systematic review, with their respective phases and main causal actions. Note that “Vegetation clearing” and “Right of way maintenance” are common to both phases and share the same set of abiotic impacts. Modified by Biasotto & Kindel 2018.

The impact from the construction of a transmission line can be measured in several different ways. Useful measurements of impacts may be area, distance, or the number of transmission structures. The effect of the transmission line on the area may depend on the topography, land cover, and existing land uses. In forested areas for example, the entire right-of-way (RoW) width is cleared and maintained free of tall-growing trees for the life of the transmission line. The result is a permanent change to the RoW land cover. In agricultural areas, heavy construction vehicles traverse the RoW and temporarily suspend the use of the land for crop production. After construction ends and the fields are properly restored however, the land beneath the line can be cropped or pastured. The degree of impact of the transmission line is determined by the quality or uniqueness of the existing environment along the proposed route. The quality of the existing environment is influenced by several factors:

- 1) The degree of disturbance that already exists  
The significance of prior disturbance can be evaluated by determining how close the place resembles pre-settlement conditions. Many areas have been substantially altered by logging, the installation of drain tiles, residential and commercial developments, or conversion to cropland.
- 2) The uniqueness of the resources  
Proposed transmission route is reviewed for species or community types that are uncommon or in decline in the region. The environmental review evaluates whether the resource possesses a feature that would make it unique, such as its size, species diversity, or whether the resource plays a special role in the surrounding landscape.
- 3) The threat of future disturbance  
The resource is compared to surrounding land uses that may affect the quality of the resource over time. Considerations include whether the current and likely future land uses may threaten

some aspect of the resource or whether the resource is valued by the adjacent community and therefore, likely to be preserved.

#### **8.4.1. Impacts during the Construction stage**

##### **8.4.1.1. Impacts on Agricultural Lands**

During the construction phase of this project, agricultural lands within the project area face significant impacts that can disrupt farm operations and increase operational costs for farm operators. The placement of transmission lines and associated structures introduces various challenges to agricultural activities:

- **Disruption of Field Operations:** The construction activities may disrupt regular field operations, complicating the movement of machinery and interrupting established fieldwork patterns crucial for efficient farming practices.
- **Soil Compaction and Damage:** Transmission structures have the potential to compact soils and damage drain tiles, compromising soil structure and the integrity of drainage systems vital for agricultural productivity.
- **Safety Hazards:** The installation of poles and guy wires poses safety hazards, presenting risks to farm workers and equipment operating in the vicinity.
- **Interference with Irrigation:** Transmission lines may interfere with the movement of irrigation equipment, limiting access to water resources essential for crop growth and management.
- **Impediments to Land Use:** The presence of transmission structures may impede future land consolidation efforts or subdivision for residential development, restricting the flexibility of land use within the project area.

Soil mixing, erosion, rutting, and compaction represent common challenges associated with transmission construction, all of which can significantly affect future crop yields and soil health. Excavation activities conducted for pole foundations or underground electrical lines may lead to soil mixing, highlighting the importance of avoiding the mixing of excavated parent material or subsoils with topsoils. Moreover, significant rutting may occur, particularly in areas with saturated or sensitive soils, exacerbating issues related to soil mixing, erosion, and compaction. The degree of soil compaction depends on soil type and saturation levels, with heavy construction equipment potentially exacerbating compaction concerns. Inadequate erosion controls during construction may lead to the erosion of valuable topsoils during rain events, impacting agricultural productivity and potentially affecting nearby wetlands and waterways. Proper protection and mitigation measures for agricultural soils during transmission line construction are crucial to prevent decreased yields in the years following construction. Therefore, it is imperative to implement effective management practices and adhere to environmental regulations to mitigate adverse impacts on agricultural lands, ensuring the long-term sustainability of farming operations within the project area.

##### **8.4.1.2. Impacts to Endangered/Threatened and Protected Species and habitat**

Endangered species, those whose continued existence is at risk, and threatened species, which are likely to become endangered, face potential disruption and habitat alteration during the construction and maintenance of transmission lines. Additionally, species classified under the Special Concern category, indicating suspected problems with abundance or distribution, may also be affected. The primary concern is the potential destruction of individual plants and animals or alterations to their habitat that render it unsuitable for their survival. For instance, trees utilized by rare birds for nesting purposes may be cut down, or soil erosion resulting from construction activities may degrade rivers and wetlands crucial for providing necessary habitat. To mitigate these impacts effectively, it is essential to map the presence



and distribution of endangered, threatened, and special concern species. Given the presence of vulnerable species in the area, the need for mapping is particularly crucial, as it informs targeted conservation efforts and proactive measures to protect these species and their habitats throughout the project lifecycle.

#### 8.4.1.3. Impacts by Invasive Alien Species

Non-native plants found outside of their natural range can become invasive. Many non-native species are harmless because they do not reproduce or spread abundantly in their new surroundings. However, a small percentage of non-native species are able to become quickly established, are highly tolerant of a wide range of conditions, and are easily dispersed. Over time, non-native, invasive species can overwhelm and eliminate native species, reducing biodiversity and negatively affecting both ecological communities and wildlife habitats. Human actions are the primary means of invasive species introductions. Transmission line construction causes disturbance of RoW soils and vegetation through the movement of people and vehicles along the RoW, access roads, and laydown areas. These activities can contribute to the spread of invasive alien species. Parts of plants, seeds, and root stocks can contaminate construction equipment and essentially “seed” invasive alien species wherever the vehicle travels. Once introduced, invasive species will likely spread and impact adjacent properties with the appropriate habitat.

#### 8.4.1.4. Impacts to wetlands

Wetlands occur in many different forms and serve vital functions including storing runoff, regenerating groundwater, filtering sediments and pollutants, and providing habitat for aquatic species and wildlife. The construction of the transmission line can impact wetlands in several ways including the following:

- Heavy machinery can crush wetland vegetation;
- Wetland soils, especially very peaty soils can be easily compacted, increasing runoff, blocking flows, and greatly reducing the wetland’s water holding capacity;
- The construction of access roads can change the quantity or direction of water flow, causing permanent damage to wetland soils and vegetation;
- Construction and maintenance equipment that crosses wetlands can stir up sediments and endanger fish and other aquatic life;
- Clearing forested wetlands changes the habitat type for decades, and can expose the wetland to invasive and shrubby plants, thus removing habitat for species in the forest interior;
- Vehicles and construction equipment can introduce exotic plant species. With few natural controls, these species may out-compete high-quality native vegetation, destroying valuable wildlife habitat.

Any of these and other activities can impair or limit wetland functions. Organic soils consist of layers of decomposed plant material that formed very slowly. Disturbed wetland soils are not easily repaired. Severe soil disturbances may permanently alter wetland hydrology. A secondary effect of disturbance is the opportunistic spread of invasive weedy species such as *Phragmites* or other similar species. These invasive species provide little food and habitat for wildlife.

Field surveys have identified various wetlands along the Right-of-Way (RoW), as outlined in paragraph 7.3.5 and in Table 8-7. Consequently, the development of targeted mitigation measures becomes crucial and imperative to address the diverse wetland ecosystems encountered during the project.

Table 8-7 – Status of wetlands affected by the project.

Wetland	Coordinates (Decimal Degree, WGS84 UTM Zone 36N)		Approximate length (meters)	Status
	Longitude	Latitude		
<b>Bidat River</b>	379682.3	289148.3	30	Natural riverine vegetation dominated by <i>Phragmites mauritianum</i> , <i>Mimosa pigra</i> , <i>Echinochloa pyramidalis</i> , <i>Cyperus difformis</i>
<b>Pamini yai River</b>	403986.8	303017.4	20	Natural Riverine woodland dominated by <i>Acacia polyacantha</i> , <i>Ficus sycomorus</i> and <i>Shirakiopsis elliptica</i>
<b>Apotogitor stream</b>	406603.2	313079.2	40	Modified riverine wetland dominated by Sugarcane <i>Sacharrum officinale</i> , <i>Phoenix reclinata</i> , <i>Echinochloa pyramidalis</i> , <i>Echinochloa colona</i> , <i>Leersia hexandra</i>
<b>Ayuge River</b>	404588	320776.2	20	Natural wetland dominated by <i>Pennisetum purpureum</i> , <i>Alchornea cordifolia</i> and <i>Echinochloa pyramidalis</i>
<b>Nyimur River</b>	420165.8	385950.3	30	Riverine bushed woodland dominated by <i>Combretum molle</i> , <i>Erythrina abyssinica</i> , <i>Vitellaria paradoxa</i> , <i>Acacia sieberiana</i> , <i>Hyperthelia dissoluta</i> and <i>Hyparrhenia cymbaria</i>
<b>Mayanju stream</b>	419981.8	387815.2	20	Streamline bushed woodland dominated by <i>Combretum molle</i> , <i>Combretum collinum</i> , <i>Philenoptera laxiflora</i> , <i>Hyparrhenia cymbaria</i> , <i>Annona senegalensis</i>

#### 8.4.1.5. Impacts on Woodlands

These can be many and differently classified, based on the nature of the forests (natural or artificial) and their extent. In general, the following impacts can be recognised:

##### Forest Fragmentation

The transmission line RoW can fragment a larger forest block into smaller tracts. Fragmentation makes interior forest species more vulnerable to predators, parasites, competition from edge species, and catastrophic events. The continued fragmentation of a forest can cause a permanent reduction in species diversity and suitable habitat. This loss of forested habitat increases the number of common (edge) plants that can encroach into what was the forest interior. This encroachment can have impacts on the number, health, and survival of interior forest species, many of which are usually rare.

### *Invasive Plants*

The activities associated with tree clearing and constructing a transmission line through or along the edge of forested areas can destroy and degrade forest habitat. Seeds and other propagating parts of non-native plants may be carried into a forest inadvertently by construction equipment. Disturbance caused by construction can then encourage aggressive growth of these invasive species. Habitat providing food and cover for local wildlife may be altered or lost if these invasive species out-compete existing native plants, resulting in a loss of plant and animal diversity.

### *Disease*

Trimming and clearing trees at certain times of the year can also contribute to the spread of disease. The cause of the disease can be usually represented by fungi that can be carried by sap-feeding beetles or spread through common root systems.

#### *8.4.1.6. Other Impacts*

A cleared RoW increases access into a forest which may lead to trespassing and vandalism. It can also provide recreation opportunities such as access for hunting.

##### *- Habitat loss and alteration*

Defined as the decrease in suitable habitat amount for organism and populations, and increase of habitat differentiations. Particularly during construction phase the route of the transmission line, the access roads to pole sites, at pole sites and staging areas will be undertaken the vegetation clearance. This impact will result into loss of vegetation cover, soil erosion in cleared areas and displacement of wildlife species that use the cleared areas as habitats. Furthermore, forest edges created by vegetation clearing could positively affect animal species from initial successional stages but negatively impacts forest-specialist species.

##### *- Illegal hunting and human-wildlife conflict*

The construction of a transmission line has resulted in illegal hunting and increased human-wildlife conflicts in the affected areas. As the project progresses, these negative impacts are likely to escalate, posing threats to both wildlife populations and human safety. Effective mitigation measures and proactive strategies are imperative to address these issues and ensure the sustainable coexistence of humans and wildlife in the project area.

##### *- Human Disturbance*

The presence of transmission lines may increase human activity in the area, including maintenance activities, vehicular traffic, and noise pollution. This human disturbance can further degrade habitats and disrupt wildlife behaviour, particularly in sensitive areas such as breeding grounds or migratory routes.

#### *8.4.1.7. Summary*

The potential negative impacts expected to arise from the project construction on biological environment are summarized in the following matrix.

Table 8-8 – Matrix of negative impacts on biological environment during the construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Agricultural lands disruption and damage	Duration (D):	Medium	Medium-low	Short-mid-term	Negligible	Medium-high	Negligible
	Frequency (F):	Sporadic					
	Spatial extent (E):	Project footprint					
	Intensity(I):	Medium					
Habitat degradation, disturbance and fragmentation	Duration (D):	Medium-long	Medium	Mid term	Medium	Medium-high	Low
	Frequency (F):	Continuous					
	Spatial extent (E):	Regional					
	Intensity(I):	Medium					
Loss of flora and vegetation	Duration (D):	Medium	Medium-high	Mid term	Medium	Medium-high	Low
	Frequency (F):	Sporadic					
	Spatial extent (E):	Project footprint					
	Intensity(I):	Medium					
Invasive alien species	Duration (D):	Long	Medium	Mid term	Medium	Medium	Low
	Frequency (F):	Frequent					
	Spatial extent (E):	Local					
	Intensity(I):	High					
Impact to threatened and protected species and habitat	Duration (D):	Medium	Medium-high	Irreversible	High	Medium-high	Low
	Frequency (F):	Sporadic					
	Spatial extent (E):	Project footprint					
	Intensity(I):	Medium					
Wetland alteration and degradation	Duration (D):	Medium-short	Medium-high	Long term	Medium	Low	Medium
	Frequency (F):	Sporadic					
	Spatial extent (E):	Project footprint					
	Intensity(I):	Medium					
Desease	Duration (D):	Medium	Medium-high	Long term	High	Medium	Medium
	Frequency (F):	Frequent					
	Spatial extent (E):	Local					
	Intensity(I):	High					
Illegal hunting and other human disturbance	Duration (D):	Medium-long	Medium-low	Short-mid-term	Low	Low	Low
	Frequency (F):	Frequent					
	Spatial extent (E):	Local					
	Intensity(I):	Medium					

### **8.4.2. Impacts during the Operation stage**

#### **8.4.2.1. Impacts on Agricultural Lands**

During the operational phase of the project, the placement of transmission structures may permanently alter land uses and disrupt existing windbreaks, leading to significant agricultural impacts within the project area. These impacts may include:

- Soil Erosion: The necessity to remove windbreaks for transmission line construction can increase soil erosion rates. Windbreaks, comprising rows of trees strategically planted along field edges or between fields, act as barriers against wind erosion and protect crops. Their removal may result in the permanent loss of topsoil, diminishing crop productivity and exacerbating soil degradation within the project area.
- Encroachment of Weeds and Pests: alterations to land use patterns due to transmission line construction can create opportunities for the encroachment of weeds and pests within the project area. Windbreaks can also serve as natural barriers that help deter the spread of weeds and pests into agricultural fields. Removal of windbreaks may lead to increased weed infestation and pest pressure, posing challenges to crop management and productivity specifically within the project area.

Preserving the integrity of windbreaks and implementing measures to mitigate soil erosion are critical considerations during the construction and operational phases of the project. Implementing strategies to protect existing windbreaks and adopting sustainable land management practices are essential for maintaining soil health and ensuring the long-term sustainability of agricultural operations within the project area.

#### **8.4.2.2. Impacts by Invasive Alien Species**

Infestation of invasive species can also occur during periodic transmission RoW maintenance activities especially if these activities include mowing and clearing of vegetation.

#### **8.4.2.3. Mortality of birds and bats**

This impact affects mainly bird species, but available evidence indicates that transmission lines could pose a collision risk and electrocution risk for bats and other mammals (as example, giraffes and elephants). Bird electrocution and collision with transmission line is one of the negative responses to transmission lines and it has been observed mainly for raptors. Bird mortality from electrocution and collision could lead to population decline and for rare species, even at low mortality rates, this impact could lead to population extirpation.

Even if no raptor or vulture species were detected during the field survey, the literature review highlights the presence of some endangered and critically endangered bird species. There are not georeferenced and recent data on endangered birds in the project area and further surveys focusing on these species need to be planned for detailed mapping. However, the presence of IBAs in the vicinity of the project area suggests that some macro-areas are more sensitive (Figure 8-4). In particular, the northern part of the transmission line is close to the Otze Forest IBA and the Nimule IBA (in South Sudan); the southern part is close to the Murchison National Park and IBA, an internationally recognized biodiversity hotspot.



Figure 8-4 – Map of the transmission line route and IBAs near to the project area. In yellow the macro-areas more sensitive for birds.

#### 8.4.2.4. Illegal hunting and human-wildlife conflict

During the operational stage of a transmission line, instances of illegal hunting and human-wildlife conflicts persist as ongoing challenges. These issues pose threats to wildlife populations and human safety in the vicinity of the transmission line.

#### 8.4.2.5. Habitat degradation and fragmentation

During the operating stage, transmission lines can cause habitat degradation and fragmentation for wildlife due to several factors:

1. **Vegetation Clearance:** Transmission lines often require the clearing of vegetation along their corridors to maintain clearance from transmission line. This vegetation clearance can lead to the loss of habitat for many species of plants and animals that rely on the vegetation for food, shelter, and breeding sites.
2. **Fragmentation of Habitat:** The construction of transmission lines can divide contiguous habitats into smaller, isolated patches. This fragmentation disrupts the natural connectivity of habitats, making it difficult for wildlife to move between areas.
3. **Barrier Effect:** Transmission lines act as physical barriers to some species movement. Animals may be hesitant to cross open spaces created by transmission line corridors, leading to

isolation of populations and limiting access to resources such as food, water, and mates. This can result in genetic isolation and reduced biodiversity within fragmented habitats.

**8.4.2.6. Human Disturbance**

The presence of transmission lines may increase human activity in the area, including maintenance activities, vehicular traffic, and noise pollution. This human disturbance can further degrade habitats and disrupt wildlife behavior, particularly in sensitive areas such as breeding grounds or migratory routes.

**8.4.2.7. Electric and Magnetic Fields (EMF) Impact**

The impacts of electromagnetic waves on organisms are still uncertain. However, some studies suspect that continuous exposure to an electromagnetic field (EMF) might generate behavioural changes and impact the reproductive success and the individual survival.

**8.4.2.8. Summary**

The potential negative impacts expected to arise from the project operation on biological environment are summarized in the following matrix.

*Table 8-9 – Matrix of negative impacts on biological environment during the operation phase.*

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Degradation of ecosystem services	Duration (D):	Medium-long	Medium	Irreversible	Medium	Medium	Medium
	Frequency (F):	Sporadic					
	Spatial extent (E):	Local					
	Intensity(I):	Low					
Loss of flora and vegetation	Duration (D):	Medium-long	Medium-low	Long term	Medium	High	Negligible
	Frequency (F):	Frequent					
	Spatial extent (E):	Regional					
	Intensity(I):	Medium					
Habitat degradation and fragmentation	Duration (D):	Medium-short	Medium	Irreversible	High	Medium	Medium
	Frequency (F):	Sporadic					
	Spatial extent (E):	Regional					
	Intensity(I):	High					
Disturbance and mortality of avifauna and bats	Duration (D):	Long	Medium-high	Irreversible	Very High	Medium-high	Medium
	Frequency (F):	Frequent					
	Spatial extent (E):	Project footprint					
	Intensity(I):	High					
Habitat degradation and fragmentation	Duration (D):	Long	Medium-low	Irreversible	High	Medium	Medium
	Frequency (F):	Continuous					
	Spatial extent (E):	Regional					
	Intensity(I):	Low					
Electric and Magnetic Fields, noise effect	Duration (D):	Medium-long	Low	Irreversible	Low	None	Low
	Frequency (F):	Continuous					
	Spatial extent (E):	Project footprint					
	Intensity(I):	Negligible					

## 8.5. Positive impacts on the Socio-Economic and Cultural Environment

### 8.5.1. Impacts during the Construction stage

#### 8.5.1.1. Employment and Income

Positive opportunities for PAPs and communities can be in the form of temporary employment, as casual labour, cooking and cleaning services

It is expected that some jobs will be available during construction of the power transmission line for the local population, mainly as casual workers. However, these employment opportunities are expected to be temporary and benefit the community in the short term only. There will be a moderately positive impact on employment, since limited number of people are likely to be employed. Nevertheless, it is a good opportunity in consideration of the poverty level in the region.

#### 8.5.1.2. Small business opportunities

As for job opportunities, small business can raise during the construction phase, for all what concern the provision of services like the sale of food and other consumable goods to workers from other parts of the country and abroad.

Table 8-10 – Matrix of positive impacts on socio-economic and cultural environment during the construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Job opportunities	Duration (D):	Medium-long	Medium	Short-mid-term	Medium	High	Medium
	Frequency (F):	Continuous					
	Spatial extent (E):	Local					
	Intensity(I):	Low					
Increase of business opportunities	Duration (D):	Medium-long	Medium	Short-mid-term	Medium	High	Medium
	Frequency (F):	Continuous					
	Spatial extent (E):	Local					
	Intensity(I):	Medium					

### 8.5.2. Impacts during the Operation stage

#### 8.5.2.1. Rural electrification

One of the most important anticipated benefits to the population is increased electricity supply to communities and households. With the additional energy supply, community institutions and trading centres could improve services, increase economic activity and accelerate their development in their areas of expertise. Effects of rural electrification are long terms and continuous, with high sensitivity in consideration of the lack of stable power in Northern Uganda.

Rural electrification will enhance the following aspects of livelihoods:

- Lighting: rural electrification brings a significant improvement in lighting compared to traditional methods like candles. This translates to brighter and more energy-efficient light sources like fluorescent lamps. Additionally, connecting to the grid ensures reliable lighting, unlike candles that can be easily extinguished and require constant refilling.
- Education: energy access allows schools to be equipped with modern technologies, providing a better service. Schools can benefit from the use of appliances such as computers, printers, and copying machines and water and clean cooking
- Communication and entertainment: With the advent of cheaper energy access, television is more accessible to consumers. Their value may be estimated by the increase time of usage.



Grid electricity also makes easier charging mobile phones easing communication and empowering rural businesses.

- Productivity: businesses are empowered through the timesaving resulting from the use of electrical appliances. For example, it allows to operate at lower costs larger machines that are required for agro-processing and producing trade, both sectors with a significant value adding potential in rural areas.
- Health: Improvements in health levels are a consequence of a multitude of factors. For instance, the possibility to operate water pumps allows an increase in hygienic standards; the reduced use of kerosene lamps, instead, reduces respiratory illnesses, relieving private and public healthcare. As reported by other studies in similar conditions connection to the grid can enhance the use of computers, printers, and copying machines, but also autoclaves, kettles and boilers. Other use of devices such as microscopes, fridges, freezers, and radio call antenna can guaranteed with grid connection, instead of generators as it happens.

*Table 8-11 – Matrix of positive impacts on socio-economic and cultural environment during the operation phase.*

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features - Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Rural Electrification	Duration (D):	Long	Very high	Irreversible	Very High	High	Very High
	Frequency (F):	Continuous					
	Spatial extent (E):	Regional					
	Intensity(I):	High					

## 8.6. Negative Impacts on the Socio-Economic and Cultural Environment

### 8.6.1. Impacts during the Construction stage

#### 8.6.1.1. Physical Displacement

The project will lead to land acquisition for transmission line right of way, causing permanent loss of land ownership for a number of families. Physical displacement can be also secondary, due to the presence of Internal Displaced People (IDP) connected to conflicts. Around 390 structures that are located within the corridor will be demolished.

This impact shall be mitigated by adequate compensation of the property losses equal to market price with assistance for relocation. Land is an important asset in Uganda in general and in the project area in particular, as the majority of the people rely on land-based livelihoods.

The impact will have a medium duration, since the procedure of land survey, land acquisition will take approximate a year and will be continuous throughout all the RAP process, the intensity is high since it will affect more than 200 people and will impact on secondary relocation. The sensitivity is high considering the nature of the impact and its irreversibility, though the mitigation effectiveness is medium high since the RAP give the possibility to compensate for the loss of structures paying the asset at full replacement costs, giving assistance in finding alternative land and in moving in the new locations. Therefore, the impacting factor which is considered high will have a medium residual impact.

#### 8.6.1.2. Economic Displacement

Economic displacement refers to the loss of income streams or means of livelihood resulting from land acquisition or obstructed access to resources (land, water, or forest) resulting from the construction or operation of a project or its associated facilities. As specified above the transmission line will require the permanent land acquisition of the Right of Way, that is a 10 m strip of the line. Along this strip the

cultivation of crops and trees below 1,8 m is still allowed except for the area that will be occupied by the tower footprint (10mx10m). According to the analysis the agricultural land that will be impacted reaches 40% of the project footprint while the remaining is occupied by shrubs, forest and by urban areas for a minimum part, it is also worth of noting that there is not cultivated land in Lamwo district under the project footprint. In consideration that the average size of a HHs land ranges from 0,3 ha to 0,7 ha, and that in one filed none to two towers can be accommodated, the permanent loss of productive land can be considered low (in the range of 10%), nevertheless the impact analysis considered also the restriction in building new structures and planting trees above a certain height in the area of the corridor (in the range of 60%), therefore the intensity of the impact raised from low to high level. The impact will have a medium duration, since the procedure of land survey, land acquisition will take approximate a year and will be continuous throughout all the RAP process. The sensitivity was marked at medium high, due to the fact that agriculture is the main economic activity in the area.

#### *8.6.1.3. Physical Cultural Resources*

The surveys detected approximate 200 graves affected by the proposed transmission line. The Acholi tribe don't have marks or identification for earth graves therefore the localization is approximate. Part of burial grounds will be encountered along the transmission line corridor in the process of tower foundations. The impact is medium long since it could happen during all the tower foundation works and it will be strictly localized to the RoW. The intensity will be medium since site specific and therefore impacting only a reduced percentage of the total graves. Due to the spiritual attachment to the graves, the sensitivity is medium high and the impact irreversible. This kind of impact can be mitigated through appropriate measures, e.g. relocation of small holy places. Monetary provision (contingency) considered in the RAP budget and chance finding procedure included in ESMP for the undetected PCR. For this reason, the mitigation is considered medium high.

#### *8.6.1.4. Disturbance during construction*

Communities living in the proximity of project construction corridor will be affected by temporary disturbance factors, such as noise, air pollution, traffic that will affect Community health and safety. The impacts will continue for all the project implementation, nevertheless being the project linear the disturbance will follow the progress of tower constructions and line stringing. Therefore, all the location nearby the line will be impacted for few months only, for this reason the intensity is low and the sensitivity is medium low, with reversible effects and high mitigation effectiveness with a well implemented ESMP.

#### *8.6.1.5. Sexual Harassment*

Large influx of male labor may also lead to an increase in exploitative sexual relationships and human trafficking whereby women and girls are forced into sex work. The impact will be continuous during all the project construction and it will have a local extension, the intensity is considered high since the Acholi Region is one of the areas with the highest rates of physical and sexual violence on women and also men. For two decades, the region was severely affected by conflict. According to different studies, these communities experienced sexual and physical violence at the hands of the insurgents, through abduction of children as sex slaves or as child soldiers, and indiscriminate mutilation and murders. Sensitivity therefore is considered high as well and the impact irreversible, nevertheless still manageable through prevention and proper awareness training, workers code of conducts and effective GRM.

#### *8.6.1.6. Increase of social conflicts*

The risk of social conflicts in the project area can be triggered either by land conflicts or by the influx of workers with different lifestyles or cultural backgrounds on the host community, in particular issues such as religious or other cultural proscriptions, local traditions and community structure and the relationship

between men, women and youths. It is worth of noting that Customary leadership of the Acholi was severely affected by the long conflict in Northern Uganda. When the camps were disbanded and people began to return to their land, customary rules not always had the answers to some of the problems faced by Acholi people. During the first two consultation phases, field activities were hampered by a very fragile security situation near the border with South Sudan. These difficulties relate to the section of the power line route through Lamwo district territory. In the next stages of the project, it will therefore be essential to ensure the direct involvement of other institutional actors, starting with the Minister of the Interior. The objective will be the creation of a coordination unit or ad hoc committee including, UETCL, SSEC and Lenders focusing on security issues, to be activated in cooperation with other interested ministers or departments, to follow the process of activities on the ground and ensure the presence of security personnel. One of the priorities of this unit will be to facilitate the coordination of efforts to secure census and field construction operations in the cross-border areas, to ensure that adequate funds are made available for this purpose, and to ensure that the communities living in these regions on both sides of the border are informed of the ongoing activities and involved in the project activities through awareness-raising campaigns and other initiatives as deemed appropriate. For this reason, the intensity of the impact is considered medium and the sensitivity medium high, nevertheless with a good GRM, stakeholder engagement and workers awareness the impact is mitigable.

#### *8.6.1.7. Increase of STD and VBD*

As reported in the baseline chapter, Uganda's population of 47 million has always been heavily impacted by illness and disease, with communicable diseases accounting for over 50% of deaths in the country. Malaria, tuberculosis (TB) and HIV/AIDS are three of the top diseases impacting Uganda and are among the leading causes of death. In consideration of the actual situation, the influx of workers from abroad or from other parts of Uganda can increase the transmission of HIV and TB through contact with local communities, while poor management of water resources in camp or construction sited could increase the spread of malaria mosquitos. The community of the project is well aware on the risk and prevention practises of these diseases though awareness campaigns conducted by the Government and NGOs. Hence, the impact has been considered medium highly sensitive, irreversible. Nevertheless, mitigation effectiveness has been considered high, because with an Occupational and Community Health and Safety in place the risk can be extremely reduced and managed.

#### *8.6.1.8. Child Labor*

Child labour has increased substantially over the last years in Uganda. In 2017, 14% or 2 million children between the age of 5 and 17 were found in child labour<sup>1</sup>. In 2022, this was risen to 39.5% (37.9% girls and 40.9% boys) or 6.2 million children. In rural areas the prevalence is 42.3%, with Karamoja (55.6%), Lango (52%), Elgon (47%), Busoga (46%) and Acholi (45.7%) as the subregions with the highest prevalence. Child labour is found in many economic sectors and predominantly in the agricultural sector. Agricultural sectors in which child labour is reported are sugarcane, rice, tea, coffee, tobacco, livestock and fishing. Other economic sectors who suffer from child labour are the extractive industry (gold mining, sand mining and stone quarrying), construction, domestic services and commercial sexual exploitation. Contractor will require local workforce for casual labour and in consideration of this trend the potential risk for the project to increase child labour is high and the impact highly frequent, highly intense and irreversible. Construction works, or quarry activities are considered as heavy work that can compromise the development of children, therefore also the residual impact remain high.

#### *8.6.1.9. Summary*

The potential negative impacts expected to arise from the project construction on socio-economic environment are summarized in the following matrix.

Table 8-12 – Matrix of negative impacts on socio-economic environment during the construction phase.

Impact Factor	Impact Factor Features	Component Sensitivity	Impact Features Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Physical displacement	Duration (D): Medium	High	Irreversible	Very High	Medium-high	Medium
	Frequency (F): Continuous					
	Spatial extent (E): Project footprint					
	Intensity(I): High					
Economic displacement	Duration (D): Medium	Medium-high	Irreversible	Very High	Medium-high	Medium
	Frequency (F): Continuous					
	Spatial extent (E): Project footprint					
	Intensity(I): High					
Physical Cultural Resources	Duration (D): Medium-long	Medium-high	Irreversible	Very High	Medium-high	Medium
	Frequency (F): Continuous					
	Spatial extent (E): Project footprint					
	Intensity(I): Medium					
Disturbance during construction	Duration (D): Medium-long	Medium-low	Short-term	Negligible	High	Negligible
	Frequency (F): Continuous					
	Spatial extent (E): Project footprint					
	Intensity(I): Low					
Sexual harassment	Duration (D): Medium-long	High	Irreversible	Very High	Medium-high	Medium
	Frequency (F): Sporadic					
	Spatial extent (E): Local					
	Intensity(I): High					
Increase of social conflicts	Duration (D): Medium-long	Medium-high	Irreversible	High	High	Low
	Frequency (F): Sporadic					
	Spatial extent (E): Local					
	Intensity(I): Medium					
Increase of STD and VBD	Duration (D): Medium-long	High	Irreversible	Very High	Medium-high	Medium
	Frequency (F): Sporadic					
	Spatial extent (E): Local					
	Intensity(I): High					
Child labor	Duration (D): Medium-long	High	Irreversible	Very High	Medium	High
	Frequency (F): Frequent					
	Spatial extent (E): Local					
	Intensity(I): High					

### 8.6.2. Impacts during the Operation stage

#### 8.6.2.1. Disturbance during operation and maintenance

Communities living in the proximity of project construction corridor will be affected by temporary disturbance factors, such as noise, air pollution, traffic and damages to crops. The impacts could happen during maintenance operations. Physical damages to crops will be compensated while disturbance will be limited in time, therefore the impact during operation is considered negligible.

#### 8.6.2.2. Land use

Changes caused by project’s development could be permanent or temporary, and direct or indirect, as follows:

- **Permanent direct impacts:** such impacts will occur on the entire Transmission Line corridor, including land acquired and land whose use will be restricted with easements. Land will be acquired at the substation, in the right of way (for the tower location) and for roads (in practice, a small portion of land will be needed for roads). Most livelihoods activities such as production of annual crops, fruits trees that do not grow over a certain height, and grazing of livestock are allowed under easement agreements. Thus, the restriction on use will be legal but will not require changes in most uses. However, forests and orchards will be changed permanently since trees will be cut in the vegetation control zone and not allowed to grow over four meters high in future.

- **Temporary direct impacts:** land use will be affected temporarily during the construction phase for construction storage and staging areas near the tower locations and for a construction staging area and offices near the substation. Wires stringing would stay mostly on access roads and in the corridor, so would affect little or no additional land; however, it is possible that conductor stringing would cause some impacts on land plots (damage to crops, fences, etc.).
- **Temporary restriction of access to land:** access to areas under construction will be limited while construction is underway. Such restrictions will be temporary, no more than a few hours or days, and would apply to relatively small areas at any one time. In addition, improper construction practices can lead to temporary or permanent changes in land use due to erosion, landslides, unnecessary vegetation clearance, landslides, and other undesirable events.

Estimated direct impact on land use, based on land cover classification by Copernicus satellite imagery, along the transmission line route are provided in the following table.

*Table 8-13 – Estimated direct impact on land use, based on Copernicus land cover classification*

District	Right of Way (ha)	RoW + Wayleave (ha)	Total
<b>Kilak</b>			
Cultivated and managed vegetation/agriculture	38.00	228.19	266.19
Herbaceous vegetation	4.16	24.69	28.86
Open forest, unknown	9.41	57.92	67.33
Shrubs	39.98	238.49	278.48
<b>Sub-total</b>	<b>91.55</b>	<b>549.30</b>	<b>640.85</b>
<b>Lamwo</b>			
Closed forest, unknown	0.00	0.11	0.11
Herbaceous vegetation	13.57	81.09	94.67
Open forest, deciduous broad leaf	0.04	0.24	0.28
Open forest, unknown	1.14	6.70	7.84
Shrubs	2.17	13.36	15.53
<b>Sub-total</b>	<b>16.92</b>	<b>101.51</b>	<b>118.43</b>
<b>Nwoya</b>			
Closed forest, unknown	0.14	0.80	0.94
Cultivated and managed vegetation/agriculture	22.07	131.80	153.87
Herbaceous vegetation	2.47	15.03	17.50
Open forest, deciduous broad leaf	0.20	0.94	1.14
Open forest, unknown	16.35	98.06	114.41
Shrubs	1.11	7.50	8.61
Urban/built up	0.13	0.80	0.93
<b>Sub-total</b>	<b>42.47</b>	<b>254.94</b>	<b>297.41</b>
<b>Total</b>	<b>150.94</b>	<b>905.75</b>	<b>1,056.69</b>

## 8.7. Transboundary and cumulative impacts

**Transboundary impacts** on the two affected countries (Uganda and South Sudan) are considered in terms of wildlife movements and cross border security. The project analysed the wildlife migration patterns in both countries and identified the section of the project subject to the migratory routes, both

Countries have to develop a specific biodiversity management plan to manage the possible impacts on migratory fauna.

For what concern security, as stated in the previous chapters the border of two Countries is characterized by a very fragile security situation. These difficulties relate to the section of the power line route through Lamwo district territory. In the next stages of the project, it will therefore be essential to ensure the direct involvement of other institutional actors, starting with the Minister of the Interior. Contractors are required to develop their own security management plan.

It is recommended that UETCL and SSEC project unit will set up a special committee for the management of transboundary issues, it can be structured starting from respective ESMD and Grievances Committee, using the same funds.

No other transboundary impacts except the ones between the two considered countries can be envisaged.

**Cumulative impacts** are impacts which result from the incremental impact of a proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.

Potential cumulative impacts could arise in the following environmental and social components: soil degradation and site related oil spills, loss of flora, proliferation of invasive species, solid waste, air quality, noise and vibration, increased traffic, strain in water resources, strain on natural resources due to construction materials requirements (sand, stone, gravel, etc.), increased demand of firewood, social impacts including labour influx, crime, disruption of services, increased conflicts, impacts on children and vulnerable groups, gender-based violence, sexual exploitation and abuse.

These potential cumulative impacts could occur if the construction of other nearby projects is performed simultaneously with the implementation of the proposed transmission line project.

It is underlined that no other major infrastructure projects under development have been detected so far in the project area, based on the collection of secondary data, analysis of satellite imagery and evidences from site reconnaissance.

Other potential cumulative impacts could arise during the normal operation of the OHTL and annexed substations, in particular the risk for collision and electrocution of wildlife and avifauna and the creation of an electromagnetic field around the conductors, in case of concurrent or future implementation of other transmission lines in the vicinity.

In the initial stretch of the transmission line, in the proximity of Olwiyo substation, other electric lines are present, as detected during the site reconnaissance and described in the Preliminary Design Report. These are:

- the Olwiyo – Nebbi 132 kV TL, which route is directed westward and will be crossed by the Interconnection project route;
- the Olwiyo – Gulu 132 kV TL, which route is directed eastward;
- the Karuma – Olwiyo 400 kV TL (currently operated at 132 kV), which route is directed to the south-east.

Furthermore, according to UETCL Grid Development Plan 2018-2040, a new 132 kV transmission line Agago – Adjumani is foreseen to be commissioned in 2040, which will cross the Interconnection project route close to the border with South Sudan, in the proximity of Nimule.

The presence (and future planning) of other transmission lines in the project area may contribute to increase the impacts on bird species. The Interconnection project already includes rigorous mitigation

measures to reduce the risk of bird collision and electrocution, including bird flight diverters along the line crossing sensitive areas for birds, i.e. the southern part near the Murchinson NP and the northern part near Nimule. The area of this mitigation measure included the Olwiyo substation where other two electric lines are present, to ensure that cumulative impacts were mitigated.

There would also be cumulative impacts on habitat (and therefore species). These would be directly proportional to the amount of ground disturbed and would be limited to the transmission line right of way (RoW).

Cumulative effects also depend to some extent on whether or not other construction activities in the project area are concurrent or overlapping. Increased land acquisition, traffic and possibly increased habitat disturbance could result from concurrent construction. However, the implementation of the mitigation measures identified for the proposed project will ensure that impacts are mitigated.

### 8.8. Possible effects of climate change on the Interconnection project

A specific overview of climate change scenario in Uganda, according to available information from international agencies, is provided in Annex 5.

Uganda is at high-risk to natural disasters such as flooding, drought, and landslides. Extreme events leading to these natural disasters have increased over the last 30 years. Flooding has become more frequent, largely due to more intense rainfall. Increased intensity of heavy rainfall has led to greater impact of floods and are causing more damage due to expanded infrastructure, human settlement and general development of the country.

Flooding is Uganda's greatest risk, affecting nearly 50,000 people annually and causing economic losses of more than \$62 million. The country is subject to both flash floods and slow-onset floods, which are common in urban areas, low-lying areas and along riverbanks and swamps. Particularly vulnerable areas include the capital, Kampala, and the northern and eastern regions.

Flash floods, triggered by heavy rainfall, are particularly problematic in arid areas and cause significant damage to infrastructure. Gulu District, for example, faces severe challenges during the rainy season, when large parts of the district become impassable. This often leads to food shortages, and access to essential services such as health and education is hampered by the destruction of roads and bridges. Flooding exacerbates existing vulnerabilities and poses significant barriers to the socio-economic development of affected communities.

As a consequence of this climate change framework, the 400 kV Interconnection project could be subject to the negative effects of increased natural hazards, in particular flooding and hydrogeological risks. Focusing on these aspects, it is underlined that the transmission line route crosses some rivers close to the border with South Sudan, in particular Achwa river and Unyama river, both tributaries of White Nile.

It is considered unlikely that climate change would have a significant effect on the Interconnection project. However, some events exacerbated by climate change could affect the transmission line under some circumstances. Such events could include:

- Floods and flash floods: although the line will cross several rivers, damage from floods is unlikely. To cope with this risk, tower foundations shall be properly designed and will not be located inside or close to any rivers or waterways.
- Landslides and mudslides: rainfall induced landslides and mudslides could occur, but project design will evaluate such risk and avoid such areas or foundations and towers shall be designed

with a safety factor that would lead to resistance to major damage from all but the most severe slides.

- Wind: extreme winds may cause line breakage or even tower failure. However, the project design will consider maximum expected winds in towers and line's design.



## 9. ANNEX 1: CARTOGRAPHY OF THE PROJECT AREA OF INFLUENCE

## 10. ANNEX 2: ESIA SURVEY TERMS OF REFERENCE

### Methodology for biodiversity data collection

In order to prepare a complete and comprehensive ESIA report, it is necessary to consult various sources of data and information. For the biological and ecological aspects, primary and secondary data will be used to assess potential impacts of the project implementation. Primary data consists of field data collection on species, habitats and ecosystems in the proposed project areas. Secondary data includes reviews of previous studies and research conducted in or near the proposed project area, previous reports from accredited sources, available national or international documentation, open access data analysis from scientifically recognised sources.

#### Consultations

Consultations with various stakeholders to obtain baseline information on biodiversity knowledge and to consider different aspects of the project's potential impacts will be carried out during the ESIA process. Consultations with the key project stakeholders including the project proponent, community members, government departments and relevant parastatals and NGOs that are active in the project area. The consultations will be held during meetings and through questionnaires. The aim of these consultations from an environmental perspective is to: Identify the main natural resources used by local communities (e.g. medicinal plants, timber and non-timber products, etc.); Identify the main conflicts and/or problems related to the interaction between the human dimension and nature (e.g. human-wildlife conflict, diseases, etc.); Identify the main threats to ecosystems and biodiversity already present in the proposed project area (e.g. overexploitation of natural resources, illegal hunting, etc.); Assess how the proposed project could affect each stakeholder

#### Preliminary screening of the TL route via Remote Sensing (RS) analysis

Prior to the plan field inspection and data collection activities, RS analysis will be utilized to establish a clear overview of the whole project area, natural resources, land cover and human settlements. Sentinel-2 Level 2A (bottom of atmosphere) multispectral images will be used (but not only from this satellite, other than these products will be used -Landsat, Modis, Prisma, etc, based on the specificity of the sites and on the required spatial map resolution required) downloaded from Copernicus Open Access Hub. The images will be processed using SNAP-ESA Sentinel Application Platform to select the bands of interest (depending on the thematic maps required) resampling them all to 10 m x 10 m spatial pixel resolution using, as an example, bilinear interpolation. Due to the security sensitivity of the areas the satellite images will play a significant role in minimizing the risks of the field operations and avoid dispersive data collections. Specifically, RS imagery will serve as the basis for the automated classification of multi-temporal Sentinel-2 imagery using random forest classifier and existing land cover/use databases as the source of training samples. In this way, Land Use maps will be developed and compared in space and in time and used to explore natural resources as well as human settlements in the area. Along with the land use map, RS images will be used to produce habitat and diversity maps: mapping habitats for a large area is a complex and time consuming task and require the integration of many information related to the structure and composition of occurring plant communities and the characteristics of the environment including the definition of topographic, climatic, chemical-physical variables as well as of those disturbance factors that can influence the composition, the stability and the functionality of the habitat. The method used for habitat classification has a great influence on the accuracy of the results. In order to define habitat maps for the project area, and depending on the available data, two approaches will be tested and considered as alternatives: in the unsupervised classification (clustering), RS image pixels will be grouped into clusters based on their spectral characteristics, with no prior knowledge of the number and type of classes. Supervised classification, on the other hand, will use information classes defined as input (prior knowledge or acquired in the field)

to the algorithm, and thus a training sample is required to formulate a model of spectral separability of classes.

### Field Surveys

Field surveys will be dedicated mainly to assess presence and distribution of the species present in the proposed project area. The target biological groups are plants, mammals, birds, herptiles (reptiles and amphibians) and arthropods. Different sampling methods will be applied to collect baseline data of each taxonomic group.

Some field data has already been collected in the project area. This will be used to assess the status of biodiversity and the potential impacts of project implementation. However, some areas have not been surveyed, in particular the southern part of the transmission line corridor, and additional field surveys are required to complete the ESIA report.

### Forest, Habitat, Vegetation and Flora

Occurrence, types and extent of vegetation and habitat categories along the TL will be initially determined thank to Remote Sensing data, as discussed above. Following this first phase, obtained data will be verified in the field when precise and accurate data are not already available. The workflow will follow these procedures: Sentinel-2 satellite images will be downloaded by the Copernicus ESA service, and used to build a multi-temporal dataset. These images will be processed to obtain monthly layers of vegetation indices (VI) and compute the associated spectral heterogeneity. The same steps will be repeated after aggregating monthly images into seasonal composites, producing seasonal layers of VIs and spectral heterogeneity indices and layers of multi-seasonal heterogeneity indices. The remotely-sensed variables will be combined in different ways, producing a total of temporal configurations to use as input for image classifications: monthly (vegetation and spectral heterogeneity indices – one layer per index per month); seasonal (vegetation and spectral heterogeneity indices – one layer per index per season); multi-temporal monthly (multi-monthly spectral heterogeneity indices – one layer per index per year); multi-temporal seasonal (multi-seasonal spectral heterogeneity indices – one layer per index per year).

For each of these temporal configurations, a separate Random Forest classification will be realized, first with the complete set of input layers and then with a subset obtained by variable selection procedure; in each case, the number of habitat classes will be first set to a high number of classes and then reduced to a minimum set of categories.

Field surveys will be done when no secondary data are available at all and to determine the accuracy and predictive power of the realized habitat and vegetation classes obtained via RS. Habitats, vegetation and plants present along the TL will be identified and eventually manually mapped on the field. In a first phase, habitats will be identified as vegetation types. A high level of detail will be achieved, if possible, and vegetation types will be identified as associations. In a second phase, some habitat types will be aggregated into coarse classes more suited for satellite remote sensing, based on their structural-physiognomic and ecological characteristics. For the collection of the above defined measures (habitat and vegetation types), and to have a clearer and quantitative idea of plant diversity associated to identified habitat, a probabilistic sampling design will be adopted: it will be based on a hierarchical stratified random sampling. Once the extent of the area to be sampled will be defined along the proposed right of way of the Transmission lines, an adequate regular grid will be created in the GIS environment and overlaid with the whole TL route: this will represent the first hierarchical level of the sampling design. The second hierarchical sampling level will be defined using the homogeneous strata defined by the habitat/vegetation/land use classification procedures obtained via RS as described before. Sampling points will be selected in these strata based on their accessibility (close to road) and a subset of them randomly selected to be inspected (in order to guarantee their representativeness and avoid subjectivity).

### Forest and vegetation field sampling methods

In the field, a team of local surveyors with experience in plant identification and in plant ecology will be involved. Surveyors will be instructed with training on the field and with reference materials by the international experts.

Along the TL, a set of sampling units will be selected, hierarchically distributed within homogeneous forest or vegetation classes identified by RS analysis. Sampling units will be located with a high-precision GPS. If the structure and condition of the area will allow, a plot of varying dimension (based on the vegetation type and structure) will be materialized on the ground and vegetation and plant species identities will be sampled. Alternatively, a transect walk will be realized, its length carefully recorded. The complete inventory of plant species occurring in each sampling unit or transect will be recorded, along with the percentage coverage of each species (% , visual estimate). Along with plant occurrences, a set of environmental variables will be collected to provide detailed information on factors related with the variation of species richness and composition, as well as the impact of human activities on the vegetation and forest characteristics. Among these, the following will have a particular importance in data analysis and will be used to validate habitat and vegetation classification maps: X and Y Coordinates; Elevation; Slope; Aspect; Litter Cover (%); Bare Soil Cover (%); Total cover of the tree layer (a layer, up to 5 m height); Total cover of the shrub layer (B layer, from 0.5 m to 5 m); Total cover of the herbaceous layer (C layer, lower than 0.5 m); Human activities in or close the sampling point; A complete description of the habitat characteristics.

### Wildlife field data collection

Linear transects along the proposed transmission line route will be used for wildlife data collection. All direct and indirect animal presence will be recorded and georeferenced, including direct and indirect observations such as burrows, pugmarks/footprints, dropping/pellets, ground digging and uprooting, tree scratching and marking, remains (skin, fur, feathers, bones, horns/antlers and carcasses), nests, holes and burrows, etc. Birds' species will be detected through vantage points located along the proposed transmission line route, while herptiles through Visual Encounter Survey (VES). All sampling points, plots and transects will be georeferenced using Global Positioning System (GPS) and characterized based on vegetation and landscape features.

### Opportunistic Encounters

All opportunistic data, i.e., those made outside the sampling effort, occurred within or in the surrounding proposed project area will be recorded. This will help to complete the checklist of species.

## Methodology for social data collection

### Land Survey and Census-Socioeconomic Survey Requirements

#### **Census survey and baseline socio-economic studies as per AfDB OS2**

The findings of a household-level census identifying and enumerating affected persons, and, with the involvement of affected persons, surveying land, structures and other fixed assets to be affected by the project. The census survey also serves other essential functions: Identifying gender-responsive socio-economic characteristics of displaced households, including a description of production systems, labour, and household organization; and baseline information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities) and standards of living (including health status) of the displaced population; Information on vulnerable groups or persons for whom special provisions may have to be made; Identifying public or community infrastructure, property or services that may be affected; Providing a basis for the design of, and budgeting for, the resettlement program; In conjunction with establishment of a cut-off date, providing a basis for excluding ineligible people from compensation and resettlement assistance; and Establishing baseline conditions for

monitoring and evaluation purposes; Land tenure and transfer systems, including an inventory of common property natural resources from which people derive their livelihoods and sustenance, non-title-based usufruct systems (including fishing, grazing, or use of forest areas) governed by local recognized land allocation mechanisms, and any issues raised by different tenure systems in the project area; The patterns of social interaction in the affected communities, including social networks and social support systems, and how they will be affected by the project; and Social and cultural characteristics of displaced communities, including a description of formal and informal institutions that may be relevant to the consultation strategy and to designing and implementing the resettlement activities.

The assessment methodology is centered on fieldwork and combines several quantitative and qualitative tools. Guidelines for interviews and focus groups are prepared based on the review of available literature on key issues, and the analysis of the context of intervention.

The overall approach of the assessment looks at historic and contemporary practices of land tenure and property rights in the project area, in order to identify ongoing changes and then to determine factors influencing them. It will be important to consider whereas land rights formalization following land acquisition plans affects land rights negotiation, and to highlight other intended and unintended project's impacts to be discussed during Focus Group Discussions (FGG) and Key Informant Interviews (KII) and validated with local leaders following field enquiry. The assessment will be organized as follows. During a preliminary phase of document review, the main objective is to have a clear understanding of context of the project and ongoing processes related to land tenure; formulate the research questions to carry out the assessment; collect the necessary documents; discuss the internal procedures with implementing partners; identify the stakeholders to be contacted; and organize the schedule of field visits. During this phase, available quantitative data will be consulted and specific evaluation tools (questionnaires, semi-structured interview outline) will be prepared.

Quantitative data will be collected through a household survey administered by the local enumerators using a Household Survey Questionnaire, while qualitative data will be collected through discussions with strategic actors and different project stakeholders. Focus groups and semi-structures interviews will be translated from local languages to English by independent interpreters. Sampling of the villages to be visited as well as the groups and household interviews and focus groups will be done prior to the start of the field data collection.

The study will be conducted using a Participatory approach known as PIA (Participatory Impact Assessment) and reflecting the principles inspiring PIA approaches and tools. A local collaborator will be recruited on site to participate in the field mission. The collaborator will be trained on project assessment using participative methodologies, and will be involved in translating interviews when necessary, and in daily debriefing. Support from local partners will be needed to facilitate travel arrangements, to mobilize local communities and other stakeholders (local authorities, operational partners), and to plan the various field meetings.

The fieldwork and local surveys will be supervised by the assessment coordinator, in order to ensure a consistent approach to the enquiry. Discussion groups will be organized in order to stimulate debate and record comments and feedback. Local teams will be provided with recording equipment as well as notebooks for recording discussion groups.

The assessment will look at the capacity of the Power Interconnection Project to support an integral, inclusive and sustainable approach to rural development. Questionnaires, interviews, and focus groups will be used to understand the social and economic impact of the Power Interconnection Project on local livelihoods. In particular, the capacity of the project to support local population will be assessed taking into account the forms of vulnerability of marginalized groups such as IDPs and returnees, women and youth, and the impact on socio-economic inequalities of other factors such as local land tenure policies, the seasonality of productive activities, mobility practices, and regional migration flows.

## 11. ANNEX 3: CHECKLIST OF WILDLIFE SPECIES

Table 1 - Complete checklist of mammal species present in the 50km buffer around the project area.

N	Order	Family	Scientific Name	Seasonality	Red List category	Trend
1	CARNIVORA	CANIDAE	<i>Canis mesomelas</i>	Resident	Least Concern	Stable
2	CARNIVORA	CANIDAE	<i>Otocyon megalotis</i>	Resident	Least Concern	Stable
3	CARNIVORA	CANIDAE	<i>Canis adustus</i>	Resident	Least Concern	Stable
4	CARNIVORA	CANIDAE	<i>Canis lupaster</i>	Resident	Least Concern	Decreasing
5	<b>CARNIVORA</b>	<b>FELIDAE</b>	<b><i>Caracal aurata</i></b>	Resident	<b>Vulnerable</b>	<b>Decreasing</b>
6	<b>CARNIVORA</b>	<b>FELIDAE</b>	<b><i>Panthera leo</i></b>	Resident	<b>Vulnerable</b>	<b>Decreasing</b>
7	CARNIVORA	FELIDAE	<i>Felis lybica</i>	Resident	Least Concern	Unknown
8	CARNIVORA	FELIDAE	<i>Leptailurus serval</i>	Resident	Least Concern	Stable
9	<b>CARNIVORA</b>	<b>FELIDAE</b>	<b><i>Panthera pardus</i></b>	Resident	<b>Vulnerable</b>	<b>Decreasing</b>
10	CARNIVORA	HERPESTIDAE	<i>Atilax paludinosus</i>	Resident	Least Concern	Decreasing
11	CARNIVORA	HERPESTIDAE	<i>Crossarchus alexandri</i>	Resident	Least Concern	Decreasing
12	CARNIVORA	HERPESTIDAE	<i>Dologale dybowskii</i>	Resident	Data Deficient	Unknown
13	CARNIVORA	HERPESTIDAE	<i>Herpestes sanguineus</i>	Resident	Least Concern	Stable
14	CARNIVORA	HERPESTIDAE	<i>Herpestes ichneumon</i>	Resident	Least Concern	Stable
15	CARNIVORA	HERPESTIDAE	<i>Ichneumia albicauda</i>	Resident	Least Concern	Stable
16	CARNIVORA	HERPESTIDAE	<i>Mungos mungo</i>	Resident	Least Concern	Stable
17	CARNIVORA	HYAENIDAE	<i>Crocuta crocuta</i>	Resident	Least Concern	Decreasing
18	CARNIVORA	HYAENIDAE	<i>Hyaena hyaena</i>	Resident	Near Threatened	Decreasing
19	CARNIVORA	HYAENIDAE	<i>Proteles cristata</i>	Resident	Least Concern	Stable
20	CARNIVORA	MUSTELIDAE	<i>Mellivora capensis</i>	Resident	Least Concern	Decreasing
21	CARNIVORA	MUSTELIDAE	<i>Ictonyx striatus</i>	Resident	Least Concern	Stable
22	CARNIVORA	MUSTELIDAE	<i>Aonyx capensis</i>	Resident	Near Threatened	Decreasing
23	CARNIVORA	MUSTELIDAE	<i>Hydrictis maculicollis</i>	Resident	Near Threatened	Decreasing
24	CARNIVORA	NANDINIIDAE	<i>Nandinia binotata</i>	Resident	Least Concern	Unknown
25	CARNIVORA	VIVERRIDAE	<i>Genetta genetta</i>	Resident	Least Concern	Stable
26	CARNIVORA	VIVERRIDAE	<i>Genetta maculata</i>	Resident	Least Concern	Unknown
27	CARNIVORA	VIVERRIDAE	<i>Genetta servalina</i>	Resident	Least Concern	Unknown
28	CARNIVORA	VIVERRIDAE	<i>Civettictis civetta</i>	Resident	Least Concern	Unknown
29	CETARTIODACTYLA	BOVIDAE	<i>Cephalophus weynsi</i>	Resident	Least Concern	Decreasing
30	CETARTIODACTYLA	BOVIDAE	<i>Hippotragus equinus</i>	Resident	Least Concern	Decreasing
31	CETARTIODACTYLA	BOVIDAE	<i>Kobus ellipsiprymnus</i>	Resident	Least Concern	Decreasing
32	CETARTIODACTYLA	BOVIDAE	<i>Kobus kob</i>	Resident	Least Concern	Decreasing
33	CETARTIODACTYLA	BOVIDAE	<i>Madoqua guentheri</i>	Resident	Least Concern	Stable
34	CETARTIODACTYLA	BOVIDAE	<i>Oreotragus oreotragus</i>	Resident	Least Concern	Stable
35	CETARTIODACTYLA	BOVIDAE	<i>Ourebia ourebi</i>	Resident	Least Concern	Decreasing
36	CETARTIODACTYLA	BOVIDAE	<i>Redunca redunca</i>	Resident	Least Concern	Decreasing
37	CETARTIODACTYLA	BOVIDAE	<i>Sylvicapra grimmia</i>	Resident	Least Concern	Decreasing
38	CETARTIODACTYLA	BOVIDAE	<i>Syncerus caffer</i>	Resident	Near Threatened	Decreasing
39	CETARTIODACTYLA	BOVIDAE	<i>Tragelaphus speki</i>	Resident	Least Concern	Decreasing

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N	Order	Family	Scientific Name	Seasonality	Red List category	Trend
40	CETARTIODACTYLA	BOVIDAE	<i>Tragelaphus scriptus</i>	Resident	Least Concern	Stable
41	CETARTIODACTYLA	BOVIDAE	<i>Tragelaphus oryx</i>	Resident	Least Concern	Stable
42	CETARTIODACTYLA	BOVIDAE	<i>Alcelaphus buselaphus</i>	Resident	Least Concern	Decreasing
43	CETARTIODACTYLA	BOVIDAE	<i>Damaliscus lunatus</i>	Resident	Least Concern	Decreasing
44	<b>CETARTIODACTYLA</b>	<b>GIRAFFIDAE</b>	<b><i>Giraffa camelopardalis</i></b>	Resident	<b>Vulnerable</b>	<b>Decreasing</b>
45	<b>CETARTIODACTYLA</b>	<b>HIPPOPOTAMIDAE</b>	<b><i>Hippopotamus amphibius</i></b>	Resident	<b>Vulnerable</b>	<b>Stable</b>
46	CETARTIODACTYLA	SUIDAE	<i>Potamochoerus larvatus</i>	Resident	Least Concern	Stable
47	CETARTIODACTYLA	SUIDAE	<i>Hylochoerus meinertzhageni</i>	Resident	Least Concern	Decreasing
48	CETARTIODACTYLA	SUIDAE	<i>Phacochoerus africanus</i>	Resident	Least Concern	Decreasing
49	CHIROPTERA	EMBALLONURIDAE	<i>Saccolaimus peli</i>	Resident	Least Concern	Unknown
50	CHIROPTERA	EMBALLONURIDAE	<i>Coleura afra</i>	Resident	Least Concern	Unknown
51	CHIROPTERA	EMBALLONURIDAE	<i>Taphozous mauritanus</i>	Resident	Least Concern	Unknown
52	CHIROPTERA	EMBALLONURIDAE	<i>Taphozous hamiltoni</i>	Resident	Data Deficient	Unknown
53	CHIROPTERA	EMBALLONURIDAE	<i>Taphozous perforatus</i>	Resident	Least Concern	Stable
54	CHIROPTERA	HIPPOSIDERIDAE	<i>Hipposideros cyclops</i>	Resident	Least Concern	Decreasing
55	CHIROPTERA	HIPPOSIDERIDAE	<i>Hipposideros abae</i>	Resident	Least Concern	Unknown
56	CHIROPTERA	HIPPOSIDERIDAE	<i>Hipposideros ruber</i>	Resident	Least Concern	Unknown
57	CHIROPTERA	MEGADERMATIDAE	<i>Lavia frons</i>	Resident	Least Concern	Stable
58	CHIROPTERA	MEGADERMATIDAE	<i>Cardioderma cor</i>	Resident	Least Concern	Unknown
59	CHIROPTERA	MINIOPTERIDAE	<i>Miniopterus natalensis</i>	Resident	Least Concern	Unknown
60	CHIROPTERA	MOLOSSIDAE	<i>Chaerephon pumilus</i>	Resident	Least Concern	Unknown
61	CHIROPTERA	MOLOSSIDAE	<i>Chaerephon major</i>	Resident	Least Concern	Stable
62	CHIROPTERA	MOLOSSIDAE	<i>Chaerephon chapini</i>	Resident	Least Concern	Unknown
63	CHIROPTERA	MOLOSSIDAE	<i>Chaerephon bivittatus</i>	Resident	Least Concern	Stable
64	CHIROPTERA	MOLOSSIDAE	<i>Chaerephon bemmeleni</i>	Resident	Least Concern	Unknown
65	CHIROPTERA	MOLOSSIDAE	<i>Chaerephon ansorgei</i>	Resident	Least Concern	Stable
66	CHIROPTERA	MOLOSSIDAE	<i>Chaerephon aloysiisabaudiae</i>	Resident	Least Concern	Decreasing
67	CHIROPTERA	MOLOSSIDAE	<i>Platymops setiger</i>	Resident	Least Concern	Unknown
68	CHIROPTERA	MOLOSSIDAE	<i>Mops condylurus</i>	Resident	Least Concern	Unknown
69	CHIROPTERA	MOLOSSIDAE	<i>Mops demonstrator</i>	Resident	Least Concern	Decreasing
70	CHIROPTERA	MOLOSSIDAE	<i>Mops trevori</i>	Resident	Data Deficient	Decreasing
71	CHIROPTERA	MOLOSSIDAE	<i>Mops nanulus</i>	Resident	Least Concern	Unknown
72	CHIROPTERA	MOLOSSIDAE	<i>Tadarida ventralis</i>	Resident	Data Deficient	Unknown
73	CHIROPTERA	MOLOSSIDAE	<i>Otomops martiensseni</i>	Resident	Near Threatened	Decreasing
74	CHIROPTERA	NYCTERIDAE	<i>Nycteris hispida</i>	Resident	Least Concern	Stable
75	CHIROPTERA	NYCTERIDAE	<i>Nycteris macrotis</i>	Resident	Least Concern	Unknown
76	CHIROPTERA	NYCTERIDAE	<i>Nycteris thebaica</i>	Resident	Least Concern	Unknown
77	CHIROPTERA	NYCTERIDAE	<i>Nycteris arge</i>	Resident	Least Concern	Stable
78	CHIROPTERA	PTEROPODIDAE	<i>Eidolon helvum</i>	Resident	Near Threatened	Decreasing
79	CHIROPTERA	PTEROPODIDAE	<i>Rousettus aegyptiacus</i>	Resident	Least Concern	Stable
80	CHIROPTERA	PTEROPODIDAE	<i>Lissonycteris angolensis</i>	Resident	Least Concern	Decreasing
81	CHIROPTERA	PTEROPODIDAE	<i>Epomophorus labiatus</i>	Resident	Least Concern	Stable

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N	Order	Family	Scientific Name	Seasonality	Red List category	Trend
82	CHIROPTERA	PTEROPODIDAE	<i>Micropteropus pusillus</i>	Resident	Least Concern	Stable
83	CHIROPTERA	RHINOLOPHIDAE	<i>Rhinolophus landeri</i>	Resident	Least Concern	Unknown
84	CHIROPTERA	RHINOLOPHIDAE	<i>Rhinolophus eloquens</i>	Resident	Least Concern	Unknown
85	CHIROPTERA	RHINOLOPHIDAE	<i>Rhinolophus hildebrandtii</i>	Resident	Least Concern	Unknown
86	CHIROPTERA	RHINOLOPHIDAE	<i>Rhinolophus fumigatus</i>	Resident	Least Concern	Unknown
87	CHIROPTERA	RHINOLOPHIDAE	<i>Rhinolophus clivosus</i>	Resident	Least Concern	Unknown
88	CHIROPTERA	RHINOLOPHIDAE	<i>Rhinolophus simulator</i>	Resident	Least Concern	Decreasing
89	CHIROPTERA	VESPERTILIONIDAE	<i>Nycticeinops schlieffeni</i>	Resident	Least Concern	Unknown
90	CHIROPTERA	VESPERTILIONIDAE	<i>Kerivoula lanosa</i>	Resident	Least Concern	Unknown
91	CHIROPTERA	VESPERTILIONIDAE	<i>Scotoecus hirundo</i>	Resident	Least Concern	Unknown
92	CHIROPTERA	VESPERTILIONIDAE	<i>Scotophilus dinganii</i>	Resident	Least Concern	Unknown
93	CHIROPTERA	VESPERTILIONIDAE	<i>Scotophilus leucogaster</i>	Resident	Least Concern	Unknown
94	CHIROPTERA	VESPERTILIONIDAE	<i>Pipistrellus hesperidus</i>	Resident	Least Concern	Unknown
95	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia somalica</i>	Resident	Least Concern	Unknown
96	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia tenuipinnis</i>	Resident	Least Concern	Unknown
97	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia zuluensis</i>	Resident	Least Concern	Unknown
98	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia helios</i>	Resident	Data Deficient	Unknown
99	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia nana</i>	Resident	Least Concern	Unknown
100	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia rendalli</i>	Resident	Least Concern	Unknown
101	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia capensis</i>	Resident	Least Concern	Stable
102	CHIROPTERA	VESPERTILIONIDAE	<i>Neoromicia guineensis</i>	Resident	Least Concern	Unknown
103	CHIROPTERA	VESPERTILIONIDAE	<i>Myotis bocagii</i>	Resident	Least Concern	Unknown
104	CHIROPTERA	VESPERTILIONIDAE	<i>Myotis welwitschii</i>	Resident	Least Concern	Unknown
105	CHIROPTERA	VESPERTILIONIDAE	<i>Glauconycteris variegata</i>	Resident	Least Concern	Unknown
106	CHIROPTERA	VESPERTILIONIDAE	<i>Pipistrellus crassulus</i>	Resident	Least Concern	Unknown
107	CHIROPTERA	VESPERTILIONIDAE	<i>Mimetillus moloneyi</i>	Resident	Least Concern	Unknown
108	CHIROPTERA	VESPERTILIONIDAE	<i>Pipistrellus rueppellii</i>	Resident	Least Concern	Unknown
109	CHIROPTERA	VESPERTILIONIDAE	<i>Pipistrellus rusticus</i>	Resident	Least Concern	Unknown
110	CHIROPTERA	VESPERTILIONIDAE	<i>Scotoecus albofuscus</i>	Resident	Data Deficient	Unknown
111	CHIROPTERA	VESPERTILIONIDAE	<i>Scotophilus nux</i>	Resident	Least Concern	Unknown
112	CHIROPTERA	VESPERTILIONIDAE	<i>Glauconycteris argentata</i>	Resident	Least Concern	Unknown
113	EULIPOTYPHLA	ERINACEIDAE	<i>Atelerix albiventris</i>	Resident	Least Concern	Stable
114	EULIPOTYPHLA	SORICIDAE	<i>Suncus megalura</i>	Resident	Least Concern	Unknown
115	EULIPOTYPHLA	SORICIDAE	<i>Crociodura turba</i>	Resident	Least Concern	Unknown
116	EULIPOTYPHLA	SORICIDAE	<i>Crociodura fuscomurina</i>	Resident	Least Concern	Unknown
117	EULIPOTYPHLA	SORICIDAE	<i>Crociodura hildegardeae</i>	Resident	Least Concern	Unknown
118	EULIPOTYPHLA	SORICIDAE	<i>Crociodura jacksoni</i>	Resident	Least Concern	Stable
119	EULIPOTYPHLA	SORICIDAE	<i>Crociodura littoralis</i>	Resident	Least Concern	Unknown
120	EULIPOTYPHLA	SORICIDAE	<i>Crociodura luna</i>	Resident	Least Concern	Unknown
121	EULIPOTYPHLA	SORICIDAE	<i>Crociodura nigrofusca</i>	Resident	Least Concern	Unknown
122	EULIPOTYPHLA	SORICIDAE	<i>Crociodura olivieri</i>	Resident	Least Concern	Unknown
123	EULIPOTYPHLA	SORICIDAE	<i>Crociodura parvipes</i>	Resident	Least Concern	Stable
124	EULIPOTYPHLA	SORICIDAE	<i>Crociodura roosevelti</i>	Resident	Least Concern	Unknown



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125	EULIPOTYPHLA	SORICIDAE	<i>Crocidura gracilipes</i>	Presence Uncertain	Data Deficient	Unknown
126	EULIPOTYPHLA	SORICIDAE	<i>Crocidura nanilla</i>	Resident	Least Concern	Stable
127	EULIPOTYPHLA	SORICIDAE	<i>Scutisorex somereni</i>	Resident	Least Concern	Unknown
128	HYRACOIDEA	PROCAVIIDAE	<i>Dendrohyrax dorsalis</i>	Resident	Least Concern	Unknown
129	HYRACOIDEA	PROCAVIIDAE	<i>Heterohyrax brucei</i>	Resident	Least Concern	Unknown
130	HYRACOIDEA	PROCAVIIDAE	<i>Procapra capensis</i>	Resident	Least Concern	Stable
131	LAGOMORPHA	LEPORIDAE	<i>Lepus capensis</i>	Resident	Least Concern	Decreasing
132	LAGOMORPHA	LEPORIDAE	<i>Lepus victoriae</i>	Resident	Least Concern	Stable
133	MACROSCELIDEA	MACROSCELIDIDAE	<i>Elephantulus fuscipes</i>	Resident	Data Deficient	Unknown
134	MACROSCELIDEA	MACROSCELIDIDAE	<i>Elephantulus rufescens</i>	Resident	Least Concern	Stable
135	PERISSODACTYLA	RHINOCEROTIDAE	<i>Ceratotherium simum</i>	Extant & Assisted Colonisation (resident)	Near Threatened	Decreasing
136	<b>PHOLIDOTA</b>	<b>MANIDAE</b>	<b><i>Smutsia temminckii</i></b>	Resident	<b>Vulnerable</b>	<b>Decreasing</b>
137	<b>PHOLIDOTA</b>	<b>MANIDAE</b>	<b><i>Phataginus tricuspis</i></b>	Resident	<b>Endangered</b>	<b>Decreasing</b>
138	PRIMATES	CERCOPITHECIDAE	<i>Colobus guereza</i>	Resident	Least Concern	Decreasing
139	PRIMATES	CERCOPITHECIDAE	<i>Cercopithecus neglectus</i>	Resident	Least Concern	Unknown
140	PRIMATES	CERCOPITHECIDAE	<i>Cercopithecus ascanius</i>	Resident	Least Concern	Decreasing
141	PRIMATES	CERCOPITHECIDAE	<i>Papio anubis</i>	Resident	Least Concern	Stable
142	PRIMATES	CERCOPITHECIDAE	<i>Chlorocebus tantalus</i>	Resident	Least Concern	Stable
143	PRIMATES	CERCOPITHECIDAE	<i>Cercopithecus mitis</i>	Resident	Least Concern	Decreasing
144	PRIMATES	CERCOPITHECIDAE	<i>Erythrocebus patas</i>	Resident	Near Threatened	Decreasing
145	<b>PRIMATES</b>	<b>CERCOPITHECIDAE</b>	<b><i>Lophocebus albigena</i></b>	Resident	<b>Vulnerable</b>	<b>Decreasing</b>
146	PRIMATES	GALAGIDAE	<i>Galagoides demidoff</i>	Resident	Least Concern	Stable
147	PRIMATES	GALAGIDAE	<i>Galagoides thomasi</i>	Resident	Least Concern	Stable
148	PRIMATES	GALAGIDAE	<i>Galago senegalensis</i>	Resident	Least Concern	Decreasing
149	<b>PRIMATES</b>	<b>HOMINIDAE</b>	<b><i>Pan troglodytes</i></b>	Resident	<b>Endangered</b>	<b>Decreasing</b>
150	PRIMATES	LORISIDAE	<i>Perodicticus ibeanus</i>	Resident	Least Concern	Decreasing
151	<b>PROBOSCIDEA</b>	<b>ELEPHANTIDAE</b>	<b><i>Loxodonta africana</i></b>	Resident	<b>Endangered</b>	<b>Decreasing</b>
152	RODENTIA	ANOMALURIDAE	<i>Anomalurus derbianus</i>	Resident	Least Concern	Unknown
153	RODENTIA	BATHYERGIDAE	<i>Fukomys ochraceocinereus</i>	Resident	Least Concern	Unknown
154	RODENTIA	GLIRIDAE	<i>Graphiurus microtis</i>	Resident	Least Concern	Unknown
155	RODENTIA	GLIRIDAE	<i>Graphiurus kelleni</i>	Resident	Least Concern	Unknown
156	RODENTIA	HYSTRICIDAE	<i>Hystrix cristata</i>	Resident	Least Concern	Unknown
157	RODENTIA	HYSTRICIDAE	<i>Atherurus africanus</i>	Resident	Least Concern	Unknown
158	RODENTIA	MURIDAE	<i>Uranomys ruddi</i>	Resident	Least Concern	Decreasing
159	RODENTIA	MURIDAE	<i>Mus musculoides</i>	Presence Uncertain	Least Concern	Unknown
160	RODENTIA	MURIDAE	<i>Gerbilliscus validus</i>	Resident	Least Concern	Stable
161	RODENTIA	MURIDAE	<i>Gerbilliscus kempfi</i>	Resident	Least Concern	Unknown
162	RODENTIA	MURIDAE	<i>Acomys wilsoni</i>	Resident	Least Concern	Stable
163	RODENTIA	MURIDAE	<i>Acomys cineraceus</i>	Resident	Least Concern	Stable
164	RODENTIA	MURIDAE	<i>Acomys percivali</i>	Resident	Least Concern	Stable
165	RODENTIA	MURIDAE	<i>Aethomys hindei</i>	Resident	Least Concern	Unknown
166	RODENTIA	MURIDAE	<i>Arvicanthis niloticus</i>	Resident	Least Concern	Unknown
167	RODENTIA	MURIDAE	<i>Colomys goslingi</i>	Resident	Least Concern	Stable

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168	RODENTIA	MURIDAE	<i>Dasymys incommutus</i>	Resident	Least Concern	Unknown
169	RODENTIA	MURIDAE	<i>Grammomys ibeanus</i>	Resident	Least Concern	Unknown
170	RODENTIA	MURIDAE	<i>Grammomys macmillani</i>	Resident	Least Concern	Unknown
171	RODENTIA	MURIDAE	<i>Lemniscomys macculus</i>	Resident	Least Concern	Stable
172	RODENTIA	MURIDAE	<i>Lophuromys sikapusi</i>	Resident	Least Concern	Unknown
173	RODENTIA	MURIDAE	<i>Mastomys erythroleucus</i>	Resident	Least Concern	Stable
174	RODENTIA	MURIDAE	<i>Mastomys natalensis</i>	Resident	Least Concern	Stable
175	RODENTIA	MURIDAE	<i>Mus minutoides</i>	Resident	Least Concern	Stable
176	RODENTIA	MURIDAE	<i>Oenomys hypoxanthus</i>	Resident	Least Concern	Stable
177	RODENTIA	MURIDAE	<i>Praomys jacksoni</i>	Resident	Least Concern	Stable
178	RODENTIA	MURIDAE	<i>Gerbilliscus robustus</i>	Resident	Least Concern	Stable
179	RODENTIA	MURIDAE	<i>Taterillus emini</i>	Resident	Least Concern	Unknown
180	RODENTIA	MURIDAE	<i>Zelotomys hildegardeae</i>	Resident	Least Concern	Stable
181	RODENTIA	MURIDAE	<i>Lemniscomys zebra</i>	Resident	Least Concern	Stable
182	RODENTIA	MURIDAE	<i>Mylomys dybowskii</i>	Resident	Least Concern	Unknown
183	RODENTIA	MURIDAE	<i>Myomyscus brockmani</i>	Resident	Least Concern	Stable
184	RODENTIA	MURIDAE	<i>Lemniscomys striatus</i>	Resident	Least Concern	Increasing
185	RODENTIA	NESOMYIDAE	<i>Steatomys parvus</i>	Resident	Least Concern	Stable
186	RODENTIA	NESOMYIDAE	<i>Dendromus melanotis</i>	Resident	Least Concern	Stable
187	RODENTIA	NESOMYIDAE	<i>Cricetomys gambianus</i>	Resident	Least Concern	Stable
188	RODENTIA	NESOMYIDAE	<i>Dendromus mystacalis</i>	Resident	Least Concern	Stable
189	RODENTIA	SCIURIDAE	<i>Heliosciurus gambianus</i>	Resident	Least Concern	Unknown
190	RODENTIA	SCIURIDAE	<i>Paraxerus boehmi</i>	Resident	Least Concern	Unknown
191	RODENTIA	SCIURIDAE	<i>Protoxerus stangeri</i>	Resident	Least Concern	Unknown
192	RODENTIA	SCIURIDAE	<i>Xerus erythropus</i>	Resident	Least Concern	Stable
193	RODENTIA	THRYONOMYIDAE	<i>Thryonomys gregorianus</i>	Resident	Least Concern	Unknown
194	RODENTIA	THRYONOMYIDAE	<i>Thryonomys swinderianus</i>	Resident	Least Concern	Unknown
195	TUBULIDENTATA	ORYCTEROPODIDAE	<i>Orycteropus afer</i>	Resident	Least Concern	Unknown

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Table 2 - Complete checklist of reptile species present in the 50km buffer around the project area.

N	Family	Scientific Name	LEGEND	Red List category	Trend
1	AGAMIDAE	<i>Agama doriae</i>	Extant (resident)	Least Concern	Stable
2	AGAMIDAE	<i>Agama finchi</i>	Extant (resident)	Least Concern	Unknown
3	ATRACTASPIDIDAE	<i>Amblyodipsas unicolor</i>	Extant (resident)	Least Concern	Unknown
4	ATRACTASPIDIDAE	<i>Aparallactus lunulatus</i>	Extant (resident)	Least Concern	Unknown
5	ATRACTASPIDIDAE	<i>Aparallactus modestus</i>	Extant (resident)	Least Concern	Unknown
6	ATRACTASPIDIDAE	<i>Polemon christyi</i>	Extant (resident)	Least Concern	Unknown
7	ATRACTASPIDIDAE	<i>Atractaspis irregularis</i>	Extant (resident)	Least Concern	Decreasing
8	ATRACTASPIDIDAE	<i>Atractaspis aterrima</i>	Extant (resident)	Least Concern	Unknown
9	CHAMAELEONIDAE	<i>Chamaeleo laevigatus</i>	Extant (resident)	Least Concern	Stable
10	CHAMAELEONIDAE	<i>Trioceros bitaeniatus</i>	Extant (resident)	Least Concern	Stable
11	CHAMAELEONIDAE	<i>Chamaeleo dilepis</i>	Extant (resident)	Least Concern	Stable
12	COLUBRIDAE	<i>Dasypeltis scabra</i>	Extant (resident)	Least Concern	Unknown
13	COLUBRIDAE	<i>Meizodon semiornatus</i>	Extant (resident)	Least Concern	Unknown
14	COLUBRIDAE	<i>Philothamnus semivariegatus</i>	Extant (resident)	Least Concern	Unknown
15	COLUBRIDAE	<i>Crotaphopeltis degeni</i>	Extant (resident)	Least Concern	Unknown
16	COLUBRIDAE	<i>Crotaphopeltis hotamboeia</i>	Extant (resident)	Least Concern	Stable
17	COLUBRIDAE	<i>Dasypeltis confusa</i>	Extant (resident)	Least Concern	Stable
18	COLUBRIDAE	<i>Meizodon regularis</i>	Extant (resident)	Least Concern	Unknown
19	COLUBRIDAE	<i>Philothamnus carinatus</i>	Extant (resident)	Least Concern	Unknown
20	COLUBRIDAE	<i>Philothamnus heterolepidotus</i>	Extant (resident)	Least Concern	Unknown
21	COLUBRIDAE	<i>Rhamnophis aethiopyssa</i>	Extant (resident)	Least Concern	Unknown
22	COLUBRIDAE	<i>Scaphiophis albopunctatus</i>	Extant (resident)	Least Concern	Unknown
23	COLUBRIDAE	<i>Toxicodryas blandingii</i>	Extant (resident)	Least Concern	Unknown
24	COLUBRIDAE	<i>Dispholidus typus</i>	Extant (resident)	Least Concern	Stable
25	COLUBRIDAE	<i>Platyceps florulentus</i>	Extant (resident)	Least Concern	Unknown
26	COLUBRIDAE	<i>Philothamnus bequaerti</i>	Extant (resident)	Least Concern	Unknown
27	COLUBRIDAE	<i>Philothamnus angolensis</i>	Extant (resident)	Least Concern	Unknown
28	COLUBRIDAE	<i>Thrasops jacksonii</i>	Extant (resident)	Least Concern	Unknown
29	COLUBRIDAE	<i>Telescopus obtusus</i>	Extant (resident)	Least Concern	Stable
30	COLUBRIDAE	<i>Hapsidophrys lineatus</i>	Extant (resident)	Least Concern	Unknown
31	COLUBRIDAE	<i>Thelotornis kirtlandii</i>	Extant (resident)	Least Concern	Unknown
32	COLUBRIDAE	<i>Toxicodryas pulverulenta</i>	Extant (resident)	Least Concern	Unknown
33	CROCODYLIDAE	<i>Crocodylus niloticus</i>	Extant (resident)	Least Concern	Stable
34	ELAPIDAE	<i>Naja haje</i>	Extant (resident)	Least Concern	Decreasing
35	ELAPIDAE	<i>Dendroaspis jamesoni</i>	Extant (resident)	Least Concern	Stable
36	ELAPIDAE	<i>Elapsoidea laticincta</i>	Extant (resident)	Least Concern	Unknown
37	ELAPIDAE	<i>Elapsoidea loveridgei</i>	Extant (resident)	Least Concern	Unknown
38	ELAPIDAE	<i>Naja nigricollis</i>	Extant (resident)	Least Concern	Unknown
39	ELAPIDAE	<i>Dendroaspis polylepis</i>	Extant (resident)	Least Concern	Stable
40	ELAPIDAE	<i>Naja subfulva</i>	Extant (resident)	Least Concern	Stable
41	GEKKONIDAE	<i>Hemidactylus mabouia</i>	Extant (resident)	Least Concern	Stable
42	GEKKONIDAE	<i>Hemidactylus angulatus</i>	Extant (resident)	Least Concern	Stable

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N	Family	Scientific Name	LEGEND	Red List category	Trend
43	GEKKONIDAE	<i>Lygodactylus gutturalis</i>	Extant (resident)	Least Concern	Stable
44	GERRHOSAURIDAE	<i>Broadleysaurus major</i>	Extant (resident)	Least Concern	Unknown
45	GRAYIIDAE	<i>Grayia smithii</i>	Extant (resident)	Least Concern	Stable
46	GRAYIIDAE	<i>Grayia tholloni</i>	Extant (resident)	Least Concern	Unknown
47	LACERTIDAE	<i>Adolfus africanus</i>	Extant (resident)	Least Concern	Stable
48	LACERTIDAE	<i>Heliobolus spekii</i>	Extant (resident)	Least Concern	Unknown
49	LACERTIDAE	<i>Holaspis guentheri</i>	Extant (resident)	Least Concern	Unknown
50	LAMPROPHIIDAE	<i>Boaedon fuliginosus</i>	Extant (resident)	Least Concern	Stable
51	LAMPROPHIIDAE	<i>Lycophidion capense</i>	Extant (resident)	Least Concern	Unknown
52	LAMPROPHIIDAE	<i>Bothrophthalmus lineatus</i>	Extant (resident)	Least Concern	Unknown
53	LAMPROPHIIDAE	<i>Lycophidion depressirostre</i>	Extant (resident)	Least Concern	Unknown
54	LAMPROPHIIDAE	<i>Lycophidion ornatum</i>	Extant (resident)	Least Concern	Unknown
55	LAMPROPHIIDAE	<i>Limaformosa savognnani</i>	Extant (resident)	Least Concern	Unknown
56	LAMPROPHIIDAE	<i>Gonionotophis brussaui</i>	Extant (resident)	Least Concern	Unknown
57	LAMPROPHIIDAE	<i>Mehelya poensis</i>	Extant (resident)	Least Concern	Unknown
58	LAMPROPHIIDAE	<i>Hormonotus modestus</i>	Extant (resident)	Least Concern	Unknown
59	LEPTOTYPHLOPIDAE	<i>Leptotyphlops emini</i>	Extant (resident)	Least Concern	Unknown
60	NATRICIDAE	<i>Natriciteres olivacea</i>	Extant (resident)	Least Concern	Unknown
61	PROSYMNIDAE	<i>Prosymna ambigua</i>	Extant (resident)	Least Concern	Unknown
62	PSAMMOPHIIDAE	<i>Hemirhagerhis nototaenia</i>	Extant (resident)	Least Concern	Unknown
63	PSAMMOPHIIDAE	<i>Psammophis lineatus</i>	Extant (resident)	Least Concern	Stable
64	PSAMMOPHIIDAE	<i>Psammophis sudanensis</i>	Extant (resident)	Least Concern	Unknown
65	PSAMMOPHIIDAE	<i>Rhamphiophis oxyrhynchus</i>	Extant (resident)	Least Concern	Unknown
66	PSAMMOPHIIDAE	<i>Rhamphiophis rostratus</i>	Extant (resident)	Least Concern	Stable
67	PSAMMOPHIIDAE	<i>Psammophis mossambicus</i>	Extant (resident)	Least Concern	Stable
68	PSAMMOPHIIDAE	<i>Rhamphiophis rubropunctatus</i>	Extant (resident)	Least Concern	Unknown
69	PSAMMOPHIIDAE	<i>Kladirostratus togoensis</i>	Extant (resident)	Least Concern	Unknown
70	PYTHONIDAE	<i>Python sebae</i>	Extant (resident)	Near Threatened	Decreasing
71	PYTHONIDAE	<i>Python regius</i>	Extant (resident)	Near Threatened	Decreasing
72	SCINCIDAE	<i>Trachylepis quinquetaeniata</i>	Extant (resident)	Least Concern	Stable
73	SCINCIDAE	<i>Trachylepis striata</i>	Extant (resident)	Least Concern	Unknown
74	SCINCIDAE	<i>Mochlus afer</i>	Extant (resident)	Least Concern	Stable
75	SCINCIDAE	<i>Trachylepis maculilabris</i>	Extant (resident)	Least Concern	Stable
76	SCINCIDAE	<i>Mochlus guineensis</i>	Extant (resident)	Least Concern	Unknown
77	SCINCIDAE	<i>Trachylepis varia</i>	Extant (resident)	Least Concern	Unknown
78	SCINCIDAE	<i>Leptosiaphos aloysiisabaudiae</i>	Extant (resident)	Least Concern	Unknown
79	SCINCIDAE	<i>Leptosiaphos kilimensis</i>	Extant (resident)	Least Concern	Unknown
80	TESTUDINIDAE	<i>Stigmochelys pardalis</i>	Extant (resident)	Least Concern	Unknown
<b>81</b>	<b>TRIONYCHIDAE</b>	<b><i>Trionyx triunguis</i></b>	<b>Extant (resident)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
82	TYPHLOPIDAE	<i>Afrotyphlops lineolatus</i>	Extant (resident)	Least Concern	Unknown
83	TYPHLOPIDAE	<i>Afrotyphlops punctatus</i>	Extant (resident)	Least Concern	Unknown
84	VARANIDAE	<i>Varanus niloticus</i>	Extant (resident)	Least Concern	Stable
85	VARANIDAE	<i>Varanus exanthematicus</i>	Extant (resident)	Least Concern	Unknown

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N	Family	Scientific Name	LEGEND	Red List category	Trend
86	VIPERIDAE	<i>Bitis arietans</i>	Extant (resident)	Least Concern	Stable
<b>87</b>	<b>VIPERIDAE</b>	<b><i>Bitis gabonica</i></b>	<b>Extant (resident)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
88	VIPERIDAE	<i>Causus lichtensteini</i>	Extant (resident)	Least Concern	Stable
89	VIPERIDAE	<i>Causus maculatus</i>	Extant (resident)	Least Concern	Stable
90	VIPERIDAE	<i>Causus resimus</i>	Extant (resident)	Least Concern	Stable
91	VIPERIDAE	<i>Causus rhombeatus</i>	Extant (resident)	Least Concern	Stable
92	VIPERIDAE	<i>Atheris squamigera</i>	Extant (resident)	Least Concern	Stable

Table 3 - Complete checklist of amphibians species present in the 50km buffer around the project area.

N	Family	Scientific Name	Seasonality	Red List category	Trend
1	BUFONIDAE	<i>Sclerophrys pusilla</i>	Extant (resident)	Least Concern	Stable
2	BUFONIDAE	<i>Sclerophrys regularis</i>	Extant (resident)	Least Concern	Stable
3	BUFONIDAE	<i>Sclerophrys steindachneri</i>	Extant (resident)	Least Concern	Unknown
4	DICROGLOSSIDAE	<i>Hoplobatrachus occipitalis</i>	Extant (resident)	Least Concern	Stable
5	HEMISOTIDAE	<i>Hemisis guineensis</i>	Extant (resident)	Least Concern	Unknown
6	HEMISOTIDAE	<i>Hemisis marmoratus</i>	Extant (resident)	Least Concern	Unknown
7	HYPEROLIIDAE	<i>Kassina senegalensis</i>	Extant (resident)	Least Concern	Unknown
8	HYPEROLIIDAE	<i>Hyperolius cinnamomeoventris</i>	Extant (resident)	Least Concern	Unknown
9	HYPEROLIIDAE	<i>Afrixalus quadrivittatus</i>	Extant (resident)	Least Concern	Unknown
10	HYPEROLIIDAE	<i>Hyperolius balfouri</i>	Extant (resident)	Least Concern	Unknown
11	HYPEROLIIDAE	<i>Hyperolius kivuensis</i>	Extant (resident)	Least Concern	Unknown
12	HYPEROLIIDAE	<i>Hyperolius viridiflavus</i>	Extant (resident)	Least Concern	Unknown
13	PHRYNOBATRACHIDAE	<i>Phrynobatrachus natalensis</i>	Extant (resident)	Least Concern	Stable
14	PIPIDAE	<i>Xenopus victorinus</i>	Extant (resident)	Least Concern	Increasing
15	PIPIDAE	<i>Xenopus fischbergi</i>	Extant (resident)	Least Concern	Stable
16	PTYCHADENIDAE	<i>Hildebrandtia ornata</i>	Extant (resident)	Least Concern	Unknown
17	PTYCHADENIDAE	<i>Ptychadena oxyrhynchus</i>	Extant (resident)	Least Concern	Stable
18	PTYCHADENIDAE	<i>Ptychadena schillukorum</i>	Extant (resident)	Least Concern	Unknown
19	PTYCHADENIDAE	<i>Ptychadena nilotica</i>	Extant (resident)	Least Concern	Stable
20	PTYCHADENIDAE	<i>Ptychadena anchietae</i>	Extant (resident)	Least Concern	Unknown
21	RANIDAE	<i>Amnirana galamensis</i>	Extant (resident)	Least Concern	Unknown
22	RANIDAE	<i>Amnirana albolabris</i>	Extant (resident)	Least Concern	Unknown

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Table 4 - Complete checklist of arthropods species present in the 50km buffer around the project area.

N	Order	Family	Scientific Name	Seasonality	Red List category	Trend
1	ARANEAE	ARANEIDAE	<i>Nephilingis cruentata</i>	Extant (resident)	Least Concern	Decreasing
2	ARANEAE	ARANEIDAE	<i>Nephila constricta</i>	Extant (resident)	Least Concern	Unknown
3	ARANEAE	ARANEIDAE	<i>Trichonephila fenestrata</i>	Extant (resident)	Least Concern	Stable
4	ARANEAE	ARANEIDAE	<i>Trichonephila senegalensis</i>	Extant (resident)	Least Concern	Stable
5	ARANEAE	ARANEIDAE	<i>Nephila turneri</i>	Extant (resident)	Least Concern	Unknown
6	ARANEAE	ARANEIDAE	<i>Nephila sumptuosa</i>	Extant (resident)	Least Concern	Unknown
7	COLEOPTERA	SCARABAEIDAE	<i>Eodrepanus fastiditus</i>	Extant (resident)	Least Concern	Unknown
8	COLEOPTERA	SCARABAEIDAE	<i>Onitis robustus</i>	Extant (resident)	Least Concern	Unknown
9	COLEOPTERA	SCARABAEIDAE	<i>Garreta azureus</i>	Extant (resident)	Least Concern	Unknown
10	COLEOPTERA	SCARABAEIDAE	<i>Onthophagus juvencus</i>	Extant (resident)	Least Concern	Unknown
11	COLEOPTERA	SCARABAEIDAE	<i>Eodrepanus parallelus</i>	Extant (resident)	Least Concern	Unknown
12	COLEOPTERA	SCARABAEIDAE	<i>Euoniticellus nasicornis</i>	Extant (resident)	Least Concern	Unknown
13	COLEOPTERA	SCARABAEIDAE	<i>Onthophagus jugicola</i>	Extant (resident)	Least Concern	Unknown
14	COLEOPTERA	SCARABAEIDAE	<i>Proagoderus brucei</i>	Extant (resident)	Data Deficient	Unknown
15	COLEOPTERA	SCARABAEIDAE	<i>Cyptochirus ambiguus</i>	Extant (resident)	Least Concern	Unknown
16	COLEOPTERA	DYTISCIDAE	<i>Copelatus peridinus</i>	Possibly Extant (resident)	Least Concern	Unknown
17	COLEOPTERA	DYTISCIDAE	<i>Copelatus pulchellus</i>	Extant (resident)	Least Concern	Unknown
18	LEPIDOPTERA	PAPILIONIDAE	<i>Papilio echerioides</i>	Extant (resident)	Least Concern	Unknown
19	LEPIDOPTERA	PAPILIONIDAE	<i>Graphium angolanus</i>	Extant (resident)	Least Concern	Unknown
20	LEPIDOPTERA	PAPILIONIDAE	<i>Graphium leonidas</i>	Extant (resident)	Least Concern	Unknown
21	LEPIDOPTERA	PAPILIONIDAE	<i>Graphium policeses</i>	Extant (resident)	Least Concern	Unknown
22	LEPIDOPTERA	PAPILIONIDAE	<i>Papilio constantinus</i>	Extant (resident)	Least Concern	Unknown
23	LEPIDOPTERA	PAPILIONIDAE	<i>Papilio dardanus</i>	Extant (resident)	Least Concern	Unknown
24	LEPIDOPTERA	PAPILIONIDAE	<i>Papilio demodocus</i>	Extant (resident)	Least Concern	Unknown
25	LEPIDOPTERA	PAPILIONIDAE	<i>Papilio nireus</i>	Extant (resident)	Least Concern	Unknown
26	LEPIDOPTERA	PAPILIONIDAE	<i>Graphium antheus</i>	Extant (resident)	Least Concern	Unknown
27	LEPIDOPTERA	NYMPHALIDAE	<i>Vanessa cardui</i>	Extant (resident)	Least Concern	Unknown
28	LEPIDOPTERA	NYMPHALIDAE	<i>Ypthima condamini</i>	Extant (resident)	Least Concern	Unknown
29	LEPIDOPTERA	LYCAENIDAE	<i>Eicochrysops messapus</i>	Extant (resident)	Least Concern	Unknown
30	LEPIDOPTERA	LYCAENIDAE	<i>Cacyreus fracta</i>	Extant (resident)	Least Concern	Unknown
31	LEPIDOPTERA	LYCAENIDAE	<i>Leptomyrina gorgias</i>	Extant (resident)	Least Concern	Unknown
32	LEPIDOPTERA	LYCAENIDAE	<i>Anthene dulcis</i>	Extant (resident)	Least Concern	Unknown
33	LEPIDOPTERA	HESPERIIDAE	<i>Andronymus caesar</i>	Extant (resident)	Least Concern	Unknown
34	LEPIDOPTERA	HESPERIIDAE	<i>Eretis umbra</i>	Extant (resident)	Least Concern	Unknown
35	LEPIDOPTERA	LYCAENIDAE	<i>Iolous mimosae</i>	Extant (resident)	Least Concern	Unknown
36	LEPIDOPTERA	LYCAENIDAE	<i>Uranotauma nubifer</i>	Extant (resident)	Least Concern	Unknown
37	LEPIDOPTERA	NYMPHALIDAE	<i>Phalanta eurytis</i>	Extant (resident)	Least Concern	Unknown
38	LEPIDOPTERA	LYCAENIDAE	<i>Tuxentius melaena</i>	Extant (resident)	Least Concern	Unknown
39	ODONATA	PLATYCNEMIDIDAE	<i>Elattoneura nigra</i>	Extant (resident)	Least Concern	Unknown
40	ODONATA	LIBELLULIDAE	<i>Neodythemis preussi</i>	Extant (resident)	Least Concern	Unknown
41	ODONATA	LIBELLULIDAE	<i>Zygonoidea fraseri</i>	Extant (resident)	Least Concern	Unknown
42	ODONATA	LIBELLULIDAE	<i>Orthetrum angustiventre</i>	Extant (resident)	Least Concern	Unknown

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43	ODONATA	AESHNIDAE	<i>Zostereschna ellioti</i>	Extant (resident)	Least Concern	Unknown
44	ODONATA	LIBELLULIDAE	<i>Acisoma inflatum</i>	Extant (resident)	Least Concern	Unknown
45	ODONATA	LIBELLULIDAE	<i>Acisoma variegatum</i>	Extant (resident)	Least Concern	Unknown
46	ODONATA	LIBELLULIDAE	<i>Pantala flavescens</i>	Extant (resident)	Least Concern	Stable
47	ODONATA	AESHNIDAE	<i>Afroeschna scotias</i>	Extant (resident)	Least Concern	Unknown
48	ODONATA	AESHNIDAE	<i>Anaciaeschna triangulifera</i>	Extant (resident)	Least Concern	Unknown
49	ODONATA	AESHNIDAE	<i>Anax ephippiger</i>	Extant (resident)	Least Concern	Unknown
50	ODONATA	AESHNIDAE	<i>Anax imperator</i>	Extant (resident)	Least Concern	Stable
51	ODONATA	AESHNIDAE	<i>Anax speratus</i>	Extant (resident)	Least Concern	Unknown
52	ODONATA	AESHNIDAE	<i>Anax tristis</i>	Extant (resident)	Least Concern	Unknown
53	ODONATA	AESHNIDAE	<i>Gynacantha africana</i>	Extant (resident)	Least Concern	Unknown
54	ODONATA	AESHNIDAE	<i>Gynacantha bullata</i>	Extant (resident)	Least Concern	Unknown
55	ODONATA	AESHNIDAE	<i>Gynacantha cylindrata</i>	Extant (resident)	Least Concern	Unknown
56	ODONATA	AESHNIDAE	<i>Gynacantha manderica</i>	Extant (resident)	Least Concern	Unknown
57	ODONATA	AESHNIDAE	<i>Gynacantha nigeriensis</i>	Extant (resident)	Least Concern	Unknown
58	ODONATA	AESHNIDAE	<i>Gynacantha villosa</i>	Extant (resident)	Least Concern	Unknown
59	ODONATA	AESHNIDAE	<i>Heliaeschna fuliginosa</i>	Extant (resident)	Least Concern	Unknown
60	ODONATA	AESHNIDAE	<i>Pinheyschna rileyi</i>	Extant (resident)	Least Concern	Unknown
61	ODONATA	CALOPTERYGIDAE	<i>Phaon iridipennis</i>	Extant (resident)	Least Concern	Unknown
62	ODONATA	CALOPTERYGIDAE	<i>Umma saphirina</i>	Extant (resident)	Least Concern	Unknown
63	ODONATA	CHLOROCYPHIDAE	<i>Chlorocypha curta</i>	Extant (resident)	Least Concern	Unknown
64	ODONATA	CHLOROCYPHIDAE	<i>Chlorocypha trifaria</i>	Extant (resident)	Least Concern	Unknown
65	ODONATA	CHLOROCYPHIDAE	<i>Chlorocypha victoriae</i>	Extant (resident)	Least Concern	Unknown
66	ODONATA	CHLOROCYPHIDAE	<i>Platycypha caligata</i>	Extant (resident)	Least Concern	Unknown
67	ODONATA	CHLOROCYPHIDAE	<i>Platycypha lacustris</i>	Extant (resident)	Least Concern	Unknown
68	ODONATA	COENAGRIONIDAE	<i>Aciagrion africanum</i>	Extant (resident)	Least Concern	Unknown
69	ODONATA	COENAGRIONIDAE	<i>Africallagma elongatum</i>	Extant (resident)	Least Concern	Unknown
70	ODONATA	COENAGRIONIDAE	<i>Africallagma subtile</i>	Extant (resident)	Least Concern	Unknown
71	ODONATA	COENAGRIONIDAE	<i>Africallagma vaginale</i>	Extant (resident)	Least Concern	Unknown
72	ODONATA	COENAGRIONIDAE	<i>Agriocnemis exilis</i>	Extant (resident)	Least Concern	Unknown
73	ODONATA	COENAGRIONIDAE	<i>Agriocnemis forcipata</i>	Extant (resident)	Least Concern	Unknown
74	ODONATA	COENAGRIONIDAE	<i>Agriocnemis gratiosa</i>	Extant (resident)	Least Concern	Unknown
75	ODONATA	COENAGRIONIDAE	<i>Agriocnemis inversa</i>	Extant (resident)	Least Concern	Unknown
76	ODONATA	COENAGRIONIDAE	<i>Agriocnemis maclachlani</i>	Extant (resident)	Least Concern	Unknown
77	ODONATA	COENAGRIONIDAE	<i>Agriocnemis victoria</i>	Extant (resident)	Least Concern	Unknown
78	ODONATA	COENAGRIONIDAE	<i>Agriocnemis zerafica</i>	Extant (resident)	Least Concern	Unknown
79	ODONATA	COENAGRIONIDAE	<i>Azuragrion nigridorsum</i>	Extant (resident)	Least Concern	Unknown
80	ODONATA	COENAGRIONIDAE	<i>Ceriagrion bakeri</i>	Extant (resident)	Least Concern	Unknown
81	ODONATA	COENAGRIONIDAE	<i>Ceriagrion corallinum</i>	Extant (resident)	Least Concern	Unknown
82	ODONATA	COENAGRIONIDAE	<i>Ceriagrion glabrum</i>	Extant (resident)	Least Concern	Stable
83	ODONATA	COENAGRIONIDAE	<i>Ceriagrion kordofanicum</i>	Extant (resident)	Least Concern	Unknown
84	ODONATA	COENAGRIONIDAE	<i>Ceriagrion suave</i>	Extant (resident)	Least Concern	Unknown
85	ODONATA	COENAGRIONIDAE	<i>Ceriagrion whellani</i>	Extant (resident)	Least Concern	Unknown

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86	ODONATA	COENAGRIONIDAE	<i>Ischnura senegalensis</i>	Extant (resident)	Least Concern	Stable
87	ODONATA	LIBELLULIDAE	<i>Tramea limbata</i>	Extant (resident)	Least Concern	Unknown
88	ODONATA	LIBELLULIDAE	<i>Tholymis tillarga</i>	Extant (resident)	Least Concern	Unknown
89	ODONATA	LIBELLULIDAE	<i>Acisoma trifidum</i>	Extant (resident)	Least Concern	Unknown
90	ODONATA	LIBELLULIDAE	<i>Aethiothemis solitaria</i>	Extant (resident)	Least Concern	Unknown
91	ODONATA	LIBELLULIDAE	<i>Aethriamanta rezia</i>	Extant (resident)	Least Concern	Unknown
92	ODONATA	LIBELLULIDAE	<i>Atoconeura kenya</i>	Extant (resident)	Least Concern	Unknown
93	ODONATA	LIBELLULIDAE	<i>Crocothemis erythraea</i>	Extant (resident)	Least Concern	Increasing
94	ODONATA	LIBELLULIDAE	<i>Diplacodes lefebvreii</i>	Extant (resident)	Least Concern	Stable
95	ODONATA	LIBELLULIDAE	<i>Hadrothemis camarensis</i>	Extant (resident)	Least Concern	Unknown
96	ODONATA	LESTIDAE	<i>Lestes pallidus</i>	Extant (resident)	Least Concern	Unknown
97	ODONATA	LIBELLULIDAE	<i>Aethiothemis corydoni</i>	Extant (resident)	Least Concern	Unknown
98	ODONATA	LIBELLULIDAE	<i>Nesciothemis farinosa</i>	Extant (resident)	Least Concern	Unknown
99	ODONATA	LIBELLULIDAE	<i>Orthetrum abbotti</i>	Extant (resident)	Least Concern	Unknown
100	ODONATA	LIBELLULIDAE	<i>Orthetrum caffrum</i>	Extant (resident)	Least Concern	Unknown
101	ODONATA	LIBELLULIDAE	<i>Orthetrum chrysostigma</i>	Extant (resident)	Least Concern	Stable
102	ODONATA	LIBELLULIDAE	<i>Orthetrum julia</i>	Extant (resident)	Least Concern	Unknown
103	ODONATA	LIBELLULIDAE	<i>Orthetrum trinacria</i>	Extant (resident)	Least Concern	Unknown
104	ODONATA	LIBELLULIDAE	<i>Palpopleura deceptor</i>	Extant (resident)	Least Concern	Unknown
105	ODONATA	GOMPHIDAE	<i>Paragomphus genei</i>	Extant (resident)	Least Concern	Unknown
106	ODONATA	COENAGRIONIDAE	<i>Pseudagrion hamoni</i>	Extant (resident)	Least Concern	Unknown
107	ODONATA	COENAGRIONIDAE	<i>Pseudagrion kersteni</i>	Extant (resident)	Least Concern	Unknown
108	ODONATA	COENAGRIONIDAE	<i>Pseudagrion sublacteam</i>	Extant (resident)	Least Concern	Unknown
109	ODONATA	COENAGRIONIDAE	<i>Pseudagrion torridum</i>	Extant (resident)	Least Concern	Unknown
110	ODONATA	LIBELLULIDAE	<i>Rhyothemis semihyalina</i>	Extant (resident)	Least Concern	Unknown
111	ODONATA	LIBELLULIDAE	<i>Tramea basilaris</i>	Extant (resident)	Least Concern	Unknown
112	ODONATA	LIBELLULIDAE	<i>Trithemis annulata</i>	Extant (resident)	Least Concern	Increasing
113	ODONATA	LIBELLULIDAE	<i>Trithemis arteriosa</i>	Extant (resident)	Least Concern	Stable
114	ODONATA	LIBELLULIDAE	<i>Trithemis furva</i>	Extant (resident)	Least Concern	Unknown
115	ODONATA	LIBELLULIDAE	<i>Trithemis kirbyi</i>	Extant (resident)	Least Concern	Increasing
116	ODONATA	LIBELLULIDAE	<i>Urothemis edwardsii</i>	Extant (resident)	Least Concern	Stable
117	ODONATA	LIBELLULIDAE	<i>Zygonyx torridus</i>	Extant (resident)	Least Concern	Unknown
118	ODONATA	LIBELLULIDAE	<i>Diplacodes luminans</i>	Extant (resident)	Least Concern	Unknown
119	ODONATA	LIBELLULIDAE	<i>Brachythemis impartita</i>	Extant (resident)	Least Concern	Unknown
120	ODONATA	PLATYCNEMIDIDAE	<i>Allocnemis nigripes</i>	Extant (resident)	Least Concern	Unknown
121	ODONATA	LIBELLULIDAE	<i>Brachythemis lacustris</i>	Extant (resident)	Least Concern	Unknown
122	ODONATA	LIBELLULIDAE	<i>Brachythemis leucosticta</i>	Extant (resident)	Least Concern	Unknown
123	ODONATA	LIBELLULIDAE	<i>Bradinopyga cornuta</i>	Extant (resident)	Least Concern	Unknown
124	ODONATA	LIBELLULIDAE	<i>Bradinopyga strachani</i>	Extant (resident)	Least Concern	Unknown
125	ODONATA	LIBELLULIDAE	<i>Chalcostephia flavifrons</i>	Extant (resident)	Least Concern	Unknown
126	ODONATA	PLATYCNEMIDIDAE	<i>Copera nyansana</i>	Extant (resident)	Least Concern	Unknown
127	ODONATA	PLATYCNEMIDIDAE	<i>Elattoneura glauca</i>	Extant (resident)	Least Concern	Unknown
128	ODONATA	PLATYCNEMIDIDAE	<i>Copera sikassoensis</i>	Extant (resident)	Least Concern	Unknown



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129	ODONATA	GOMPHIDAE	<i>Crenigomphus hartmanni</i>	Extant (resident)	Least Concern	Unknown
130	ODONATA	GOMPHIDAE	<i>Crenigomphus renei</i>	Extant (resident)	Least Concern	Unknown
131	ODONATA	LIBELLULIDAE	<i>Crocothemis sanguinolenta</i>	Extant (resident)	Least Concern	Unknown
132	ODONATA	LIBELLULIDAE	<i>Crocothemis divisa</i>	Extant (resident)	Least Concern	Unknown
133	ODONATA	LIBELLULIDAE	<i>Diplacodes deminuta</i>	Extant (resident)	Least Concern	Unknown
134	ODONATA	LIBELLULIDAE	<i>Hadrothemis coacta</i>	Extant (resident)	Least Concern	Unknown
135	ODONATA	LIBELLULIDAE	<i>Hadrothemis defecta</i>	Extant (resident)	Least Concern	Unknown
136	ODONATA	LIBELLULIDAE	<i>Hadrothemis infesta</i>	Extant (resident)	Least Concern	Unknown
137	ODONATA	LIBELLULIDAE	<i>Hadrothemis versuta</i>	Extant (resident)	Least Concern	Unknown
138	ODONATA	AESHNIDAE	<i>Gynacantha vesiculata</i>	Extant (resident)	Least Concern	Unknown
139	ODONATA	COENAGRIONIDAE	<i>Pseudagrion glaucescens</i>	Extant (resident)	Least Concern	Unknown
140	ODONATA	COENAGRIONIDAE	<i>Pseudagrion kibalense</i>	Extant (resident)	Least Concern	Unknown
141	ODONATA	COENAGRIONIDAE	<i>Pseudagrion massaicum</i>	Extant (resident)	Least Concern	Unknown
142	ODONATA	COENAGRIONIDAE	<i>Pseudagrion melanicterum</i>	Extant (resident)	Least Concern	Unknown
143	ODONATA	COENAGRIONIDAE	<i>Pseudagrion nubicum</i>	Extant (resident)	Least Concern	Unknown
144	ODONATA	COENAGRIONIDAE	<i>Pseudagrion salisburyense</i>	Extant (resident)	Least Concern	Unknown
145	ODONATA	COENAGRIONIDAE	<i>Pseudagrion sjoestedti</i>	Extant (resident)	Least Concern	Unknown
146	ODONATA	COENAGRIONIDAE	<i>Pseudagrion spernatum</i>	Extant (resident)	Least Concern	Unknown
147	ODONATA	COENAGRIONIDAE	<i>Pseudagrion sudanicum</i>	Extant (resident)	Least Concern	Unknown
148	ODONATA	GOMPHIDAE	<i>Gomphidia bredoi</i>	Extant (resident)	Least Concern	Unknown
149	ODONATA	GOMPHIDAE	<i>Ictinogomphus ferox</i>	Extant (resident)	Least Concern	Stable
150	ODONATA	LESTIDAE	<i>Lestes dissimulans</i>	Extant (resident)	Least Concern	Unknown
151	ODONATA	LESTIDAE	<i>Lestes ictericus</i>	Extant (resident)	Least Concern	Unknown
152	ODONATA	LESTIDAE	<i>Lestes plagiatus</i>	Extant (resident)	Least Concern	Unknown
153	ODONATA	LESTIDAE	<i>Lestes uncifer</i>	Extant (resident)	Least Concern	Unknown
154	ODONATA	LESTIDAE	<i>Lestes virgatus</i>	Extant (resident)	Least Concern	Unknown
155	ODONATA	GOMPHIDAE	<i>Microgomphus schoutedeni</i>	Extant (resident)	Least Concern	Unknown
156	ODONATA	GOMPHIDAE	<i>Neurogomphus featheri</i>	Extant (resident)	Least Concern	Unknown
157	ODONATA	GOMPHIDAE	<i>Notogomphus dorsalis</i>	Extant (resident)	Least Concern	Unknown
158	ODONATA	GOMPHIDAE	<i>Notogomphus leroyi</i>	Extant (resident)	Least Concern	Unknown
159	ODONATA	GOMPHIDAE	<i>Paragomphus cognatus</i>	Extant (resident)	Least Concern	Unknown
160	ODONATA	GOMPHIDAE	<i>Paragomphus elpidius</i>	Extant (resident)	Least Concern	Unknown
161	ODONATA	GOMPHIDAE	<i>Paragomphus viridior</i>	Extant (resident)	Least Concern	Unknown
162	ODONATA	LIBELLULIDAE	<i>Hemistigma albipunctum</i>	Extant (resident)	Least Concern	Unknown
163	ODONATA	LIBELLULIDAE	<i>Malgassophlebia bispina</i>	Extant (resident)	Least Concern	Unknown
164	ODONATA	LIBELLULIDAE	<i>Micromacromia camerunica</i>	Extant (resident)	Least Concern	Unknown
165	ODONATA	LIBELLULIDAE	<i>Notiothemis robertsi</i>	Extant (resident)	Least Concern	Unknown
166	ODONATA	LIBELLULIDAE	<i>Olpogastra lugubris</i>	Extant (resident)	Least Concern	Unknown
167	ODONATA	LIBELLULIDAE	<i>Orthetrum austeni</i>	Extant (resident)	Least Concern	Unknown
168	ODONATA	LIBELLULIDAE	<i>Orthetrum brachiale</i>	Extant (resident)	Least Concern	Unknown
169	ODONATA	LIBELLULIDAE	<i>Orthetrum camerunense</i>	Extant (resident)	Least Concern	Unknown
170	ODONATA	LIBELLULIDAE	<i>Orthetrum guineense</i>	Extant (resident)	Least Concern	Unknown
171	ODONATA	LIBELLULIDAE	<i>Orthetrum hintzi</i>	Extant (resident)	Least Concern	Unknown

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172	ODONATA	LIBELLULIDAE	<i>Orthetrum icteromelas</i>	Extant (resident)	Least Concern	Unknown
173	ODONATA	LIBELLULIDAE	<i>Orthetrum machadoi</i>	Extant (resident)	Least Concern	Unknown
174	ODONATA	LIBELLULIDAE	<i>Orthetrum microstigma</i>	Extant (resident)	Least Concern	Unknown
175	ODONATA	LIBELLULIDAE	<i>Orthetrum monardi</i>	Extant (resident)	Least Concern	Unknown
176	ODONATA	LIBELLULIDAE	<i>Orthetrum stemmale</i>	Extant (resident)	Least Concern	Unknown
177	ODONATA	LIBELLULIDAE	<i>Oxythemis phoenicosceles</i>	Extant (resident)	Least Concern	Unknown
178	ODONATA	LIBELLULIDAE	<i>Palpopleura jucunda</i>	Extant (resident)	Least Concern	Unknown
179	ODONATA	LIBELLULIDAE	<i>Palpopleura lucia</i>	Extant (resident)	Least Concern	Unknown
180	ODONATA	LIBELLULIDAE	<i>Palpopleura portia</i>	Extant (resident)	Least Concern	Unknown
181	ODONATA	LIBELLULIDAE	<i>Parazyxomma flavicans</i>	Extant (resident)	Least Concern	Unknown
182	ODONATA	MACROMIIDAE	<i>Phyllomacromia africana</i>	Possibly Extant (resident)	Least Concern	Unknown
183	ODONATA	MACROMIIDAE	<i>Phyllomacromia aureozona</i>	Extant (resident)	Least Concern	Unknown
184	ODONATA	MACROMIIDAE	<i>Phyllomacromia contumax</i>	Extant (resident)	Least Concern	Unknown
185	ODONATA	MACROMIIDAE	<i>Phyllomacromia kimminsi</i>	Extant (resident)	Least Concern	Unknown
186	ODONATA	MACROMIIDAE	<i>Phyllomacromia melania</i>	Extant (resident)	Least Concern	Unknown
187	ODONATA	MACROMIIDAE	<i>Phyllomacromia overlaeti</i>	Extant (resident)	Least Concern	Unknown
188	ODONATA	MACROMIIDAE	<i>Phyllomacromia picta</i>	Extant (resident)	Least Concern	Unknown
189	ODONATA	MACROMIIDAE	<i>Phyllomacromia pseudoafricana</i>	Extant (resident)	Least Concern	Unknown
190	ODONATA	MACROMIIDAE	<i>Phyllomacromia sylvatica</i>	Extant (resident)	Least Concern	Unknown
191	ODONATA	LIBELLULIDAE	<i>Rhyothemis fenestrina</i>	Extant (resident)	Least Concern	Unknown
192	ODONATA	LIBELLULIDAE	<i>Tetrathemis camerunensis</i>	Extant (resident)	Least Concern	Unknown
193	ODONATA	LIBELLULIDAE	<i>Tetrathemis polleni</i>	Extant (resident)	Least Concern	Unknown
194	ODONATA	LIBELLULIDAE	<i>Thermochoria equivocata</i>	Extant (resident)	Least Concern	Unknown
195	ODONATA	LIBELLULIDAE	<i>Trithemis aconita</i>	Extant (resident)	Least Concern	Unknown
196	ODONATA	LIBELLULIDAE	<i>Trithemis dichroa</i>	Extant (resident)	Least Concern	Unknown
197	ODONATA	LIBELLULIDAE	<i>Trithemis donaldsoni</i>	Extant (resident)	Least Concern	Unknown
198	ODONATA	LIBELLULIDAE	<i>Trithemis dorsalis</i>	Extant (resident)	Least Concern	Unknown
199	ODONATA	LIBELLULIDAE	<i>Trithemis grouti</i>	Extant (resident)	Least Concern	Unknown
200	ODONATA	LIBELLULIDAE	<i>Trithemis hecate</i>	Extant (resident)	Least Concern	Unknown
201	ODONATA	LIBELLULIDAE	<i>Trithemis imitata</i>	Extant (resident)	Least Concern	Unknown
202	ODONATA	LIBELLULIDAE	<i>Trithemis integra</i>	Extant (resident)	Least Concern	Unknown
203	ODONATA	LIBELLULIDAE	<i>Trithemis nuptialis</i>	Extant (resident)	Least Concern	Unknown
204	ODONATA	LIBELLULIDAE	<i>Trithemis pruinata</i>	Extant (resident)	Least Concern	Unknown
205	ODONATA	LIBELLULIDAE	<i>Trithemis stictica</i>	Extant (resident)	Least Concern	Unknown
206	ODONATA	LIBELLULIDAE	<i>Trithemis weneri</i>	Extant (resident)	Least Concern	Unknown
207	ODONATA	LIBELLULIDAE	<i>Trithetrum navasi</i>	Extant (resident)	Least Concern	Unknown
208	ODONATA	LIBELLULIDAE	<i>Urothemis assignata</i>	Extant (resident)	Least Concern	Unknown
209	ODONATA	LIBELLULIDAE	<i>Zygonyx natalensis</i>	Extant (resident)	Least Concern	Unknown
210	ODONATA	LIBELLULIDAE	<i>Zyomma atlanticum</i>	Extant (resident)	Least Concern	Unknown
211	ODONATA	COENAGRIONIDAE	<i>Ceriagrion platystigma</i>	Extant (resident)	Least Concern	Unknown
212	ODONATA	PLATYCNEMIDIDAE	<i>Mesocnemis singularis</i>	Extant (resident)	Least Concern	Unknown
213	ODONATA	AESHNIDAE	<i>Heliaeschna cynthiae</i>	Extant (resident)	Least Concern	Unknown
214	ODONATA	CHLOROCYPHIDAE	<i>Chlorocypha cancellata</i>	Extant (resident)	Least Concern	Unknown

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N	Order	Family	Scientific Name	Seasonality	Red List category	Trend
215	ODONATA	COENAGRIONIDAE	<i>Agriocnemis palaeforma</i>	Extant (resident)	Vulnerable	Unknown
216	ODONATA	COENAGRIONIDAE	<i>Pseudagrion hageni</i>	Extant (resident)	Least Concern	Unknown
217	ODONATA	COENAGRIONIDAE	<i>Pseudagrion rufocinctum</i>	Extant (resident)	Least Concern	Unknown
218	ODONATA	CORDULIIDAE	<i>Hemicordulia africana</i>	Extant (resident)	Least Concern	Unknown
219	ODONATA	GOMPHIDAE	<i>Notogomphus lujai</i>	Extant (resident)	Least Concern	Unknown
220	ODONATA	GOMPHIDAE	<i>Phyllogomphus selysi</i>	Extant (resident)	Least Concern	Unknown
221	ODONATA	LIBELLULIDAE	<i>Tetrathemis corduliformis</i>	Extant (resident)	Least Concern	Unknown
222	ODONATA	AESHNIDAE	<i>Gynacantha victoriae</i>	Extant (resident)	Least Concern	Unknown
223	ORTHOPTERA	TRIDACTYLIDAE	<i>Afrotridactylus usambaricus</i>	Extant (resident)	Least Concern	Unknown
224	ORTHOPTERA	ACRIDIDAE	<i>Acrotylus patruelis</i>	Extant (resident)	Least Concern	Unknown
225	ORTHOPTERA	TETTIGONIIDAE	<i>Eulioptera reticulata</i>	Extant (resident)	Least Concern	Unknown
226	ORTHOPTERA	TETTIGONIIDAE	<i>Eulioptera spinulosa</i>	Extant (resident)	Least Concern	Unknown
227	ORTHOPTERA	TETTIGONIIDAE	<i>Tylopsis rubescens</i>	Extant (resident)	Least Concern	Unknown
228	ORTHOPTERA	TETTIGONIIDAE	<i>Conocephalus iris</i>	Extant (resident)	Least Concern	Unknown
229	ORTHOPTERA	TETTIGONIIDAE	<i>Plangia graminea</i>	Extant (resident)	Least Concern	Unknown
230	ORTHOPTERA	TETTIGONIIDAE	<i>Ruspolia ampla</i>	Extant (resident)	Least Concern	Unknown
231	ORTHOPTERA	TRIGONIIDAE	<i>Pteronemobius monochromus</i>	Extant (resident)	Data Deficient	Unknown
232	ORTHOPTERA	TETTIGONIIDAE	<i>Ruspolia flavovirens</i>	Extant (resident)	Data Deficient	Unknown
233	ORTHOPTERA	ACRIDIDAE	<i>Coryphosima stenoptera</i>	Extant (resident)	Least Concern	Unknown
234	ORTHOPTERA	TETRIGIDAE	<i>Paratettix asbenensis</i>	Extant (resident)	Least Concern	Unknown

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Table 5 - Complete checklist of birds species present in the 50km buffer around the project area.

N	Order	Family	Scientific Name	Seasonality	Red List category	Trend
1	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Macheiramphus alcinus</i>	Extant (resident)	Least Concern	Stable
2	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Circaetus cinerascens</i>	Extant (resident)	Least Concern	Decreasing
3	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Circus ranivorus</i>	Extant (resident)	Least Concern	Decreasing
4	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Polyboroides typus</i>	Extant (resident)	Least Concern	Stable
5	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Kaupifalco monogrammicus</i>	Extant (resident)	Least Concern	Stable
6	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Melierax metabates</i>	Extant (resident)	Least Concern	Stable
7	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Melierax poliopterus</i>	Extant (resident)	Least Concern	Stable
8	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Micronisus gabar</i>	Extant (resident)	Least Concern	Stable
9	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Accipiter minullus</i>	Extant (resident)	Least Concern	Stable
10	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Accipiter rufiventris</i>	Extant (resident)	Least Concern	Increasing
11	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Aquila spilogaster</i>	Extant (resident)	Least Concern	Decreasing
12	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Lophaetus occipitalis</i>	Extant (resident)	Least Concern	Increasing
13	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Accipiter toussenelii</i>	Extant (resident)	Least Concern	Decreasing
14	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Buteo augur</i>	Extant (resident)	Least Concern	Stable
15	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Accipiter tachiro</i>	Extant (resident)	Least Concern	Decreasing
16	ACCIPITRIFORMES	ELANIDAE	<i>Elanus caeruleus</i>	Extant (resident)	Least Concern	Stable
17	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Gypaetus barbatus</i>	Extant (resident)	Near Threatened	Decreasing
18	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Gypohierax angolensis</i>	Extant (resident)	Least Concern	Stable
19	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Polemaetus bellicosus</i></b>	<b>Extant (resident)</b>	<b>Endangered</b>	<b>Decreasing</b>
20	<b>ACCIPITRIFORMES</b>	<b>SAGITTARIIDAE</b>	<b><i>Sagittarius serpentarius</i></b>	<b>Extant (resident)</b>	<b>Endangered</b>	<b>Decreasing</b>
21	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Terathopus ecaudatus</i></b>	<b>Extant (resident)</b>	<b>Endangered</b>	<b>Decreasing</b>
22	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Haliaeetus vocifer</i>	Extant (resident)	Least Concern	Stable
23	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Circaetus beaudouini</i></b>	<b>Extant (resident)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
24	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Milvus aegyptius</i>	Extant (resident)	Least Concern	Decreasing
25	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Accipiter badius</i>	Extant (resident)	Least Concern	Stable
26	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Accipiter brevipes</i>	Extant (non-breeding)	Least Concern	Stable
27	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Hieraetus ayresii</i>	Extant (resident)	Least Concern	Decreasing
28	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Circus pygargus</i>	Extant (non-breeding)	Least Concern	Decreasing
29	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Circus macrourus</i>	Extant (non-breeding)	Near Threatened	Decreasing
30	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Aviceda cuculoides</i>	Extant (resident)	Least Concern	Stable
31	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Butastur rufipennis</i>	Extant (non-breeding)	Least Concern	Decreasing
32	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Buteo auguralis</i>	Extant (resident)	Least Concern	Stable
33	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Circaetus cinereus</i>	Extant (resident)	Least Concern	Decreasing
34	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Circaetus pectoralis</i>	Extant (resident)	Least Concern	Stable
35	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Circus aeruginosus</i>	Extant (non-breeding)	Least Concern	Stable
36	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Clanga pomarina</i>	Extant (non-breeding)	Least Concern	Stable
37	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Aquila rapax</i></b>	<b>Extant (resident)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
38	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Gyps africanus</i></b>	<b>Extant (resident)</b>	<b>Critically Endangered</b>	<b>Decreasing</b>
39	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Gyps rueppelli</i></b>	<b>Extant (resident)</b>	<b>Critically Endangered</b>	<b>Decreasing</b>
40	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Necrosyrtes monachus</i></b>	<b>Extant (resident)</b>	<b>Critically Endangered</b>	<b>Decreasing</b>
41	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Torgos tracheliotos</i></b>	<b>Extant (resident)</b>	<b>Endangered</b>	<b>Decreasing</b>
42	<b>ACCIPITRIFORMES</b>	<b>ACCIPITRIDAE</b>	<b><i>Trigonoceps occipitalis</i></b>	<b>Extant (resident)</b>	<b>Critically Endangered</b>	<b>Decreasing</b>

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43	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Aquila nipalensis</i>	Extant (non-breeding)	Endangered	Decreasing
44	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Hieraaetus pennatus</i>	Extant (non-breeding)	Least Concern	Stable
45	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Hieraaetus wahlbergi</i>	Extant (resident)	Least Concern	Stable
46	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Milvus migrans</i>	Extant (non-breeding)	Least Concern	Stable
47	ACCIPITRIFORMES	PANDIONIDAE	<i>Pandion haliaetus</i>	Extant (non-breeding)	Least Concern	Increasing
48	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Buteo buteo</i>	Extant (non-breeding)	Least Concern	Increasing
49	ACCIPITRIFORMES	ACCIPITRIDAE	<i>Pernis apivorus</i>	Extant (non-breeding)	Least Concern	Stable
50	ANSERIFORMES	ANATIDAE	<i>Aythya fuligula</i>	Extant (non-breeding)	Least Concern	Stable
51	ANSERIFORMES	ANATIDAE	<i>Spatula querquedula</i>	Extant (non-breeding)	Least Concern	Decreasing
52	ANSERIFORMES	ANATIDAE	<i>Dendrocygna bicolor</i>	Extant (resident)	Least Concern	Decreasing
53	ANSERIFORMES	ANATIDAE	<i>Dendrocygna viduata</i>	Extant (resident)	Least Concern	Increasing
54	ANSERIFORMES	ANATIDAE	<i>Thalassornis leuconotus</i>	Extant (resident)	Least Concern	Decreasing
55	ANSERIFORMES	ANATIDAE	<i>Plectropterus gambensis</i>	Extant (resident)	Least Concern	Increasing
56	ANSERIFORMES	ANATIDAE	<i>Nettapus auritus</i>	Extant (resident)	Least Concern	Decreasing
57	ANSERIFORMES	ANATIDAE	<i>Anas sparsa</i>	Extant (resident)	Least Concern	Decreasing
58	ANSERIFORMES	ANATIDAE	<i>Anas undulata</i>	Extant (resident)	Least Concern	Stable
59	ANSERIFORMES	ANATIDAE	<i>Anas erythrorhyncha</i>	Extant (resident)	Least Concern	Decreasing
60	ANSERIFORMES	ANATIDAE	<i>Spatula hottentota</i>	Extant (resident)	Least Concern	Decreasing
61	ANSERIFORMES	ANATIDAE	<i>Netta erythrophthalma</i>	Extant (resident)	Least Concern	Decreasing
62	ANSERIFORMES	ANATIDAE	<i>Sarkidiornis melanotos</i>	Extant (resident)	Least Concern	Decreasing
63	ANSERIFORMES	ANATIDAE	<i>Mareca penelope</i>	Extant (non-breeding)	Least Concern	Decreasing
64	ANSERIFORMES	ANATIDAE	<i>Alopochen aegyptiaca</i>	Extant (resident)	Least Concern	Decreasing
65	ANSERIFORMES	ANATIDAE	<i>Spatula clypeata</i>	Extant (non-breeding)	Least Concern	Decreasing
66	ANSERIFORMES	ANATIDAE	<i>Anas acuta</i>	Extant (non-breeding)	Least Concern	Decreasing
67	ANSERIFORMES	ANATIDAE	<i>Anas crecca</i>	Extant (non-breeding)	Least Concern	Unknown
68	<b>ANSERIFORMES</b>	<b>ANATIDAE</b>	<b><i>Aythya ferina</i></b>	<b>Extant (non-breeding)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
69	BUCEROTIFORMES	BUCEROTIDAE	<i>Tockus flavirostris</i>	Extant (resident)	Least Concern	Decreasing
70	BUCEROTIFORMES	BUCEROTIDAE	<i>Lophoceros alboterminatus</i>	Extant (resident)	Least Concern	Decreasing
71	BUCEROTIFORMES	BUCEROTIDAE	<i>Lophoceros nasutus</i>	Extant (resident)	Least Concern	Stable
72	BUCEROTIFORMES	PHOENICULIDAE	<i>Phoeniculus purpureus</i>	Extant (resident)	Least Concern	Decreasing
73	BUCEROTIFORMES	PHOENICULIDAE	<i>Phoeniculus bollei</i>	Extant (resident)	Least Concern	Decreasing
74	BUCEROTIFORMES	PHOENICULIDAE	<i>Rhinopomastus aterrimus</i>	Extant (resident)	Least Concern	Decreasing
75	BUCEROTIFORMES	BUCEROTIDAE	<i>Bycanistes sharpii</i>	Extant (resident)	Least Concern	Decreasing
76	BUCEROTIFORMES	BUCEROTIDAE	<i>Lophoceros fasciatus</i>	Extant (resident)	Least Concern	Unknown
77	BUCEROTIFORMES	BUCEROTIDAE	<i>Bycanistes subcylindricus</i>	Extant (resident)	Least Concern	Unknown
78	<b>BUCEROTIFORMES</b>	<b>BUCEROTIDAE</b>	<b><i>Bucorvus abyssinicus</i></b>	<b>Extant (resident)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
79	BUCEROTIFORMES	UPUPIDAE	<i>Upupa epops</i>	Extant (resident)	Least Concern	Decreasing
80	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus europaeus</i>	Extant (passage)	Least Concern	Decreasing
81	CAPRIMULGIFORMES	APODIDAE	<i>Tachymarptis melba</i>	Extant (resident)	Least Concern	Stable
82	CAPRIMULGIFORMES	APODIDAE	<i>Apus apus</i>	Extant (passage)	Least Concern	Stable
83	CAPRIMULGIFORMES	APODIDAE	<i>Apus affinis</i>	Extant (resident)	Least Concern	Increasing
84	CAPRIMULGIFORMES	APODIDAE	<i>Rhaphidura sabini</i>	Extant (resident)	Least Concern	Stable
85	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus natalensis</i>	Extant (resident)	Least Concern	Decreasing

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86	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus inornatus</i>	Extant (non-breeding)	Least Concern	Stable
87	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus tristigma</i>	Extant (resident)	Least Concern	Stable
88	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus climacurus</i>	Extant (resident)	Least Concern	Stable
89	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus clarus</i>	Extant (resident)	Least Concern	Stable
90	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus longipennis</i>	Extant (breeding)	Least Concern	Stable
91	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus pectoralis</i>	Extant (resident)	Least Concern	Stable
92	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus poliocephalus</i>	Extant (resident)	Least Concern	Stable
93	CAPRIMULGIFORMES	APODIDAE	<i>Neafrapus cassini</i>	Extant (resident)	Least Concern	Stable
94	CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus vexillarius</i>	Extant (non-breeding)	Least Concern	Stable
95	CAPRIMULGIFORMES	APODIDAE	<i>Apus caffer</i>	Extant (resident)	Least Concern	Increasing
96	CAPRIMULGIFORMES	APODIDAE	<i>Cypsiurus parvus</i>	Extant (resident)	Least Concern	Increasing
97	CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus spinosus</i>	Extant (resident)	Least Concern	Increasing
98	CHARADRIIFORMES	SCOLOPACIDAE	<i>Numenius phaeopus</i>	Extant (non-breeding)	Least Concern	Decreasing
99	CHARADRIIFORMES	SCOLOPACIDAE	<i>Calidris pugnax</i>	Extant (non-breeding)	Least Concern	Decreasing
100	CHARADRIIFORMES	SCOLOPACIDAE	<i>Lymnocyptes minimus</i>	Extant (non-breeding)	Least Concern	Stable
101	CHARADRIIFORMES	SCOLOPACIDAE	<i>Actitis hypoleucos</i>	Extant (non-breeding)	Least Concern	Decreasing
102	CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa ochropus</i>	Extant (non-breeding)	Least Concern	Increasing
103	CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa erythropus</i>	Extant (non-breeding)	Least Concern	Stable
104	CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa nebularia</i>	Extant (non-breeding)	Least Concern	Stable
105	CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa glareola</i>	Extant (non-breeding)	Least Concern	Stable
106	CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa stagnatilis</i>	Extant (non-breeding)	Least Concern	Decreasing
107	CHARADRIIFORMES	LARIDAE	<i>Chlidonias leucopterus</i>	Extant (non-breeding)	Least Concern	Stable
108	CHARADRIIFORMES	TURNICIDAE	<i>Turnix sylvaticus</i>	Extant (resident)	Least Concern	Decreasing
109	CHARADRIIFORMES	SCOLOPACIDAE	<i>Gallinago nigripennis</i>	Extant (resident)	Least Concern	Unknown
110	CHARADRIIFORMES	JACANIDAE	<i>Actophilornis africanus</i>	Extant (resident)	Least Concern	Stable
111	CHARADRIIFORMES	BURHINIDAE	<i>Burhinus senegalensis</i>	Extant (resident)	Least Concern	Unknown
112	CHARADRIIFORMES	BURHINIDAE	<i>Burhinus vermiculatus</i>	Extant (resident)	Least Concern	Unknown
113	CHARADRIIFORMES	BURHINIDAE	<i>Burhinus capensis</i>	Extant (resident)	Least Concern	Stable
114	CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius pecuarius</i>	Extant (resident)	Least Concern	Unknown
115	CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius marginatus</i>	Extant (resident)	Least Concern	Decreasing
116	CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus crassirostris</i>	Extant (resident)	Least Concern	Unknown
117	CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus tectus</i>	Extant (resident)	Least Concern	Unknown
118	CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus senegallus</i>	Extant (resident)	Least Concern	Stable
119	CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus lugubris</i>	Extant (resident)	Least Concern	Unknown
120	CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus coronatus</i>	Extant (resident)	Least Concern	Increasing
121	CHARADRIIFORMES	PLUVIANIDAE	<i>Pluvianus aegyptius</i>	Extant (resident)	Least Concern	Decreasing
122	CHARADRIIFORMES	GLAREOLIDAE	<i>Rhinoptilus chalcopterus</i>	Extant (resident)	Least Concern	Stable
123	CHARADRIIFORMES	GLAREOLIDAE	<i>Cursorius temminckii</i>	Extant (resident)	Least Concern	Stable
124	CHARADRIIFORMES	GLAREOLIDAE	<i>Glareola nuchalis</i>	Extant (resident)	Least Concern	Decreasing
125	CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius tricollaris</i>	Extant (resident)	Least Concern	Unknown
126	CHARADRIIFORMES	ROSTRATULIDAE	<i>Rostratula benghalensis</i>	Extant (resident)	Least Concern	Decreasing
127	CHARADRIIFORMES	SCOLOPACIDAE	<i>Calidris ferruginea</i>	Extant (non-breeding)	Near Threatened	Decreasing
128	CHARADRIIFORMES	SCOLOPACIDAE	<i>Limosa limosa</i>	Extant (non-breeding)	Near Threatened	Decreasing

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129	CHARADRIIFORMES	LARIDAE	<i>Chlidonias hybrida</i>	Extant (non-breeding)	Least Concern	Stable
130	CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus albiceps</i>	Extant (resident)	Least Concern	Stable
131	CHARADRIIFORMES	SCOLOPACIDAE	<i>Numenius arquata</i>	Extant (non-breeding)	Near Threatened	Decreasing
132	CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius asiaticus</i>	Extant (non-breeding)	Least Concern	Decreasing
133	CHARADRIIFORMES	BURHINIDAE	<i>Burhinus oedicnemus</i>	Extant (non-breeding)	Least Concern	Decreasing
134	CHARADRIIFORMES	LARIDAE	<i>Larus cirrocephalus</i>	Extant (resident)	Least Concern	Stable
135	CHARADRIIFORMES	SCOLOPACIDAE	<i>Calidris minuta</i>	Extant (non-breeding)	Least Concern	Increasing
136	CHARADRIIFORMES	SCOLOPACIDAE	<i>Calidris temminckii</i>	Extant (non-breeding)	Least Concern	Unknown
137	CHARADRIIFORMES	LARIDAE	<i>Gelochelidon nilotica</i>	Extant (non-breeding)	Least Concern	Decreasing
138	CHARADRIIFORMES	RECURVIROSTRIDAE	<i>Himantopus himantopus</i>	Extant (resident)	Least Concern	Increasing
139	CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius dubius</i>	Extant (non-breeding)	Least Concern	Stable
140	CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius hiaticula</i>	Extant (non-breeding)	Least Concern	Decreasing
141	CHARADRIIFORMES	SCOLOPACIDAE	<i>Gallinago gallinago</i>	Extant (non-breeding)	Least Concern	Decreasing
142	CHARADRIIFORMES	LARIDAE	<i>Hydroprogne caspia</i>	Extant (non-breeding)	Least Concern	Increasing
143	CHARADRIIFORMES	TURNICIDAE	<i>Turnix nanus</i>	Extant (passage)	Least Concern	Decreasing
144	CHARADRIIFORMES	RECURVIROSTRIDAE	<i>Recurvirostra avosetta</i>	Extant (resident)	Least Concern	Unknown
145	CHARADRIIFORMES	LARIDAE	<i>Rynchops flavirostris</i>	Extant (passage)	Least Concern	Decreasing
146	CHARADRIIFORMES	SCOLOPACIDAE	<i>Gallinago media</i>	Extant (non-breeding)	Near Threatened	Decreasing
147	CHARADRIIFORMES	GLAREOLIDAE	<i>Glareola nordmanni</i>	Extant (passage)	Near Threatened	Decreasing
148	CHARADRIIFORMES	LARIDAE	<i>Larus fuscus</i>	Extant (non-breeding)	Least Concern	Increasing
149	CICONIIFORMES	CICONIIDAE	<i>Ciconia ciconia</i>	Extant (non-breeding)	Least Concern	Increasing
150	CICONIIFORMES	CICONIIDAE	<i>Mycteria ibis</i>	Extant (resident)	Least Concern	Decreasing
151	CICONIIFORMES	CICONIIDAE	<i>Ciconia abdimii</i>	Extant (non-breeding)	Least Concern	Decreasing
152	CICONIIFORMES	CICONIIDAE	<i>Ephippiorhynchus senegalensis</i>	Extant (resident)	Least Concern	Decreasing
153	CICONIIFORMES	CICONIIDAE	<i>Leptoptilos crumenifer</i>	Extant (resident)	Least Concern	Increasing
154	CICONIIFORMES	CICONIIDAE	<i>Ciconia microscelis</i>	Extant (resident)	Least Concern	Stable
155	CICONIIFORMES	CICONIIDAE	<i>Ciconia nigra</i>	Extant (non-breeding)	Least Concern	Unknown
156	CICONIIFORMES	CICONIIDAE	<i>Anastomus lamelligerus</i>	Extant (resident)	Least Concern	Stable
157	COLIIFORMES	COLIIDAE	<i>Colius striatus</i>	Extant (resident)	Least Concern	Increasing
158	COLIIFORMES	COLIIDAE	<i>Urocolius macrourus</i>	Extant (resident)	Least Concern	Decreasing
159	COLUMBIFORMES	COLUMBIDAE	<i>Columba arquatrix</i>	Extant (resident)	Least Concern	Decreasing
160	COLUMBIFORMES	COLUMBIDAE	<i>Aplopelia larvata</i>	Extant (resident)	Least Concern	Stable
161	COLUMBIFORMES	COLUMBIDAE	<i>Streptopelia decipiens</i>	Extant (resident)	Least Concern	Stable
162	COLUMBIFORMES	COLUMBIDAE	<i>Streptopelia vinacea</i>	Extant (resident)	Least Concern	Stable
163	COLUMBIFORMES	COLUMBIDAE	<i>Streptopelia semitorquata</i>	Extant (resident)	Least Concern	Increasing
164	COLUMBIFORMES	COLUMBIDAE	<i>Turtur abyssinicus</i>	Extant (resident)	Least Concern	Stable
165	COLUMBIFORMES	COLUMBIDAE	<i>Turtur afer</i>	Extant (resident)	Least Concern	Stable
166	COLUMBIFORMES	COLUMBIDAE	<i>Turtur tympanistris</i>	Extant (resident)	Least Concern	Stable
167	COLUMBIFORMES	COLUMBIDAE	<i>Treron waalia</i>	Extant (resident)	Least Concern	Decreasing
168	COLUMBIFORMES	COLUMBIDAE	<i>Treron calvus</i>	Extant (resident)	Least Concern	Decreasing
169	COLUMBIFORMES	COLUMBIDAE	<i>Columba guinea</i>	Extant (resident)	Least Concern	Stable
170	COLUMBIFORMES	COLUMBIDAE	<i>Columba uncinata</i>	Extant (resident)	Least Concern	Decreasing
171	COLUMBIFORMES	COLUMBIDAE	<i>Columba delegorguei</i>	Extant (resident)	Least Concern	Decreasing

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172	COLUMBIFORMES	COLUMBIDAE	<i>Spilopelia senegalensis</i>	Extant (resident)	Least Concern	Stable
173	COLUMBIFORMES	COLUMBIDAE	<i>Streptopelia capicola</i>	Extant (resident)	Least Concern	Increasing
174	COLUMBIFORMES	COLUMBIDAE	<i>Oena capensis</i>	Extant (non-breeding)	Least Concern	Increasing
175	CORACIIFORMES	CORACIIDAE	<i>Coracias abyssinicus</i>	Extant (resident)	Least Concern	Increasing
176	CORACIIFORMES	CORACIIDAE	<i>Coracias caudatus</i>	Extant (resident)	Least Concern	Stable
177	CORACIIFORMES	CORACIIDAE	<i>Coracias naevius</i>	Extant (resident)	Least Concern	Decreasing
178	CORACIIFORMES	CORACIIDAE	<i>Eurystomus glaucurus</i>	Extant (resident)	Least Concern	Stable
179	CORACIIFORMES	ALCEDINIDAE	<i>Alcedo quadribrachys</i>	Extant (resident)	Least Concern	Stable
180	CORACIIFORMES	ALCEDINIDAE	<i>Ispidina picta</i>	Extant (resident)	Least Concern	Stable
181	CORACIIFORMES	ALCEDINIDAE	<i>Halcyon leucocephala</i>	Extant (resident)	Least Concern	Stable
182	CORACIIFORMES	ALCEDINIDAE	<i>Halcyon senegalensis</i>	Extant (resident)	Least Concern	Stable
183	CORACIIFORMES	ALCEDINIDAE	<i>Halcyon malimbica</i>	Extant (resident)	Least Concern	Decreasing
184	CORACIIFORMES	ALCEDINIDAE	<i>Halcyon chelicuti</i>	Extant (resident)	Least Concern	Stable
185	CORACIIFORMES	ALCEDINIDAE	<i>Megaceryle maxima</i>	Extant (resident)	Least Concern	Decreasing
186	CORACIIFORMES	MEROPIIDAE	<i>Merops bulocki</i>	Extant (resident)	Least Concern	Stable
187	CORACIIFORMES	MEROPIIDAE	<i>Merops pusillus</i>	Extant (resident)	Least Concern	Decreasing
188	CORACIIFORMES	MEROPIIDAE	<i>Merops oreobates</i>	Extant (resident)	Least Concern	Unknown
189	CORACIIFORMES	MEROPIIDAE	<i>Merops hirundineus</i>	Extant (resident)	Least Concern	Stable
190	CORACIIFORMES	MEROPIIDAE	<i>Merops albicollis</i>	Extant (non-breeding)	Least Concern	Stable
191	CORACIIFORMES	MEROPIIDAE	<i>Merops superciliosus</i>	Extant (resident)	Least Concern	Stable
192	CORACIIFORMES	MEROPIIDAE	<i>Merops nubicus</i>	Extant (resident)	Least Concern	Decreasing
193	CORACIIFORMES	MEROPIIDAE	<i>Merops variegatus</i>	Extant (resident)	Least Concern	Stable
194	CORACIIFORMES	ALCEDINIDAE	<i>Corythornis cristatus</i>	Extant (resident)	Least Concern	Stable
195	CORACIIFORMES	ALCEDINIDAE	<i>Ceryle rudis</i>	Extant (resident)	Least Concern	Unknown
196	CORACIIFORMES	MEROPIIDAE	<i>Merops viridissimus</i>	Extant (resident)	Least Concern	Increasing
197	CORACIIFORMES	CORACIIDAE	<i>Coracias garrulus</i>	Extant (non-breeding)	Least Concern	Decreasing
198	CORACIIFORMES	MEROPIIDAE	<i>Merops persicus</i>	Extant (non-breeding)	Least Concern	Stable
199	CUCULIFORMES	CUCULIDAE	<i>Clamator jacobinus</i>	Extant (resident)	Least Concern	Stable
200	CUCULIFORMES	CUCULIDAE	<i>Clamator levaillantii</i>	Extant (non-breeding)	Least Concern	Stable
201	CUCULIFORMES	CUCULIDAE	<i>Cuculus solitarius</i>	Extant (resident)	Least Concern	Stable
202	CUCULIFORMES	CUCULIDAE	<i>Cuculus gularis</i>	Extant (resident)	Least Concern	Stable
203	CUCULIFORMES	CUCULIDAE	<i>Cuculus rochii</i>	Extant (non-breeding)	Least Concern	Stable
204	CUCULIFORMES	CUCULIDAE	<i>Chrysococcyx klaas</i>	Extant (resident)	Least Concern	Stable
205	CUCULIFORMES	CUCULIDAE	<i>Chrysococcyx caprius</i>	Extant (resident)	Least Concern	Stable
206	CUCULIFORMES	CUCULIDAE	<i>Centropus grillii</i>	Extant (resident)	Least Concern	Stable
207	CUCULIFORMES	CUCULIDAE	<i>Centropus monachus</i>	Extant (resident)	Least Concern	Stable
208	CUCULIFORMES	CUCULIDAE	<i>Centropus senegalensis</i>	Extant (resident)	Least Concern	Stable
209	CUCULIFORMES	CUCULIDAE	<i>Centropus superciliosus</i>	Extant (resident)	Least Concern	Stable
210	CUCULIFORMES	CUCULIDAE	<i>Ceuthmochares aereus</i>	Extant (resident)	Least Concern	Stable
211	CUCULIFORMES	CUCULIDAE	<i>Cuculus clamosus</i>	Extant (resident)	Least Concern	Stable
212	CUCULIFORMES	CUCULIDAE	<i>Chrysococcyx cupreus</i>	Extant (resident)	Least Concern	Stable
213	CUCULIFORMES	CUCULIDAE	<i>Cuculus canorus</i>	Extant (non-breeding)	Least Concern	Decreasing
214	CUCULIFORMES	CUCULIDAE	<i>Clamator glandarius</i>	Extant (resident)	Least Concern	Stable



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215	CUCULIFORMES	CUCULIDAE	<i>Cercococcyx mechowi</i>	Extant (resident)	Least Concern	Decreasing
216	FALCONIFORMES	FALCONIDAE	<i>Polihierax semitorquatus</i>	Extant (resident)	Least Concern	Stable
217	FALCONIFORMES	FALCONIDAE	<i>Falco ardosiaceus</i>	Extant (resident)	Least Concern	Stable
218	FALCONIFORMES	FALCONIDAE	<i>Falco ruficollis</i>	Extant (resident)	Least Concern	Decreasing
219	FALCONIFORMES	FALCONIDAE	<i>Falco alopex</i>	Extant (resident)	Least Concern	Stable
220	FALCONIFORMES	FALCONIDAE	<i>Falco biarmicus</i>	Extant (resident)	Least Concern	Decreasing
221	<b>FALCONIFORMES</b>	<b>FALCONIDAE</b>	<b><i>Falco vespertinus</i></b>	<b>Extant (passage)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
222	FALCONIFORMES	FALCONIDAE	<i>Falco cuvierii</i>	Extant (resident)	Least Concern	Decreasing
223	FALCONIFORMES	FALCONIDAE	<i>Falco naumanni</i>	Extant (non-breeding)	Least Concern	Stable
224	FALCONIFORMES	FALCONIDAE	<i>Falco peregrinus</i>	Extant (non-breeding)	Least Concern	Increasing
225	FALCONIFORMES	FALCONIDAE	<i>Falco subbuteo</i>	Extant (non-breeding)	Least Concern	Decreasing
226	FALCONIFORMES	FALCONIDAE	<i>Falco tinnunculus</i>	Extant (resident)	Least Concern	Decreasing
227	GALLIFORMES	PHASIANIDAE	<i>Ortygornis sephaena</i>	Extant (resident)	Least Concern	Stable
228	GALLIFORMES	PHASIANIDAE	<i>Scleroptila streptophora</i>	Extant (resident)	Near Threatened	Decreasing
229	GALLIFORMES	PHASIANIDAE	<i>Scleroptila gutturalis</i>	Extant (resident)	Least Concern	Stable
230	GALLIFORMES	PHASIANIDAE	<i>Pternistis icterorhynchus</i>	Extant (resident)	Least Concern	Stable
231	GALLIFORMES	PHASIANIDAE	<i>Pternistis squamatus</i>	Extant (resident)	Least Concern	Decreasing
232	GALLIFORMES	PHASIANIDAE	<i>Coturnix delegorguei</i>	Extant (resident)	Least Concern	Stable
233	GALLIFORMES	PHASIANIDAE	<i>Synoicus adansonii</i>	Extant (resident)	Least Concern	Stable
234	GALLIFORMES	ODONTOPHORIDAE	<i>Ptilopachus petrosus</i>	Extant (resident)	Least Concern	Stable
235	GALLIFORMES	NUMIDIDAE	<i>Guttera verreauxi</i>	Extant (resident)	Least Concern	Stable
236	GALLIFORMES	PHASIANIDAE	<i>Coturnix coturnix</i>	Extant (resident)	Least Concern	Decreasing
237	GALLIFORMES	NUMIDIDAE	<i>Numida meleagris</i>	Extant (resident)	Least Concern	Stable
238	GRUIFORMES	RALLIDAE	<i>Crex crex</i>	Extant (passage)	Least Concern	Stable
239	GRUIFORMES	RALLIDAE	<i>Porzana porzana</i>	Extant (non-breeding)	Least Concern	Stable
240	GRUIFORMES	RALLIDAE	<i>Zapornia parva</i>	Extant (non-breeding)	Least Concern	Stable
241	GRUIFORMES	HELIORNITHIDAE	<i>Podica senegalensis</i>	Extant (resident)	Least Concern	Decreasing
242	GRUIFORMES	RALLIDAE	<i>Sarothrura pulchra</i>	Extant (resident)	Least Concern	Decreasing
243	GRUIFORMES	RALLIDAE	<i>Sarothrura elegans</i>	Extant (resident)	Least Concern	Stable
244	GRUIFORMES	RALLIDAE	<i>Sarothrura affinis</i>	Extant (resident)	Least Concern	Decreasing
245	GRUIFORMES	RALLIDAE	<i>Crex egregia</i>	Extant (resident)	Least Concern	Stable
246	GRUIFORMES	RALLIDAE	<i>Zapornia flavirostra</i>	Extant (resident)	Least Concern	Unknown
247	GRUIFORMES	RALLIDAE	<i>Porphyrio alleni</i>	Extant (resident)	Least Concern	Decreasing
248	GRUIFORMES	RALLIDAE	<i>Zapornia pusilla</i>	Extant (resident)	Least Concern	Unknown
249	GRUIFORMES	RALLIDAE	<i>Gallinula chloropus</i>	Extant (resident)	Least Concern	Stable
250	GRUIFORMES	RALLIDAE	<i>Porphyrio porphyrio</i>	Extant (resident)	Least Concern	Unknown
251	MUSOPHAGIFORMES	MUSOPHAGIDAE	<i>Tauraco schuettii</i>	Extant (resident)	Least Concern	Stable
252	MUSOPHAGIFORMES	MUSOPHAGIDAE	<i>Tauraco leucolophus</i>	Extant (resident)	Least Concern	Stable
253	MUSOPHAGIFORMES	MUSOPHAGIDAE	<i>Musophaga rossae</i>	Extant (resident)	Least Concern	Stable
254	MUSOPHAGIFORMES	MUSOPHAGIDAE	<i>Crinifer zonurus</i>	Extant (resident)	Least Concern	Stable
255	OTIDIFORMES	OTIDIDAE	<i>Neotis denhami</i>	Extant (resident)	Near Threatened	Decreasing
256	OTIDIFORMES	OTIDIDAE	<i>Lissotis melanogaster</i>	Extant (resident)	Least Concern	Decreasing
257	PASSERIFORMES	ACROCEPHALIDAE	<i>Acrocephalus schoenobaenus</i>	Extant (non-breeding)	Least Concern	Stable

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258	PASSERIFORMES	PHYLLOSCOPIDAE	<i>Phylloscopus trochilus</i>	Extant (non-breeding)	Least Concern	Decreasing
259	PASSERIFORMES	PHYLLOSCOPIDAE	<i>Phylloscopus sibilatrix</i>	Extant (non-breeding)	Least Concern	Decreasing
260	PASSERIFORMES	SYLVIIDAE	<i>Sylvia atricapilla</i>	Extant (non-breeding)	Least Concern	Increasing
261	PASSERIFORMES	SYLVIIDAE	<i>Curruca nisoria</i>	Extant (passage)	Least Concern	Stable
262	PASSERIFORMES	MUSCICAPIDAE	<i>Saxicola rubetra</i>	Extant (non-breeding)	Least Concern	Decreasing
263	PASSERIFORMES	MUSCICAPIDAE	<i>Oenanthe pleschanka</i>	Extant (non-breeding)	Least Concern	Stable
264	PASSERIFORMES	MUSCICAPIDAE	<i>Oenanthe isabellina</i>	Extant (non-breeding)	Least Concern	Stable
265	PASSERIFORMES	PITTIDAE	<i>Pitta angolensis</i>	Extant (non-breeding)	Least Concern	Decreasing
266	PASSERIFORMES	LANIIDAE	<i>Lanius isabellinus</i>	Extant (non-breeding)	Least Concern	Stable
267	PASSERIFORMES	LANIIDAE	<i>Lanius excubitoroides</i>	Extant (resident)	Least Concern	Stable
268	PASSERIFORMES	LANIIDAE	<i>Lanius mackinnoni</i>	Extant (resident)	Least Concern	Increasing
269	PASSERIFORMES	LANIIDAE	<i>Lanius collaris</i>	Extant (resident)	Least Concern	Increasing
270	PASSERIFORMES	LANIIDAE	<i>Lanius corvinus</i>	Extant (resident)	Least Concern	Unknown
271	PASSERIFORMES	LANIIDAE	<i>Eurocephalus ruppelli</i>	Extant (resident)	Least Concern	Stable
272	PASSERIFORMES	ORIOIIDAE	<i>Oriolus larvatus</i>	Extant (resident)	Least Concern	Increasing
273	PASSERIFORMES	CAMPEPHAGIDAE	<i>Ceblepyris pectoralis</i>	Extant (resident)	Least Concern	Decreasing
274	PASSERIFORMES	SCOTOCERCIDAE	<i>Erythrocerus mccallii</i>	Extant (resident)	Least Concern	Decreasing
275	PASSERIFORMES	MONARCHIDAE	<i>Trochocercus nitens</i>	Extant (resident)	Least Concern	Decreasing
276	PASSERIFORMES	MONARCHIDAE	<i>Terpsiphone viridis</i>	Extant (resident)	Least Concern	Stable
277	PASSERIFORMES	MALACONOTIDAE	<i>Dryoscopus gambensis</i>	Extant (resident)	Least Concern	Stable
278	PASSERIFORMES	MALACONOTIDAE	<i>Dryoscopus angolensis</i>	Extant (resident)	Least Concern	Stable
279	PASSERIFORMES	MALACONOTIDAE	<i>Tchagra australis</i>	Extant (resident)	Least Concern	Stable
280	PASSERIFORMES	MALACONOTIDAE	<i>Laniarius luehderi</i>	Extant (resident)	Least Concern	Stable
281	PASSERIFORMES	MALACONOTIDAE	<i>Laniarius aethiopicus</i>	Extant (resident)	Least Concern	Stable
282	PASSERIFORMES	MALACONOTIDAE	<i>Laniarius erythrogaster</i>	Extant (resident)	Least Concern	Stable
283	PASSERIFORMES	MALACONOTIDAE	<i>Chlorophoneus sulfureopectus</i>	Extant (resident)	Least Concern	Stable
284	PASSERIFORMES	MALACONOTIDAE	<i>Malaconotus blanchoti</i>	Extant (resident)	Least Concern	Increasing
285	PASSERIFORMES	VANGIDAE	<i>Prionops plumatus</i>	Extant (resident)	Least Concern	Stable
286	PASSERIFORMES	VANGIDAE	<i>Megabyas flammulatus</i>	Extant (resident)	Least Concern	Decreasing
287	PASSERIFORMES	VANGIDAE	<i>Bias musicus</i>	Extant (resident)	Least Concern	Decreasing
288	PASSERIFORMES	PLATYSTEIRIDAE	<i>Batis molitor</i>	Extant (resident)	Least Concern	Stable
289	PASSERIFORMES	PLATYSTEIRIDAE	<i>Batis ituriensis</i>	Extant (resident)	Least Concern	Stable
290	PASSERIFORMES	PLATYSTEIRIDAE	<i>Platysteira cyanea</i>	Extant (resident)	Least Concern	Stable
291	PASSERIFORMES	PLATYSTEIRIDAE	<i>Dyaphorophya castanea</i>	Extant (resident)	Least Concern	Stable
292	PASSERIFORMES	PLATYSTEIRIDAE	<i>Dyaphorophya jamesoni</i>	Extant (resident)	Least Concern	Stable
293	PASSERIFORMES	TURDIDAE	<i>Stizorhina fraseri</i>	Extant (resident)	Least Concern	Decreasing
294	PASSERIFORMES	TURDIDAE	<i>Turdus pelios</i>	Extant (resident)	Least Concern	Unknown
295	PASSERIFORMES	MUSCICAPIDAE	<i>Agricola pallidus</i>	Extant (resident)	Least Concern	Stable
296	PASSERIFORMES	MUSCICAPIDAE	<i>Bradornis microrhynchus</i>	Extant (resident)	Least Concern	Stable
297	PASSERIFORMES	MUSCICAPIDAE	<i>Melaenornis fischeri</i>	Extant (resident)	Least Concern	Stable
298	PASSERIFORMES	MUSCICAPIDAE	<i>Melaenornis edolioides</i>	Extant (resident)	Least Concern	Stable
299	PASSERIFORMES	MUSCICAPIDAE	<i>Muscicapa adusta</i>	Extant (resident)	Least Concern	Decreasing
300	PASSERIFORMES	MUSCICAPIDAE	<i>Bradornis comitatus</i>	Extant (resident)	Least Concern	Stable

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301	PASSERIFORMES	MUSCICAPIDAE	<i>Fraseria caerulescens</i>	Extant (resident)	Least Concern	Stable
302	PASSERIFORMES	MUSCICAPIDAE	<i>Pogonocichla stellata</i>	Extant (resident)	Least Concern	Decreasing
303	PASSERIFORMES	MUSCICAPIDAE	<i>Sheppardia aequatorialis</i>	Extant (resident)	Least Concern	Decreasing
304	PASSERIFORMES	MUSCICAPIDAE	<i>Cossypha heuglini</i>	Extant (resident)	Least Concern	Stable
305	PASSERIFORMES	MUSCICAPIDAE	<i>Cossypha natalensis</i>	Extant (resident)	Least Concern	Stable
306	PASSERIFORMES	MUSCICAPIDAE	<i>Cossypha niveicapilla</i>	Extant (resident)	Least Concern	Stable
307	PASSERIFORMES	MUSCICAPIDAE	<i>Cercotrichas leucophrys</i>	Extant (resident)	Least Concern	Stable
308	PASSERIFORMES	MUSCICAPIDAE	<i>Myrmecocichla nigra</i>	Extant (resident)	Least Concern	Stable
309	PASSERIFORMES	MUSCICAPIDAE	<i>Oenanthe albifrons</i>	Extant (resident)	Least Concern	Stable
310	PASSERIFORMES	STURNIDAE	<i>Lamprotornis chalcurus</i>	Extant (resident)	Least Concern	Stable
311	PASSERIFORMES	STURNIDAE	<i>Lamprotornis chalybaeus</i>	Extant (resident)	Least Concern	Stable
312	PASSERIFORMES	STURNIDAE	<i>Lamprotornis purpuroptera</i>	Extant (resident)	Least Concern	Unknown
313	PASSERIFORMES	STURNIDAE	<i>Creatophora cinerea</i>	Extant (resident)	Least Concern	Stable
314	PASSERIFORMES	PARIDAE	<i>Melaniparus funereus</i>	Extant (resident)	Least Concern	Decreasing
315	PASSERIFORMES	HIRUNDINIDAE	<i>Riparia paludicola</i>	Extant (resident)	Least Concern	Decreasing
316	PASSERIFORMES	HIRUNDINIDAE	<i>Hirundo aethiopica</i>	Extant (resident)	Least Concern	Increasing
317	PASSERIFORMES	HIRUNDINIDAE	<i>Hirundo smithii</i>	Extant (resident)	Least Concern	Increasing
318	PASSERIFORMES	HIRUNDINIDAE	<i>Cecropis senegalensis</i>	Extant (resident)	Least Concern	Increasing
319	PASSERIFORMES	HIRUNDINIDAE	<i>Psalidoprocne albiceps</i>	Extant (resident)	Least Concern	Stable
320	PASSERIFORMES	PYCNONOTIDAE	<i>Stelgidillas gracilirostris</i>	Extant (resident)	Least Concern	Stable
321	PASSERIFORMES	PYCNONOTIDAE	<i>Phyllastrephus strepitans</i>	Extant (resident)	Least Concern	Decreasing
322	PASSERIFORMES	PYCNONOTIDAE	<i>Phyllastrephus hypochloris</i>	Extant (resident)	Least Concern	Stable
323	PASSERIFORMES	PYCNONOTIDAE	<i>Phyllastrephus albigularis</i>	Extant (resident)	Least Concern	Stable
324	PASSERIFORMES	PYCNONOTIDAE	<i>Bleda syndactylus</i>	Extant (resident)	Least Concern	Stable
325	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola erythrops</i>	Extant (resident)	Least Concern	Stable
326	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola cantans</i>	Extant (resident)	Least Concern	Stable
327	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola lateralis</i>	Extant (resident)	Least Concern	Stable
328	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola aberrans</i>	Extant (resident)	Least Concern	Stable
329	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola chiniana</i>	Extant (resident)	Least Concern	Stable
330	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola ruficeps</i>	Extant (resident)	Least Concern	Stable
331	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola troglodytes</i>	Extant (resident)	Least Concern	Stable
332	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola ayresii</i>	Extant (resident)	Least Concern	Decreasing
333	PASSERIFORMES	CISTICOLIDAE	<i>Prinia subflava</i>	Extant (resident)	Least Concern	Stable
334	PASSERIFORMES	CISTICOLIDAE	<i>Schistolais leucopogon</i>	Extant (resident)	Least Concern	Stable
335	PASSERIFORMES	CISTICOLIDAE	<i>Prinia bairdii</i>	Extant (resident)	Least Concern	Stable
336	PASSERIFORMES	CISTICOLIDAE	<i>Prinia erythroptera</i>	Extant (resident)	Least Concern	Stable
337	PASSERIFORMES	CISTICOLIDAE	<i>Drymocichla incana</i>	Extant (resident)	Least Concern	Stable
338	PASSERIFORMES	CISTICOLIDAE	<i>Apalis flavida</i>	Extant (resident)	Least Concern	Increasing
339	PASSERIFORMES	CISTICOLIDAE	<i>Camaroptera brachyura</i>	Extant (resident)	Least Concern	Increasing
340	PASSERIFORMES	MACROSPHENIDAE	<i>Melocichla mentalis</i>	Extant (resident)	Least Concern	Stable
341	PASSERIFORMES	ACROCEPHALIDAE	<i>Acrocephalus gracilirostris</i>	Extant (resident)	Least Concern	Stable
342	PASSERIFORMES	CISTICOLIDAE	<i>Phyllolais pulchella</i>	Extant (resident)	Least Concern	Stable
343	PASSERIFORMES	CISTICOLIDAE	<i>Eremomela flavicrissalis</i>	Extant (resident)	Least Concern	Decreasing

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344	PASSERIFORMES	MACROSPHENIDAE	<i>Sylvietta virens</i>	Extant (resident)	Least Concern	Stable
345	PASSERIFORMES	MACROSPHENIDAE	<i>Sylvietta brachyura</i>	Extant (resident)	Least Concern	Stable
346	PASSERIFORMES	MACROSPHENIDAE	<i>Sylvietta whytii</i>	Extant (resident)	Least Concern	Decreasing
347	PASSERIFORMES	LOCUSTELLIDAE	<i>Catrisicus brevirostris</i>	Extant (resident)	Least Concern	Decreasing
348	PASSERIFORMES	PELLORNEIDAE	<i>Illadopsis albipectus</i>	Extant (resident)	Least Concern	Stable
349	PASSERIFORMES	ALAUDIDAE	<i>Mirafra africana</i>	Extant (resident)	Least Concern	Decreasing
350	PASSERIFORMES	ALAUDIDAE	<i>Pinarocorys erythropygia</i>	Extant (breeding)	Least Concern	Stable
351	PASSERIFORMES	ALAUDIDAE	<i>Galerida modesta</i>	Extant (resident)	Least Concern	Stable
352	PASSERIFORMES	NECTARINIIDAE	<i>Anthreptes longuemarei</i>	Extant (resident)	Least Concern	Stable
353	PASSERIFORMES	NECTARINIIDAE	<i>Anthreptes orientalis</i>	Extant (resident)	Least Concern	Stable
354	PASSERIFORMES	NECTARINIIDAE	<i>Hedypna collaris</i>	Extant (resident)	Least Concern	Stable
355	PASSERIFORMES	NECTARINIIDAE	<i>Cyanomitra verticalis</i>	Extant (resident)	Least Concern	Stable
356	PASSERIFORMES	NECTARINIIDAE	<i>Chalcomitra amethystina</i>	Extant (resident)	Least Concern	Stable
357	PASSERIFORMES	NECTARINIIDAE	<i>Chalcomitra rubescens</i>	Extant (resident)	Least Concern	Stable
358	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris osea</i>	Extant (resident)	Least Concern	Stable
359	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris chloropygius</i>	Extant (resident)	Least Concern	Stable
360	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris pulchellus</i>	Extant (resident)	Least Concern	Stable
361	PASSERIFORMES	PASSERIDAE	<i>Gymnoris dentata</i>	Extant (resident)	Least Concern	Stable
362	PASSERIFORMES	MOTACILLIDAE	<i>Tmetothylacus tenellus</i>	Extant (resident)	Least Concern	Stable
363	PASSERIFORMES	MOTACILLIDAE	<i>Macronyx croceus</i>	Extant (resident)	Least Concern	Stable
364	PASSERIFORMES	PLOCEIDAE	<i>Plocepasser mahali</i>	Extant (resident)	Least Concern	Stable
365	PASSERIFORMES	PLOCEIDAE	<i>Plocepasser superciliosus</i>	Extant (resident)	Least Concern	Stable
366	PASSERIFORMES	PLOCEIDAE	<i>Ploceus baglafecht</i>	Extant (resident)	Least Concern	Stable
367	PASSERIFORMES	PLOCEIDAE	<i>Ploceus ocularis</i>	Extant (resident)	Least Concern	Stable
368	PASSERIFORMES	PLOCEIDAE	<i>Ploceus heuglini</i>	Extant (resident)	Least Concern	Stable
369	PASSERIFORMES	PLOCEIDAE	<i>Ploceus nigerrimus</i>	Extant (resident)	Least Concern	Stable
370	PASSERIFORMES	PLOCEIDAE	<i>Ploceus badius</i>	Extant (resident)	Least Concern	Stable
371	PASSERIFORMES	PLOCEIDAE	<i>Ploceus superciliosus</i>	Extant (resident)	Least Concern	Stable
372	PASSERIFORMES	PLOCEIDAE	<i>Quelea erythropis</i>	Extant (resident)	Least Concern	Stable
373	PASSERIFORMES	PLOCEIDAE	<i>Euplectes hordeaceus</i>	Extant (resident)	Least Concern	Stable
374	PASSERIFORMES	PLOCEIDAE	<i>Euplectes capensis</i>	Extant (resident)	Least Concern	Stable
375	PASSERIFORMES	PLOCEIDAE	<i>Euplectes macroura</i>	Extant (resident)	Least Concern	Stable
376	PASSERIFORMES	PLOCEIDAE	<i>Euplectes albonotatus</i>	Extant (resident)	Least Concern	Stable
377	PASSERIFORMES	PLOCEIDAE	<i>Euplectes ardens</i>	Extant (resident)	Least Concern	Stable
378	PASSERIFORMES	ESTRILDIDAE	<i>Nesocharis capistrata</i>	Extant (resident)	Least Concern	Stable
379	PASSERIFORMES	ESTRILDIDAE	<i>Pytilia phoenicoptera</i>	Extant (resident)	Least Concern	Stable
380	PASSERIFORMES	ESTRILDIDAE	<i>Clytospiza monteiri</i>	Extant (resident)	Least Concern	Stable
381	PASSERIFORMES	ESTRILDIDAE	<i>Lagonosticta rufopicta</i>	Extant (resident)	Least Concern	Stable
382	PASSERIFORMES	ESTRILDIDAE	<i>Lagonosticta rara</i>	Extant (resident)	Least Concern	Stable
383	PASSERIFORMES	ESTRILDIDAE	<i>Estrilda paludicola</i>	Extant (resident)	Least Concern	Stable
384	PASSERIFORMES	ESTRILDIDAE	<i>Estrilda rhodopyga</i>	Extant (resident)	Least Concern	Stable
385	PASSERIFORMES	ESTRILDIDAE	<i>Estrilda nonnula</i>	Extant (resident)	Least Concern	Stable
386	PASSERIFORMES	ESTRILDIDAE	<i>Estrilda charmosyna</i>	Extant (resident)	Least Concern	Stable

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387	PASSERIFORMES	ESTRILDIDAE	<i>Spermestes cucullata</i>	Extant (resident)	Least Concern	Stable
388	PASSERIFORMES	ESTRILDIDAE	<i>Amadina fasciata</i>	Extant (resident)	Least Concern	Stable
389	PASSERIFORMES	FRINGILLIDAE	<i>Crithagra leucopygia</i>	Extant (resident)	Least Concern	Stable
390	PASSERIFORMES	EMBERIZIDAE	<i>Emberiza tahapisi</i>	Extant (resident)	Least Concern	Stable
391	PASSERIFORMES	EMBERIZIDAE	<i>Emberiza flaviventris</i>	Extant (resident)	Least Concern	Stable
392	PASSERIFORMES	EMBERIZIDAE	<i>Emberiza affinis</i>	Extant (resident)	Least Concern	Stable
393	PASSERIFORMES	EMBERIZIDAE	<i>Emberiza cabanisi</i>	Extant (resident)	Least Concern	Stable
394	PASSERIFORMES	TURDIDAE	<i>Geokichla piaggiae</i>	Extant (resident)	Least Concern	Decreasing
395	PASSERIFORMES	DICRURIDAE	<i>Dicrurus adsimilis</i>	Extant (resident)	Least Concern	Stable
396	PASSERIFORMES	LANIIDAE	<i>Lanius phoenicuroides</i>	Extant (non-breeding)	Least Concern	Stable
397	PASSERIFORMES	PYCNONOTIDAE	<i>Bleda ugandae</i>	Extant (resident)	Least Concern	Stable
398	PASSERIFORMES	PYCNONOTIDAE	<i>Atimastillas flavigula</i>	Extant (resident)	Least Concern	Stable
399	PASSERIFORMES	CISTICOLIDAE	<i>Camaroptera toroensis</i>	Extant (resident)	Least Concern	Unknown
400	PASSERIFORMES	ESTRILDIDAE	<i>Coccopygia quartinia</i>	Extant (resident)	Least Concern	Stable
401	PASSERIFORMES	NECTARINIIDAE	<i>Deleornis axillaris</i>	Extant (resident)	Least Concern	Decreasing
402	PASSERIFORMES	ESTRILDIDAE	<i>Lagonosticta nigricollis</i>	Extant (resident)	Least Concern	Stable
403	PASSERIFORMES	NECTARINIIDAE	<i>Anthreptes tephrolaemus</i>	Extant (resident)	Least Concern	Stable
404	PASSERIFORMES	HIRUNDINIDAE	<i>Ptyonoprogne rufigula</i>	Extant (resident)	Least Concern	Stable
405	PASSERIFORMES	LANIIDAE	<i>Lanius collurio</i>	Extant (non-breeding)	Least Concern	Decreasing
406	PASSERIFORMES	MUSCICAPIDAE	<i>Sheppardia polioptera</i>	Extant (resident)	Least Concern	Decreasing
407	PASSERIFORMES	HIRUNDINIDAE	<i>Cecropis abyssinica</i>	Extant (resident)	Least Concern	Increasing
408	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola juncidis</i>	Extant (resident)	Least Concern	Increasing
409	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola eximius</i>	Extant (resident)	Least Concern	Stable
410	PASSERIFORMES	LOCUSTELLIDAE	<i>Locustella fluviatilis</i>	Extant (passage)	Least Concern	Decreasing
411	PASSERIFORMES	ACROCEPHALIDAE	<i>Hippolais icterina</i>	Extant (passage)	Least Concern	Decreasing
412	PASSERIFORMES	ESTRILDIDAE	<i>Estrilda erythronotos</i>	Extant (resident)	Least Concern	Stable
413	PASSERIFORMES	ESTRILDIDAE	<i>Lagonosticta rubricata</i>	Extant (resident)	Least Concern	Stable
414	PASSERIFORMES	ACROCEPHALIDAE	<i>Acrocephalus arundinaceus</i>	Extant (non-breeding)	Least Concern	Decreasing
415	PASSERIFORMES	ESTRILDIDAE	<i>Spermestes bicolor</i>	Extant (resident)	Least Concern	Stable
416	PASSERIFORMES	STURNIDAE	<i>Lamprotornis chloropterus</i>	Extant (resident)	Least Concern	Stable
417	PASSERIFORMES	MOTACILLIDAE	<i>Motacilla cinerea</i>	Extant (non-breeding)	Least Concern	Stable
418	PASSERIFORMES	HIRUNDINIDAE	<i>Cecropis daurica</i>	Extant (resident)	Least Concern	Stable
419	PASSERIFORMES	MALACONOTIDAE	<i>Nilaus afer</i>	Extant (resident)	Least Concern	Stable
420	PASSERIFORMES	ESTRILDIDAE	<i>Pytilia melba</i>	Extant (resident)	Least Concern	Stable
421	PASSERIFORMES	MUSCICAPIDAE	<i>Luscinia megarhynchos</i>	Extant (non-breeding)	Least Concern	Stable
422	PASSERIFORMES	ORIOIIDAE	<i>Oriolus oriolus</i>	Extant (passage)	Least Concern	Stable
423	PASSERIFORMES	MUSCICAPIDAE	<i>Monticola saxatilis</i>	Extant (non-breeding)	Least Concern	Decreasing
424	PASSERIFORMES	SYLVIIDAE	<i>Sylvia borin</i>	Extant (non-breeding)	Least Concern	Decreasing
425	PASSERIFORMES	CALYPTOMENIDAE	<i>Smithornis rufolateralis</i>	Extant (resident)	Least Concern	Decreasing
426	PASSERIFORMES	MALACONOTIDAE	<i>Tchagra senegalus</i>	Extant (resident)	Least Concern	Stable
427	PASSERIFORMES	MOTACILLIDAE	<i>Anthus cinnamomeus</i>	Extant (resident)	Least Concern	Stable
428	PASSERIFORMES	CISTICOLIDAE	<i>Apalis rufogularis</i>	Extant (resident)	Least Concern	Stable
429	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola chubbii</i>	Extant (resident)	Least Concern	Stable

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430	PASSERIFORMES	PARIDAE	<i>Melaniparus guineensis</i>	Extant (resident)	Least Concern	Stable
431	PASSERIFORMES	REMIZIDAE	<i>Anthoscopus parvulus</i>	Extant (resident)	Least Concern	Stable
432	PASSERIFORMES	CAMPEPHAGIDAE	<i>Campephaga flava</i>	Extant (resident)	Least Concern	Stable
433	PASSERIFORMES	ALAUDIDAE	<i>Mirafra rufocinnamomea</i>	Extant (resident)	Least Concern	Decreasing
434	PASSERIFORMES	ALAUDIDAE	<i>Mirafra albicauda</i>	Extant (resident)	Least Concern	Decreasing
435	PASSERIFORMES	NICATORIDAE	<i>Nicator chloris</i>	Extant (resident)	Least Concern	Stable
436	PASSERIFORMES	CISTICOLIDAE	<i>Eremomela icteropygialis</i>	Extant (resident)	Least Concern	Stable
437	PASSERIFORMES	CISTICOLIDAE	<i>Eremomela canescens</i>	Extant (resident)	Least Concern	Stable
438	PASSERIFORMES	CISTICOLIDAE	<i>Eremomela badiceps</i>	Extant (resident)	Least Concern	Stable
439	PASSERIFORMES	CISTICOLIDAE	<i>Apalis jacksoni</i>	Extant (resident)	Least Concern	Stable
440	PASSERIFORMES	CISTICOLIDAE	<i>Apalis cinerea</i>	Extant (resident)	Least Concern	Stable
441	PASSERIFORMES	CISTICOLIDAE	<i>Eminia lepida</i>	Extant (resident)	Least Concern	Stable
442	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola marginatus</i>	Extant (resident)	Least Concern	Stable
443	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola natalensis</i>	Extant (resident)	Least Concern	Stable
444	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola brachypterus</i>	Extant (resident)	Least Concern	Stable
445	PASSERIFORMES	HIRUNDINIDAE	<i>Psalidoprocne pristoptera</i>	Extant (resident)	Least Concern	Decreasing
446	PASSERIFORMES	PLATYSTEIRIDAE	<i>Batis erlangeri</i>	Extant (resident)	Least Concern	Decreasing
447	PASSERIFORMES	HIRUNDINIDAE	<i>Delichon urbicum</i>	Extant (non-breeding)	Least Concern	Decreasing
448	PASSERIFORMES	MALACONOTIDAE	<i>Bocagia minuta</i>	Extant (resident)	Least Concern	Decreasing
449	PASSERIFORMES	HIRUNDINIDAE	<i>Cecropis semirufa</i>	Extant (resident)	Least Concern	Increasing
450	PASSERIFORMES	DICRURIDAE	<i>Dicrurus ludwigii</i>	Extant (resident)	Least Concern	Stable
451	PASSERIFORMES	MONARCHIDAE	<i>Terpsiphone rufiventer</i>	Extant (resident)	Least Concern	Decreasing
452	PASSERIFORMES	LANIIDAE	<i>Lanius gubernator</i>	Extant (resident)	Least Concern	Stable
453	PASSERIFORMES	CORVIDAE	<i>Ptilostomus afer</i>	Extant (resident)	Least Concern	Stable
454	PASSERIFORMES	CORVIDAE	<i>Corvus albus</i>	Extant (resident)	Least Concern	Stable
455	PASSERIFORMES	HYLIOTIDAE	<i>Hyliota flavigaster</i>	Extant (resident)	Least Concern	Decreasing
456	PASSERIFORMES	STENOSTIRIDAE	<i>Elminia longicauda</i>	Extant (resident)	Least Concern	Stable
457	PASSERIFORMES	STURNIDAE	<i>Lamprotornis superbus</i>	Extant (resident)	Least Concern	Unknown
458	PASSERIFORMES	STURNIDAE	<i>Onychognathus morio</i>	Extant (resident)	Least Concern	Increasing
459	PASSERIFORMES	PLOCEIDAE	<i>Ploceus nigricollis</i>	Extant (resident)	Least Concern	Stable
460	PASSERIFORMES	PLOCEIDAE	<i>Anaplectes leuconotos</i>	Extant (resident)	Least Concern	Stable
461	PASSERIFORMES	PLOCEIDAE	<i>Ploceus melanocephalus</i>	Extant (resident)	Least Concern	Stable
462	PASSERIFORMES	ORIOOLIDAE	<i>Oriolus auratus</i>	Extant (non-breeding)	Least Concern	Decreasing
463	PASSERIFORMES	ORIOOLIDAE	<i>Oriolus brachyrynchus</i>	Extant (resident)	Least Concern	Stable
464	PASSERIFORMES	ORIOOLIDAE	<i>Oriolus nigripennis</i>	Extant (resident)	Least Concern	Stable
465	PASSERIFORMES	CAMPEPHAGIDAE	<i>Ceblepyris caesius</i>	Extant (resident)	Least Concern	Stable
466	PASSERIFORMES	CAMPEPHAGIDAE	<i>Campephaga phoenicea</i>	Extant (resident)	Least Concern	Stable
467	PASSERIFORMES	MUSCICAPIDAE	<i>Ficedula semitorquata</i>	Extant (non-breeding)	Least Concern	Decreasing
468	PASSERIFORMES	MUSCICAPIDAE	<i>Cichladusa guttata</i>	Extant (resident)	Least Concern	Stable
469	PASSERIFORMES	STURNIDAE	<i>Pholia sharpii</i>	Extant (resident)	Least Concern	Decreasing
470	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris venustus</i>	Extant (resident)	Least Concern	Stable
471	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris mariquensis</i>	Extant (resident)	Least Concern	Stable
472	PASSERIFORMES	PLOCEIDAE	<i>Sporopipes frontalis</i>	Extant (resident)	Least Concern	Stable

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473	PASSERIFORMES	PLOCEIDAE	<i>Ploceus intermedius</i>	Extant (resident)	Least Concern	Stable
474	PASSERIFORMES	TURDIDAE	<i>Geokichla princei</i>	Extant (resident)	Least Concern	Decreasing
475	PASSERIFORMES	MUSCICAPIDAE	<i>Chamaetylas poliocephala</i>	Extant (resident)	Least Concern	Decreasing
476	PASSERIFORMES	MUSCICAPIDAE	<i>Artomyias fuliginosa</i>	Extant (resident)	Least Concern	Stable
477	PASSERIFORMES	MUSCICAPIDAE	<i>Fraseria plumbea</i>	Extant (resident)	Least Concern	Stable
478	PASSERIFORMES	MUSCICAPIDAE	<i>Cossypha cyanocampter</i>	Extant (resident)	Least Concern	Decreasing
479	PASSERIFORMES	MUSCICAPIDAE	<i>Cercotrichas hartlaubi</i>	Extant (resident)	Least Concern	Stable
480	PASSERIFORMES	STURNIDAE	<i>Cinnyricinclus leucogaster</i>	Extant (resident)	Least Concern	Decreasing
481	PASSERIFORMES	BUPHAGIDAE	<i>Buphagus erythrorynchus</i>	Extant (resident)	Least Concern	Decreasing
482	PASSERIFORMES	PYCNONOTIDAE	<i>Eurillas virens</i>	Extant (resident)	Least Concern	Stable
483	PASSERIFORMES	PYCNONOTIDAE	<i>Eurillas latirostris</i>	Extant (resident)	Least Concern	Stable
484	PASSERIFORMES	PYCNONOTIDAE	<i>Baeopogon indicator</i>	Extant (resident)	Least Concern	Stable
485	PASSERIFORMES	SCOTOCERCIDAE	<i>Hylia prasina</i>	Extant (resident)	Least Concern	Stable
486	PASSERIFORMES	LEIOTRICHIDAE	<i>Argya rubiginosa</i>	Extant (resident)	Least Concern	Stable
487	PASSERIFORMES	NECTARINIIDAE	<i>Hedydipna platura</i>	Extant (breeding)	Least Concern	Stable
488	PASSERIFORMES	NECTARINIIDAE	<i>Anthreptes seimundi</i>	Extant (resident)	Least Concern	Stable
489	PASSERIFORMES	NECTARINIIDAE	<i>Cyanomitra olivacea</i>	Extant (resident)	Least Concern	Stable
490	PASSERIFORMES	NECTARINIIDAE	<i>Chalcomitra senegalensis</i>	Extant (resident)	Least Concern	Stable
491	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris bouvieri</i>	Extant (resident)	Least Concern	Stable
492	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris cupreus</i>	Extant (resident)	Least Concern	Stable
493	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris erythrocerus</i>	Extant (resident)	Least Concern	Stable
494	PASSERIFORMES	NECTARINIIDAE	<i>Cinnyris superbus</i>	Extant (resident)	Least Concern	Decreasing
495	PASSERIFORMES	MOTACILLIDAE	<i>Anthus leucophrys</i>	Extant (resident)	Least Concern	Stable
496	PASSERIFORMES	MOTACILLIDAE	<i>Anthus trivialis</i>	Extant (non-breeding)	Least Concern	Decreasing
497	PASSERIFORMES	PLOCEIDAE	<i>Dinemellia dinemelli</i>	Extant (resident)	Least Concern	Stable
498	PASSERIFORMES	PLOCEIDAE	<i>Euplectes afer</i>	Extant (resident)	Least Concern	Stable
499	PASSERIFORMES	PLOCEIDAE	<i>Euplectes franciscanus</i>	Extant (resident)	Least Concern	Stable
500	PASSERIFORMES	PLOCEIDAE	<i>Euplectes axillaris</i>	Extant (resident)	Least Concern	Stable
501	PASSERIFORMES	VIDUIDAE	<i>Anomalospiza imberbis</i>	Extant (resident)	Least Concern	Stable
502	PASSERIFORMES	PLOCEIDAE	<i>Amblyospiza albifrons</i>	Extant (resident)	Least Concern	Stable
503	PASSERIFORMES	ESTRILDIDAE	<i>Cryptospiza salvadorii</i>	Extant (resident)	Least Concern	Stable
504	PASSERIFORMES	ESTRILDIDAE	<i>Euschistospiza dybowskii</i>	Extant (resident)	Least Concern	Stable
505	PASSERIFORMES	ESTRILDIDAE	<i>Estrilda troglodytes</i>	Extant (resident)	Least Concern	Stable
506	PASSERIFORMES	ESTRILDIDAE	<i>Estrilda astrild</i>	Extant (resident)	Least Concern	Stable
507	PASSERIFORMES	ESTRILDIDAE	<i>Amandava subflava</i>	Extant (resident)	Least Concern	Stable
508	PASSERIFORMES	ESTRILDIDAE	<i>Euodice cantans</i>	Extant (resident)	Least Concern	Stable
509	PASSERIFORMES	FRINGILLIDAE	<i>Crithagra mozambica</i>	Extant (resident)	Least Concern	Decreasing
510	PASSERIFORMES	FRINGILLIDAE	<i>Crithagra sulphurata</i>	Extant (resident)	Least Concern	Stable
511	PASSERIFORMES	FRINGILLIDAE	<i>Crithagra canicapilla</i>	Extant (resident)	Least Concern	Stable
512	PASSERIFORMES	TURDIDAE	<i>Neocossyphus rufus</i>	Extant (resident)	Least Concern	Decreasing
513	PASSERIFORMES	TURDIDAE	<i>Neocossyphus poensis</i>	Extant (resident)	Least Concern	Unknown
514	PASSERIFORMES	MUSCICAPIDAE	<i>Empidonis semipartitus</i>	Extant (resident)	Least Concern	Stable
515	PASSERIFORMES	MUSCICAPIDAE	<i>Muscicapa gambagae</i>	Extant (resident)	Least Concern	Stable

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516	PASSERIFORMES	MUSCICAPIDAE	<i>Muscicapa aquatica</i>	Extant (resident)	Least Concern	Stable
517	PASSERIFORMES	MUSCICAPIDAE	<i>Oenanthe heuglinii</i>	Extant (resident)	Least Concern	Stable
518	PASSERIFORMES	MUSCICAPIDAE	<i>Thamnolaea cinnamomeiventris</i>	Extant (resident)	Least Concern	Stable
519	PASSERIFORMES	STURNIDAE	<i>Lamprotornis purpureus</i>	Extant (resident)	Least Concern	Stable
520	PASSERIFORMES	STURNIDAE	<i>Lamprotornis splendidus</i>	Extant (resident)	Least Concern	Unknown
521	PASSERIFORMES	PYCNONOTIDAE	<i>Pycnonotus barbatus</i>	Extant (resident)	Least Concern	Increasing
522	PASSERIFORMES	PYCNONOTIDAE	<i>Ixonotus guttatus</i>	Extant (resident)	Least Concern	Stable
523	PASSERIFORMES	ZOSTEROPIIDAE	<i>Zosterops senegalensis</i>	Extant (resident)	Least Concern	Stable
524	PASSERIFORMES	PELLORNEIDAE	<i>Illadopsis puveli</i>	Extant (resident)	Least Concern	Stable
525	PASSERIFORMES	PELLORNEIDAE	<i>Illadopsis fulvescens</i>	Extant (resident)	Least Concern	Stable
526	PASSERIFORMES	LEIOTRICHIDAE	<i>Turdoides tenebrosa</i>	Extant (resident)	Least Concern	Decreasing
527	PASSERIFORMES	LEIOTRICHIDAE	<i>Turdoides plebejus</i>	Extant (resident)	Least Concern	Stable
528	PASSERIFORMES	PASSERIDAE	<i>Passer griseus</i>	Extant (resident)	Least Concern	Stable
529	PASSERIFORMES	PASSERIDAE	<i>Passer eminibey</i>	Extant (resident)	Least Concern	Stable
530	PASSERIFORMES	MOTACILLIDAE	<i>Motacilla aguimp</i>	Extant (resident)	Least Concern	Stable
531	PASSERIFORMES	PLOCEIDAE	<i>Ploceus pelzelni</i>	Extant (resident)	Least Concern	Stable
532	PASSERIFORMES	PLOCEIDAE	<i>Ploceus luteolus</i>	Extant (resident)	Least Concern	Stable
533	PASSERIFORMES	PLOCEIDAE	<i>Ploceus melanogaster</i>	Extant (resident)	Least Concern	Decreasing
534	PASSERIFORMES	PLOCEIDAE	<i>Ploceus vitellinus</i>	Extant (resident)	Least Concern	Stable
535	PASSERIFORMES	PLOCEIDAE	<i>Ploceus cucullatus</i>	Extant (resident)	Least Concern	Stable
536	PASSERIFORMES	PLOCEIDAE	<i>Ploceus jacksoni</i>	Extant (resident)	Least Concern	Stable
537	PASSERIFORMES	PLOCEIDAE	<i>Ploceus bicolor</i>	Extant (resident)	Least Concern	Stable
538	PASSERIFORMES	PLOCEIDAE	<i>Malimbus rubricollis</i>	Extant (resident)	Least Concern	Stable
539	PASSERIFORMES	PLOCEIDAE	<i>Quelea cardinalis</i>	Extant (resident)	Least Concern	Stable
540	PASSERIFORMES	PLOCEIDAE	<i>Quelea quelea</i>	Extant (resident)	Least Concern	Stable
541	PASSERIFORMES	ESTRILDIDAE	<i>Nigrita canicapillus</i>	Extant (resident)	Least Concern	Stable
542	PASSERIFORMES	ESTRILDIDAE	<i>Pytilia afra</i>	Extant (resident)	Least Concern	Stable
543	PASSERIFORMES	ESTRILDIDAE	<i>Mandingoa nitidula</i>	Extant (resident)	Least Concern	Stable
544	PASSERIFORMES	ESTRILDIDAE	<i>Pyrenestes ostrinus</i>	Extant (resident)	Least Concern	Stable
545	PASSERIFORMES	ESTRILDIDAE	<i>Lagonosticta senegala</i>	Extant (resident)	Least Concern	Stable
546	PASSERIFORMES	ESTRILDIDAE	<i>Uraeginthus bengalus</i>	Extant (resident)	Least Concern	Stable
547	PASSERIFORMES	ESTRILDIDAE	<i>Spermestes fringilloides</i>	Extant (resident)	Least Concern	Stable
548	PASSERIFORMES	VIDUIDAE	<i>Vidua chalybeata</i>	Extant (resident)	Least Concern	Stable
549	PASSERIFORMES	VIDUIDAE	<i>Vidua macroura</i>	Extant (resident)	Least Concern	Stable
550	PASSERIFORMES	VIDUIDAE	<i>Vidua paradisaea</i>	Extant (resident)	Least Concern	Stable
551	PASSERIFORMES	FRINGILLIDAE	<i>Linurgus olivaceus</i>	Extant (resident)	Least Concern	Stable
552	PASSERIFORMES	ESTRILDIDAE	<i>Ortygospiza atricollis</i>	Extant (resident)	Least Concern	Stable
553	PASSERIFORMES	PASSERIDAE	<i>Passer shelleyi</i>	Extant (resident)	Least Concern	Stable
554	PASSERIFORMES	MUSCICAPIDAE	<i>Oenanthe oenanthe</i>	Extant (non-breeding)	Least Concern	Decreasing
555	PASSERIFORMES	MOTACILLIDAE	<i>Anthus cervinus</i>	Extant (non-breeding)	Least Concern	Stable
556	PASSERIFORMES	MOTACILLIDAE	<i>Motacilla alba</i>	Extant (non-breeding)	Least Concern	Stable
557	PASSERIFORMES	HIRUNDINIDAE	<i>Hirundo rustica</i>	Extant (non-breeding)	Least Concern	Decreasing
558	PASSERIFORMES	ACROCEPHALIDAE	<i>Acrocephalus scirpaceus</i>	Extant (resident)	Least Concern	Stable



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559	PASSERIFORMES	ACROCEPHALIDAE	<i>Iduna pallida</i>	Extant (non-breeding)	Least Concern	Stable
560	PASSERIFORMES	HIRUNDINIDAE	<i>Riparia riparia</i>	Extant (non-breeding)	Least Concern	Decreasing
561	PASSERIFORMES	MUSCICAPIDAE	<i>Ficedula albicollis</i>	Extant (passage)	Least Concern	Increasing
562	PASSERIFORMES	MOTACILLIDAE	<i>Motacilla flava</i>	Extant (non-breeding)	Least Concern	Decreasing
563	PASSERIFORMES	MUSCICAPIDAE	<i>Muscicapa striata</i>	Extant (non-breeding)	Least Concern	Decreasing
564	PASSERIFORMES	HIRUNDINIDAE	<i>Neophedina cincta</i>	Extant (resident)	Least Concern	Increasing
565	PASSERIFORMES	MUSCICAPIDAE	<i>Phoenicurus phoenicurus</i>	Extant (non-breeding)	Least Concern	Increasing
566	PASSERIFORMES	SYLVIIDAE	<i>Curruca communis</i>	Extant (non-breeding)	Least Concern	Increasing
567	PASSERIFORMES	MUSCICAPIDAE	<i>Saxicola torquatus</i>	Extant (resident)	Least Concern	Stable
568	PASSERIFORMES	LANIIDAE	<i>Lanius senator</i>	Extant (non-breeding)	Near Threatened	Decreasing
569	PASSERIFORMES	LOCUSTELLIDAE	<i>Bradypterus centralis</i>	Extant (resident)	Least Concern	Stable
570	PASSERIFORMES	MALACONOTIDAE	<i>Laniarius mufumbiri</i>	Extant (resident)	Near Threatened	Decreasing
571	PASSERIFORMES	PLATYSTEIRIDAE	<i>Platysteira peltata</i>	Extant (resident)	Least Concern	Decreasing
572	PASSERIFORMES	REMIZIDAE	<i>Anthoscopus caroli</i>	Extant (resident)	Least Concern	Decreasing
573	PASSERIFORMES	HIRUNDINIDAE	<i>Hirundo angolensis</i>	Extant (resident)	Least Concern	Increasing
574	PASSERIFORMES	CISTICOLIDAE	<i>Cisticola carruthersi</i>	Extant (resident)	Least Concern	Decreasing
575	PASSERIFORMES	PHYLLOSCOPIIDAE	<i>Phylloscopus budongoensis</i>	Extant (resident)	Least Concern	Decreasing
576	PASSERIFORMES	MOTACILLIDAE	<i>Motacilla capensis</i>	Extant (resident)	Least Concern	Stable
577	PASSERIFORMES	PLOCEIDAE	<i>Ploceus castanops</i>	Extant (resident)	Least Concern	Stable
578	PASSERIFORMES	FRINGILLIDAE	<i>Crithagra frontalis</i>	Extant (resident)	Least Concern	Stable
579	PASSERIFORMES	FRINGILLIDAE	<i>Crithagra koliensis</i>	Extant (resident)	Least Concern	Decreasing
580	PASSERIFORMES	LEIOTRICHIDAE	<i>Turdoides jardineii</i>	Extant (resident)	Least Concern	Stable
581	PASSERIFORMES	PLOCEIDAE	<i>Ploceus xanthops</i>	Extant (resident)	Least Concern	Stable
582	PELECANIFORMES	ARDEIDAE	<i>Egretta garzetta</i>	Extant (resident)	Least Concern	Increasing
583	PELECANIFORMES	ARDEIDAE	<i>Egretta ardesiaca</i>	Extant (resident)	Least Concern	Stable
584	PELECANIFORMES	ARDEIDAE	<i>Ardea melanocephala</i>	Extant (resident)	Least Concern	Increasing
585	PELECANIFORMES	ARDEIDAE	<i>Ardea goliath</i>	Extant (resident)	Least Concern	Stable
586	PELECANIFORMES	ARDEIDAE	<i>Ixobrychus sturmii</i>	Extant (resident)	Least Concern	Unknown
587	PELECANIFORMES	SCOPIIDAE	<i>Scopus umbretta</i>	Extant (resident)	Least Concern	Stable
588	PELECANIFORMES	THRESKIORNITHIDAE	<i>Bostrychia hagedash</i>	Extant (resident)	Least Concern	Increasing
589	PELECANIFORMES	THRESKIORNITHIDAE	<i>Platalea alba</i>	Extant (resident)	Least Concern	Stable
590	PELECANIFORMES	PELECANIDAE	<i>Pelecanus rufescens</i>	Extant (resident)	Least Concern	Stable
591	PELECANIFORMES	ARDEIDAE	<i>Ardea brachyrhyncha</i>	Extant (resident)	Least Concern	Decreasing
592	PELECANIFORMES	ARDEIDAE	<i>Calherodius leuconotus</i>	Extant (resident)	Least Concern	Decreasing
593	PELECANIFORMES	ARDEIDAE	<i>Ardeola ralloides</i>	Extant (resident)	Least Concern	Unknown
594	PELECANIFORMES	THRESKIORNITHIDAE	<i>Threskiornis aethiopicus</i>	Extant (resident)	Least Concern	Stable
595	<b>PELECANIFORMES</b>	<b>BALAENICIPITIDAE</b>	<b><i>Balaeniceps rex</i></b>	<b>Extant (resident)</b>	<b>Vulnerable</b>	<b>Decreasing</b>
596	PELECANIFORMES	ARDEIDAE	<i>Ardea cinerea</i>	Extant (resident)	Least Concern	Unknown
597	PELECANIFORMES	ARDEIDAE	<i>Ardea purpurea</i>	Extant (resident)	Least Concern	Decreasing
598	PELECANIFORMES	ARDEIDAE	<i>Ardea alba</i>	Extant (resident)	Least Concern	Unknown
599	PELECANIFORMES	ARDEIDAE	<i>Bubulcus ibis</i>	Extant (resident)	Least Concern	Increasing
600	PELECANIFORMES	ARDEIDAE	<i>Ixobrychus minutus</i>	Extant (resident)	Least Concern	Decreasing
601	PELECANIFORMES	ARDEIDAE	<i>Nycticorax nycticorax</i>	Extant (resident)	Least Concern	Decreasing

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602	PELECANIFORMES	THRESKIORNITHIDAE	<i>Plegadis falcinellus</i>	Extant (resident)	Least Concern	Decreasing
603	PELECANIFORMES	ARDEIDAE	<i>Butorides striata</i>	Extant (resident)	Least Concern	Stable
604	PELECANIFORMES	PELECANIDAE	<i>Pelecanus onocrotalus</i>	Extant (non-breeding)	Least Concern	Unknown
605	PICIFORMES	INDICATORIDAE	<i>Indicator maculatus</i>	Extant (resident)	Least Concern	Decreasing
606	PICIFORMES	INDICATORIDAE	<i>Indicator variegatus</i>	Extant (resident)	Least Concern	Stable
607	PICIFORMES	INDICATORIDAE	<i>Indicator indicator</i>	Extant (resident)	Least Concern	Increasing
608	PICIFORMES	INDICATORIDAE	<i>Indicator minor</i>	Extant (resident)	Least Concern	Stable
609	PICIFORMES	INDICATORIDAE	<i>Indicator exilis</i>	Extant (resident)	Least Concern	Unknown
610	PICIFORMES	INDICATORIDAE	<i>Prodotiscus insignis</i>	Extant (resident)	Least Concern	Decreasing
611	PICIFORMES	PICIDAE	<i>Campethera nubica</i>	Extant (resident)	Least Concern	Stable
612	PICIFORMES	PICIDAE	<i>Campethera abingoni</i>	Extant (resident)	Least Concern	Stable
613	PICIFORMES	PICIDAE	<i>Pardipicus caroli</i>	Extant (resident)	Least Concern	Decreasing
614	PICIFORMES	PICIDAE	<i>Dendropicos poecilolaemus</i>	Extant (resident)	Least Concern	Stable
615	PICIFORMES	PICIDAE	<i>Dendropicos fuscescens</i>	Extant (resident)	Least Concern	Stable
616	PICIFORMES	PICIDAE	<i>Dendropicos namaquus</i>	Extant (resident)	Least Concern	Stable
617	PICIFORMES	PICIDAE	<i>Dendropicos xantholophus</i>	Extant (resident)	Least Concern	Stable
618	PICIFORMES	PICIDAE	<i>Dendropicos obsoletus</i>	Extant (resident)	Least Concern	Stable
619	PICIFORMES	LYBIIDAE	<i>Pogoniulus scolopaceus</i>	Extant (resident)	Least Concern	Decreasing
620	PICIFORMES	LYBIIDAE	<i>Pogoniulus bilineatus</i>	Extant (resident)	Least Concern	Stable
621	PICIFORMES	LYBIIDAE	<i>Pogoniulus chrysoconus</i>	Extant (resident)	Least Concern	Stable
622	PICIFORMES	LYBIIDAE	<i>Pogoniulus pusillus</i>	Extant (resident)	Least Concern	Stable
623	PICIFORMES	LYBIIDAE	<i>Tricholaema lacrymosa</i>	Extant (resident)	Least Concern	Stable
624	PICIFORMES	LYBIIDAE	<i>Lybius guifsobalito</i>	Extant (resident)	Least Concern	Increasing
625	PICIFORMES	LYBIIDAE	<i>Pogonornis bidentatus</i>	Extant (resident)	Least Concern	Stable
626	PICIFORMES	LYBIIDAE	<i>Pogonornis rolleti</i>	Extant (resident)	Least Concern	Decreasing
627	PICIFORMES	LYBIIDAE	<i>Trachyphonus erythrocephalus</i>	Extant (resident)	Least Concern	Stable
628	PICIFORMES	LYBIIDAE	<i>Trachylaemus purpuratus</i>	Extant (resident)	Least Concern	Decreasing
629	PICIFORMES	LYBIIDAE	<i>Trachyphonus darnaudii</i>	Extant (resident)	Least Concern	Stable
630	PICIFORMES	LYBIIDAE	<i>Gymnobucco cinereiceps</i>	Extant (resident)	Least Concern	Decreasing
631	PICIFORMES	LYBIIDAE	<i>Lybius leucocephalus</i>	Extant (resident)	Least Concern	Stable
632	PICIFORMES	PICIDAE	<i>Dendropicos goertae</i>	Extant (resident)	Least Concern	Stable
633	PICIFORMES	INDICATORIDAE	<i>Indicator willcocksii</i>	Extant (resident)	Least Concern	Unknown
634	PICIFORMES	PICIDAE	<i>Jynx torquilla</i>	Extant (non-breeding)	Least Concern	Decreasing
635	PICIFORMES	LYBIIDAE	<i>Tricholaema hirsuta</i>	Extant (resident)	Least Concern	Decreasing
636	PICIFORMES	LYBIIDAE	<i>Buccanodon duchaillui</i>	Extant (resident)	Least Concern	Decreasing
637	PODICIPEDIFORMES	PODICIPEDIDAE	<i>Podiceps cristatus</i>	Extant (resident)	Least Concern	Unknown
638	PODICIPEDIFORMES	PODICIPEDIDAE	<i>Tachybaptus ruficollis</i>	Extant (resident)	Least Concern	Decreasing
639	PSITTACIFORMES	PSITTACIDAE	<i>Poicephalus meyeri</i>	Extant (resident)	Least Concern	Stable
640	PSITTACIFORMES	PSITTACIDAE	<i>Agapornis pullarius</i>	Extant (resident)	Least Concern	Decreasing
641	<b>PSITTACIFORMES</b>	<b>PSITTACIDAE</b>	<b><i>Psittacus erithacus</i></b>	<b>Extant (resident)</b>	<b>Endangered</b>	<b>Decreasing</b>
642	PTEROCLIFORMES	PTEROCLIDAE	<i>Pterocles quadricinctus</i>	Extant (resident)	Least Concern	Stable
643	STRIGIFORMES	STRIGIDAE	<i>Bubo lacteus</i>	Extant (resident)	Least Concern	Stable
644	STRIGIFORMES	STRIGIDAE	<i>Strix woodfordii</i>	Extant (resident)	Least Concern	Stable

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N	Order	Family	Scientific Name	Seasonality	Red List category	Trend
645	STRIGIFORMES	STRIGIDAE	<i>Glaucidium perlatum</i>	Extant (resident)	Least Concern	Stable
646	STRIGIFORMES	STRIGIDAE	<i>Glaucidium tephronotum</i>	Extant (resident)	Least Concern	Stable
647	STRIGIFORMES	STRIGIDAE	<i>Bubo cinerascens</i>	Extant (resident)	Least Concern	Stable
648	STRIGIFORMES	STRIGIDAE	<i>Otus senegalensis</i>	Extant (resident)	Least Concern	Stable
649	STRIGIFORMES	STRIGIDAE	<i>Scotopelia peli</i>	Extant (resident)	Least Concern	Decreasing
650	STRIGIFORMES	TYTONIDAE	<i>Tyto alba</i>	Extant (resident)	Least Concern	Stable
651	STRIGIFORMES	STRIGIDAE	<i>Asio capensis</i>	Extant (resident)	Least Concern	Stable
652	STRIGIFORMES	STRIGIDAE	<i>Otus scops</i>	Extant (non-breeding)	Least Concern	Decreasing
653	SULIFORMES	PHALACROCORACIDAE	<i>Microcarbo africanus</i>	Extant (resident)	Least Concern	Decreasing
654	SULIFORMES	ANHINGIDAE	<i>Anhinga rufa</i>	Extant (resident)	Least Concern	Decreasing
655	SULIFORMES	PHALACROCORACIDAE	<i>Phalacrocorax carbo</i>	Extant (resident)	Least Concern	Increasing
656	TROGONIFORMES	TROGONIDAE	<i>Apaloderma narina</i>	Extant (resident)	Least Concern	Stable

## 12. ANNEX 4: POVERTY ANALYSIS

Electricity plays a central role in all aspects of human welfare and economic growth, including access to water, agricultural productivity, health care, education, job creation, climate change and environmental sustainability. Globally, in 2021 access to electricity grew by an annual average of 0.7 percentage points between 2010 and 2021, rising from 84 percent of the world's population to 91 percent. However still 675 million people do not have access to electricity, the vast majority live in SSA. In fact, in 2021, 567 million people in sub-Saharan Africa did not have access to electricity, accounting for more than 80% of the global population without access. The access deficit in the region stayed almost the same as in 2010<sup>22</sup>.

This lack of access to sustainable electricity supply forces some to pay high prices for poor quality substitutes or go without electricity all together. Lack of access to electricity does not only impose significant constraints on the provision of social services, but it also impedes economic growth, damages human health, increases vulnerability to climate change and traps many in abject poverty (UNDP 2009).

In this framework Uganda set a long-term development agenda aims at socio-economic transformation and attainment of an upper middle-income country status by 2040 and to achieve this the country needs increased access to clean, affordable, and reliable energy. SDG 7 obligates member states to ensure access to affordable, reliable, sustainable, and modern energy for all. However, although Uganda is rich in energy resources, access to affordable, reliable electricity remains a major constraint to the country's socio-economic transformation and achievement of sustainable development.<sup>23</sup>

The ultimate goal of this project is regional integration by improving the livelihood of the people as well as the quality of the socioeconomic development environment for South Sudan through increased availability and affordability of electricity supply. It aims at improving access to electricity in South Sudan and Northern Uganda through increased cross-border sharing of power and to provide reliable power supply to the environs of the project. Outputs of the preparatory activities would enable the NELSAP, South Sudan and Uganda to take the necessary steps to have the transmission line constructed. The proposed 400 kV AC Over Head Transmission Line from Olwiyo to Bibia in Uganda, Nimule (which is at the Uganda/South Sudan Border) and Juba in South Sudan is an important additional network to facilitate regional integration of electricity networks and facilitate power trade. This transmission line will finally connect to Olwiyo substation in Northern Uganda (which is already on going under the initiative of the Uganda Government).

Among the specific objective of the project there are two point that refer to the enhancement of livelihood, namely:

- Facilitate of rural electrification and improvement in the standard of living for the population in the project areas.
- Provide a stable power supply to the South Sudan around the Capital Juba and the Ugandan communities near the border in order to improve businesses for social and economic development of the project area.
- Poverty reduction and Improvement in the standard of living by providing electricity needed for health, education, clean water and communication infrastructures.

<sup>22</sup> Tracking SDG!7: The Energy Progress Report 2023

<sup>23</sup> The Energy and Climate Change Nexus in Uganda: Policy Challenges and Opportunities for Climate Compatible Development

The project contributes primarily to three Sustainable Development Goals (SDG), touching also other goals as side effects:

SDG 1\_End poverty in all its forms everywhere and

SDG 7\_Ensure access to affordable, reliable, sustainable and modern energy for all

SDG 9\_Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



**Objectives of poverty Analysis**

The objective is to analyse the development impact of the project and its impact on poverty reduction and to undertake the following tasks: a) assess the likely development impact on economic activity for each individual country, b) prepare a socioeconomic and poverty profile of potential project beneficiaries in each country

**Electricity Supply and Demand in the Country**

In the year 2020 the National Planning Authority of Uganda, in consultation with other government institutions and other stakeholders has developed “Uganda Vision 2040”, a document in which the future of the Country for the next years has been described and planned. Regarding the electricity sector, the Vision 2040 has foreseen a high growth of the electricity consumption: the electricity per capita consumption will increase from the 75 kWh/capita in 2010 up to 3668 75 kWh/capita in 2040. The target of the year 2040 have been updated by the “Uganda Energy Policy 2023” Report. According to UETCL, the Vision provides the direction of the growth and yearly the load forecast prepared by UETCL is readapted to match the Vision growth with the actual demand growth.

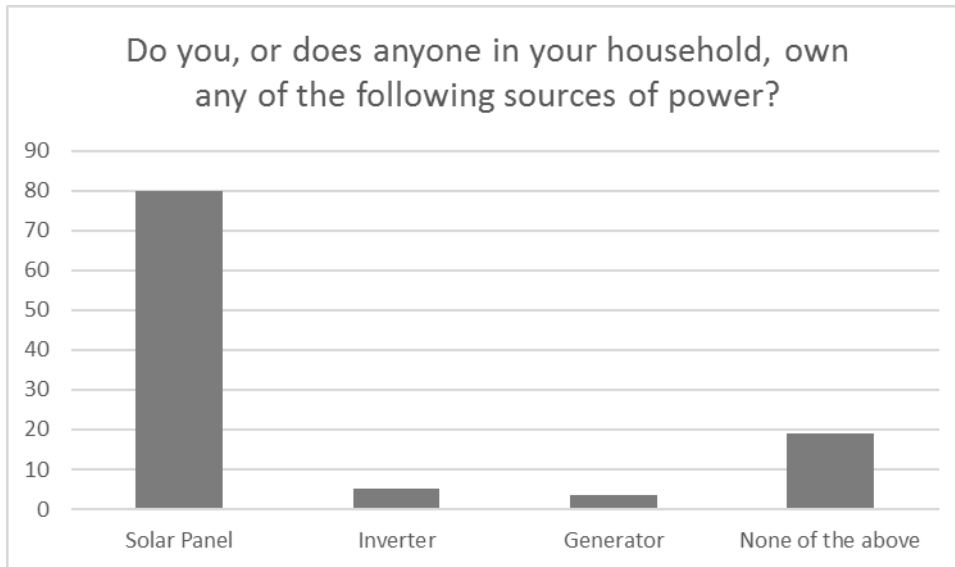
In Uganda mainly of the electricity is consumed domestically, with households consuming the largest amount (61%), followed by commercial (14%), transport (13%), industry (8%), and others including export consuming only 4%. But then even at household level, the use of electricity is limited to lighting due to the high tariffs and for most households, charcoal and firewood remain the most accessible and affordable sources of energy for cooking. While there has been general increase in energy consumption in all the main sectors of economy over the last decade, consumption of electricity in the industrial and commercial sectors remains low due to the low levels of industrialization, urbanization and overall economic development in the country.

The Electricity Regulatory Authority (ERA) estimates that as of December 2022, installed electricity capacity in Uganda was 1,402 megawatts (MW) with demand at 843 MW, leaving a surplus of 559 MW. Uganda has one of the lowest electrification rates in Africa, in urban areas, 57.2% of Ugandans have access to electricity; however, access drops to 10% in rural areas, and it is only 22.1% nationwide. As of December 2022, Uganda had approximately 3,385 km of transmission lines, which the government aims to increase to 4,354 km by 2025. As investment in transmission is still insufficient, some existing generation capacity cannot be distributed. Additional investment is also needed to enable export of electricity to other countries in the region.

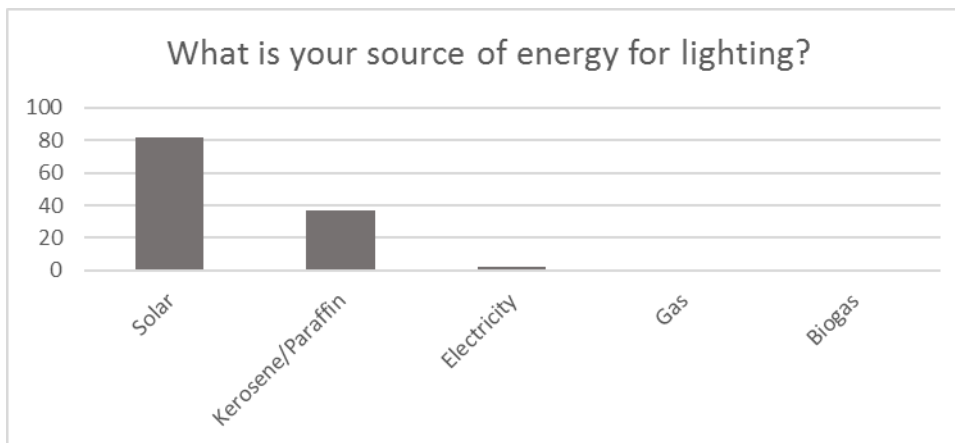
For what concern the electrification of Norther Uganda, after peace returned in 2008, the region has been one of the targets of the REA’s rural electrification efforts through the construction of new transmission lines and distribution networks. Nevertheless, the connection reaches limited areas and it is instable, preventing the development of business activities. Different researches show stories of households facing power shortage and looking for alternative off grid source of power<sup>24</sup>.

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<sup>24</sup> *The problem of power. Partial electrification in Northern Uganda*  
*End-review of Norwegian Support to Rural Electrification Projects in Uganda*



*Access to electricity in the project area*



*Access to electricity in the project area*

**Development Impacts due to the interconnection**

The energy exchanged between Uganda and South Sudan is significantly affected by the balance between demand and available generation for each specific country: if one country has a power deficit while at the same time the other country has a power surplus, the interconnection project is able to take advantage of this fact enabling the power exchange between the two countries in one specific direction.

2028 is the first year of operation of the proposed interconnection. With respect to the transmission system of South Sudan which is basically starting from scratch and in 2028 only the city of Juba is expected to be connected to the national grid, the transmission system of Uganda is in a more mature phase and well-integrated. Furthermore, the local generation of Uganda is much higher than the local demand. Thus, the presence of the interconnection can have a positive impact of the Ugandan hydropower generation fleet since the power surplus can be exchanged towards South Sudan reducing the system over-generation associated to the hydropower plant. Therefore, in 2028, the major advantages coming from the interconnection are taken by the South Sudanese network since now it has

the possibility to import clean energy coming from the hydropower plants of Uganda that can replace its old and unreliable diesel generators installed in the capital. This will increase the reliability of supply of the load erasing the risk of Energy Not Supplied (ENS) and it avoids the need of burning fuel. From Uganda point of view, the advantage is associated to the possibility of exporting its power surplus. However, as anticipated before, the number of exchanges is limited by the reduced load that the interconnection is able to reach: since only the load of Juba is reachable by the interconnection, the maximum amount of power that flows across the interconnection is equal to the peak load of the city of Juba that, according to the load demand forecast, in 2028 barely reaches 90MW during its peak value as confirmed by the hourly profile of the power flowing across the interconnection.

In year 2033, Ugandan generation fleet increases thanks to the construction of Ayago and Oriang as also new small hydropower plants as Muzizi while on the other hand, the internal demand of Uganda is expected to increase. However, also in 2033 Uganda is expected to have a significant power surplus that is willing to export to the neighbouring countries as Tanzania but also South Sudan. In the meanwhile, in 2033 the national transmission infrastructure of South Sudan begins its evolution reaching the major cities of the neighbouring regions close to Juba as also other major villages of Central Equatorial. Thus, the load demand that now the interconnection is able to supply increases. However, at the same time, another important benefit associated to the presence of Grand Fula can be observed: compared to the situation in 2028, now in 2033 South Sudan is able to export part of its energy to Uganda. The amount is very limited in particular if compared to the amount of energy coming from Uganda to South Sudan, but it is a first sign of the potential role that the hydropower plants of South Sudan can play in the long-term period. This has a positive effect also for Uganda because, thanks to the possibility of South Sudan to export the excess of power coming from Grand Fula even if for a limited number of hours, this opens to the possibility of Uganda to import the power from South Sudan rather than using its costly thermal generating units.

In year 2038, no significant increase in the Uganda generation capacity is expected to occur while the load demand increases according to the load demand forecast. Thus, Uganda starts showing a reduced power surplus, actually it has a power deficit during some periods of the year. On the other hand, the national transmission infrastructure of South Sudan is finally completed and the capital and major cities of all the regions are interconnected together. Furthermore, in addition to the proposed interconnection between Juba and Bibia, in 2038 two new interconnections are considered to be in operation and both connect South Sudan to Ethiopia:

- the first one is a 220kV double circuit transmission line between Gambela and Malakal.
- The second one is the new 400kV double circuit transmission link between Juba and Teppi that, together with the 220kV double circuit link in the north of the country, is able to increase the Net Transfer Capacity (NTC) between these two countries up to 1000MW.

The significant evolution of the transmission system of South Sudan, together with the conclusion of Grand Fula hydropower plant, represents an important step in the evolution for South Sudan that now has the possibility to export the power produced by its own hydropower plants to the neighbouring countries. This is confirmed by the amount of energy exchanged across the interconnection between Uganda and South Sudan: in 2038, as firstly proposed by the deterministic analysis, Uganda starts to be affected by a deficit of power due to the evolution of its internal load and this leads to the import of power coming from South Sudan and beyond, as for example from Ethiopia that has a lot of hydropower plants. The need of Uganda to import power from South Sudan when its own generation is not enough increases the amount of energy flowing across the interconnection which is significantly higher than the total transit in the previous two target years.



In year 2043, Uganda increases its generation fleet thanks to the construction of Uhuru hydropower plant for a total installed capacity of 400MW. However, also the internal load demand increases and there is also the evolution of the industrial loads in the country. Similarly, also South Sudan increases its generation fleet thanks to the partial commissioning of Bedden power plants: it is the second major hydro power project for size and priority of the country, and it is located downstream to Grand Fula. Furthermore, in 2043 another interconnection is expected to be in operation this time with Kenya that is another important country in the area due to the size of its generation fleet. This interconnection strengthens the area increasing the possibility of power exchange between South Sudan, Uganda, Ethiopia and Kenya.

Actually, the overall situation does not change significantly between 2038 and 2043: there is an increment in the total energy exchanged that in 2043 roughly reaches 3000 GWh and, as observed in 2038, the energy flowing from South Sudan to Uganda is greater than the one flowing from Uganda to South Sudan (the proportional also in 2043 is close to 60% in import and 40% in export from the Uganda point of view).

In year 2048, in order to cope with the rapid and significant increase of demand, both domestic and industrial, new 4 CCGT units of 300MW each, in addition to a first identical CCGT unit installed in year 2043, are considered to be installed. No other significant variations are expected to affect the Ugandan power system. It means that the power deficit observed in year 2043 for Uganda increases, due to the relevant increment in the load demand.

On the other hand, in South Sudan, year 2048 is a very important year due to the fact that, from the transmission point of view, the national transmission network reaches its final configuration with the conclusion of the 220kV backup backbone in addition to the 400kV corridor between Juba and Malakal. From the generation point of view, in year 2048 it is expected that all the four major hydropower projects of South Sudan should be fully in operation thanks to the conclusion of the power plant of Bedden but also to the construction of the last two hydropower sites of Lakki and Shukoli, both located downstream with respect to Grand Fula for a cumulative installed capacity of more than 2300MW.

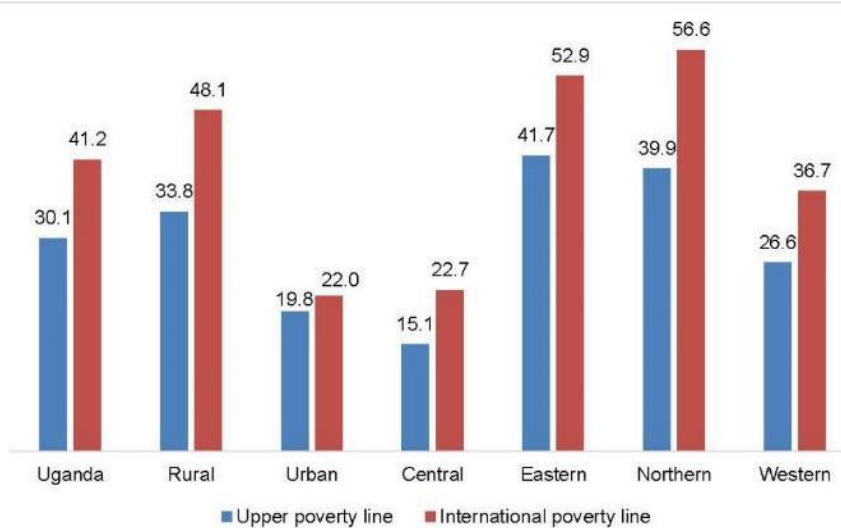
In 2048 Uganda, as anticipated by the deterministic analysis, is a country with a high-power deficit between load and generation and so it is willing to import energy from neighbouring countries and, thanks to the proposed interconnection, it is able to import the energy firstly from South Sudan and secondly, through the same interconnection, from Ethiopia and Kenya. These is the reason of the high energy that it is flowing from South Sudan to Uganda that now correspond to more than 90% of the total energy exchanged between the two countries.

### **Socioeconomic and poverty profile of potential project beneficiaries**

The project beneficiaries can be divided into three main categories: a) direct consumers of electricity (households, commercial and industrial consumers), b) people of Northern Uganda benefitting indirectly from the services and c) people living in the direct impact zone. The first group will rely on long terms on more stable and clean electricity, while the second will benefit on indirect benefit of better-quality services such as schools, hospitals, trade centers etc. The third group will benefit on short terms from the induced commercial activities that will flourish with the coming contractors (i.e. casual labor, supply of services as food, canteen, laundry, driving etc....)

In order to understand the condition of the beneficiaries it is necessary to have an understanding of the wellbeing of people living in the interested area.

The poverty profile of project beneficiaries, we consider the people of Northern Uganda, is defined by three sources of information: the Uganda’s current national poverty line, the poverty maps of Uganda and the Multidimensional Poverty Index. These three tools help in understanding the current situation at country, regional and project level. The Uganda National Households Survey 2019/2020 (UNHS), using the monetary measure of poverty estimates the incidence of population living below the poverty line<sup>25</sup> at 20.3 percent (23.4 rural and 11.7 urban) of the total population<sup>26</sup>. The report highlights that of 20.3 percent, 41.8 percent are food poor that is unable to have a minimum income to meet the food needs. Regionally the northern region accounts for 56.7 percent of food poor. The distribution of poverty does not change also with the parameter of upper poverty line which is fixed at 1.77 US dollars per person per month, the share of Ugandans living in poverty stands at 30.1 percent, representing 12.3 million poor persons. The poverty headcount at USD1.9 per person per day (2011 PPP) is 41.1 percent and in absolute numbers, income poor persons is estimated at 16.9 million. These estimated are well above the national poverty lines. However, the poverty patterns remain unchanged.



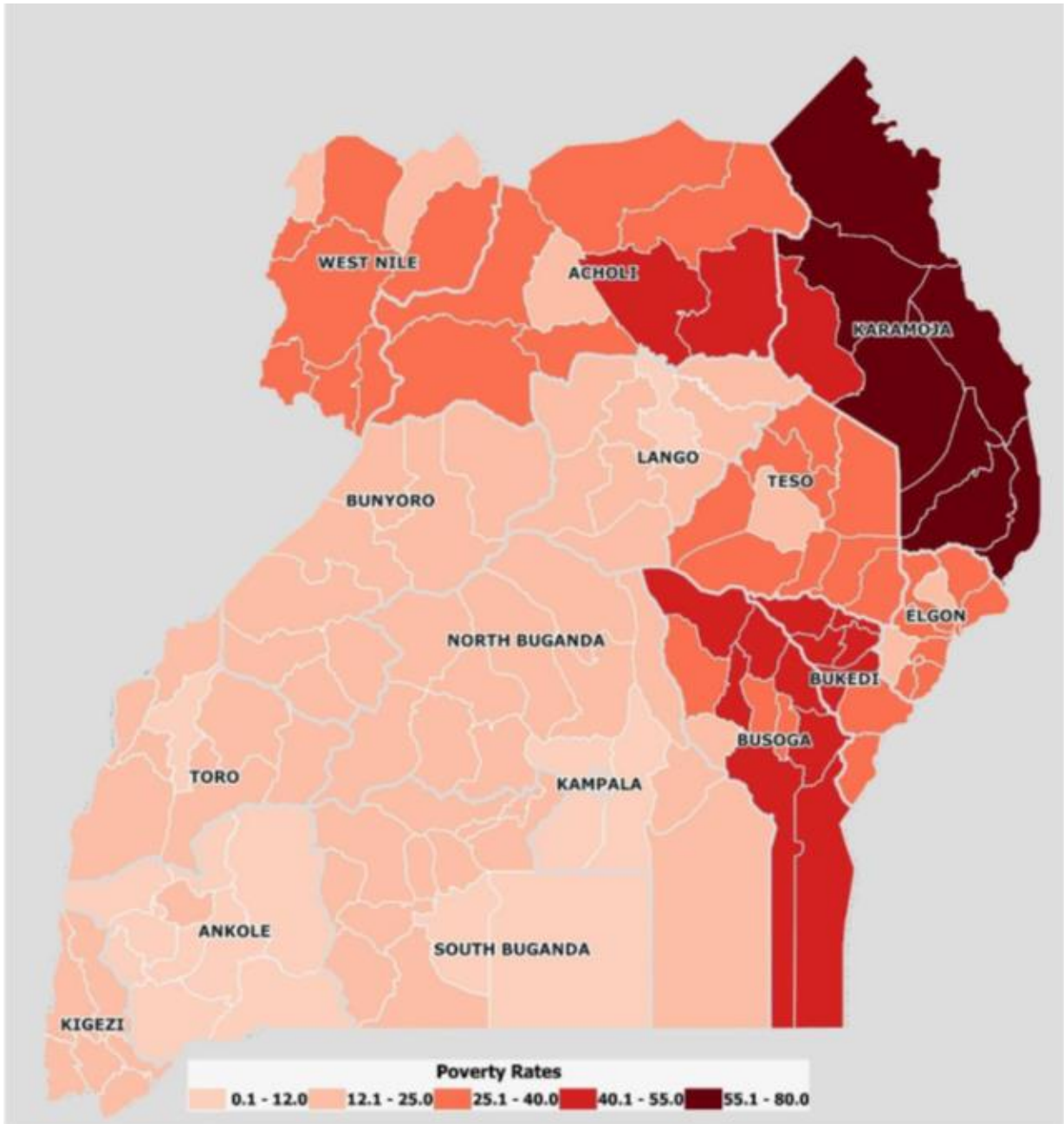
Another study that helps understanding the pattern of poverty distribution in Uganda is the Poverty maps of Uganda produced based on the 2016/2017 Uganda NHS and 2014 National Housing population Census. The maps reflect in general terms the pattern described above, with the Eastern and Northern regions more affected by poverty. Figure 1 shows poverty distribution of Northern Region, through this distribution it is possible to see the poverty rate of the districts crossed by the project namely Nowya, Amuru and Lamwo, the areas interested by the project show a poverty rate that range from 20,1% to 40%.

The incidence of poverty in the northern region was the second highest region in 2016/17 with 32.5 percent of its population living below the national poverty line. It declined nearly 10 percentage points from 42 percent in 2012/13. An estimated 34.6 percent of children in the northern region live in households below the national poverty line. Inequality indicators are also very high. The Gini coefficient is 0.39 for both the entire population and children. There are vast disparities in poverty incidence between districts, ranging from 12.0 percent in Lira District to 71.7 percent in Nabilatuk District. Inequality is also high and varied across districts. The Gini coefficients range from 0.33 in Dokolo District to 0.65 in Amuru District. Child poverty has a similar distribution. All of the sub-counties with the highest

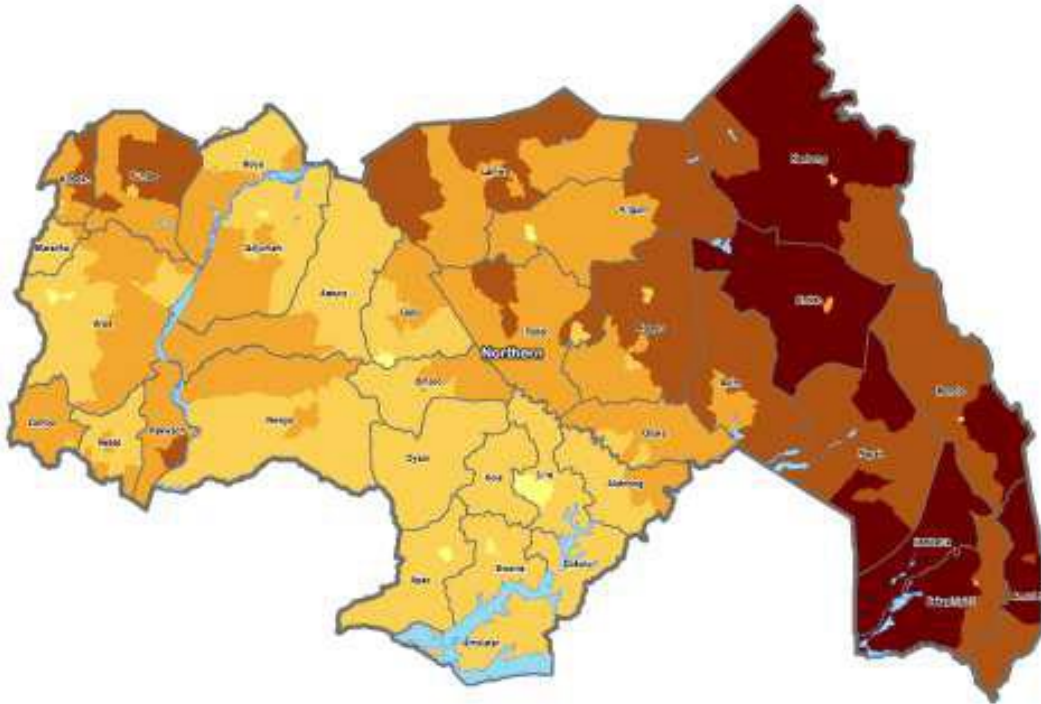
<sup>25</sup> In UNHS 2019/2020 the poverty estimates are presented with a bias towards the existing official absolute poverty line (USD 1,25 per capita per day) but a snapshot is also presented based on the upper poverty line of USD 1.77 and international poverty line of USD1.90 per day per person. Uganda National Household Survey, 2019/2020

<sup>26</sup> The national standard indicator framework (NSI)

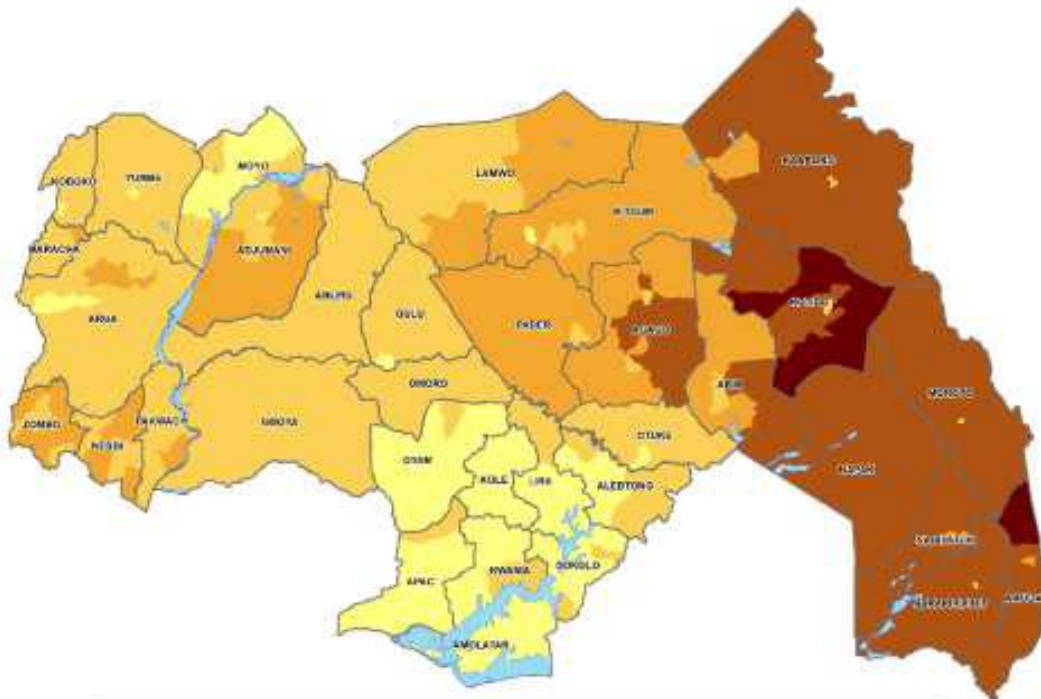
poverty rates are located in Karamoja. In Karamoja sub-region, 42 of the 64 sub counties have poverty rates above 60 percent. Loro sub-county in Amudat district has the highest poverty incidence in the entire northern region, while Rengen sub county in Kotido district has the higher child poverty rate of 80 percent.



Northern Region Household Poverty rate - 2012/13



Northern region Household poverty rate - 2016/17



The Ugandan MPI is based on the 2016/17 and 2019/20 Uganda National Household Surveys and aims to broaden the measurement of poverty in Uganda to Leave No One Behind.

The Multidimensional Poverty Identifies the poverty through the combination of the number of people who experience multiple deprivation and the intensity of the deprivations. The Uganda MPI is calculated using 12 indicators grouped under four dimensions: education; health; living standards; employment and financial inclusion. 27% of the population are multidimensionally poor, but not monetarily poor.

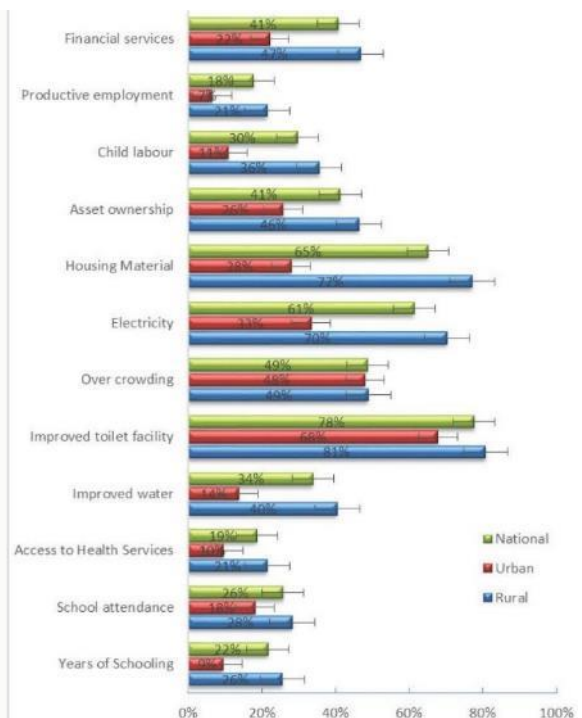
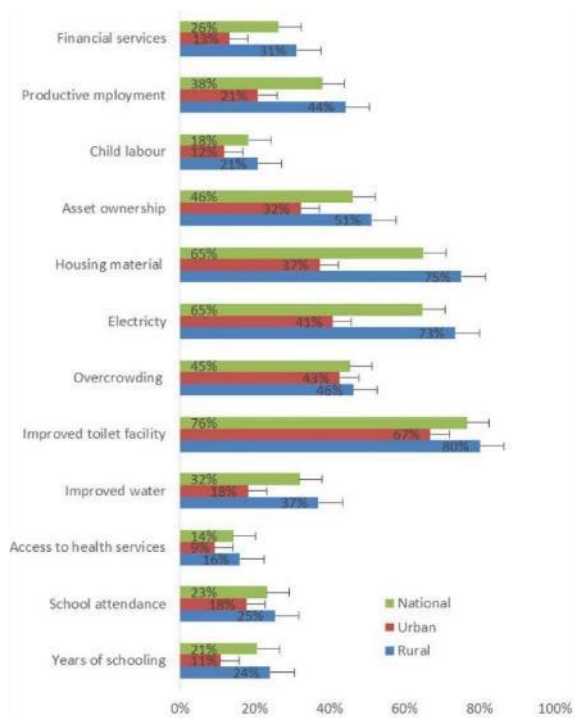
At the national level, the incidence of multidimensional poverty (the percentage of people who are multidimensional poor or the poverty rate or headcount ratio) was estimated at 42.1 percent. The average intensity of poverty (the average percentage of dimensions in which poor people are deprived, or the average deprivation score of poor persons) was estimated at 54.5 percent, implying that on average, the poor are deprived in 2.2 dimensions.

At the regional level, multidimensional poverty is highest in the Northern region (63 percent), followed by the Eastern region (45.7 percent). A similar trend emerges for the intensity as well as the MPI. At the sub-regional level, Karamoja has the highest levels of multidimensional poverty, poverty intensity and MPI, at 85 percent, 68 percent and 0.58 respectively. The other sub-regions with high incidences of poverty are Acholi (64 percent), West Nile (59 percent), Lango (57 percent), and Teso (56 percent).

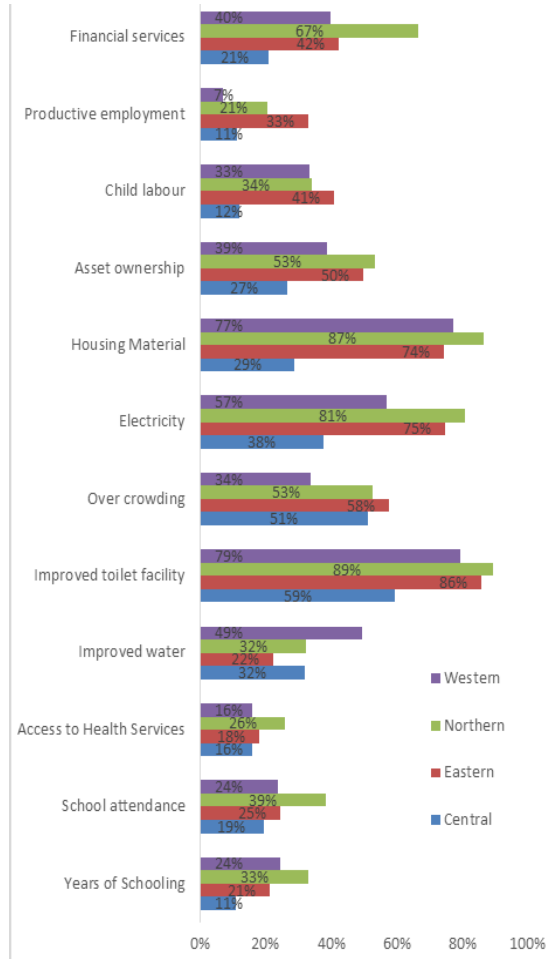
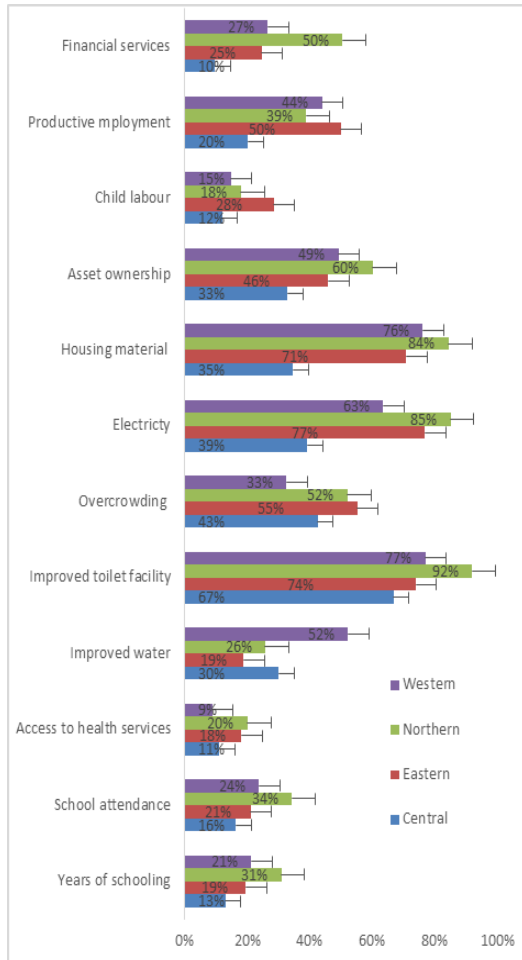
Figure below shows the proportion of the population who are deprived in one specific indicator, regardless of whether they are deemed multidimensionally poor or otherwise. As can be seen, the highest deprivations are in terms of access to improved toilet facilities, housing materials and clean energy or electricity.

BOS computations based on UNHS 2019/20

UBOS computations based on UNHS 2017/19



The breakdown at regional level confirms that people in Northern region suffer from higher deprivations as reported in the charts below.



UBOS computations based on UNHS 2019/20

UBOS computations based on UNHS 2017/19

The data proposed show the rate of deprivation per category and region, nevertheless it does not allow to understand the intensity of poverty, since one individual could suffer from one or more deprivations. Looking at the chart below we can see the difference between monetary poor and multidimensional poor.

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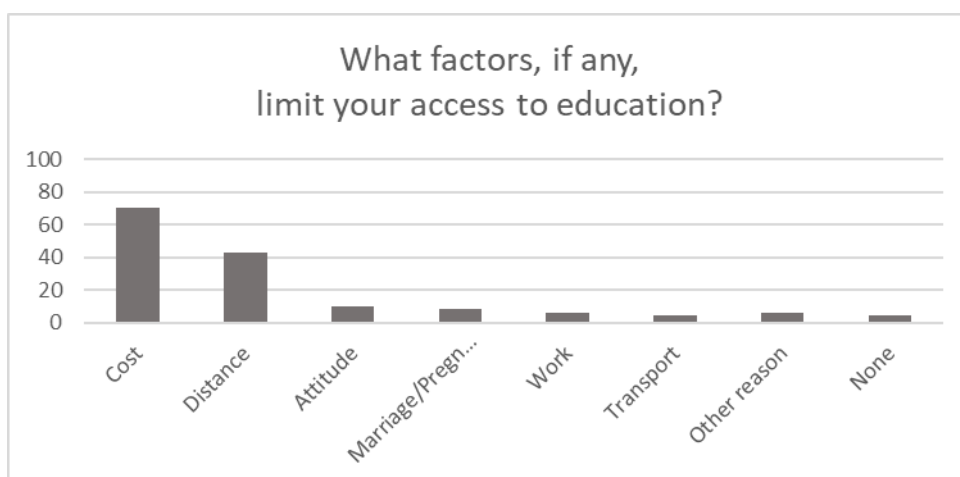
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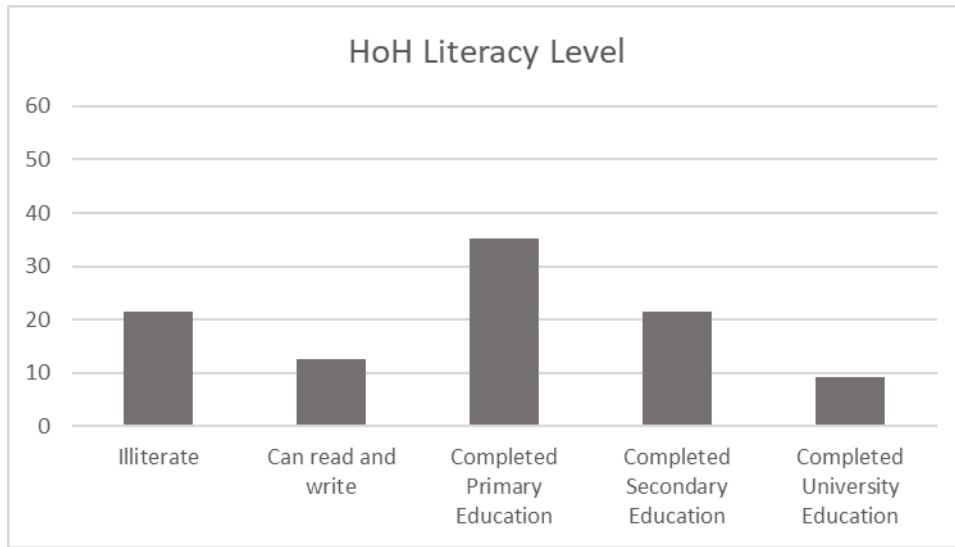
Sub-region	Monetary poor 2016/17	Monetary poor 2019/20	Multidimensional poor 2016/17	Multidimensional poor 2019/20
National	21.4	20.3	44.3	42.1
Kampala	2.6	1.6	2.7	0.4
Buganda South	9.0	6.9	18.3	17.9
Buganda North	11.0	13.6	29.0	31.5
Busoga	37.5	29.4	49.9	45.1
Bukedi	43.7	34.6	65.4	42.2
Elgon	34.5	13.2	55.6	40.5
Teso	25.1	22.0	52.7	55.6
Karamoja	60.2	65.6	86.7	84.9
Lango	25.6	23.5	56.3	57.0
Acholi	33.4	67.7	70.3	63.6
West Nile	34.9	16.9	62.8	59.1
Bunyoro	17.3	9.8	42.0	45.7
Toro	11.1	12.8	49.0	45.5
Ankole	6.8	13.3	37.3	42.6
Kigezi	12.2	27.6	38.8	48.4

The data collected along the project shows the status of deprivation of affected families and confirming the considerations made above.

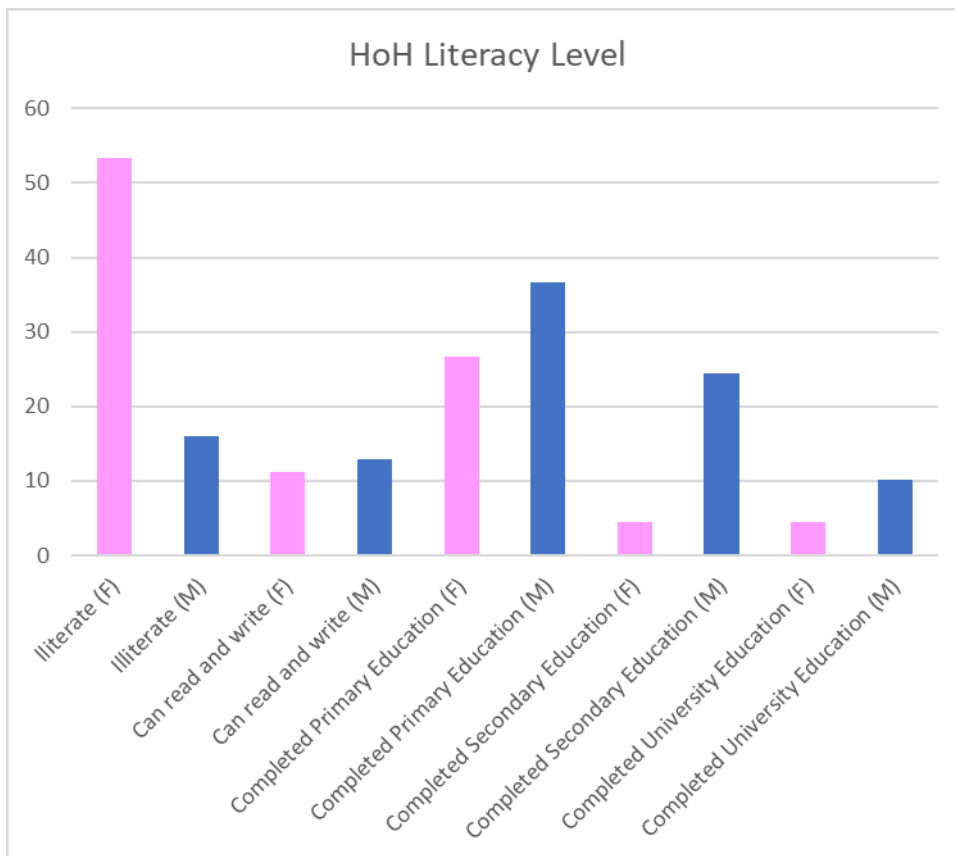
In the project area the drop out of schools have been investigated and as results 79% of respondents declare costs as major limit, ad distance as second more frequent constrains with 45% of answers



Constraints to access to education.

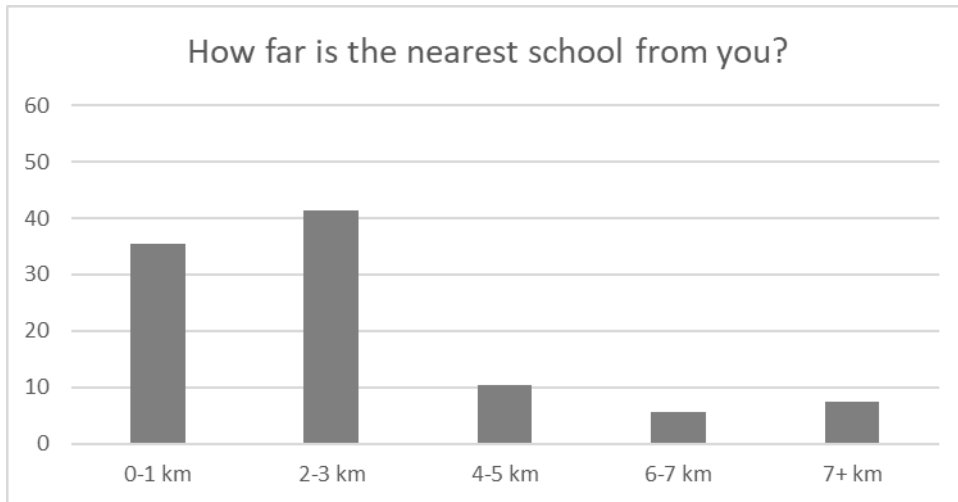


*Households' literacy level.*



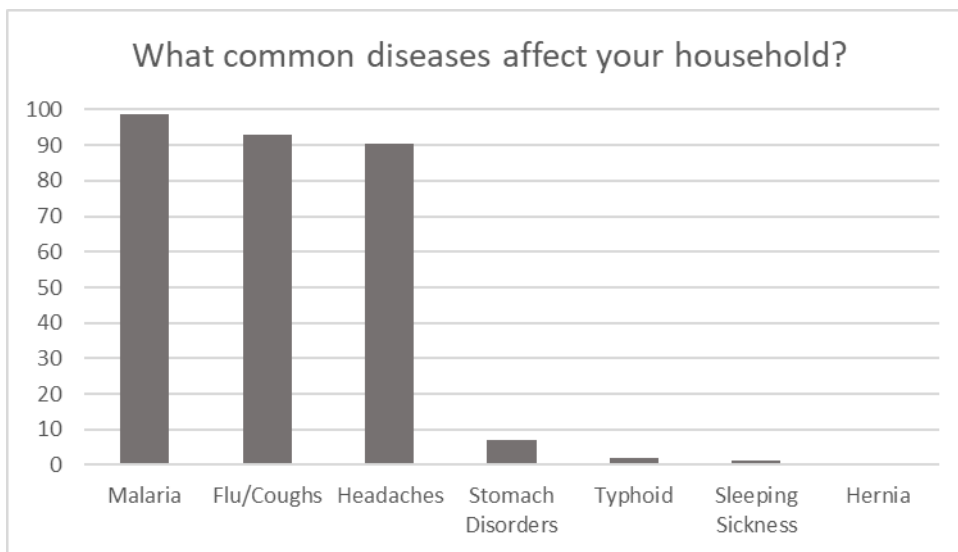
*Households' literacy level.*



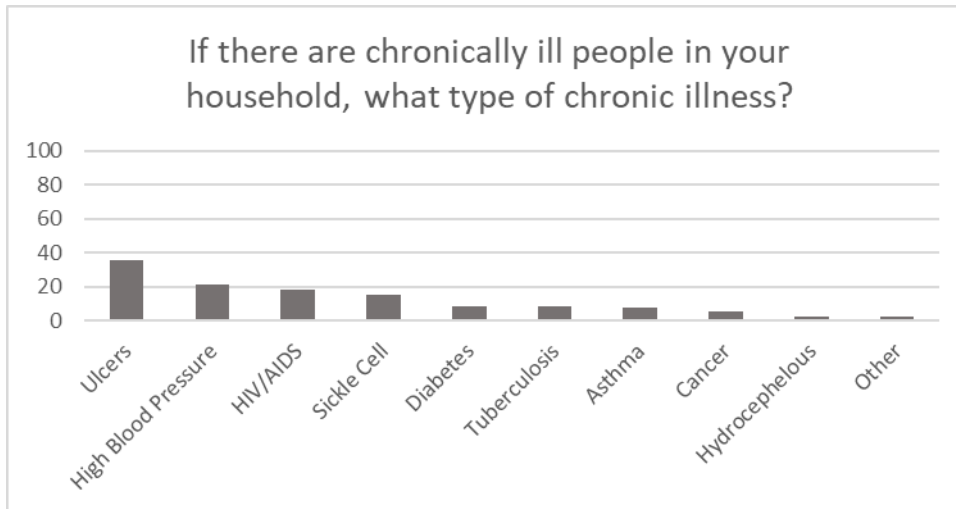


*Distance to the nearest school for families in the project area.*

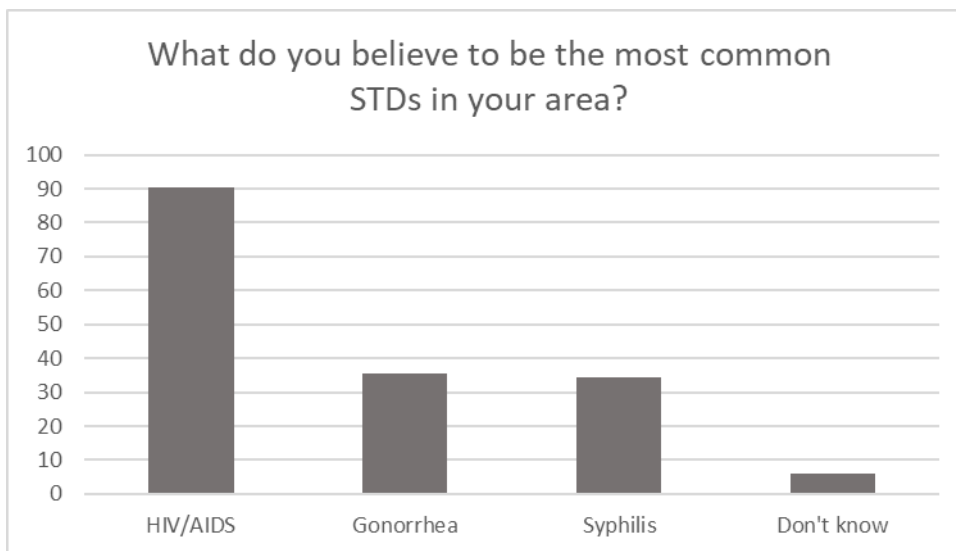
Uganda’s population of 47 million has always been heavily impacted by illness and disease, with communicable diseases accounting for over 50% of deaths in the country. Malaria, tuberculosis (TB) and HIV/AIDS are three of the top diseases impacting Uganda and are among the leading causes of death. The graphics below show the condition of project affected people in 2024.



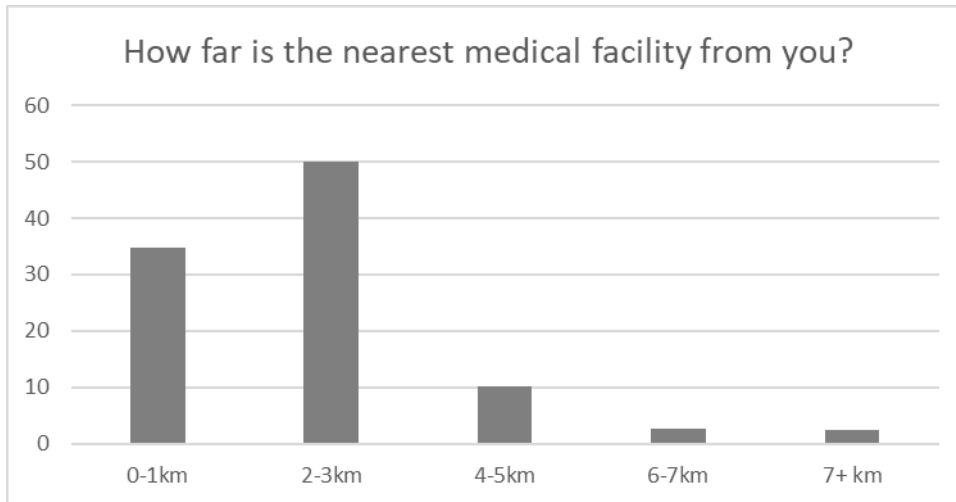
*HHs common diseases in the project area.*



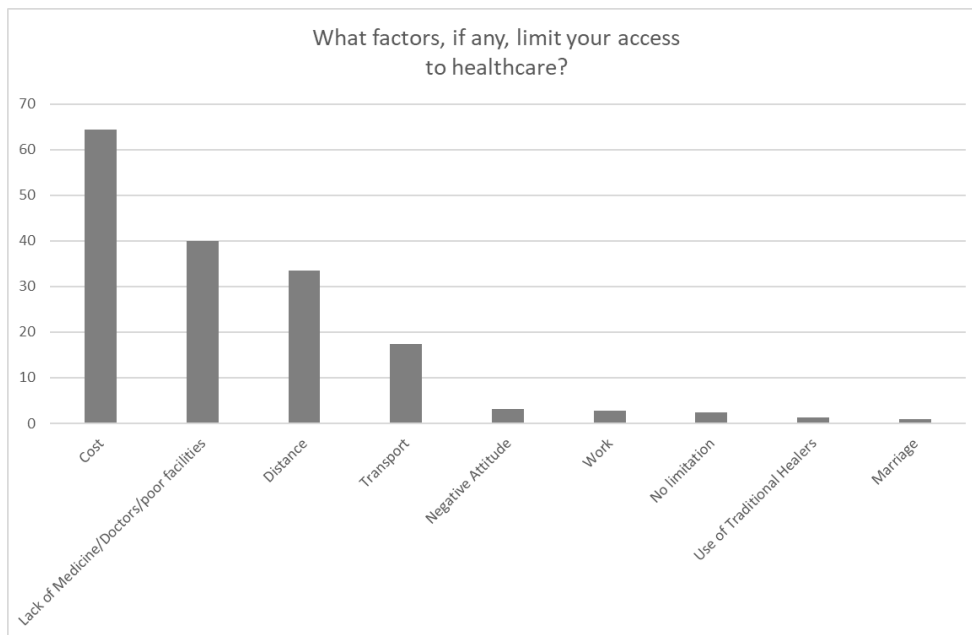
*HHs Chronic illness in the project area.*



*Most common STD in the project area.*



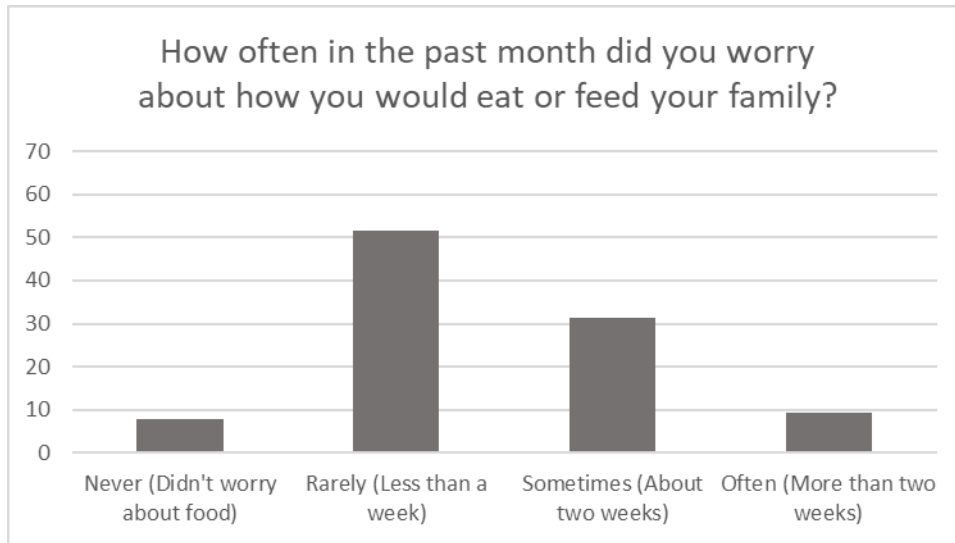
*Distance to the nearest medical facility for families in the project area.*



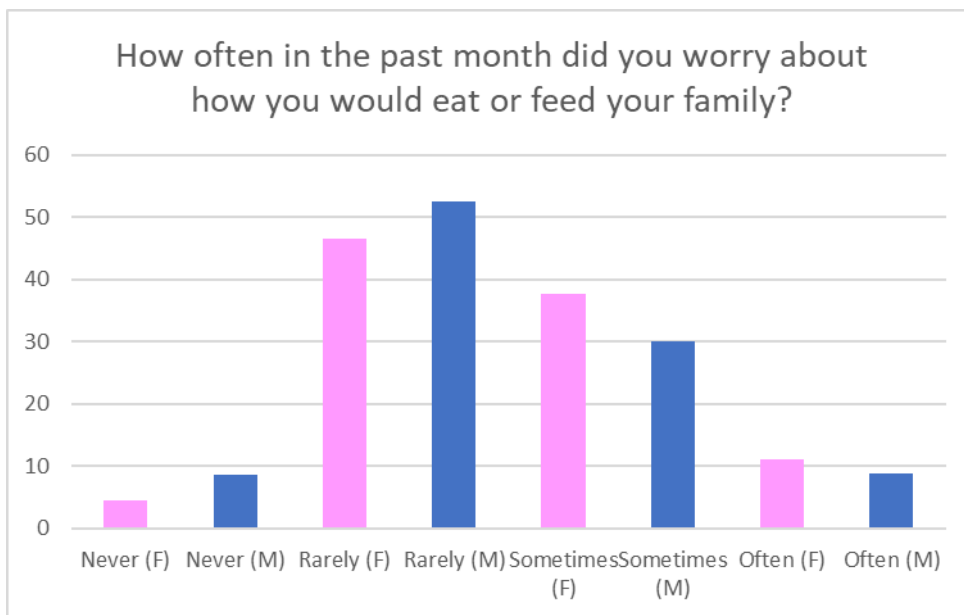
*Factors limiting the access to healthcare in the project area.*

A food security assessment in northern Uganda indicated that in 2014 about 24% of households were food insecure, and that only 12% of children aged 6 to 23 months had minimum acceptable diets, with only 26% of children fed as per recommended minimum dietary diversity. Representing a typical rural agrarian community, this study indicated a broad level relationship between household food insecurity, dietary diversity and associated coping strategies. It is evident that most of the diets in this area are largely staple based, mainly dominated by grains, roots, and tubers, with evidence showing limited diversity of diets accessible for children.

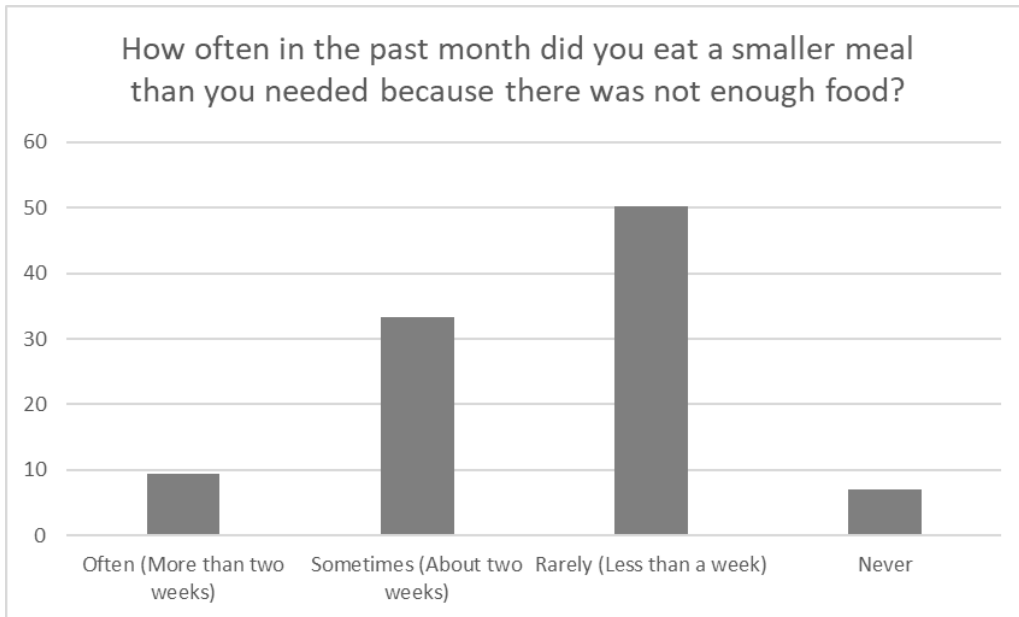
The topic was investigated also among affected households, the situation of food security is an issue of vulnerability since 30% of affected HHs face sometimes difficulties to feed their family and 10% often.



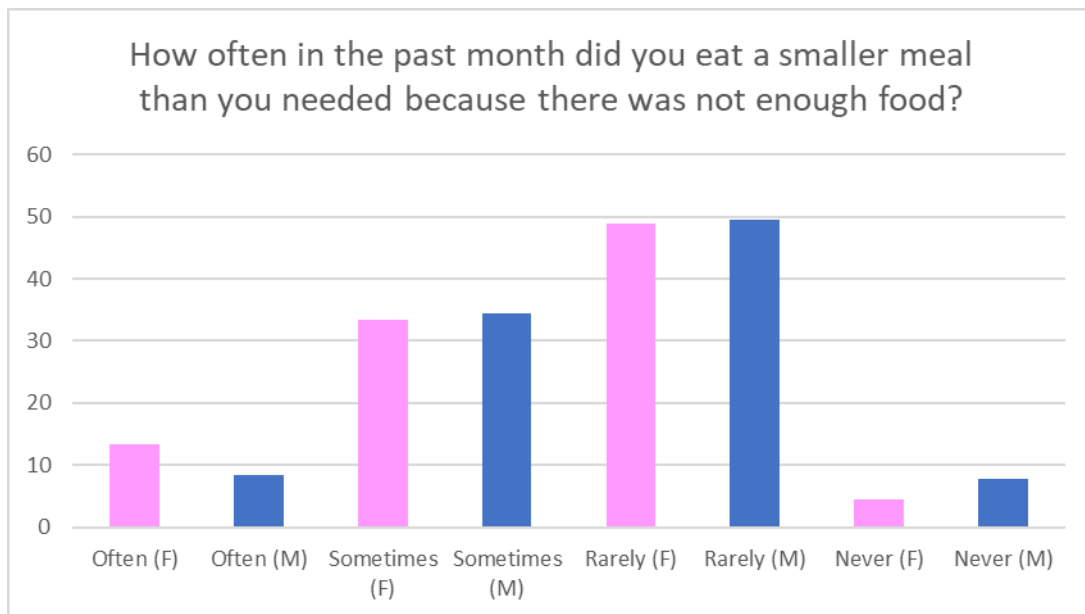
*Food security in the project area.*



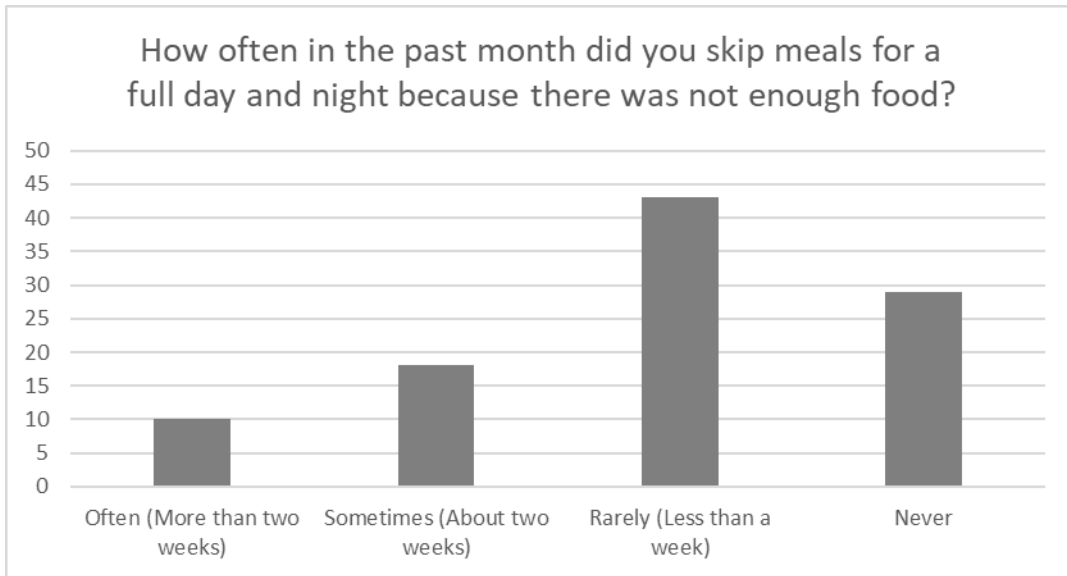
*Comparison between male and female households on the food security in the project area.*



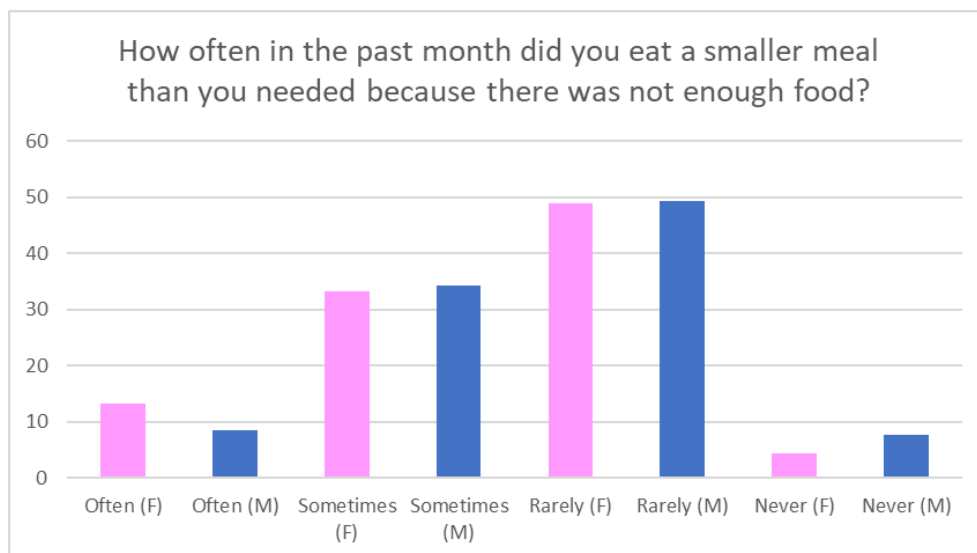
*Frequency of smaller meals eaten in the project area due to insufficient food.*



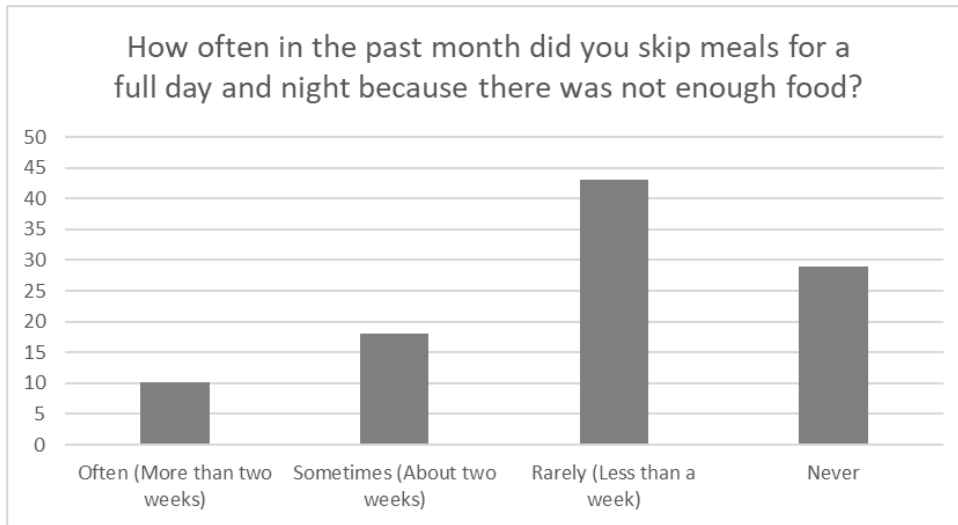
*Comparison between male and female households on the frequency of smaller meals eaten in the project area due to insufficient food.*



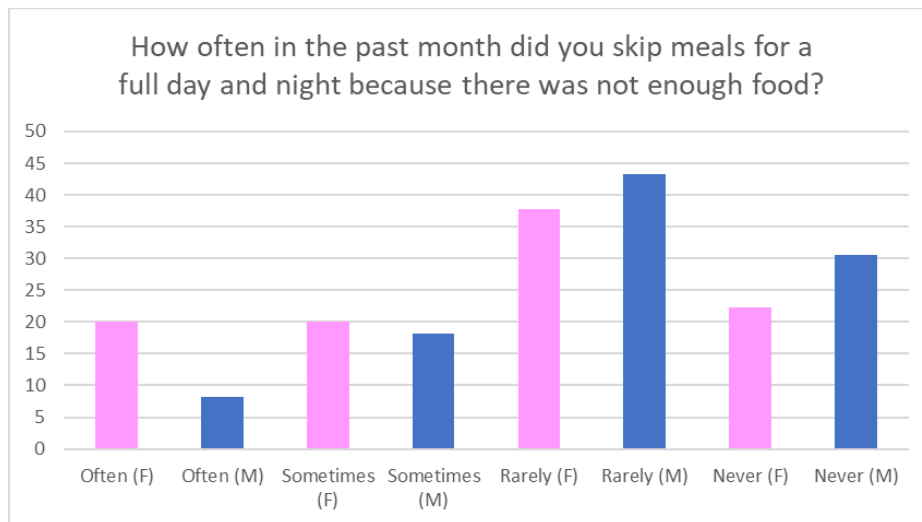
*Frequency of fewer meals eaten in the project area due to insufficient food.*



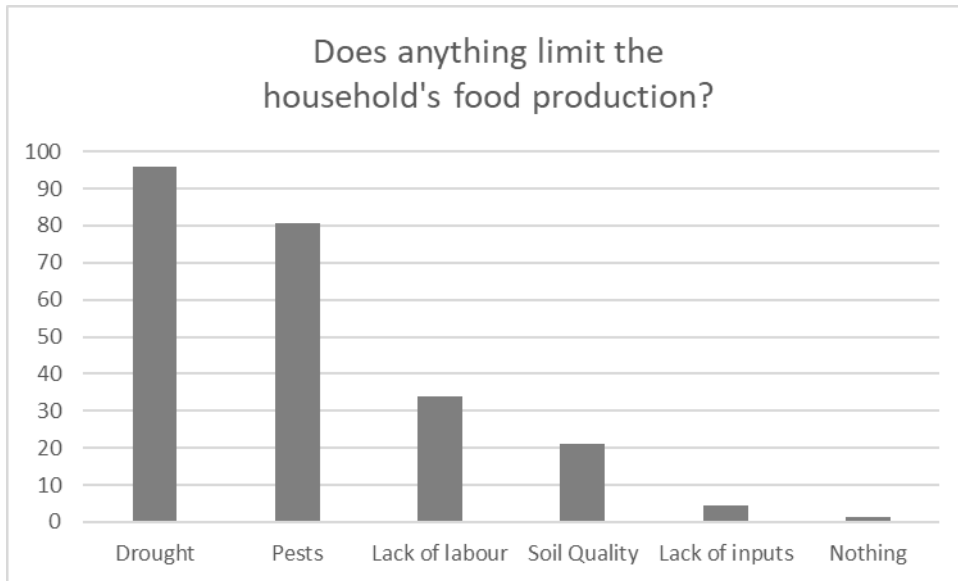
*Comparison between male and female households on the frequency of fewer meals eaten in the project area due to insufficient food.*



*Overall frequency of meals skipped for a full day in the project area due to insufficient food.*



*Comparison between male and female households on the frequency of meals skipped for a full day in the project area due to insufficient food.*

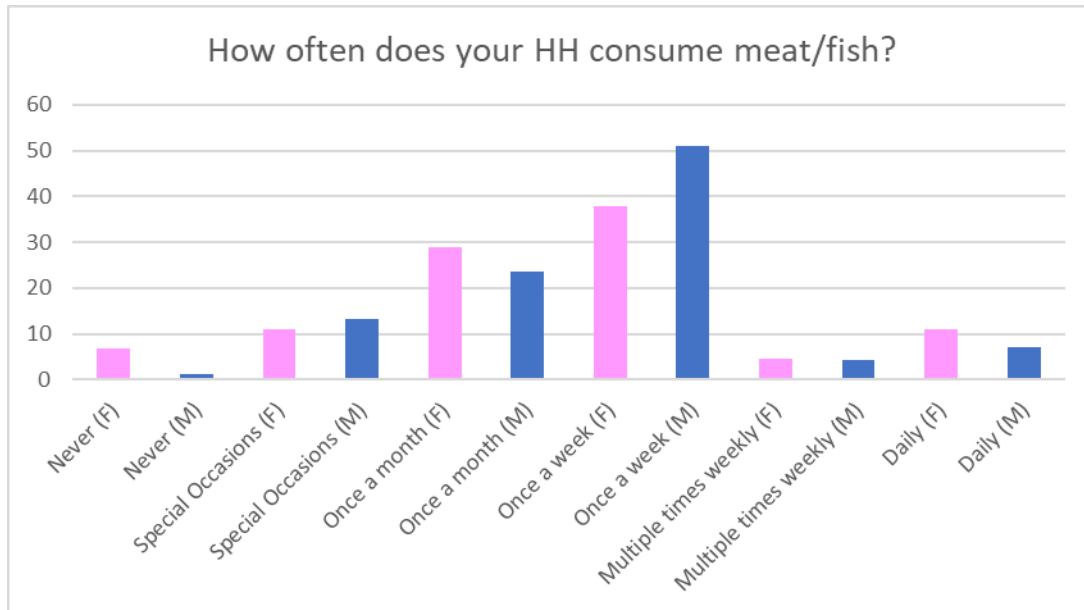


*Causes of household food production limitation in the project area.*



*Frequency of fish and meat meals in the project area.*





*Comparison between male and female households on the frequency of fish and meat meals in the project area.*

### Project benefits

Developing an economic analysis that includes the interconnection of rural areas implies the quantification of economic benefits associated with the increase availability and reliability of electricity-related services in rural areas. In fact, the interconnection of rural areas brings not just a reduction of energy costs (e.g. the switch from kerosene lamps to electric bulbs or the switch from diesel generation to grid), but it also increases the quantity and quality of many electricity-related services (electric lighting is better in terms of luminosity than other options), their availability (lumen/hours increase), while reducing negative effects of less advanced energy sources (e.g. smoke, smell and noise).

The increase in quality and quantity of these services brings an increase in people’s utility: better lighting means that children can study at night or that people feel safer walking around the village. Increased energy availability means that people can use refrigerators, can use a TV or PC, and so on and so forth. In terms of economic activities in rural areas, electrification allows for increased productivity. For instance, cheaper water pumping and storage of fresh produce increase the value of agricultural activities. Therefore, electricity enables a wide range of services that increase people’s well-being<sup>27</sup>.

It is worth of noting that direct welfare impacts of rural electrification for rural households are generally moderate. The key rationale for rural grid electrification, justifying the high investment cost, is therefore the expected boost of economic activity<sup>28</sup>.

<sup>27</sup> Source: Meier, P., Peter, V., Barnes, D. F., Bogach, S. V., & Farchy, D. (2010). Peru: National survey of rural household energy use

<sup>28</sup> Gaul, M., Berg, C., Schmidt, M., Alff, U., Luh, V., and Schröder, M. (2019). The Impact of Rural Electrification – Results of the 2013-2019 Impact Monitoring of the Investments in Rural Electrification in West Nile Sub-Region, Uganda. KfW Development Bank, Frankfurt am Main.



Below, we provide few examples on the benefit that will be induced by the Project

**Lighting:** Its value may be evaluated in terms of quality (measured in Lumen-Flux provided by a fluorescent lamp with respect to a candle) or in terms of reliability (being connected to the grid means having a continuous provision of the service). Moreover, together with an improved service, the dweller will enjoy an increase in real income due to the lower cost of the service and higher efficiency.

**Education:** energy access allows schools to be equipped with modern technologies, providing a better service. Schools can benefit from the use of appliances such as computers, printers, and copying machines and water and clean cooking

**Communication and entertainment:** With the advent of cheaper energy access, television is more accessible to consumers. Their value may be estimated by the increase time of usage. Grid electricity also makes easier charging mobile phones easing communication and empowering rural businesses.

**Productivity:** businesses are empowered through the timesaving resulting from the use of electrical appliances. For example, it allows to operate at lower costs larger machines that are required for agro-processing and producing trade, both sectors with a significant value adding potential in rural areas.

**Health:** Improvements in health levels are a consequence of a multitude of factors. For instance, the possibility to operate water pumps allows an increase in hygienic standards; the reduced use of kerosene lamps, instead, reduces respiratory illnesses, relieving private and public healthcare. As reported by other studies in similar conditions connection to the grid can enhance the use of computers, printers, and copying machines, but also autoclaves, kettles and boilers. Other use of devices such as microscopes, fridges, freezers, and radio call antenna can guaranteed with grid connection, instead of generators as it happens.

Thus, it is fundamental to take all these benefits into account when performing a cost benefit analysis that includes rural areas. This can be possible if and only if we can forecast how household will change their behaviour once they have electricity from the grid. Generally, these benefits can be measured with the consumer surplus approach that is defined as the difference between the amount consumers are willing to pay and the amount, they pay for a product or service. Willingness to pay accounts for all the benefits that will be enjoyed from the product or service in question. For example, the benefits of lighting service may include longer study hours, better indoor air quality, ability to socialize in the evening, and extended working hours. In short, consumer surplus covers the benefits captured by consumers above what they are willing to pay.

## 13. ANNEX 5: CLIMATE CHANGE ASSESSMENT

### REDUCTION OF CARBON SEQUESTRATION AND STORAGE CAPACITY

#### Introduction

Carbon sequestration and storage (C) is perhaps the most widely recognized Ecosystem Service (ES) and certainly the most quantified among the so-called regulation and maintenance ES (MA 2005, Haines & Potschin 2013). Ecosystems have the ability to regulate the global climate by exchanging greenhouse gases such as carbon dioxide (CO<sub>2</sub>) with the atmosphere. Forests, grasslands, wetlands, and other ecosystems store carbon (C) in plant biomass and soil (referred to as "carbon pools") as a result of ongoing photosynthetic processes, sequestering CO<sub>2</sub> from the atmosphere where it acts as a greenhouse gas contributing to global warming (EEA, 2020). This Ecosystem Service is commonly measured using two indicators: sequestered C and stored C. It represents a dynamic measure of "ES flow," which intersects the supply of a service produced by ecosystems with the demand required by humans (Burkhard, 2017). In the case of C sequestration, it is assumed that all of the ES supply (i.e. the provision of a service by a particular ecosystem regardless of its use) is absorbed by the demand (the need for ES by society), so the total globally sequestered C corresponds to the flow of climate regulation benefits reaching our societies. Carbon storage, on the other hand, refers to the total amount of C stored in each pool measured at a given time (Mg C ha<sup>-1</sup>). In this case, it is a simpler, static measure, corresponding to the overall result of a lengthy process of C sequestration. Here, the C stored in ecosystems is interpreted as "potential ES" and is quantified by assuming that the C returns to the atmosphere in the form of CO<sub>2</sub>. This second indicator is commonly used to assess the effects of land management on C sequestration and storage ES. In other words, disturbing or modifying ecosystems that provide this ES through fires, pollutants, or more commonly through land use or land cover change can result in the release of large amounts of CO<sub>2</sub>. Conversely, other land management changes such as reforestation or alternative agricultural practices can lead to increased CO<sub>2</sub> storage capacity.

#### Application of the transferable modelling frameworks

Among the most modern and reproducible methodologies for quantifying and mapping ES are the so-called "transferable modeling frameworks" (Burkhard, 2017). These methods propose a standardized quantification approach implemented in software, tools, and libraries to easily quantify multiple ES. The Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) spatially explicit modeling tool (Tallis et al. 2008, <http://invest.ecoinformatics.org/>) has been used to estimate and map carbon storage ES in the study area defined with respect to a 100-meter buffer from the Transmission Line RoW (see below). The InVEST Carbon Storage model uses a land use map and data on C stored in 4 pools (aboveground biomass, belowground biomass, soil, and dead organic matter) to estimate the total amount of accumulated C in a given ecosystem. Aboveground biomass includes the live biomass of plants above the soil (trunk, roots, branches, leaves...), belowground biomass includes plant root systems, while soil organic matter is the largest terrestrial C pool and includes decomposing organic matter along with soil microorganisms. Finally, dead organic matter includes litter and dead wood, both fallen and standing. The model aggregates the quantities of carbon from these pools depending on the land use or land cover category and produces maps of stored C for each pool and overall accumulation. Data on C expressed as tons of C per hectare (Mg C ha<sup>-1</sup>) in aboveground and belowground biomass, soil, and dead organic matter were obtained from numerous bibliographic sources and European and international inventories.

### Specification of the adopted model

In the 100m buffer study area (along the transmission line) the latest (2019) Land Use map was retrieved through Copernicus at <https://lcviewer.vito.be/download>. The map is realised at 100 m spatial resolution upscaling Sentinel II 10x10 m resolution, with a three classification levels with class definitions according to the UN-FAO's Land Cover Classification System (LCCS) scheme (Buchhorn et al. 2019, Figure 5). Such layer is developed from PROBA-V satellite observations and organized into millions of Sentinel-2 equivalent tiles of 110x110km (with UTM projection). All Sentinel II images have been radiometrically and atmospherically corrected (sen2cor algorithm) to ensure accurate reflectance values for subsequent analysis. Machine learning algorithm (random forest) was used to classify land cover types in each image. This step involves training the algorithm with labelled data and then applying it to classify the entire image. Values of C stocked in aboveground biomass, belowground biomass, in soil and in litter biomass expressed in ton C ha<sup>-1</sup> were attributed according to multiple literature sources (see in the reference list). A Biomass - C conversion factor of 0.47 was adopted from IPCC (2006) Guidelines for national greenhouse gas inventories, "Intergovernmental Panel on Climate Change (IPCC), Agriculture, Forestry and other land use (AFOLU), Institute for Global Environmental. Values are referred to Tropical dry IPCC climate zone. A 0 value of biomass was attributed to Cultivated and managed vegetation/agriculture. Due to the relatively small amount of litter in non-forest area a 0 value of C was attributed to Shrubland, Herbaceous vegetation and cultivated lands (Table 13-1). The impact simulation assumes forest (116, 124, 126) and shrubland (20) is converted to herbaceous vegetation (30).

Table 13-1 – Values of C used for the calculation of the components associated to specific land-use carbon stock pools

Copernicus Land use code	Land use description	C aboveground (ton ha-1)	C belowground (ton ha-1)	C soil (ton ha-1)	C litter (ton ha-1)	Ratio	Total
20	Shrubland	22.75 (a)	46.41	19.00 (c)	0.00	2.04 (b)	<b>88.16</b>
30	Herbaceous vegetation	1.08 (d)	1.71	19.00 (c)	0.00	1.58 (b)	<b>21.79</b>
40	Cultivated and managed vegetation/agriculture	0.00	0.00	19.00 (c)	0.00	/	<b>19.00</b>
50	Urban / built up	0.00	0.00	0.00	0.00	/	<b>0.00</b>
116	Closed forest, unknown	32.85 (e)	10.91	19.00 (c)	2.10 (g)	0.33 (f)	<b>64.86</b>
124	Open forest, deciduous broad leaf	32.85 (e)	10.91	19.00 (c)	2.10 (g)	0.33 (f)	<b>64.86</b>
126	Open forest, unknown	32.85 (e)	10.91	19.00 (c)	2.10 (g)	0.33 (f)	<b>64.86</b>

## Results

The presented findings represent changes observed within a 100-meter buffer zone surrounding the projected transmission line route. It's crucial to note that the analysis assumes a significant transformation scenario, where forests (classes 116, 124, 126) and shrublands (class 20) are converted into grasslands (class 30) along the RoW. This assumption serves as a comparison model for potential impacts, emphasizing the importance of understanding the potential outcomes of such conversions. The data reveals substantial alterations in carbon stocks, with a notable decrease observed post-impact. Prior to the simulated impact, the total carbon stock was substantial, amounting to 58,620.56 tons across various carbon pools (Table 13-2). However, post-impact assessments demonstrate a significant reduction in total carbon stock, which decreased to 25,583.81 tons.

*Table 13-2 – Sum of C stock for C pool type in the study area, pre and post impact*

Area	C_above (ton C)	C_below (ton C)	C_soil (ton C)	C_litter (ton C)	Total C (ton C)
Pre impact	15480.37	19156.19	23522.00	412.00	58620.56
Post impact	708.12	1263.69	23522.00	0	25583.81

This decline is particularly evident in aboveground and belowground carbon pools, indicating a considerable loss of carbon. Statistical analysis highlights the magnitude of these changes, with mean carbon levels declining from 47.31 to 20.65 tons per hectare post-impact (Table 13-3, Table 13-4), reflecting increased variability in carbon levels across the study area. It's essential to recognize that these results underscore the potential environmental consequences of land use changes and emphasize the importance of implementing effective mitigation measures. The application of the described mitigation strategies can help minimize the adverse effects of such changes, supporting ecosystem resilience and sustainability in the region.

*Table 13-3 – Total C stock statistics, pre and post impact*

Area	Total C (ton C)	Mean C (ton C ha <sup>-1</sup> )	Median C (ton C ha <sup>-1</sup> )	SD C (ton C ha <sup>-1</sup> )	Min C (ton C ha <sup>-1</sup> )	Max C (ton C ha <sup>-1</sup> )
Pre impact	58620.56	47.31	21.79	30.72	0	88.16
Post impact	25583.81	20.65	21.79	1.49	0	21.79

*Table 13-4 – Total C change*

Total C change (ton C)	Mean C change (ton C ha <sup>-1</sup> )	Median C change (ton C ha <sup>-1</sup> )	SD C change (ton C ha <sup>-1</sup> )	Min C change (ton C ha <sup>-1</sup> )	Max C change (ton C ha <sup>-1</sup> )
33036.75	26.66	0	29.67	0	66.37

At the global level, the mitigation potential of reducing deforestation and forest degradation is estimated to range from 1.41 to 7.98 GtCO<sub>2</sub>e yr<sup>-1</sup> over the period 2020-2050 (IPCC 2019). This global strategy not only holds significant promise for climate mitigation but also presents opportunities for climate-water-sustainability synergies. By preserving primary and old secondary forests, it is possible to bolster carbon sequestration efforts while simultaneously supporting healthy water cycles,

protecting biodiversity, and enhancing the resilience of local communities and urban areas. These forests play a pivotal role as carbon sinks and regulators of regional water cycles and climatic patterns (e.g., Luysaert et al. 2018; Luysaert et al. 2008). Studies have shown that natural forests can be up to six times more effective at carbon storage than agroforestry and up to forty times more effective than tree plantations per unit area until 2100 (Lewis et al. 2019). However, there are growing concerns regarding increased carbon losses attributed to drought-induced tree mortality and subsequent carbon sink saturation in tropical forests (Hubau et al. 2020; Green et al. 2019).

## References

- (a in table) IPCC LULUCF (2019) Vol.4, Tab. 4.7
- (b in table) IPCC LULUCF (2003) Annex Table 3A.1.8
- (c in table) IPCC LULUCF (2019) Vol. 4, Tab. 2.3 (low activity clay)
- (d in table) IPCC LULUCF (2003) Table 3.4.2
- (e in table) IPCC LULUCF (2019) Vol.4, Tab. 4.7
- (f in table) IPCC LULUCF (2019) Vol.4, Tab. 4.4
- (g in table) IPCC LULUCF (2003) Tab. 3.2.1

IPCC (2019) Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Available at <https://www.ipcc-nggip.iges.or.jp/public/2019rf/>

IPCC (2003) Good Practice Guidance for Land Use, Land-Use Change and Forestry. Available at: [https://www.ipcc.ch/site/assets/uploads/2018/03/GPG\\_LULUCF\\_FULLEN.pdf](https://www.ipcc.ch/site/assets/uploads/2018/03/GPG_LULUCF_FULLEN.pdf)

## REDUCTION OF CARBON DIOXIDE (CO<sub>2</sub>) EMISSIONS ASSOCIATED TO THE PROJECT

The assessment of the reduction of greenhouse gases (GHG) emissions due to the implementation of the interconnection project is taken from the Feasibility Study.

The benefits of the Project are evaluated thanks to the probabilistic simulations of two identical models, one with the presence of the interconnection and a second one without the presence of the interconnection. In this evaluation, all the prospective benefits coming from the avoided use of conventional thermal units and more in general associated to the burning of fuel and the associated costs of fuel are reported in Table 13-5.

Specifically, the two indexes that were chosen to emphasize the benefits associated to the proposed interconnection coming from the dispatchable thermal units are:

- the productions coming from conventional thermal units installed in South Sudan and the expected reduction in the case with the interconnection;
- the CO<sub>2</sub> emission generated by the conventional power units that have to burn fuel in order to produce electricity.

Table 13-5 - Benefits coming from the reduction of thermal production and CO<sub>2</sub> emission in Uganda

Year	2028	2029	2030	2031	2032	2033	2038	2043	2048
<b>Thermal production and costs</b>									
<b>WITH interconnection</b>	0	0	0	0	0	59.09	147.93	16.04	437.06
<b>WITHOUT interconnection</b>	0	0	0	0	0	31.65	388.16	1150.04	5347.06
<b>reduction [GWh]</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>-27.44</b>	<b>240.23</b>	<b>1134.00</b>	<b>4910.00</b>
<b>Production Cost [\$/MWh]</b>	151.60	151.60	151.60	151.60	151.60	158.80	168.10	53.10	52.70
<b>Benefit [M\$]</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>-4.36</b>	<b>40.38</b>	<b>87.87</b>	<b>263.21</b>
<b>CO<sub>2</sub> emission</b>									
<b>WITH interconnection</b>	0	0	0	0	0	47.41	118.68	7.22	157.62
<b>WITHOUT interconnection</b>	0	0	0	0	0	25.49	311.42	507.49	1910.14
<b>reduction [kton]</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>-21.92</b>	<b>192.74</b>	<b>500.27</b>	<b>1752.52</b>
<b>Valorization of CO<sub>2</sub> [\$/ton]</b>	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
<b>Benefits [M\$]</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>-0.03</b>	<b>0.24</b>	<b>0.63</b>	<b>2.19</b>

### Dispatchable production, CO<sub>2</sub> reduction and fuel costs

For the case of Uganda, in the time interval that goes from 2028 to 2032, there are no benefits associated to the dispatchable production units. This is given by the fact that Uganda, both in case with the presence of the interconnection and in the case without, does not need to produce power from conventional thermal units so the country does not need to burn any fossil fuel thanks to its power surplus given by its own hydro power plants. Thus, in this time interval there is no benefit associated to this category for Uganda.

The most significant and important benefits associated to the proposed interconnection for the Uganda standpoint are in the medium and long-time period:

- In 2038, Uganda starts reducing its power surplus associated to the excess of production from its hydropower plants in fact during some hours of the year it has to switch on its existing thermal generating units in order to supply its internal demand. The need of burning fuel to cover its local demand increases in the case without the interconnection because it is not capable of importing the clean and cheaper energy produced by hydropower plants of South Sudan and Ethiopia and it increases the production coming from internal but costly thermal units.
- In 2043, in order to cope with the evolution of the internal demand from the reviewed generation expansion plan, a new Combined Cycle Gas Turbine (CCGT) unit of 300MW is installed. This new unit with the presence of the proposed interconnection is not exploited while, in the case without interconnection, is necessary to contain the Expected Energy Not Supplied (EENS) below the acceptable threshold avoiding load curtailment due to lack of interconnection. Thus, the presence of the interconnection has a significant benefit for Uganda in terms of avoiding expenditure in capital costs postponing the investments for new thermal units.
- In 2048, due to the significant increment of the load, both domestic and industrial, new thermal units need to be installed and, in addition to the CCGT unit proposed for the year 2043, other 4x300MW CCGT units should be installed for a total installed capacity of 1500MW. These five units are highly recommended in the case without the interconnection otherwise the EENS associated to the lack of interconnection would have been too high. In the case with the interconnection, all five units are not necessary since the level of energy produced is roughly 450GWh and, most importantly, the peak of productions reaches barely 600MW. Therefore, the presence of the interconnection is able to avoid the construction of a total of 3x300MW CCGT units, together with the all the necessary associated investment costs.

Summing up, it is possible to conclude that, from the Uganda standpoint, the most important benefit coming from the presence of the interconnection is associated to the possibility to avoid or postpone investments for new thermal generating units, in particular:

- In year 2043 the interconnection postpones the need for the commissioning of one CCGT unit for 300MW
- In year 2048, the presence of the interconnection limits the quantity of CCGTs that need to be installed from 5x300MW each to 2x300MW for a total avoided installed capacity of 900MW in CCGTs with the associated investments costs.
- Assuming that for a new thermal CCGT generating unit the investment cost is approximately 1200k\$/MW, the benefit associated to the avoided expenditure for the realization of new CCGT units for a total installed capacity of 900MW is equal to 1080 MUS\$.

The consequent effect of the reduction in the production of power coming from the thermal production units is the reduction of carbon dioxide (CO<sub>2</sub>) emission that similarly can be emphasized through economic considerations.

Marginal production costs are obtained using data of Table 13-6 and Table 13-7 that report the fuel costs for the different types of commodities involved for the 5-target years and the performance data of the generation mix of existing and future thermal power plants.



These data come both from international publications and outlooks as reported in 0 and 0 and international sources like the European Network of Transmission System Operators for Electricity (ENTSO-E) and World Bank datasets.

Table 13-6 - Fuel costs of the different commodities considered in the power system under study

Fuel costs of the different commodities [\$/GJ]					
Commodities	Year				
	2028	2033	2038	2043	2048
Natural Gas	6.83	6.88	7.03	7.11	7.04
Diesel	14.6	15.35	16.37	17.01	17.76
Heavy Oil	12.8	13.5	14.4	15.04	15.8

Table 13-7 - Main characteristics of the different technologies considered in the power system under study

Main characteristics of the different technologies of thermal units					
Technology	Efficiency [%]	CO <sub>2</sub> emission [kg/GJ]	Variable O&M costs [\$/MWh]	Minimum time ON [hours]	Minimum time OFF [hours]
Future CCGT units	0.58	57	1.9	2	2
Actual Diesel	0.35	78	1.3	1	1
Actual Thermal	0.35	78	3.9	3	3
Future thermal running on heavy oil (only South Sudan)	0.4	78	3.9	3	3

The quantification of the economic benefit for the country of CO<sub>2</sub> reduction is assumed to be equal to the expected value of Certified Emissions Reductions (CERs). Based on the Consultant’s reviews of literature sources ([3] and [4]), the current price of CERs has been assumed 1.25 US\$/ton CO<sub>2</sub>.

**References**

- [1] World Energy Outlook 2023, IEA, October 2023
- [2] U.S. Energy Information Administration, EIA, March 2023
- [3] UNFCCC papers, <https://unfccc.int/documents>
- [4] The Clean Energy Regulator” of the Government of Australia <https://www.cleanenergyregulator.gov.au/>

**BALANCE OF CARBON EMISSIONS ASSOCIATED TO THE PROJECT**

The balance is performed considering:

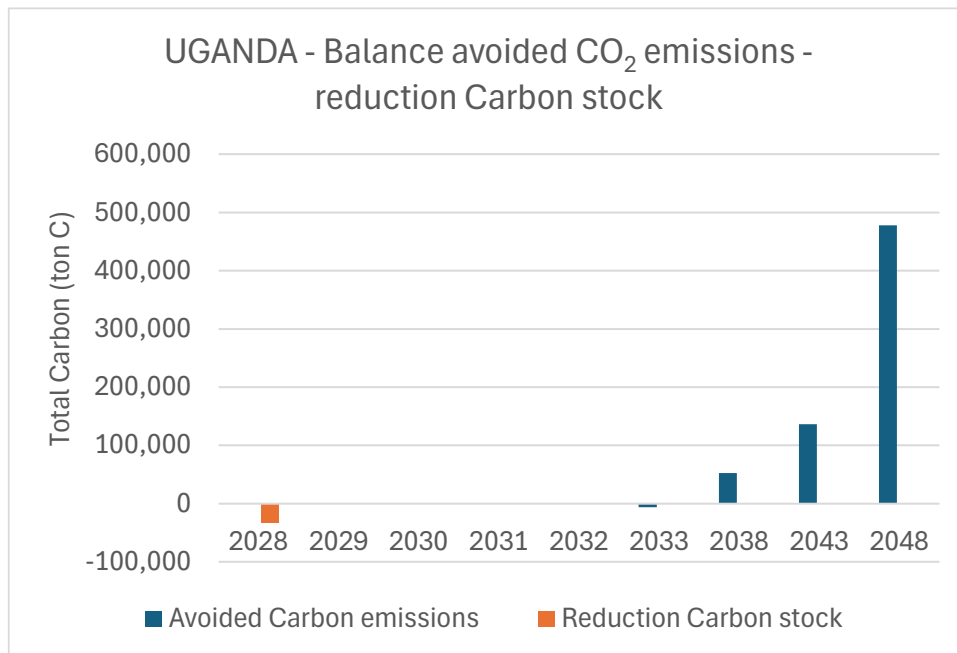
- The reduction of total carbon stock capacity, due to vegetation clearance for the project implementation, which amounts to 33,036.75 ton C;
- The amount of avoided CO<sub>2</sub> emissions in Uganda during the first year of service of the Interconnection project (2028), equal to 0.00 kton CO<sub>2</sub>

The avoided carbon dioxide and carbon emissions are detailed in Table 13-8. The quantity of carbon associated to avoided CO<sub>2</sub> emission is estimated considering the share of carbon atomic weight (C ≈ 12 g mol<sup>-1</sup>) on the molecular mass of carbon dioxide (CO<sub>2</sub> ≈ 44 g mol<sup>-1</sup>).

The balance with reduction of carbon sequestration capacity is shown in the graph below (Figure 13-1).

*Table 13-8 – Benefits coming from the reduction of CO<sub>2</sub> emission in Uganda*

Year	2028	2029	2030	2031	2032	2033	2038	2043	2048
<b>CO<sub>2</sub> emissions</b>									
<b>WITH interconnection</b>	0	0	0	0	0	47.41	118.68	7.22	157.62
<b>WITHOUT interconnection</b>	0	0	0	0	0	25.49	311.42	507.49	1910.14
<b>Reduction CO<sub>2</sub> [kton]</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>-21.92</b>	<b>192.74</b>	<b>500.27</b>	<b>1752.52</b>
<b>Reduction C [ton]</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>-5,978.18</b>	<b>52,565.45</b>	<b>136,437.27</b>	<b>477,960.00</b>



*Figure 13-1 – Balance between reduction of carbon emissions associated to the project and reduction of carbon stock capacity in Uganda*

For the case of Uganda, in the time interval that goes from 2028 to 2032, there are no benefits associated to the dispatchable production units. Therefore, the carbon balance associated to the Interconnection project is initially negative, since the loss of carbon sequestration capacity due to project implementation (quantified in 33,036.75 ton C) is not counterbalanced by an amount of avoided carbon emissions.

It is underlined that this balance is limited to the first year of service of the interconnection (2028).

Nevertheless, the most significant and important benefits associated to the proposed interconnection for the Uganda standpoint are in the medium and long-time period.

Starting from 2038, Uganda starts reducing its power surplus associated to the excess of production from its hydropower plants. The need of burning fuel to cover its local demand increases in the case without the interconnection, because Uganda is not capable of importing the clean and cheaper energy produced by hydropower plants of South Sudan and Ethiopia and it increases the production coming from internal but costly thermal units. Therefore, in presence of the interconnection the benefit is represented by a reduced need to produce energy with own thermal power plants.

Furthermore, in the following years the presence of the interconnection is associated to the possibility to avoid or postpone investments for new thermal generating units, in particular:

- In year 2043 the interconnection postpones the need for the commissioning of one CCGT unit for 300MW
- In year 2048, the presence of the interconnection limits the quantity of CCGTs that need to be installed from 5x300MW each to 2x300MW for a total avoided installed capacity of 900MW in CCGTs with the associated investments costs.
- Assuming that for a new thermal CCGT generating unit the investment cost is approximately 1200k\$/MW, the benefit associated to the avoided expenditure for the realization of new CCGT units for a total installed capacity of 900MW is equal to 1080 MUS\$.

It is underlined that the carbon balance does not consider, on the conservative side, the expected partial restoration of lost biomass after project completion, since the growth of trees below 1.8 m will be allowed in the wayleave.

The overall carbon balance for Uganda is judged positive and beneficial against climate change, especially in the medium and long-time period.

## EFFECTS OF CLIMATE CHANGE AND VARIABILITY ON THE PLANNED PROJECT

### Current climate change situation in Uganda

Average temperatures in Uganda have risen by 1.3°C since the 1960s, with minimum temperatures increasing by 0.5–1.2°C and maximum temperatures by 0.6–0.9°C during this period. Since 1960, there has been a consistent increase in average temperatures at a rate of 0.28°C per decade. This rise in temperatures has led to a significant increase in the frequency of hot days and nights, with daily temperature observations indicating a notable trend. The frequency of hot days, defined as days with temperatures exceeding a certain threshold, has risen by 74 days (an additional 20% of days) between 1960 and 2003. Particularly significant increases have been observed in June, July, and August, with hot days rising by an average of 8.6 days per month during these months. Similarly, the average number of hot nights has increased by 136 nights since 1960 (an additional 37% of nights), with the most significant increases occurring in the same months, rising by 14 days per month. Cold days and nights, defined as days or nights with temperatures below a certain threshold, have become less frequent as temperatures have warmed. The number of cold days has decreased by 20 days since 1960, with the most rapid decrease observed in the September, October, November season. Overall, these trends indicate a significant shift in Uganda's climate towards warmer temperatures, with notable impacts on the frequency of both hot and cold extremes.

Uganda's precipitation patterns exhibit significant variability, with an overall statistically significant reduction observed in both annual and seasonal rainfall. Particularly, the March to May rainy season has been notably affected, experiencing decreases of 6.0 mm per month per decade. This decline in rainfall has been particularly pronounced in certain northern districts such as Gulu, Kitgum, and Kotido. Although trends in extreme rainfall conditions are challenging to ascertain due to data limitations and seasonal variations, Uganda has witnessed an increase in drought occurrences over the past six decades. Over the last two decades, western, northern, and north-eastern regions have faced more frequent and prolonged drought conditions. Notably, the highly arid district of Karamoja in the northeast experienced seven droughts between 1991 and 2000, with additional occurrences in subsequent years like 2001, 2002, 2005, 2008, and 2011. The proportion of rainfall derived from heavy precipitation events is projected to rise, heightening the risk of disasters such as floods and landslides. These trends underscore the evolving climate challenges facing Uganda, with implications for agriculture, water resources and the overall socio-economic landscape.

### The future climate change in Project area

Analysis of climate change data from the World Bank Group's *Climate Change Knowledge Portal* has allowed to understand future climatic trends in the Project area (north-western / central Uganda). Climate projection data are modelled from the global climate model compilations of the Coupled Model Inter-comparison Projects (CMIPs), overseen by the World Climate Research Program. Data presented is CMIP6, derived from the Sixth phase of the CMIPs. The CMIPs form the data foundation of the IPCC Assessment Reports.

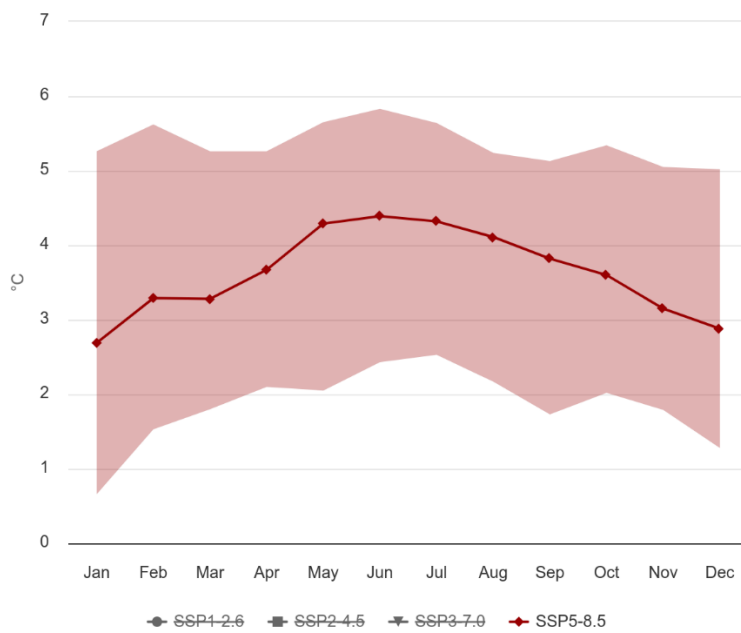
The scenario approach is used to characterize the range of plausible climate futures and to illustrate the consequences of different pathways (policy choices, technological changes, etc). CMIP6 introduced the Shared Socio-economic Pathways (SSPs). The SSPs represent possible societal development and policy paths for meeting designated radiative forcing by the end of the century. CMIP6 includes scenarios with high and very high GHG emissions (SSP3-7.0 and SSP5-8.5) and CO<sub>2</sub> emissions that

roughly double from current levels by 2100 and 2050, respectively, scenarios with intermediate GHG emissions (SSP2-4.5) and CO2 emissions remaining around current levels until the middle of the century, and scenarios with very low and low GHG emissions and CO2 emissions declining to net zero around or after 2050, followed by varying levels of net negative CO2 emissions (SSP1-1.9 and SSP1-2.6).

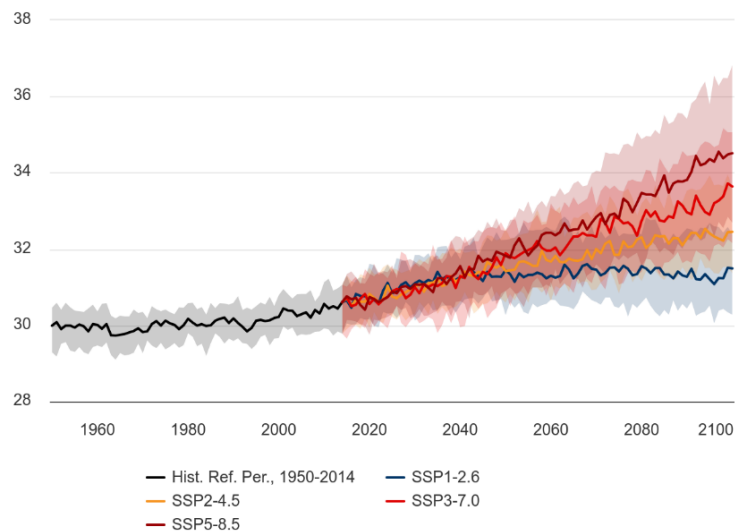
**TEMPERATURES**

The most relevant variables related to temperature are average maximum surface air temperature and anomalies until year 2100, using the period 1995-2014 as reference. Data presented in following are referred to Amuru District.

**Projected Average Maximum Surface Air Temperature Anomaly for 2080-2099 Amuru, Uganda; (Ref. Period: 1995-2014), SSP5-8.5, Multi-Model Ensemble**



**Projected Average Maximum Surface Air Temperature  
Amuru, Uganda; (Ref. Period: 1995-2014), Multi-Model Ensemble**



The high-emission scenario (IPCC SSP5-8.5) shows how the average maximum temperatures at the end of the century could reach 34°C, about 4°C more than in the reference period.

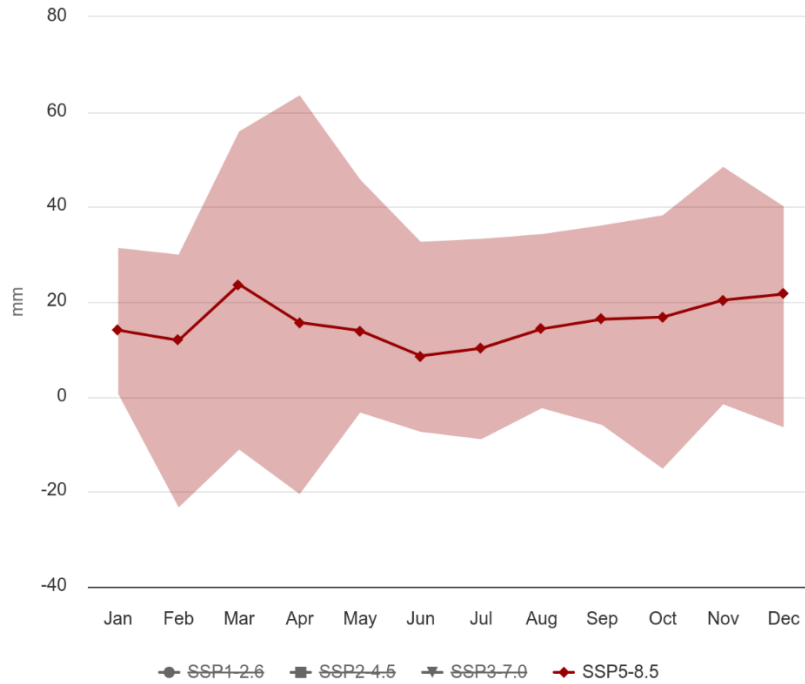
As a matter of fact, increased temperatures are expected for East Africa and specifically for Uganda. Under a high-emission scenario, monthly temperature change is expected to increase by 1.8°C for the 2050s and by 3.7°C by the 2090s.

Increased temperatures will also impact increased aridity and the length and severity of the dry season (December to March). Projected rates of warming are greatest in Uganda’s coolest season: June to September, with temperatures expected to increase by 1.5 to 5.4°C by the end of the century. Hot days are expected to occur on 15–43% of days by the 2050s and by 18–73% of days by end of century. Nights that are considered ‘hot’ (>26°C) are expected to increase more quickly than hot days. Temperature rise is projected to increase across all emission scenarios throughout the end of the century (World Bank Group, *Uganda Climate Risk Country Profile*, 2021).

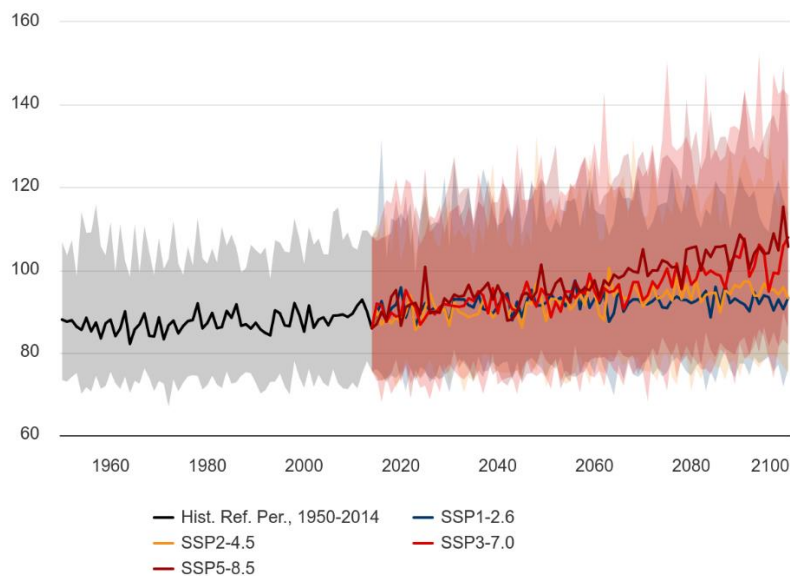
**PRECIPITATION**

The relevant variables related to precipitation are the extreme events such as the average of the largest 5-day cumulative precipitation values and anomalies until year 2100, using the period 1995-2014 as reference. Data presented in following are referred to Amuru District..

**Projected Average Largest 5-Day Cumulative Precipitation Anom 2080-2099 Amuru, Uganda; (Ref. Period: 1995-2014), SSP5-8.5, Multi-Model Ensemble**



**Projected Average Largest 5-Day Cumulative Precipitation Amuru, Uganda; (Ref. Period: 1995-2014), Multi-Model Ensemble**



The high-emission scenario (IPCC SSP5-8.5) shows how the largest 5-day cumulative precipitation at the end of the century could reach 100mm, about 20mm more than in the reference period. Under a high-emission scenario, monthly annual precipitation is expected to increase in some areas of the country, with decreases in others, notably the north-eastern areas. Overall, there is a likely increase

for the number of consecutive wet days (daily accumulation of rainfall  $\geq 1$ mm per day) throughout the year.

Additionally, the number of days with precipitation greater than 20mm will increase in each of the two rainy seasons in Uganda. For the annual national-scale aggregate, average precipitation is likely to increase slightly by the of the century under a high emissions scenario of RCP8.5, with much of the increase expected for certain areas and occurring through an increase in intense precipitation events (World Bank Group, *Uganda Climate Risk Country Profile*, 2021).

## Conclusions

Uganda is at high-risk to natural disasters such as flooding, drought, and landslides. Extreme events leading to these natural disasters have increased over the last 30 years. Flooding has become more frequent, largely due to more intense rainfall. Increased intensity of heavy rainfall has led to greater impact of floods and are causing more damage due to expanded infrastructure, human settlement and general development of the country.

Flooding is Uganda's greatest risk, affecting nearly 50,000 people annually and causing economic losses of more than \$62 million. The country is subject to both flash floods and slow-onset floods, which are common in urban areas, low-lying areas and along riverbanks and swamps. Particularly vulnerable areas include the capital, Kampala, and the northern and eastern regions.

Flash floods, triggered by heavy rainfall, are particularly problematic in arid areas and cause significant damage to infrastructure. Gulu District, for example, faces severe challenges during the rainy season, when large parts of the district become impassable. This often leads to food shortages, and access to essential services such as health and education is hampered by the destruction of roads and bridges. Flooding exacerbates existing vulnerabilities and poses significant barriers to the socio-economic development of affected communities.

As a consequence of this climate change framework, the 400 kV Interconnection project could be subject to the negative effects of increased natural hazards, in particular flooding and hydrogeological risks. Focusing on these aspects, it is underlined that the transmission line route crosses some rivers close to the border with South Sudan, in particular Achwa river and Unyama river, both tributaries of White Nile.

It is considered unlikely that climate change would have a significant effect on the Interconnection project. However, some events exacerbated by climate change could affect the transmission line under some circumstances. Such events could include:

- Floods and flash floods: although the line will cross several rivers, damage from floods is unlikely. To cope with this risk, tower foundations shall be properly designed and will not be located inside or close to any rivers or waterways.
- Landslides and mudslides: rainfall induced landslides and mudslides could occur, but project design will evaluate such risk and avoid such areas or foundations and towers shall be designed with a safety factor that would lead to resistance to major damage from all but the most severe slides.
- Wind: extreme winds may cause line breakage or even tower failure. However, the project design will consider maximum expected winds in towers and line's design.



## 14. ANNEX 6: SUB PLANS

SUB PLANS FOR MANAGEMENT AND MONITORING

See Volume II – ESMP

## 15. ANNEX 7: SEP AND CONSULTATION RECORDS

## Stakeholder Engagement Plan (SEP)

### Brief Summary of Previous Stakeholder Engagement Activities

#### Previous RAP consultations

Previous consultations were carried out in two phases: from October to December 2019, at the time of environment scoping and line route selection, and from January to March 2020, as part of the detailed ESIA and RAP studies.

Multiple groups of stakeholders were consulted. The four main groups were:

- directly affected people, those who reside in or derive their living from areas where the project has a direct impact on;
- those who reside near project areas or use resources in the project area and will have to relocate or adjust their livelihoods because of the project activities, or their access to the resources will be restricted due to the project activities;
- national Stakeholders and Government Institutions;
- local government institutions;
- civil society organizations (NGOs).

The RAP team organized several consultative meetings and discussions with various key stakeholders and PAPs. Later, sub county meetings and subsequently village meetings were held with residents of various villages traversed by the line. Formal interviews were held with PAPs using a standard socioeconomic questionnaire.

The issues of discussion with PAPs include:

- Information on project design/scope and project owner
- Disclosure in advance of details of the full compensation and resettlement procedure to be applied (disclosure of affected PAPs, negotiations on valuations, emission of notices to vacate, physical relocations)
- PAP eligibility criteria
- Methodology used for valuations
- Grievance redress mechanism
- Options available for compensations
- Availability of livelihood restoration measures and resettlement assistance
- Availability of assistance to vulnerable people.

#### First round of consultations of the updated study

The consultant visited district and sub-county offices in October 2023 to engage various stakeholders and discuss matters relating to acquisition of land and landed assets in the affected districts.

The following organizations/ offices were engaged for the purpose of the study:

- The District Land Board of Lamwo District
- The District Land Board of Amuru District
- The Town council of Atiak sub-county

- The District Land Board Nwoya District

The mission allowed to assess to which extent key stakeholders are aware of the project's current development. Key issues that were discussed are women land rights, existing land conflicts, the ongoing process of registration of freehold land ownership, the Certificates of Customary Ownership (CCOs) and their impact on land acquisition, the validation of compensation rates for each visited district and the delays in approving compensation rates for 2023/24 Financial Year in some of the districts where the project will be implemented. The main findings of these consultations are resumed in the following table.

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Date and place	Stakeholder group	Characteristics	Key Issues discussed	Minute of Meeting
23 <sup>rd</sup> October 2023, Lamwo District Assistant's office	District Land Board of Lamwo District	Lamwo as a district was not affected earlier during the initial studies but is now likely to be affected due to the proposed diversion	<p>The District Land Board confirmed that the board have approved the compensation rates provided by the Ministry of Lands, Housing and Urban Development</p> <p>There are no refugee settlements in the sub-County of Palabek- Nyimur.</p> <p>No ongoing land dispute within the proposed project area</p> <p>Discussion of Acholi customary institutions regulating women' land rights</p>	UG_MoM_1st_1
24th October 2023, Amuru District Land Board Office	District Land Board of (Amuru District	In this district, the project is likely to affect some government land.	<p>The office has no record of any land disputes at the time of consultation.</p> <p>The district Land Board is currently referring to compensation rates that are outdated, as they relate to the financial year 2020/21.</p> <p>The land board has received many applications for Freehold land ownership.</p>	UG_MoM_1st_2

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Date and place	Stakeholder group	Characteristics	Key Issues discussed	Minute of Meeting
24th October 2023, Atiak sub-county	Atiak town council	<p>The meeting allowed to clarify issues related to the recently created Atiak sub-county and demarcation of new administrative divisions.</p> <p>It should be noted that land committees are constituted at sub-county level.</p>	<p>There was a misunderstanding because the project was expected to solve a problem related to the existing power line which cuts through people's commercial plots.</p>	UG_MoM_1st_2
27th October 2023, Nwoya District Land Board Office	District Land Board of Nwoya District	<p>The District Physical Planner and Senior Land Officer were not aware of the project at the time of consultation.</p>	<p>Existing strip maps were displayed to district officials for further clarification.</p> <p>In this district, the Land Board has issued many Certificates of Customary Ownership (CCOs).</p> <p>The district Land Board approved compensation rates for the financial year 2023/24.</p>	UG_MoM_1st_3

The environmental impact assessment necessitated stakeholder engagement, involving the Uganda Wildlife Authority (UWA), to address potential impacts of the project on wildlife and on protected areas like Keyo Central Forest Reserve and Murchison Falls National Park. The meeting was held on 23rd November 2023, at UWA headquarters in Kampala, between representatives of consultants, and UWA staff (Manager EIA and Monitoring).

Discussions focused on understanding the social and environmental implications of the project, including issues like human-wildlife conflicts and habitat protection. Recommendations from UWA highlighted the importance of mitigating cumulative impacts, addressing wildlife crimes, and implementing strategies to manage human-wildlife conflicts, emphasizing the need for collaboration and proactive measures during project implementation. Additionally, strategies were proposed to address challenges such as poaching, wildfires, and habitat degradation, emphasizing the importance of effective management plans and community-based interventions.

### **Second round of consultations of the updated study**

In January 2024, the consultant visited district and sub-county to sensitize PAPs about project characteristics and clarify pending issues related to land acquisition and compensation. During these meetings, PAPs were able to raise their concerns and obtain clarifications about their specific cases. They were also given information about the purpose of the social survey to clearly assess socio-economic profiles and adapt compensation measures accordingly.

Key issues discussed during these meetings are:

- Land Requirements and Locations
- Eligibility for compensation
- Grievance Redress Mechanisms
- compensation for contested land
- relocation of graves and cultural sites
- relations between current and previous surveys
- difference in compensation in the right of way and in the way leave
- relation between timing of land valuation and the agricultural calendar
- farmers refusing to give up their land for compensation

The mission also allowed to assess at which extent PAPs are aware of the project development.

### **Security Issues**

During the first two consultation phases, field activities were hampered by a very fragile security situation near the border with South Sudan. These difficulties relate to the new section of the power line route through Lamwo district territory. Due to this situation, visits to some locations were not possible. It should be noted that the local population is directly affected by this insecurity situation, which makes it difficult to organize public meetings to present the project and the different activities about assets valuation of and the compensation process.

In the next stages of the project, it will therefore be essential to ensure the direct involvement of other institutional actors, starting with the Minister of the Interior. The objective will be the creation of a

coordination unit or ad hoc committee including, UETCL, SSEC and Lenders focusing on security issues, to be activated in cooperation with other interested ministers or departments, to follow the process of activities on the ground and ensure the presence of security personnel.

One of the priorities of this unit will be to facilitate the coordination of efforts to secure census and field construction operations in the cross-border areas, to ensure that adequate funds are made available for this purpose, and to ensure that the communities living in these regions on both sides of the border are informed of the ongoing activities and involved in the project activities through awareness-raising campaigns and other initiatives as deemed appropriate.

This process will have to be extended to organize consultations with all the institutions involved. This relates to the possibility of financing development initiatives as a form of collective compensation at community level, as discussed during the workshops and coordination meeting with the client. A feasibility study will be needed to select the development interventions, and to identify the localities and communities that will benefit from these projects. This study will need to consider several factors such as the geographical distribution of funded projects and the forms of involvement of local communities to identify priority interventions. Other criteria will have to be considered to assess the social and economic impact of the interventions, their environmental sustainability and long-term impact.



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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
Amuru	Pabbo	Palwong	31/01/24	PAPs	27M, 17F	A key issue discussed during this meeting is the relation between current consultations and previous surveys. This concerns in particular PAPs who in 2020 received “plot numbers” written on small pieces of paper and wonder what is the actual importance of this informal document for land compensation.	UG_MoM_2nd_3
	Kilak North sub-county	Pabbo town council, Central ward parish	30/01/24	PAPs	65M, 16F	Other cases were discussed such update of PAP register for land bought after 2020 survey, compensation for land disputed between family members, change in land valuation after the 2020 survey.	UG_MoM_2nd_2
	Lamogi sub county	Pakiri parish	30/01/24	PAPs	37M, 5F	Explication on the project through maps, practical examples of land requirements, impacts and compensation measures, grievance redress mechanisms.	UG_MoM_2nd_1
	Lamogi sub county	Apotokitoo parish	30/01/24	PAPs	24M, 2F	Several cases of compensation were discussed such as deceased landowner, compensation rates used for parcels that were initially surveyed in 2019, or errors in transcribing names in PAPs register.	

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
	Lamogi sub county	Odur parish	31/01/24	PAPs	19M, 2F	<p>Other questions concerning the relation between previous and current surveys were raised, such as the case of a farmer who cut trees after the 2020 survey informed him that he will have to vacate his land.</p> <p>Farmers also asked when the land value will come, because the planting season was approaching at the time of the survey, and they don't know if agricultural activities (including the decision to rent land to other farmers) will affect land value.</p> <p>Choice of in-kind compensation was also discussed.</p>	UG_MoM_2nd_4
	Lamogi sub county		30/01/24	Community development officer	1	The Consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.	UG_MoM_2nd_5

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
	Lamogi sub county		30/01/24	Chief Administrative Officer	1	The communications consultant gave an overview of the project.	
	Lamogi sub county		30/01/24	Local Council Chairperson	1	The communications consultant gave an overview of the project.	
	Lamogi sub county		31/01/24	Resident district commissioner	1	The communications consultant gave an overview of the project.	
	Guruguru sub-county		31/01/24	Community development officer	1	The communications consultant gave an overview of the project.	
	Atiak sub-county		31/01/24	Local Council Chairperson	1	The Chairperson informed the team that the affected villages have since the 2020 survey been split into two; Pacilo West Village and Pupwonya South Village.	
	Atiak sub-county		1/02/24	Town clerk and CDO	1	The Town Clerk informed the project team that the villages previously listed as Kal-East and Kal-West have since been split and renamed to Pabuga Ward, Amoyo-Kol Ward, and Pagimoro Ward. He also offered support to mobilize PAPs to attend the sensitization meetings and other future project activities.	

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
	Atiak sub-county		1/02/24	local leaders	11	During the sensitization meeting the PAPs raised their concerns about project's activities and were given clarifications on their specific cases, such as a PAP who lost his national ID and was advised to replace it ahead of compensation.	UG_MoM_2nd_6
	Atiak sub-county	Pupwonya parish	2/02/24	local leaders	9	Several issues were discussed during this meeting, such as the obligation for PAPs to vacate land within a period of 6 months since the payment of compensation. The consultant provided additional information concerning this point and compensation measures.	
	Pacilo West village		31/11/24	local leaders	11	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. Among several issues raised during the discussion, one PAP referred to the use of an independent valuer for his property besides the government valuer.	
	Opara sub-county		2/02/24	local leaders	20	During this report, local leaders raised the issue of power supply for the communities living alongside the line. The consultant explained that smaller power	

District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
						lines can only be constructed where substations are available.	
<b>Nwoya district</b>	Alero sub county	Okura parish	10/02/24	PAPs	10M, 4F	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. Several key issues were discussed during this meeting, such as PAPs not willing to sell their land, treatment for pieces of land owned by different persons that were combined and captured as one during the first survey, and compensation measures for affected property which is communally owned.	UG_MoM_2nd_7
	Alero sub county	Panyabono parish	10/02/24	PAPs	10M, 2F		
	Alero sub county	Bwobo nam parish	10/02/24	PAPs	24M, 5F		
	Alero sub county	Kale parish	10/02/24	PAPs	17M, 7F		
	Paminya sub county	Langol parish	10/02/24	PAPs	6M, 2F	Issues discussed during this meeting are: possibility to use land after pegging, compensation for crops died out after the previous survey.	
	Paminya sub county	Lalar parish	10/02/24	PAPs	5M, 1F		
	Anaka town council sub county	Ceke Ward parish	9/02/24	PAPs	53M, 22F	PAPs were given details concerning the treatment for vulnerable persons and updating of compensation rates. Reference was made to the payment of compensation payment for the Nwoya-Gulu 132Kv power line, since this line was	
	Anaka town council sub county	Labyei ward parish	9/02/24	PAPs	34M, 12F		

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
						constructed before PAPs were paid. PAPs were informed that construction of the new power line will only begin after PAPs have been paid.	
	Lungulu sub-county	Lolango parish	9/02/24	PAPs	36M, 5F	Among the attendants, PAPs demolished their houses in the old corridor and reconstructed new houses outside but find their new houses falling in the new diverted corridor. They were informed that their case will be take in due consideration by UETCL for further investigation of the cases. Farmers also asked for clarifications concerning the Certificates of Customary Ownership (CCO) for their land, and the relevance of this document for compensation purposes.	
	Purongo sub-county	Paromo parish	8-9/02/24	PAPs	---	Issues discussed during this meeting are: explanation of the concrete marks used as control points by the survey team, questions raised by PAPs concerning the line diversions, delays in payment of compensation.	

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District	Sub-county	Parish	Date	Stakeholder group	Attendance (PAPs are disaggregated by gender)	Key issues discussed	Minute of Meeting (annexes)
	District HQ		5/02/24	Chief administrative officer	1	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.	UG_MoM_2nd_5
			6/02/24	Resident district commissioner	1		
			1/02/24	Community development officer	1		
			5/02/24	Local council chairperson	1	The LC informed the team about the ongoing challenges in the district where land is a contentious issue.	

**Stakeholder identification and analysis**

**A. Directly affected parties**

The parties directly affected by the project are the villages located near the construction sites as per In these categories the key stakeholder in each village is: Head of Village; Informal/customary leader; Women Group, Children, Landowners, Sharecroppers etc. The administrative units affected by the preferred line route option are listed in the table below.

*Table 15-1 - Administrative units affected by the Project*

District	County	Sub-County	Parish
AMURU	KILAK	ATI AAK	BIBIA
			KAL
			PACILO
			PALUKERE
			PAWEL
		PUPWONYA	
		LAMO GI	COKE
			OBOO
			PALEMA
		PABBO	KAL
PALWONG			
PARUBANGA			
LAMWO	LAMWO	PALABEK OGILI	PADWAT
NWOYA	NWOYA	ALERO	BWOBONAM
			KAL
			PAIBWOR
			PANGU
			PANYABONO
		ANAKA TOWN COUNCIL	CEKE WARD
			LABYEI WARD
		PURONGO	PAROMO
			PATIRA
			PAWATOMERO

**B. Indirectly affected parties**

Other villages located outside the project area could be indirectly impacted by the heavy traffic and induced activities. To be identified in later stages, at the moment no parties are indirectly impacted

**C. Other interested parties**



## Government Bodies

The administrative authorities and technical offices will be part of consultation and disclosure activities due to their role in the decision making and monitoring purposes. The list below shows the main public institutions that will be involved in the engagement plan.

- Ministry of Lands, Housing and Urban Development (MLHUD)
- Ministry of Water and Environment (MWE)
- Ministry of Tourism, Wildlife and Antiquities
- National Environment Management Authority (NEMA)
- National Forestry Authority (NFA)
- Uganda Wildlife Authority (UWA)
- The District Local Government Authorities
- The District Land Boards
- The District Environmental Officer and Community Development Officer
- Ministry of Gender, Labour and Social Development (MGLSD), Department of Occupational Health and Safety

## Project Proponent

The project proponent is responsible for planning and development stage. This institution has responsibility to establish Transmission Line Development Plan. The proponent shall guide the implementation of the Environmental and Social Management measures during construction and operation phase at corporate level through a dedicated Chief Executive Officer responsible of the Project.

## Project Implementation Consultant

The Project Consultant is represented by an association of international engineering firms with the scope to assist and support the proponent in all relevant fields for the design of the Transmission Line including ESIA and RAP Studies.

## Contractors

The Project Contractors will be selected through competitive bidding. They will be responsible to apply all the environmental mitigation measures that will be described in the ESIA and any additional land acquisition according to the RAP.

## Disadvantaged/Vulnerable Groups

**Vulnerable people** are distinct groups of people who might suffer more or face the risk of being further marginalized due to the project and specifically include: i) households that are headed by women, ii) household heads with disabilities, iii) households falling under the regional poverty line, and iv) elderly household heads. These specific groups will be reached during the consultation phase through the selection of representatives who can take the role of spokesperson and facilitators. For vulnerable groups to participate in project activities, they need to be invited to consultation activities with appropriate assistance according to the actual needs.

**Summary of project stakeholder needs**

Stakeholder group	Key Issues	Language needs	Preferred notification means (e-mail, phone, radio, letter)	Specific needs (accessibility, large print, child care, daytime meetings)
Villages	Directly affected people impacted by land taking. Possible problem related to land acquisitions and disturbance during the construction	Official language and Local Language	Written information, radio	Timing for meeting in conformity with PAPs working schedule
Women Groups	Gender Based Violence during construction, needs of jobs during the project.	Official language and Local Language	Visit with translator and gender expert	Child care for meetings— late afternoon preferred timing
Vulnerable groups	Presence of child households’ heads and child labour	Official language and Local Language	Visit with translator and gender expert	Assistance for disable people
Institutional stakeholders: District and Villages Authorities	Key role in the disclosure of information, security management and mediation with project affected people	Official language	Letter	Introduction letter
Contractors and Sub Contractors	Specific disclosure of project social and environmental risk and management measures	English	Formal letter and meetings with UETCL ESMD experts	Periodic meeting with experts

**Stakeholder Engagement Program**

Proposed strategy for information disclosure/timelines

ESIA Disclosure Process	Method	Stakeholder	F	PC/M	Implementing Agency
Disclosure of Draft ESIA	Presentation	Affected Districts and Counties Chiefs of Affected Parishes and Villages	March 2024	na	UETCL
Disclosure of Draft ESIA	Presentation	Ministry of Energy and Mineral Development National Environmental Management Authority (NEMA)	March 2024	na	UETCL
Disclosure of Draft ESIA and ESMP	Non-technical Summary	Chiefs of Affected Parishes and Villages	March 2024	na	UETCL
Disclosure of Approved ESIA	Report	Available to the public on web site	-	2025	UETCL

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ESIA Disclosure Process	Method	Stakeholder	F	PC/M	Implementing Agency
Disclosure of Approved ESIA and ESMP	Non-technical Summary	Chiefs of Affected Parishes and Villages	-	2025	UETCL

*F=Feasibility DS=Detailed Design PC/M=Pre-Construction/Mobilization*

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RAP Disclosure Process	Method	Stakeholder	F	DS	PC/M	Implementing Agency
PROJECT STUDIES ANNOUCEMENT CENSUS /CUT OFF DATES	Information through sub district and villages to affected peoples	Directly interested Parties	February 2023			UETCL
Disclosure of RAP	PIB (Public Information Booklet, bulletin on board in every sub districts/village) Collection of written comments via booklet and presentation of answer to AP representatives selected by the communities	Directly interested Parties		2024 (After approval of CGV)		UETCL
Payment Notification	Letter and Meeting	Directly interested Parties			2025	UETCL
Displacement Notification	Letter and Meeting	Directly interested Parties			2025	UETCL

*F=Feasibility DS=Detailed Design PC/M=Pre-Construction/Mobilization*

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RAP Disclosure Process	Method	Stakeholder	F	DS	PC/M	Implementing Agency
PROJECT STUDIES ANNOUCEMENT CENSUS /CUT OFF DATES	Information through sub district and villages to affected peoples	Directly interested Parties	February 2023			UETCL
Disclosure of RAP	PIB (Public Information Booklet, bulletin on board in every sub districts/village) Collection of written comments via booklet and presentation of answer to AP representatives selected by the communities	Directly interested Parties		2024 (After approval of CGV)		UETCL
Payment Notification	Letter and Meeting	Directly interested Parties			2025	UETCL
Displacement Notification	Letter and Meeting	Directly interested Parties			2025	UETCL

*F=Feasibility DS=Detailed Design PC/M=Pre-Construction/Mobilization*

**Proposed strategy for consultation during construction**

Consultations	Method	Stakeholder	Construction Phase	Implementing Agency
Set up of Security Committee	Meetings	UETCL, SSEC, Lenders, South Sudan and Uganda Ministry of interior	Pre construction phase	UETCL and SSEC
Project kick off, schedule and impacts	Meetings	Authorities, PAPs, and Communities	2026	UETCL
Labor influx and Community Health and Safety (induction training)	Community meetings And radio announcement	PAPs and Communities	Before mobilization	Each Contractor and Sub Contractor
Periodic meeting on ESHS (SUBPLANS as per ESMP)	Community/ schools meetings And radio announcement	PAPs and Communities	Every month after mobilization and when necessary, as described in the Contractors Sub Plans	Each Contractor and Sub Contractor
Periodic FGDs of GRM	KII and FGDs	COMMUNITIES, PAPs, WORKERS, GRM Committee	Every month	UETCL

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Consultations	Method	Stakeholder	Construction Phase	Implementing Agency
Effectiveness of compensation measures and livelihood restoration	KII and FGDs	COMMUNITIES, PAPs, WORKERS	Every month the first year of construction and every 4 months from second	UETCL



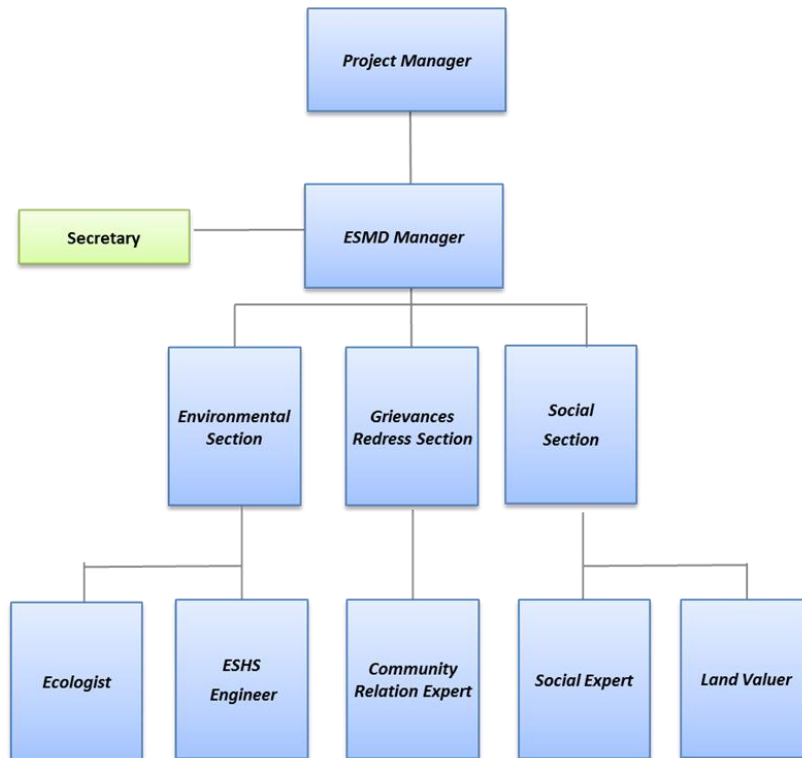
## Resources and Responsibilities for implementing stakeholder engagement activities

An Environmental and Social Management Division (ESMD) within the project structure will actively liaison with the concerned stakeholders and Government of Uganda (GoU) agencies to assure a smooth implementation of the plans. Different parties to be involved directly and indirectly for environmental management of the proposed project components include among others:

Donor Agencies;

- Project Management Unit of UETCL;
- Supervising Engineers for UETCL implementation;
- Construction Contractor; and
- Regional and Local level political and governmental institutions, Community-based Organizations (CBOs), etc.
- Directly Affected Parties

The ESMD will have three sections namely Environmental Section, Grievance Section and Social Section. Environmental Section will be responsible for implementing physical and biological mitigation and enhancement programs and relevant monitoring activities, as well as compliance monitoring of programs implemented by the contractors as per contractual agreement. Social Section will work on land acquisition and compensation, resettlement and rehabilitation, community development, livelihood programs, health related programs, etc. and relevant monitoring of social programs implemented by the project and compliance monitoring of programs implemented by the contractors as per contractual agreement. ESM social section is in charge to develop this SEP and use it as living document throughout all the project construction and operation phase.



At the same time the contractor shall provide its own Stakeholder Engagement Sub-Plan, which shall be developed in compliance with ESMP standards and with all the other Contractors Sub Plans, listed here below.

- SP01: Erosion and Sediment Control Management Plan
- SP02: Water and Soil Pollution Control Management Plan
- SP03: Air pollution and Dust Management Plan
- SP04: Noise and Vibration Management Plan
- SP05: Waste Management Plan
- SP06: Hazardous Material Management Plan
- SP07: Vegetation Clearing Management Plan
- SP08: Biodiversity Management Plan
- SP09: Traffic Management Plan
- SP10: Cultural Heritage Management Plan
- SP11: Occupational Health and Safety Management Plan
- SP12: Community Health and Safety Management Plan
- *SP13: Stakeholders Engagement Management Plan*
- SP14: Local Employment Management Plan
- SP15: Contractor Management Plan
- SP16: Labor Influx Management Plan
- SP17: Security Management Plan
- SP18: GBV/SEA/CAE

The guidelines for Sub Plan Stakeholders Engagement Management Plan are reported in the following box and extracted from the ESMP

INFORMATION REQUIRED	DETAILS
Developer	Both UETCL and Contractor respectively
Project Phase	Pre-Construction – Construction – Operation
Place	Entire Project Area
Social aspect	Management of Project Stakeholders Relation
Description of Impact	Social Unrest, Friction with Local Authorities, Delay in Authorization Processes
Affected Activities	All construction works activities
Consequence	Stop or slowdown of construction works
Management and Measure	<p>Describe regulatory, lender, company, and/or other requirements for consultation and disclosure</p> <p>Develop a Stakeholders Map and a Stakeholder Engagement Matrix including at least</p> <ul style="list-style-type: none"> <li>▪ Villages Heads</li> <li>▪ Traditional Leaders</li> <li>▪ District Authorities</li> <li>▪ Road Authorities</li> <li>▪ Health authorities</li> <li>▪ Forest authorities</li> <li>▪ Contractors</li> <li>▪ UETCL</li> <li>▪ Women Representatives</li> <li>▪ Youth representatives</li> <li>▪ Directly affected Households</li> <li>▪ Vulnerable Groups</li> </ul> <p>Identification of key stakeholders potentially involved in the management of project GBV, their capacity and potential roles and responsibilities</p> <p>Define a communication plan with periodic meeting with stakeholders to integrate the Stakeholder Engagement with the Project Cycle detailing which information will be disclosed and the periodicity of the external reports.</p> <p>Define communication tools and languages, including local dialects, where necessary</p> <p>Describe resources and responsibilities for implementing stakeholder engagement activities detailing the number and qualification of staff necessary</p> <p>Describe how stakeholder engagement activities will be incorporated into a company’s management system</p> <p>Create Project Information Centre for affected communities</p>

	Include Project Grievances Redress Mechanism, specifying the methods to disseminate it and the responsibilities for managing it. Define a Budget
Monitoring	Compliance Monitoring through records of public meetings, FGD, meeting with authorities, meeting with workers and community, dissemination of information. Participatory monitoring through the involvement of affected stakeholders in scientific sampling methods and analysis observations by affected parties, triangulated to strengthen validation group discussions on the success of mitigation or benefit measures and/or on how to manage new issues that have arisen
Period of Implementation	All the project Phases
Frequency	Not less than one in a Month
Training	Capacity-building and training programs to enable project-affected people or local organizations to acquire the technical skills necessary to participate in effective implementation programs and monitoring
Facilities, Equipment, Material and Supply	Dissemination tools
Compliance	Project Disclosure Policy, National Standards and IFC Stakeholder Engagement Good Practice Note

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Social component	Target Population	Mitigation Enhancement	Responsibility		Monitoring Frequency	Costs	Phase: Constr. (C) Oper. (O)
			Mitigation	Monitoring			
Stakeholder Engagement	Affected authorities from Village to Parish and County level	Develop a Stakeholder Engagement Plan which shall include at least: Chiefs of Affected Parishes and Villages Road Authorities Health authorities Forest authorities Tourist authorities Contractors UETCL Women Representatives Youth representatives Create Project Information Centre for communities	UETCL	ESMD and Contractor	Quarterly basis	45,000	P, C
			Contractor	ESMD and Contractor	Quarterly basis	45,000	P, C

## Grievance Mechanism

This subsection describes the GRM that UETCL will put in place for all the activities under the Employer's responsibility.

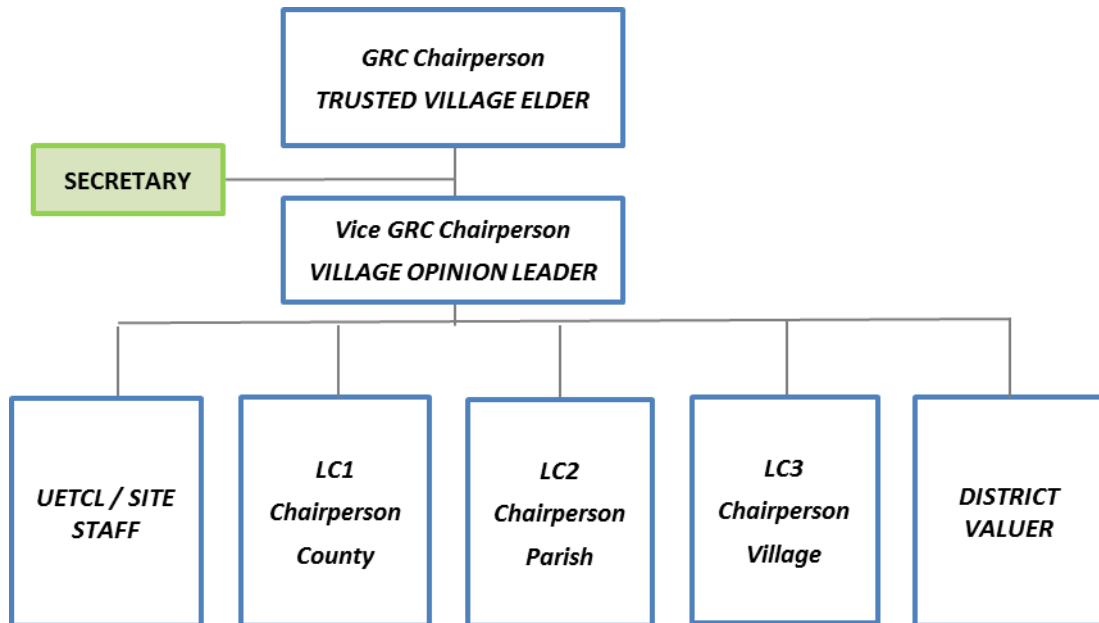
At the same time the Contractors will have their own GRM in place for what concerns Contractor's human resources and any damage caused to the surrounding communities and properties throughout all Project phases, as defined in the Bidding Documents. The Contractors GRM shall address GBV and Sexual Harassment, Exploitation and Abuse using a differentiated channel.

## Grievances Redress Committees

Membership of the GRCs will be voluntary and it will be functional throughout the project life. The size of the GRC will depend on the number of villages within the cluster. It will comprise:

- The GRC Chairperson, who will be a trusted village elder, (for example a religious representative) and not any of the LC chairpersons. This is to avoid conflicts about jurisdiction, political inclination and also to ensure public trust of the committee in case some community members do not trust their chairpersons;
- GRC Vice Chairperson who may be an opinion leader or a respected member of the community;
- Secretary (responsible for recording grievances in the log book and taking minutes during GRC sittings);
- The LC3 chairperson for the sub county with jurisdiction over the villages in the cluster;
- The LC2 chairperson for the Parish with the jurisdiction over the villages in the cluster
- The LC1 chairpersons of each of the affected villages in the cluster or their representatives will be ordinary members.
- District Valuer

The Committees shall have funds to regularly meet and operate on the field during all the RAP process and project implementation.



The complaints related to any aspect of the land acquisition process will be handled through fair negotiations in order to reach an acceptable resolution. All complaints will be documented and kept with UETCL. The project authority will ensure that funds are delivered on time to the implementing partners for timely payment of compensation and preparation and implementation of social activities, as applicable. The compensation issues and rehabilitation measures will be completed before beginning of major construction works. The PAPs/AHs and community will be exempted from all administrative fees incurred, pursuant to the grievance redress procedures except for cases filed in court

The grievance redress mechanism recommended to manage land acquisition related issues is described below:

- A) **Disclosure of the Mechanism to Community** – once designed and approved the mechanism shall be disclosed in a culturally appropriate manner in the local language and format that is understandable to all community groups. The disclosure will be implemented through public meetings with local authorities, and through meetings in schools and meeting with women groups, involving Customary Institutions in the process as participants.
- B) **Receive and Recording** – Grievances will be received by the Committee. The grievances can be filed through grievances offices directly or by phone. A dedicated channel for GBV grievances will be set through the appointment of one grievances officer with experience in gender. They shall be captured in a logbook, classified, and reported to the Committee. The complainant shall receive an acknowledgment of receipt of the grievance within a prescribed and reasonable timeframe, preferably in writing. Keeping a record of those who lodged grievances helps to know who and where the vulnerable and most affected persons by project activities are. Therefore, data such as gender, age and location is also recorded, which assists in understanding the grievances better. Most importantly, the project shall recognize that those who register grievances must be protected and, therefore, handles grievances with the highest level of confidentiality; complainants are free to remain anonymous and should feel free to give as little personal information as they wish. While there is no formal minimum requirement for submitting a grievance, to enable effective review and

management, the project prefers that any stakeholder who submits a complaint to include the following information:

- Name(s) of the complainant(s);
- Information on whether the identity of the complainant should be kept confidential or can be disclosed to relevant individuals/structures during the investigation process;
- Contact details (geographical location, telephone number, e-mail ...);

Even without individual or personal detail, the Project will follow up and solve each grievance.

C) **Categorize grievances** – Having received and registered a complaint, the next step is to establish the eligibility of the complaint. The following criteria should be used to assess and verify eligibility:

- The issue falls within the scope of the GRM
- The complainant is anonymous or identifiable with a name and contact details provided
- The complainant is affected the project
- The grievance is clear
- The complaint has a direct relationship to the project or activity; and
- All the mandatory preliminary information is available.

The purpose of this step is to ensure that the issue being raised is relevant to the project. If the grievance is not eligible, the complainant will immediately be given the reasons. On the other hand, a decision on eligibility is only meant to trigger an initial assessment and response. It is not an admission that the organization has caused an impact, or a commitment to provide the complainant with any specific form of redress. The assessment at this step will also enhance decision-making as to whether the complaint should be directed to a different entity.

As a result of the assessment, the grievance will be assigned to one of the four categories

- CATEGORY 0: Complaints that are not related to the project;
- CATEGORY 1: Queries, comments, and suggestions;
- CATEGORY 2: Complaints and concerns, which are not criminal in nature or do not require the involvement of police. Concerns and complaints about land acquisition or livelihood restoration, environmental damages, nuisance impacts such as noise or dust, waste management, risks to public safety.
- CATEGORY 3: Complaints and concerns that involve allegations that require investigation or intervention by the police or other law enforcement authorities. Any grievance which involves loss of life, child abuse, rape, defilement, child sacrifice, sexual harassment or any violence against children.

If the grievances fall under categories 1, 2 or 3 they can be further classified:

**SURVEY GRIEVANCES:** Grievances may arise at the design stage, such as where some communities feel they were not offered enough information about the objectives of the exercise. In such situations, the UETCL and GRC shall be notified to prepare an appropriate response.

**SOCIAL GRIEVANCES** - social-related grievances may arise at any stage of the project management cycle as a result of inadequate consultation, sensitization, and or disruption of social setups by migrant workers. There are also situations when social grievances arise out of unrealistic



expectations. When these kinds of impacts arise, the project related experts shall be notified to assess the grievance and take appropriate remedial measures.

**RESETTLEMENT GRIEVANCES:** Resettlement, Land Acquisition, and Compensation Related Grievances. The grievances are mainly caused by inadequate consultation and sensitization; delayed release of compensation packages or delayed return of land titles to Project Affected Persons. The process involves a lot of interaction with people during the implementation of (a) RAP implementation, the (b) land and asset inventories, (c) land valuations and verifications, (d) disbursement and during a final land take.

**D) Review and Investigate** – In this phase, the grievances will be classified into basic categories.

In general, Category 0 grievances will involve verification that the stakeholder is satisfied with the response. If the grievance involves another project or an institutional issue, the complainant should be referred there accordingly. Category 1 grievances will involve confirming receipt of the positive feedback and informing the relevant technical staff within UETCL. Regarding category 2 grievances, verification, investigation, negotiation, mediation or arbitration, coordination with appropriate authorities, making decisions, proposing resolutions, as well as the implementation of agreed actions, will involve a thorough assessment and getting back to the complainant for more information in case it is required. A grievance which falls in category 3 shall be logged and escalated to police without any delay. If grievances include more than one issue, the Grievance Officer will make sure that all issues are reviewed and addressed at the same time to avoid any delays.

To ensure the investigation is fair, trackable and thorough each step and agreed action shall be documented with related evidence

**E) Develop Resolution and Respond** – A range of proposed resolutions will be recommended based on the investigation result. The proposed resolution shall be agreed and accepted by both parties (the Project and also the complainant). The project will follow the steps of the grievance's resolution. Hence, following the above principle the Grievance Redress Mechanism (GRM) will be established to allow project affected persons/households (PAPs/AHs) to appeal any disagreeable decisions, practices and activities arising from compensation for land and assets. The PAPs/AHs will be made fully aware of their rights and the procedures. The PAPs/AHs will have access to both locally constructed grievances redress committees specified and formal courts of appeal system. Under the latter system every PAP/AH can appeal to the court if they feel that they are not compensated appropriately.

The process of developing resolution and response can be articulated in three steps

**Step 1:** Complaints of APs/AHs and community on any aspect of compensation, relocation, or unaddressed losses of private and community property shall in first instance be settled verbally or in written form in the field-based project office. The complaint can be discussed in a meeting between the PAPs/AHs, the Village Leader, the grievance redress committee (GRC). The GRC will be the main responsible to be in close contact with all affected people and public and hear, record, and formally file their complaints in the registers on a regular basis. The Team will resolve the issues at the field level in close coordination with APs within 15 days and two meetings of the received of the grievances. If the complaint remained unresolved at field level the GRC will forward the complaint to the second level of GRM.

**Step 2:** if the grievances are not solved at the local level within 15 days, the GRC will take over the case lodging the grievances to the UETCL Division at Headquarters in Kampala, the APs PAP/HHs and community may produce documents to support their grievances. UETCL will made field

observation and discuss the issues with concerned Authorities and APs/HHs. Those issues thus brought to UETCL will be resolved within 30days and two meetings from the date of the complaint received.

**Step 3:** If the PAPs/HHs and local community are not satisfied with the decision or in absence of any response of its representatives, within 30 days of the complaint, the PAPs/AHs and community may submit its case to the district court. The decision of the court will be acceptable to both Parties.

**There are 3 stages of GRM mentioned here, nevertheless the APs/AHs will have full rights to approach to the appropriate Courts of law with their grievances at any stages of the process.**

- F) **Close Out and Reporting** - If the solution is not accepted by the complainant, the Project will conduct further consultation with the complainant to obtain more detailed clarification on the issues with the aim of agreeing upon a mutual solution. Should the complainants agree and accept the provided resolution, the Project will record the agreement in a Grievance Resolution Minutes Form and update the Grievance Log. All documentation will be stored in one central place for easy management. The fulfilment of agreements, satisfaction of complainants, and number of complaints received shall be monitored over the land acquisition process as this data will be required as part of the external monitoring for the lenders

## Stakeholder engagement report for consultations made with Uganda Wildlife Authority (UWA) over the development of Olwiyo-Nimule Transmission Line



### Overview

The proposed transmission line extends from Olwiyo Substation, on the Karuma-Pakwach road in Nwoya District, and entails the construction of approximately 134km of 400kV line to the proposed Nimule 400/132/33kV substation located at Elegu near the South Sudan border. It is expected the proposed project will be used for rural electrification using the 33kV distribution line at Olwiyo as well as at the proposed Elegu substation, near Nimule, to supply the districts of Nwoya, Amuru, and Lamwo.

The project Components are:

- The Proposed 400kV 134km Olwiyo-Elegu (Nimule) Transmission line with OPGW
- Upgrade of Olwiyo 132/33kV Olwiyo Substation to 400/132/33kV
- New greenfield 400/132/33kV Substation at Elegu (Nimule)
- Construction of 33kV distribution lines to facilitate rural electrification

In accordance with the Terms of Reference, a minimum of three feasible line route alternatives were required to be considered for the proposed 400kV transmission line. The two feasible line route alternatives, in addition to the one submitted by UETCL, were identified by means of a desktop study using ArcGIS. Site visits were done to study and compare the routes, though a detailed analysis of alternatives to determine the preferred route for the proposed transmission line. Finally, the current route (Green line) under consideration for a detailed study was evaluated as the best with the least environmental and social impacts. It was also evaluated on the technical considerations and came out as the most appropriate.

### **Need for stakeholder engagement.**

A walkover survey was conducted in October 2023 and detailed surveys in January 2024, to assess valued environmental components (VECs) to be impacted by the project. It was established that the considered route option crosses Keyo Central Forest Reserve under NFA management in Amuru district – this reserve will be directly impacted by the project, while the Olwiyo substation is located about 18.5km from Murchison Falls National Park, an important Bird and Biodiversity area (IBA) under the management of UWA. The national park will be indirectly impacted by project especially during the construction phase.

To this end, stakeholder consultations were undertaken with both authorities to ensure harmonious development and co-existence of the project with these protected areas. This report, therefore, documents views and comments/needs from UWA and NFA with respect to transmission line development.

### **Purpose of stakeholder engagements**

NFA and UWA were engaged as a suitable avenue to provide relevant and adequate information and to obtain stakeholders perceived/real positive and negative social and environmental impacts of the project in their protected areas, but also understand issues of management of human-wildlife conflicts, need for identification of avoidance features, migration corridors, protected species and reserved tree species of national and international importance, protected area land management among other.

### **Minutes of engagements**

1. Uganda Wildlife Authority (UWA).

The meeting was held on 23<sup>rd</sup> November 2023, at UWA headquarters in Kampala, between representatives of Colenco Consulting limited, and UWA staff (Manager EIA and Monitoring)

### **Agenda**

1. Prayer
2. Introduction
3. UWA communication
4. Consultant Presentation
5. Reaction and comment
6. Conclusion
7. Record of engagement

Prayer was undertaken and introductions were made.

### **List of participants**

1. Justine NAMARA – Manager-EIA and Monitoring, UWA
2. Andrew NKAMBO – Botanist, Colenco Consulting LTD
3. Vicent BIRUNGI – Biodiversity Specialist, Colenco Consulting LTD
4. Jimmy Baluku- EIA/OM- UWA

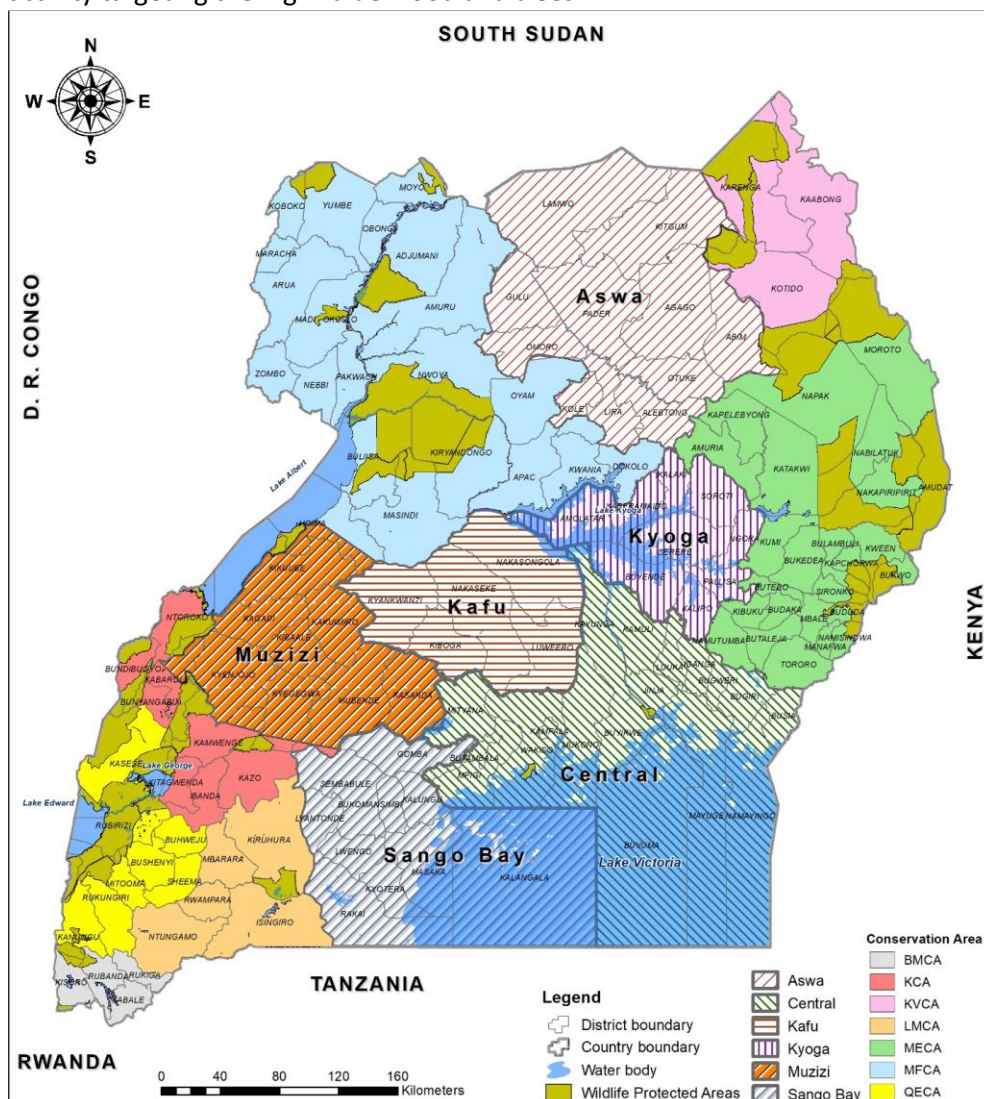
Presentation and slides

### **Key issues raised, and recommendations made by UWA**

1. Since the transmission line doesn't cross or touch the boundaries of the national park, no other wildlife conservation area within the project area of influence, under UWA, is recognized to be

impacted, though the developer shall ensure that cumulative and indirect impacts of the project are mitigated.

- The project area is located within the Murchison Falls Conservation Area (MFCA) and Aswa range. Aswa zone cover parts of North and North-Eastern Uganda including Agago, Pader, Kitgum, Gulu, Kotido, Kaabong and Lamwo, Abim and Otuke Districts. This zone is managed from Pader Wildlife Station. The zone comprises of extensive areas of woodland which are habitats for key wildlife species such as buffaloes, elephants. In the North-East, large areas of the zone are used for cattle grazing and recently agriculture is being promoted which is likely to affect wildlife and cause an increase in Human-Wildlife Conflicts related to crop destruction. In addition to the perennial fire threats, charcoal production has been introduced as an economic activity targeting the high value woodland trees.



**Figure 1: Wildlife Management Zones outside UWA Protected Areas**

- Previous projects of the same nature (transmission line and roads) or linear projects have been identified to propel wildlife crimes such as poaching, proper sensitization and awareness training of workers during construction phase is key.

4. Review the National Plan for Managing Wildlife Outside UWA Protected Areas 2021/2022 - 2030/2031. The Plan is to guide stakeholders in taking well informed decisions for the sustainable management of wildlife outside UWA protected areas. The plan prioritizes the activities and resources necessary for management of wildlife in critical ecosystems. It also defines mechanisms for how stakeholders can engage and benefit from the management of wildlife outside UWA protected areas specifically through active participation in implementation of collaborative initiatives.
5. During project implementation, Identify and document problem animal hotspots, Support community-based interventions that address Human-Wildlife Conflicts, Implement the Human-Wildlife Conflict management strategy, Support Local Governments to develop and enforce land use plans around conservation areas.
6. Seek UWA support in form of rangers as and when necessary, in case of wildlife encounters and need for rescue operations, especially during construction phase.
7. Identify and map critical wildlife areas especially breeding sites for eventual protection during the construction phase.
8. Report any cases of Human wildlife conflict and poaching to the Authority or nearby authorities like police.
9. Uncontrolled bush fires contribute to habitat degradation and adversely affect wildlife survival. The most affected habitats include rangelands, woodlands, and wetlands. During the construction and operational phases, conduct awareness campaigns on wildfires, Support the development and implementation of management plans for areas that are prone to fires and which hold substantial wildlife numbers
10. Beware of animal distribution of these corridors and need to be protected if not avoided to manage human wildlife conflicts (HWC), as seen below.

SAMPLE SPECIES	DISTRIBUTION	POPULATION	THREAT of HWC	LEVEL
<b>MAMMALS</b>				
<b>Elephants</b>	Otzi-Dufile-East Madi corridor, Areas around QECA, KCA, MFCA, BMCA, KVCA	Moderate	High	
<b>Hippos</b>	Kalangala, areas around LMCA, Katonga, Packwach, Lake Victoria shores	High	High	
<b>Buffaloes</b>	Karenga, East Madi, Nwoya, LMCA, Kakuuto-Sango Bay corridor	Moderate	High	
<b>PRIMATES</b>				

SAMPLE SPECIES	DISTRIBUTION	POPULATION	THREAT of HWC	LEVEL
<b>chimpanzees</b>	Kibale and Kikuube, Kagadi Districts, Bugoma and Budongo forests	High	High	
<b>Baboons</b>	Around PAs and Forest Reserves	High	Low	
<b>Black and White Colobus</b>	Rwenzori region, Mt Elgon, Forest Reserves	High	High	
<b>Red Tailed Monkey</b>	Every where	High	High	
<b>Red colobus Monkey</b>	Forest reserves	High	High	
<b>Vervet Monkey</b>	Every where	High	High	
<b>Blue Monkey</b>	Forest reserves	Moderate	High	
<b>Grey Cheeked Mangabeys</b>	Around PAs and forest reserves	Low	High	
<b>Patas Monkey</b>	Karamoja, Around MFCA,	Low	High	
<b>CANIVORES</b>				
<b>Cheetah</b>	Pian Upe,	Low	High	
<b>Leopards</b>	Karenga, Nakasongola, Nakaseke LMCA Ranches,	Low	High	
<b>Lions</b>	QECA, MFCA	Low	High	
<b>Hyenas</b>	Around PAs	Low	High	
<b>Serval Cats</b>	Around PAs widely distributed	Low	High	
<b>BIRDS</b>				
<b>Vultures</b>	Around Pas	Low	high	
<b>Shoebill</b>	Around Wetlands	Low	high	
<b>Crested Crane</b>	Around Wetlands	Low	high	

SAMPLE SPECIES	DISTRIBUTION	POPULATION	THREAT of HWC	LEVEL
<b>REPTILES</b>				
<b>Crocodiles</b>	Kalangala, Mayuge, Masaka, Kafu and other Lake Victoria shores, LMCA, QECA Katwe, water bodies	Moderate	high	
<b>Pythons</b>	Getting displaced in most wetland areas and lake shores, riverine forests	moderate	high	
<b>UNGULATES</b>				
<b>Kob</b>	Kafu basin- Kyankwanzi, Nakaseke, Nakasongola, Nwoya, Kilak around PAs	moderate	high	
<b>Reed buck</b>	Kafu basin- Kyankwanzi, Nakaseke, Nakasongola, Nwoya, Kilak, Karenga	Low	high	
<b>Sitatungas</b>	different wetlands and around water bodies	moderate	high	
<b>Kudus</b>	Amudat, Karenga, Karamoja region	moderate	high	

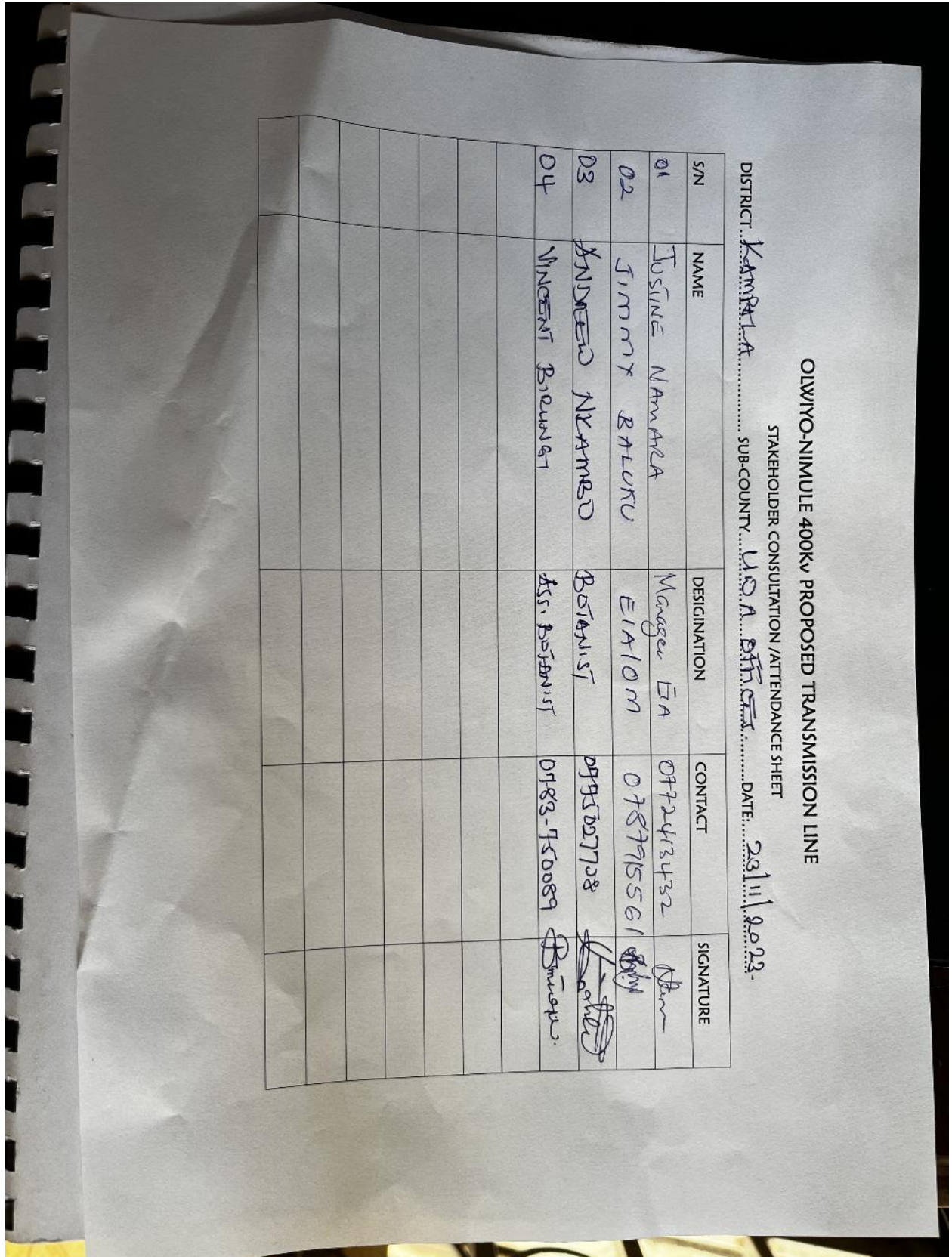
## Conclusion

The engagement ended with the fact that UWA protected areas like Murchison Falls National Park are not directly affected by the project, however, the project developer needs to proactively undertake effective implementation of the recommendations and suggested mitigation measures to largely reduce possible cumulative impacts such as human wildlife conflicts, poaching and other illegal activities within the project area. UWA recommends any form of project support in form of rangers to be requested especially in wildlife rescues among others.

## Attendance register







**OLWIYO-NIMULE 400KV PROPOSED TRANSMISSION LINE**

**STAKEHOLDER CONSULTATION /ATTENDANCE SHEET**

DISTRICT: KAMBILA..... SUB-COUNTY: W.O.A. BIFITA..... DATE: 23/11/2023

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
01	JUSINE NAMARA	Manager EA	0722413432	<i>[Signature]</i>
02	JIMMY BALUKU	EIA/OM	0787915561	<i>[Signature]</i>
03	VINCENT BREWIN	Asst. Botanist	0783-750089	<i>[Signature]</i>
04				

## UG\_MoM\_1st\_1

### OLWIYO-NIMULE PROPOSED 400Kv TRANSMISSION POWER LINE MINUTES FOR THE CONSULTATIVE MEETING HELD WITH THE OFFICIALS OF LAMWO DISTRICT.

**Venue:** Lamwo District Assistant C.A.O's office **Date:** 23<sup>rd</sup> October 2023

**Participants;**

1. John Banga-----Assistant Land Economist (Colenco)
2. Agnes Naamara-----Secretary (Colenco)
3. Kinyera George-----Assistant C.A.O/Secretary District Land Board (Lamwo District)

Category	Issues raised/Person/s responsible	Response												
<b>Introductions</b>	All													
<b>The Project in general</b>	<p>Mr. Banga introduced the consultancy team and enlightened the Assistant C.A.O about the project and inquired if he was aware of the project.</p> <p>Mr. Banga clarified that Lamwo as a district was not affected earlier during the initial studies but is now likely to be affected due to the proposed diversion and the section likely to be affected is within the Sub-County of Palabek-Nyimur.</p> <p>Mr. Banga further sought clarification if the Sub-County of Palabek- Nyimur. had any refugee settlements.</p>	<p>The ACAO/Secretary to the District Land Board confirmed having received the ESIA Team in his office but said he did not have prior knowledge about the project.</p> <p>Mr. Kinyera clarified that he is well conversant with the Sub-County of Palabek- Nyimur and that there are no any refugee settlements. He further clarified that the Sub-County with refugee settlements is that of Palabek-Ogiri and Palabek-Nyimur can only be considered as a host community.</p>												
<b>District Compensation Rates</b>	The consultant inquired whether the district had a list of the current District Compensation Rates and if yes, he requested to have a copy.	<p>The ACAO/Secretary to the District Land Board confirmed that the board have approved the compensation rates for the current Financial year following a request from the Ministry of Lands, Housing and Urban Development to all districts to update the compensation rates as stipulated by the Land Act.</p> <p>Mr. Kinyera further informed the consultant that same compensation rates had already been submitted to the ministry of lands for moderation.</p>												
<b>Land disputes</b>	<p>Mr. Banga inquired if there were any land wrangles/disputes related to land in the proposed project area.</p> <p>Mr. Banga also inquired if there were any titled land parcels in the proposed project area.</p> <p>Mr. Banga further sought clarification if women are also allowed to own land in the Acholi culture.</p>	<p>Mr. Kinyera informed the consultant of the District Land Board had not recorded any land dispute within the proposed project area.</p> <p>Mr. Kinyera informed the consultant that there were no titled parcels of land at the moment.</p> <p>The ACAO/Secretary to the District Land Board informed the consultant that land ownership is predominantly by men. In the Acholi culture land is majorly owned customarily and if the husband dies then the land ownership of the deceased is taken over by his brother who later on takes the responsibility of distributing the land to the deceased's sons.</p> <p>However, Mr. Kinyera also pointed out that women are allowed to buy their own land which they can latter on convert to Freehold tenure.</p>												
<b>Contact Persons/Telephone Contacts</b>	Mr. Banga requested the ACAO for any district officials who could further be contacted on land matters at the District.	<p>Mr. Kinyera provided the consultant the following contacts; -</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Designation</th> <th>Contact</th> </tr> </thead> <tbody> <tr> <td>J.J.Omach</td> <td>Sub-county Chief for Palabek-Nyimur</td> <td>0779-102498</td> </tr> <tr> <td>Nyeko Wilfred</td> <td>District Community Development Officer</td> <td>0762-880113 0772-317761</td> </tr> <tr> <td>Billi Moses</td> <td>Chairman LC3 Palabek-Nyimur Sub county</td> <td>0773-399400</td> </tr> </tbody> </table>	Name	Designation	Contact	J.J.Omach	Sub-county Chief for Palabek-Nyimur	0779-102498	Nyeko Wilfred	District Community Development Officer	0762-880113 0772-317761	Billi Moses	Chairman LC3 Palabek-Nyimur Sub county	0773-399400
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Billi Moses	Chairman LC3 Palabek-Nyimur Sub county	0773-399400												

## UG\_MoM\_1st\_2

### OLWIYO-NIMULE PROPOSED 400kV TRANSMISSION POWER LINE

#### MINUTES FOR THE CONSULTATIVE MEETING HELD WITH THE OFFICIALS OF AMURU DISTRICT.

Venue Amuru District Land Board Office Date 24<sup>th</sup> October 2023

**Participants; -**

1. John Banga ----- Assistant Land Economist (Colenco)
2. Agnes Naamara ----- Secretary (Colenco)
3. Oringa Phillip-----District Physical Planner (Amuru District)
4. Oketta Geoffrey-----Lands Records Assistant (Amuru District)

Category	Issues Raised/Person/s Responsible	Response																					
<b>Introductions</b>	All																						
<b>The project in general</b>	<p>Mr. John Banga introduced the project and inquired if the District Land Board officials were aware of the project.</p> <p>Mr. Banga further informed the Physical planner that the main aim for the project is to up-date the reports that were originally captured in the year 2020.</p> <p>Mr. Oringa inquired from the consultant the voltage of the proposed power line.</p> <p>In seeking further clarification from the consultant, the physical planner displayed the Amuru District Framework Plan Map for the period 2022-2032 to confirm if the proposed project is already captured.</p>	<p>The District Physical Planner informed the consultant his office had already been contacted by the ESIA team regarding the same matter.</p> <p>However, Mr. Oringa informed the consultant that he was not aware of the project having been carried out earlier in the year 2020.</p> <p>The consultant informed Mr. Oringa that the proposed transmission line is a 400Kv power line and is meant to evacuate power from Olwiyo Substation traversing Nwoya, Amuru and Lamwo districts to the southern Sudan. The consultant further said that in addition, there will be a substation which will be situated in Amuru district.</p> <p>After looking at the Map, the consultant confirmed that the project had also been captured and mapped as, "Proposed 400Kv Power Line". The consultant further clarified that there is a diversion that has been proposed so as to avoid going through Nimule Forest reserve and that when the design of proposed transmission line has been finalized, the consultant will share the same with his office for the district to update district Framework plan.</p> <p>For more guidance, Mr. Oringa provided telephone contacts for the officials to be consulted on land matters at the district as;- District Staff Surveyor, Mr. Mwaka Edmond Owor ----- 0782-161232 Chairman Amuru DLB, Mr. Johnson Oryem ----- 0772-411570</p>																					
<b>Land Disputes</b>	Mr. Banga inquired about the existence of any land wrangles/disputes along the proposed project area.	Mr. Oringa informed the consultant that his office has no record of any disputes at the moment. He further said that a look at the map indicates that the project is likely to affect some government land citing schools as an example.																					
<b>Land Ownership</b>	Mr. Banga inquired if there are any registered land parcels along the proposed project area.	The physical planner informed the consultant that the land board has to date received many applications for Freehold land ownership, some already processed and others in the process of being granted.																					
<b>District Compensation Rates</b>	Mr. Banga inquired about the existence of updated District Compensation Rates for Amuru District.	After consulting the Chairman Amuru District Land Board, Mr. Oringa informed the consultant that compensation rates I use at the moment are for the Financial Year 2020/2021. He however suggested to the consultant to borrow from the neighboring districts.																					
<b>Area Land Committees</b>	Mr. Banga consulted Mr. Oketta Geoffrey, the Lands Records Assistant about the contacts of the different Area Land Committees along the project area.	Mr. Oketta provided the contacts for the different Area Land Committee chairpersons as listed here below; -																					
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Name of Official	Designation	Question	Response from the Consultant
CONSULTATIVE MEETING AT ATIAK SUB-COUNTY			

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Alimogan Kevin	Office Attendant	She welcomed the consultant to the Sub-County Offices.	
Banga John	Assistant Land Economist	Inquired if the Sub-County Chief, Chairman L.C 3 or Community Development Officer (C.D.O) were available for consultation.	The office attendant informed the consultant that all had gone to the field
		Read out the earlier captured affected Parishes as being Pawel, Palukele, Pupwonya, Kal, Pachilo and Bibia and requested the office attendant to confirm the same.	The office attendant informed the consultant that Atiak sub- County has since been sub-divided to create Atiak Town Council.  She further clarified that Pawel and Palukele Parishes belong to Opara Sub-County while Kal Ward falls in Atiak Town Council and Bibia Ward falls in Elegu Town Council.  Ms. Kevin clarified that the affected Parishes in Atiak Sub-County are Pupwonya and Pachilo Parishes.
<b>CONSULTATIVE MEETING AT ATIAK TOWN COUNCIL HEADQUARTERS</b>			
Lalonyo Johnson	Former C.D.O at Atiak Town Council now C.D.O at Atiak Sub-County.	Welcomed the consultant to the Town Council and later led the team to the acting Town Clerk Mr. Okoya George.	
Okoya George	Ward(Town) Agent	Welcomed the team and introduced himself as the acting Town Clerk at the time since the Town Clerk was away on official duties.	
Banga John	Assistant Land Economist	Introduced the consultants team and the purpose for the visit.	
Okoya George	Ward(Town) Agent	Confirmed prior knowledge of the project and having received the ESIA team the day before.	
Banga John	Assistant Land Economist	Inquired about which areas in the Town Council are traversed by the proposed Olwiy-Nimule 400Kv Transmission Power Line.	Mr. Okoya confirmed the affected areas as being Paboga Ward, Amoyo-Kol Ward and Pagimoro Ward.
		Inquired about the existence of updated District Compensation Rates at the Town Council.	Mr. Okoya said the current compensation rates being used at the Town Council are out-dated(FY 2021-2022).
Okoya George	Ward(Town) Agent	Inquired from the consultant if it is possible to relocate the existing distribution power line along the highway which cuts through people's commercial plots thus rendering them useless.	Mr Banga clarified that they are representing UETCL on the proposed project and that it is the responsibility of UEDCL to re-locate distribution lines.  He further advised the Town Council administration to consult UEDCL offices within their area about the same.

The personnel listed below with their telephone contacts will play an important role during the RAP process

Name of Personnel	Designation	Contact
	<b>ATIAK TOWN COUNCIL</b>	
Odokonyero stephen	Town Clerk	0775-013838
Okot Kenneth	Mayor (Chairman LC3)	0774-725439
	<b>OPARA SUB COUNTY</b>	
Ajok Lillian	Senior Assistant Secretary	0782-577513
Akelo Lillian	Community Development Officer	0779-211967
	<b>PABBO SUB COUNTY</b>	
Opio Laporo Robert	Community Development Officer	0782-508817
	<b>LAMOGI SUB COUNTY</b>	
	Senior Assistant Secretary	0772685229
Acan Monica	Community Development Officer	0770-446216
	<b>ATIAK SUB COUNTY</b>	

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Akera Samuel	Chairman LC3	0783-256222
Kisembo Mathias	Senior Assistant Secretary	0772-524397
Lalonyo Johnson Awudu	Community Development Officer	0771-988854

## UG\_MoM\_1st\_3

### OLWIYO-NIMULE PROPOSED 400Kv TRANSMISSION POWER LINE

#### MINUTES FOR THE CONSULTATIVE MEETING HELD WITH THE OFFICIALS OF NWOYA DISTRICT

**Venue** Nwoya District Land Board Office **Date** 17<sup>th</sup> October 2023

**Participants; -**

1. John Banga ----- Assistant Land Economist (Colenco)
2. Agnes Naamara ----- Secretary (Colenco)
3. Ocwa Simon Peter-----Senior Land officer (Nwoya District)
4. Komakech Eric-----Physical Planner (Nwoya District)
5. Okot Boniface ----- Chairman Area Land Committee Lungulu Sub county

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Category	Issues Raised/Person/s Responsible	Response																		
<b>Introductions</b>	All																			
<b>The project in general</b>	<p>Mr. John Banga introduced the project and inquired if the District Land Board officials were aware of the project.</p> <ul style="list-style-type: none"> <li>Mr. Ocwa Simon Peter inquired from the consultant as to what phase the project had reached.</li> <li>Mr. Komakeck Eric inquired if the names of the Project Affected Persons (PAPs) and individual land holdings had already been captured.</li> <li>Mr. Ocwa inquired if the project in question was for the line which is already under construction from Olwiyo Substation to Gulu.</li> <li>Mr. Ocwa Simon Peter further inquired about the names of the people who were part of the consultant team.</li> </ul>	<p>The District Physical Planner and Senior Land Officer informed the consultant that they were not aware about the project.</p> <ul style="list-style-type: none"> <li>Mr. Banga explained that the initial surveys, valuation data capture, social economic surveys had already been done, reports produced in the year 2020 by a different consultant. Mr. Banga further explained that the current consultant (<b>Colenco</b>) has been contracted to update the existing reports, that is RAP and ESIA.</li> <li>Mr. Banga clarified that the Olwiyo-Gulu transmission line which is under construction with Pylons already erected is different and it is a 132kV power line. He further clarified that the Olwiyo-Nimule 400kV proposed transmission line is meant to transmit power up to Southern Sudan with a proposed Substation at Nimule.</li> <li>The consultant further displayed the existing strip maps to the district officials for further clarification.</li> <li>Mr. Banga revealed the List among which <b>Ms. Lilian AKello Aol</b> who was an assistant Sociologist on the team is well known to Mr. Ocwa</li> </ul>																		
<b>Land Disputes</b>	Mr. Banga inquired about the existence of any land wrangles/disputes along the project	<ul style="list-style-type: none"> <li>Mr. Ocwa Simon Peter explained that the District Land Board has since mapped out titled parcels within the district and more so along the project area and that it will require the project surveyor to liaise with the district Land Surveyor on that matter.</li> <li>Mr. Ocwa further clarified that the District Land Board has since issued many Certificates Of Customary Ownership (CCOs) in the district and the project should take them into consideration.</li> </ul>																		
<b>District Compensation Rates</b>	Mr. Banga inquired about the existence of updated district compensation rates for the current Financial Year.	<p>Mr. Ocwa informed the consultant that Nwoya District Land Board had already drafted and approved the district compensation rates for the Financial Year 2023/2024. He further added that the compensation rates had already been submitted to the Ministry of Lands for moderation. The officer to whom the rates were submitted is Mr. Alex Bwogi and this confirmed from an email communication to the officer.</p> <p>A copy of the rates was also obtained by the consultant from the land office.</p>																		
<b>Area Land Committees</b>	Mr. Banga inquired about the composition of Area Land Committees at the District.	<p>Mr. Ocwa informed the consultant that, the Area Land Committees are constituted at Sub-County level. However, the consultant was informed that the current area committees' tenure will be expiring at then of October 2023.</p> <p>The current Area Land Committees along the project area are as listed here below; -</p> <table border="1"> <thead> <tr> <th>Area</th> <th>Name</th> <th>Contact</th> </tr> </thead> <tbody> <tr> <td>Anaka S/c</td> <td>Galdino Ongwech</td> <td>0774-505075</td> </tr> <tr> <td>Purongo S/c</td> <td>Ocitti John</td> <td>0782-699369</td> </tr> <tr> <td>Anaka T/c</td> <td>Onencan Stephen</td> <td>0771-164108</td> </tr> <tr> <td>Lungulu S/c</td> <td>Okot Boniface</td> <td>0775-408500</td> </tr> <tr> <td>Alero S/c</td> <td>Lolum Jonan Dick</td> <td>0777-327529 0780-581409</td> </tr> </tbody> </table>	Area	Name	Contact	Anaka S/c	Galdino Ongwech	0774-505075	Purongo S/c	Ocitti John	0782-699369	Anaka T/c	Onencan Stephen	0771-164108	Lungulu S/c	Okot Boniface	0775-408500	Alero S/c	Lolum Jonan Dick	0777-327529 0780-581409
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	Mr. Banga inquired from Mr. Okot Boniface, chairman Area Land Committee Lungulu Sub County if he was aware of any land disputes within his area of jurisdiction.	<p>Mr. Okot informed the consultant that there were no land wrangles/disputes at the moment in his area.</p> <p>He further indicated that the only dispute he had received in his office was from one family about a wrong name that had been recorded during the first data capture but the matter was sorted amicably among the family members.</p>																		



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OLWIYO-NIMULE 400kv PROPOSED TRANSMISSION LINE  
STAKE HOLDER CONSULTATION/ATTENDANCE SHEET

DISTRICT NWOYA SUBCOUNTY Lungulu PARISH BAJERE  
DATE 18/10/2023

NO.	NAME	DESIGNATION	CONTACT	SIGNATURE
01	OKOT BENIFACE	Clp. Land Lungulu	0775462500	

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**OLWIYO-NIMULE 400kv PROPOSED TRANSMISSION LINE  
 STAKE HOLDER CONSULTATION/ATTENDANCE SHEET**

DISTRICT Nwoya SUBCOUNTY DLB offices PARISH \_\_\_\_\_  
 DATE 17/10/2023

NO.	NAME	DESIGNATION	CONTACT	SIGNATURE
01	WELLO NURETH	CEO	0777281975	
02	KOMBECH ERICK	PHYSICAL PLANNER	0788943850	
03	OGWA SIMON PETER	CLAU	0772460835	
04	MARA ISOMON	R.O	076937915	

## UG\_MoM\_2nd\_1

### OLWIYO-NIMULE PROPOSED 400kV TRANSMISSION POWER LINE

#### MINUTES FOR THE SENSITIZATION MEETING HELD WITH THE PAPs/AHs OF LAMOGI SUB-COUNTY, AMURU DISTRICT.

Venue Lamogi Sub-County Headquarters Date 30<sup>th</sup> January 2024

**Participants; -**

1. Denis Jjuuko ----- Communications Expert
2. Sarah Nakendo ----- Sociologist
3. Walusimbi Adam ----- Communications Assistant
4. Okot Alex Malaika ----- LC I Councillor (Apotokitoo Village, Lamogi Sub-County, Amuru District)
5. Okot Charles ----- Councillor LC III
6. Lawino Alice ----- Councillor LC III
7. Onek Jimmy ----- Councillor LC III
8. Onen Charles Ajalia ----- Councillor LC II (Obbo Parish, Lamogi Sub-County, Amuru District)
9. Akena Joseph ----- Councillor LC I (Pakiri Village, Lamogi Sub-County, Amuru District)
10. Oyet Martin ----- NRM Administrator (ADLG)
11. Anena Stella ----- Senior Assistant Chief Administrative Officer (Amuru District)
12. Francis Lawoko ----- Community Development Officer (Amuru District)
13. Ojara Atkinson ----- Councillor LCIII
14. PAPs from Lamogi Sub-County, Amuru District

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Category	Issues Raised/Person/s Responsible	Response
<b>Introductions</b>	All	
<b>The project in general</b>	The communications consultant gave an overview of the project with the help of an Acholi language interpreter, Mr. Francis Lawoko.  The consultant took the attendees through the communications brief, explaining the various sections and elaborating where necessary using a tape measure, maps, and examples related to Land Requirements and Locations; What the land will be used for; Possible impacts; Eligibility; Compensation; Entitlement; Benefits; Grievance Redress Mechanisms (Area Land Committees); and the Social Survey.	The consultant invited the sociologist to talk more about the Social Survey and its aims.  Attendees were invited to ask questions in response to the presentation.
	The sociologist explained to attendees the reasons for carrying out the Social Survey whose aim is to inform future key decisions related to the project which in turn will benefit the people. She further explained about the voluntary nature of the survey; the importance of providing accurate information by respondents; and the nature of information that will be gathered i.e. household income, education levels, number of inhabitants in a home etc.	The sociologist introduced to attendees the team of social surveyors who were intentionally sourced from the project affected communities of Amuru District to ensure the utmost transparency and efficiency in carrying out of the social survey.
<b>Compensation in cases of deceased land owner</b>	Sam Okot inquired whether he will be compensated since he is the heir to a deceased land owner whose grave is also on the affected land.	PAPs were informed that project compensation will be given to the rightful legal successor.
<b>Importance of Survey</b>	David Ogwen (PAP) inquired why the survey would require that much information about him.	The PAP was informed that the survey aims to acquire the latest and most reliable information about PAPs so as to aid in the effective implementation of the project.
<b>Fluctuating Market Value</b>	Mrs. Apio Grace inquired about whether she will be paid according to the latest value of the land or when it was surveyed in 2018 given that she hasn't been utilizing her land since the survey.	PAPs were informed that compensation will be based on the value of the land/property at the time of compensation.
<b>Date of compensation</b>	PAPs expressed frustration for suspending activities on their land since the first mapping/land survey. Many indicated that they had cut down trees or broke down their houses and wondered how they would be paid	PAPs were informed that compensation will be accorded to them following the completion of the necessary surveys and verifications, mapping given the change in route.
<b>Mode of payment</b>	PAPs inquired about whether they can choose how to receive the money.	PAPs were informed that mobile money and banks accounts provided by the PAPs will be used for compensation after valuation and verification processes. However, funds beyond Shs.2m will only be sent via bank account.
<b>Aligning bio-data to national ID information</b>	Dr. Oloya J.J expressed concern about the misrepresentation of his name on the PAPs list and suggested information should be aligned to citizen national IDs and registered phone numbers so as to improve communication via SMS i.e., for meetings, project progress etc.	The consultant told PAPs that names will be verified before payment to ensure that only genuine PAPs are compensated.
	He also inquired whether PAPs would be compensated for lost income for not utilizing/developing their land since the last survey in 2020.	PAPs were informed that at the right time, they will be informed of the values of the land/property to be compensated and what they are being compensated for for their acceptance or not.
<b>False acquisition of land</b>	Mr. Odong Richard from Pakiri Village informed the meeting about a possible malicious exclusion of his name by family members from the list of PAPs.	The consultant informed the PAPs that the GRM will be constituted where such issues would be handled to ensure that all PAPs receive compensation
<b>Wanting a new house instead of money</b>	Mr. Richard Okello inquired about the possibility of getting a new house instead of money as compensation.	The PAP was that it is possible for the project to build for the PAP a new house in a new area as compensation that is of the same value as the land/property that he is being compensated for.
<b>Family Disputes</b>	Mr. William Okoya inquired how the project will handle compensation in families with land ownership disputes.	The consultant informed the PAP that the project will only compensate the legally accredited owner, and encouraged families to make use of internal mechanisms, area land committees or courts of law to solve such issues before compensation.

The personnel listed below with their telephone contacts will play an important role during the RAP process

Name of Personnel	Designation	Contact
Mr. Okot Alex Malaika	LC I Councilor (Apotokitoo Village, Lamogi Sub-County, Amuru District)	0763293964
Mr. Okot Charles	Councilor LC III	0777363927
Ms. Lawino Alice	Councilor LC III	0751401511
Mr. Onek Jimmy	Councilor LC III	0772008219
Mr. Onen Charles Ajalia	Councilor LC II (Obbo Parish, Lamogi Sub-County, Amuru District)	0777945473

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Mr. Akena Joseph	Councilor LC I (Pakiri Village, Lamogi Sub-County, Amuru District)	0777527077
Oyet Martin	NRM Administrator (ADLG)	0789255474
Keri David Obol	Councilor LC II (Pakiri Village, Lamogi Sub-County, Amuru District)	0774141635
Francis Lawoko	Community Development Officer (Amuru District)	0759687070
Anena Stella	Senior Assistant Chief Administrative Officer (Amuru District)	0774264086
Ojara Atkinson	Councilor LCIII	07837841911

Photos below of PAPs in Lamogi Sub County.





## UG\_MoM\_2nd\_2

### MINUTES OF A SENSITIZATION MEETING HELD ON WEDNESDY JANUARY 31, 2024 AT PABBO TOWN COUNCIL HEADQUARTERS, AMURU DISTRICT, NORTHERN UGANDA.

	PRESENT	ABSENT WITH APOLOGIES
1	Denis Jjuuko - Communications Consultant	
2	Sarah Nakendo - Sociologist	
3	Adam Walusimbi - Communications Assistant	
4	Francis Lawoko - Community Development Officer (Amuru District)	
5	Okwera Kenedy - LCI Councilor (Agoro Village)	
6	Odoki Justine - LCI Councilor (Turu Village)	
7	Obalo Stephine - Chairperson LCI (Lumule Village)	
8	Oketa Yot Peter – LCI Councilor (Paibi Village)	
9	Adum Isabella – Town Clerk (Pabbo Town Council)	
10	Camhara Richard P. Okumu – Mayor (Pabbo Town Council)	
11	PAPs from Pabbo Town Council, Amuru District	

NO.	ITEM	DECISIONS AND ACTIONS
1	Opening Prayer	
2	Introductions	
3	Overview of the project	The communications consultant gave an overview of the project with the help of an Acholi language interpreter.
4	Social Survey / data collection	The sociologist informed attendees about the social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	Bought land after 2020 survey	Ayiko Charles says that he purchased land that was surveyed and allocated to previous owner in 2020 inquired whether her or landlord will get compensation.  The PAP was informed that it is the current owner of the land that will get compensated and there will be a verification exercise to establish the owner of the land before compensation is paid.
6	Contested land	How will the project handle compensation for family land with disputes? Can each member be paid separately?  PAPs were advised to solve their family disputes before compensation and agree on who owns what so that there is contest during the process leading to compensation. However, PAPs were told that GRM will be established to help solve such issues and where they fail, courts of law will prevail.
7	Trees cut before latest survey	Komakech Santo claims that PAPs cut trees after 2020 survey inquired whether they will be compensated after the latest survey?  PAPs were informed that this issue will be communicated to UETCL and will be informed on the way forward.
8	Value of land	Okello Sarafina inquired whether increases in value of land will be considered or will they be paid according to the latest valuation or that from the 2020 survey?  PAPs were informed that the compensations will be based on the current value and that is why they should enable the valuer and surveyors and other teams to establish the values.
9	Relocating of graves	Aciro Monica said that PAPs were concerned about whether proper cultural and ethical procedures will be followed during the relocation of graves. Will compensation vary by gender, age etc of the deceased?  The PAPs were informed that valuation will be done as per the laws of Uganda but PAPs are expected to carry out their proper cultural practices .
10	Change in plans and project delays	PAPs expressed dissatisfaction with constantly shifting affected areas and the uncertainty it creates to them. The same goes for delayed compensation without a clear set date.

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		The PAPs were informed that building high voltage lines is done according to international acceptable standards but also there are technical reasons the line is change from the old to the new. Compensations take time because there is need to establish ownership and actual values of the land.
11	<b>Deceased PAPs</b>	Acaa Catherine: How will the project handle compensation of PAPs who die before being paid?  PAPS were informed that family would agree on the heir to be compensated and inform the project accordingly but the project will carry out proper investigation to establish that the person died to avoid cases of fraud where somebody may claim a person whereas not.
12	<b>Difference between right of way &amp; wayleave</b>	If the powerline only stands on 10 meters, who do you restrict how we use the 25 meters on either side?  The PAPs were informed that the wayleave provides a safe corridor for people given the high voltage the powerline carries.
13	<b>Non-allocation of plot numbers</b>	Some PAPs did not receive plot numbers from 2020 survey and are anxious of missing out on compensation.  PAPs were told that land surveyors and valuers are establishing again the people to be affected and they should accord them the necessary support to carry out their work. It was also the reason they should participate in the social survey.
14	<b>Does survey have a hidden agenda</b>	PAPs inquired whether the detailed information required by survey team is meant to measure their financial end education capacity so as to provide an advantage to the project during compensation negotiations.  PAPs were informed that the procedure is transparent and they will be informed of the values of their land for their acceptance. Where they don't accept the value, they can petition the GRM committees or go to court of law. Compensation will be carried out as per establish procedure of the government of Uganda.
15	<b>Closing remarks</b>	Mr. Camhara Richard Okumu, the Mayor of Pabbo Town Council, thanked resident for attending the meeting and vouched for the credibility of the project in regards to compensation and the surveys. He called for better mobilization of PAPs and pledged to support the project as needed.
16	<b>Adjournment</b>	Meeting adjourned by Chairperson at 06:00 pm
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
Okwera Kenedy	LCI Councilor (Agoro Village)	0788642643
Odoki Justine	LCI Councilor (Turu Village, Pabbo Town Council)	0770622903
Obalo Stephine	Chairperson LCI (Lumule Village)	0783385219
Oketa Yot Peter	LCI Councilor (Paibi Village)	0784230317
Adum Isabella	Town Clerk (Pabbo Town Council)	0772682045
Camhara Richard P. Okumu	Mayor (Pabbo Town Council)	0782364171
Francis Lawoko	Community Development Officer (Amuru District)	0759687070

**Photos**





Figure 15-1 Huge turn of PAPs in Pabbo



Figure 15-2 PAPs in Pabbo



Figure 15-3 PAPs in Pabbo



Figure 15-4 Demonstrating to PAPs the height of the allowable crops in the wayleave



## UG\_MoM\_2nd\_3

### MINUTES OF A SENSITIZATION MEETING HELD ON TUESDAY, JANUARY 31, 2024 AT JENG-GIARI TRADING CENTER, PALWONG PARISH, PABO SUB-COUNTY, AMURU DISTRICT, NORTHERN UGANDA.

	PRESENT	ABSENT WITH APOLOGIES
1	Denis Juuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Francis Lawoko - Community Development Officer (Amuru District)	
4	Labalpiny John Alfred – LC III Pabo Sub-County	
5	Owot Hilton – LC I Kati-Kati B Village	
6	Ogitti Richard – LC I Kati-Kati A Village	
7	Oboko Richard – LC II Chairman	
8	PAPs from Pabo Sub-County, Amuru District	

The meeting was moderated by Francis Lawoko, and Adam Walusimbi recorded the minutes.

NO.	ITEM	DECISIONS AND ACTIONS
1	Opening Prayer	
2	Introductions	
3	Welcoming remarks	Mr. Oboko welcomes project team to Palwong Parish and the project to the area and hopes to build a better working relationship.
4	Overview of the project	The communications consultant gave an overview of the project with the help of an Acholi language interpreter. He also informed attendees about the social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	Plot numbers	David Lakony: During 2020 survey, PAPs received “plot numbers” written on small pieces of paper. Are they still valid or should they expect new numbers from 2024 survey?  PAPs were informed that the power line has gone through many changes and the surveyor and valuation team is visiting the district again to map it which will inform the affected people and households.
6	Change of ownership	Aringo Margaret: Some of the PAPs surveyed in 2020 sold parts of, or all of their land. The new owners wanted to know if they will also be compensated.  The owner of the land during the verification exercise is the one to be paid. PAPs were urged to ensure that they have sales agreements which are not contestable.
7	Non affected persons	Okello Blazio: Is there any other benefit to the local community from the powerline project aside from compensation of PAPs?  Uganda will earn income from the project which will be used for national development. Where there are substations, power could be extended to other areas. During construction of the line, contractors are expected to employ some of the people from the community. Already, young people from the region have been trained as data collectors.
8	Refusal to sell	Bolusia Betty: PAPs wanted to know what would happen if they had no intention of selling their property and express the same to the project. Will they be forcefully removed?  There is no intention to take anybody’s land by force. The government can also change its plans by diverting the line to somewhere else. However, the government of Uganda by law can take the land as long as there is adequate compensation and sufficient notice of time is given.
9	Can the project connect the trading center to the national grid?	Oyella Peter Kidega: Although PAPs understood that project is for high voltage lines, they requested that UETCL helps connect Jeng-Giari trading center to the national grid since it is a business hub in the community.  This request will be put in the report.

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10	Is compensation in right of way the same as in way leave?	<p>Acellam Bosco: PAPs who own plots in the 10 meter right of way and also in the 50-meter wayleave requested for more value compensation for land in right of way.</p> <p>Compensations will depend on the valuation team and such PAPs will be informed of the values before payment is made.</p>
11	Difference between right of way & wayleave	<p>Oyet Charles: If the powerline only stands on 10 meters, who do you restrict how we use the 25 meters on either side?</p> <p>This is for safety purposes since it is a high voltage line.</p>
12	Sub-division of affected plot	<p>Ayella Joel: Will family members be compensated individually if they divide the affected plot into smaller plots amongst themselves?</p> <p>Compensation doesn't depend on the size of land rather on whether the land is in the affected area or not. All owners of land will be compensated.</p>
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
Labalpiny John Alfred	LC III Pabo Sub-County	0788939727
Owot Hilton	LC I Kati-Kati B Village	0787934867
Ogitti Richard	LC I Kati-Kati A Village	078486988
Oboko Richard	LC II Chairman	0782317210
Francis Lawoko	Community Development Officer (Amuru District)	0759687070

Photos



Figure 15-5 PAPs in a sensitization meeting



Figure 15-6 Sensitization meeting in Palwong Parish



Figure 15-7 Sensitization meeting in Palwong

## UG\_MoM\_2nd\_4

### MINUTES OF A SENSITIZATION MEETING HELD ON WEDNESDAY JANUARY 31, 2024 AT MR. NYEKO BOSCO'S HOME IN ODUR VILLAGE, LAMOGI SUB-COUNTY, AMURU DISTRICT, UGANDA.

	PRESENT	ABSENT WITH APOLOGIES
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Sarah Nakendo - Sociologist	
4	Komakech Patrick Kibwota – LC III Chairperson (Guru Guru Sub-county)	
5	Lamunu Lucy – Councilor III	
6	Odida Martin Bostine – Secretary for work (Guru Guru Sub-county)	
7	Acayo Christine Oyera – Councillor III (Odur Village)	
8	Aisu Godfrey – Health Inspector (Parabongo HC III)	
9	Omara Mark – LC III Lamora/Odur	
10	Opiyo Charles – CDO (Guru Guru Sub-County)	
11	Ojera Vincent – Chairperson	
12	PAPs from Lamogi Sub-county, Amuru District	
13	PAPs from Guru Guru Sub-county, Amuru District	

The meeting was moderated by Opiyo Charles, and Adam Walusimbi recorded the minutes.

NO.	ITEM	DECISIONS AND ACTIONS
1	<b>Opening Prayer</b>	
2	<b>Introductions</b>	
3	<b>Overview of the project</b>	The communications consultant gave an overview of the project with the help of an Acholi language interpreter.
4	<b>Social Survey / data collection</b>	The sociologist informed attendees about the social survey and urged PAPs to voluntarily take part and provide accurate information.
	<b>KEY ISSUES RAISED</b>	
5	<b>Tree Compensation</b>	Mr. Nyeko Bosco asked if the project will compensate for the trees he cut after the 2020 survey informed him that he will have to vacate his land.  The PAPs were informed that compensations will be based on current value but the question will be sent to UETCL for further clarification in subsequent meetings.
6	<b>New health facilities</b>	Rev. Jacob Odoch asked whether the latest social survey will lead to the establishment of new health centers in the affected community.  The PAPs were informed that generally when Uganda makes money from South Sudan, it will

		lead to development but direct construction of health centres may be out of scope for this particular assignment.
7	<b>Sensitization should improve</b>	<p>Mr. Onen Ainya advised project team to improve sensitization with more meetings and even mass media such as radio.</p> <p>The PAPs were informed that this will be forwarded for consideration.</p>
8	<b>Appreciation &amp; support for project</b>	Ms. Aber Lucy Oyet on behalf of the Amora Village LC1 expressed her appreciation for the project and reassured her support.
9	<b>When is the valuer coming?</b>	<p>Mr. Martin Oponya wanted to know when the government valuer will value his land since the planting season is approaching and he may also rent his land to other farmers. Will that affect the land value?</p> <p>The PAPs were informed that the surveyor and the valuer were on ground and will be in their area soon but the actual compensation will take some time as it is a lengthy process and they will be informed when this is due. PAPs can still use their land during this period as they haven't compensated yet.</p>
10	<b>Deceased owner</b>	<p>Mr. Odong Walter inquired what will be done in regards to land owners who have died since the last survey in 2020.</p> <p>The family will appoint the heir to receive compensation but there will be a thorough verification exercise to establish that the person died.</p>
11	<b>Why do surveyors need financial information?</b>	<p>Ms. Acayo Christine expressed concerns about why surveyors are asking PAPs about whether they grow cash crops or food crops.</p> <p>PAPs were informed that the survey is part of the entire process to establish economic activity in the area.</p>
12	<b>Recruitment of data collectors</b>	<p>Ms. Acayo Christine requested that the project should recruits data collectors that are from the exact villages they intend to survey.</p> <p>The PAPs were informed that the data collectors are drawn from Amuru and Nwoya districts and it may be hard to recruit one from each particular village.</p>



13	<b>Training village-based surveyors</b>	<p>Ms. Aber Lucy inquired why youth from her village were not trained to take up the survey and data collection jobs.</p> <p>The PAPs were informed that the data collectors are drawn from Amuru and Nwoya districts and it may be hard to recruit one from each particular village.</p>
14	<b>Refusal of compensation</b>	<p>Mr. Odoch Michael asked what would happen if he refused to give up his land for the project.</p> <p>He was informed that the project doesn't take land by force but it would be in his interest not to sabotage government projects. The other option is that the projects can also be diverted to another area but he was also informed that the law enables government to acquire any land as long as it has adequately compensated the land owner.</p>
15	<b>Replacement plot of land</b>	<p>Mr. Opiru Geoffrey inquired if there is a limit on how far his land can be located should he choose another plot as compensation.</p> <p>He was informed that the project will determine where such land will be located but within the same area of the same value as what has been taken.</p>
16	<b>What will power benefit us?</b>	<p>Mr. Bosco Nyeko asked if the high voltage power will also supply power to the village.</p> <p>He was informed that this is a high voltage line and power can only be tapped through sub stations. However, government has other plans that are to connect rural areas which are ongoing in parts of Uganda.</p>
17	<b>Skilling youth to work &amp; benefit from project</b>	<p>Mr. Komakech Martin Kibwota urged the project to begin skilling youth from affected communities and enable them to work on the construction and maintenance of the power line.</p> <p>The PAPs were informed that this request will be forwarded to the UETCL for consideration.</p>
	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

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**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
Komakech Patrick Kibwota	LC III Chairperson (Guru Guru Sub-county)	0772786980
Lamunu Lucy	Councilor III	0782807768
Odida Martin Bostine	Secretary for work (Guru Guru Sub-county)	0789580986
Acayo Christine Oyera	Councillor III (Odur Village)	0779380820
Aisu Godfrey	Health Inspector (Parabongo HC III)	0775197020
Omara Mark	LC III Lamora/Odur	0775784714
Opiyo Charles	CDO (Guru Guru Sub-County)	0773421711
Ojera Vincent	Chairperson	0782396585





**UG\_MoM\_2nd\_5**

**MINUTES OF A COURTESY MEETING WITH THE COMMUNITY DEVELOPMENT OFFICER, LAMOGI SUB-COUNTY, AMURU DISTRICT ON TUESDAY, JANUARY 30, 2024 FROM 9:00AM TO 9:30AM AT LAMOGI SUB-COUNTY HEADQUARTERS, AMURU DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Francis Lawoko - CDO Lamogi Sub-County, Amuru District	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The CDO officially welcomed the team to Lamogi Sub-county and wished them a productive stay.
3	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the CDO who acknowledged receipt.
4	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
5	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Francis Lawoko	CDO Lamogi Sub-County, Amuru District	0759687070

**MINUTES OF A COURTESY MEETING WITH THE CHIEF ADMINISTRATIVE OFFICER, AMURU DISTRICT ON TUESDAY, JANUARY 30, 2024 AT AMURU DISTRICT HEADQUARTERS, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assitant	
3	Francis Lawoko - CDO Lamogi Sub-County, Amuru District	
4	Otai Charles – Chief Administrative Officer, Amuru District	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The CAO officially welcomed the team to Amuru District and offered support as needed.
3	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the CAO who acknowledged receipt.
4	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
5	<b>Closing remarks</b>	The CAO thanked UETCL for setting up the project in his district citing the benefits to the local community and the entire country. He pledged to support the team as they conducted their work across the district.
6	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Otai Charles	Chief Administrative Officer, Amuru District	0772640638
Francis Lawoko	CDO Lamogi Sub-County, Amuru District	0759687070

**MINUTES OF A COURTESY MEETING WITH THE LC5 CHAIRPERSON, AMURU DISTRICT ON TUESDAY, JANUARY 30, 2024 AT AMURU DISTRICT HEADQUARTERS, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Francis Lawoko - CDO Lamogi Sub-County, Amuru District	
4	Michael Lakony – LC5 Chairperson, Amuru District	
5	Select local leaders and district staff	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The LC5 Chairperson officially welcomed the team to Amuru District and offered his support to the project.
3	<b>Warm reception by people and leaders</b>	The LC5 Chairperson informed the UETCL team to expect a warm reception from the people of Amuru as they are well aware of the project and are looking forward to the benefits.
4	<b>Introduction letter</b>	The communications consultant delivered a copy UETCL's official introduction letter to the LC5 Chairperson who acknowledged receipt.
5	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
6	<b>Closing remarks</b>	The LC5 Chairperson thanked UETCL for choosing to invest in Amuru district citing the benefits to the local community and the entire country. He pledged to continue supporting the project.
7	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Michael Lakony	LC5 Chairperson, Amuru District	0782777855 / 0742853008
Francis Lawoko	CDO Lamogi Sub-County, Amuru District	0759687070

**MINUTES OF A COURTESY MEETING WITH THE RESIDENT DISTRICT COMMISSIONER, AMURU DISTRICT ON WEDNESDAY, JANUARY 31, 2024 AT THE OFFICE OF THE RDC, AMURU DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Francis Lawoko - CDO Lamogi Sub-County, Amuru District	
4	Odong Latek Steven – RDC Amuru District	

The meeting was moderated by Michael Lakony, and Adam Walusimbi Recorded the minutes.

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The RDC officially welcomed the project team to Amuru District
3	<b>Security</b>	The RDC informed the team that security in the district is good and they shouldn't expect any disruptions during the conducting of their work. He promised to inform all relevant personnel of the ongoing project activities.
4	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the RDC who acknowledged receipt.
5	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
6	<b>Closing remarks</b>	The RDC thanked UETCL for the work it is doing in Amuru district and working inline with government's objective of transforming the country through infrastructure development.
7	<b>Adjournment</b>	Meeting adjourned
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Odong Latek Steven	RDC, Amuru District	0772425425
Acham Proscovia	Deputy RDC, Amuru District	0776967963 / 0782969264
Francis Lawoko	CDO Lamogi Sub-County, Amuru District	0759687070

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**MINUTES OF A COURTESY MEETING WITH THE COMMUNITY DEVELOPMENT OFFICER, GURUGURU SUB-COUNTY, AMURU DISTRICT ON WEDNESDAY, JANUARY 31, 2024 IN AMURU DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Opiyo Charles - CDO Guru Guru Sub-County, Amuru District	

The meeting was moderated by Denis Jjuuko, and Adam Walusimbi recorded the minutes.

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The CDO officially welcomed the team to Guru Guru Sub-county and wished them a hospitable and productive stay.
3	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the CDO who acknowledged receipt.
4	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
5	<b>Pledge of support</b>	The CDO offered to escort the team and help them mobilize PAPs across the Sub-county for the sensitization meetings.
6	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Opiyo Charles	CDO Guru Guru Sub-County, Amuru District	0773421711



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**MINUTES OF A COURTESY MEETING WITH THE LC3 CHAIRPERSON, ATIAK SUB-COUNTY, AMURU DISTRICT ON WEDNESDAY, JANUARY 31, 2024 IN PACILO TRADING CENTER, PACILO WEST VILLAGE, AMURU DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Akera Samuel - LC III Atiak Sub-county, Amuru District	

The meeting was moderated by Denis Jjuuko, and Adam Walusimbi recorded the minutes.

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The LC3 Chairperson officially welcomed the UETCL team to Atiak Sub-county offered his support.
3	<b>Split of villages into two</b>	The LC5 Chairperson informed the team that the affected villages have since the 2020 survey been split into two; Pacilo West Village and Pupwonya South Village.
4	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the LC3 Chairperson who acknowledged receipt.
5	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
6	<b>Pledge of support</b>	The LC3 Chairperson offered to escort the team and help them mobilize PAPs across the Sub-county for the sensitization meetings.
7	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Akera Samuel	LC III Atiak Sub-county, Amuru District	0783176368

**UG\_MoM\_2nd\_6**

**MINUTES OF A COURTESY MEETING WITH THE TOWN CLERK AND COMMUNITY DEVELOPMENT OFFICER, ATIAK TOWN COUNCIL, AMURU DISTRICT ON THURSDAY FEBRUARY 1, 2024 AT ATIAK TOWN COUNCIL HEADQUARTERS, AMURU DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Odokonyero Stephen – Town Clerk, Atiak Town Council, Amuru District	
4	Okoya George - CDO Atiak Town Council	

The meeting was moderated by Denis Jjuuko, and Adam Walusimbi recorded the minutes.

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The Town Clerk officially welcomed the team to Atiak Sub-county and informed them that the PAPs are eagerly waiting for the project.
3	<b>Change in names of places</b>	The Town Clerk informed the project team that the villages previously listed as Kal-East and Kal-West have since been split and renamed to; Pabuga Ward, Amoyo-Kol Ward, and Pagimoro Ward
4	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the Town Clerk who acknowledged receipt.
5	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
6	<b>Pledge of support</b>	The Town Clerk offered help the team mobilize PAPs across the Town Council to attend the sensitization meetings and other future project activities.
7	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Odokonyero Stephen	Town Clerk, Atiak Town Council, Amuru District	0783176368
Okoya George	CDO Atiak Town Council	0782014182

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**MINUTES OF A COURTESY MEETING WITH THE CHIEF ADMINISTRATIVE OFFICER, NWOYA DISTRICT ON MONDAY FEBRUARY 5, 2024 AT NWOYA DISTRICT HEADQUARTERS, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	Nantume Jenifer Egungu – CAO Nwoya District
2	Adam Walusimbi - Communications Assistant	
3	Akello Poli – Secretary for CAO Nwoya District	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The CAO's secretary officially welcomed the team to Nwoya District.
3	<b>Phone conversation with the CAO</b>	Due to pressing issues, the meeting with the CAO was virtual through telephone as she had traveled for another engagement. The CAO appreciated UETCL for investing in Nwoya and promised to support the team during their stay in Nwoya.
4	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
5	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the CAO to her secretary who acknowledged receipt.
6	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Nantume Jenifer Egungu	CAO Nwoya District	0776403199
Akello Poli	Secretary for CAO Nwoya District	0783037490

**MINUTES OF A COURTESY MEETING WITH THE LC5 CHAIRPERSON, NWOYA DISTRICT ON MONDAY FEBRUARY 5, 2024 AT NWOYA DISTRICT HEADQUARTERS, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Emmanuel Orach – LC5 Chairperson Nwoya District	

The meeting was moderated by Denis Jjuuko, and Adam Walusimbi recorded the minutes.

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The LC5 Chairperson officially welcomed the team to Nwoya District.
3	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the LC5 Chairperson who acknowledged receipt.
4	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
5	<b>Challenges in compensation agreements</b>	The LC5 informed the team about the ongoing challenges in the district where land is a contentious issue. He was optimistic that the sensitization meetings will improve the situation.
6	<b>Vote of thanks</b>	The LC5 Chairperson appreciated UETCL and the government for the introduction of the powerline project which is guaranteed to benefit the residents of Nwoya through jobs, skills acquisition etc.
7	<b>Adjournment</b>	Meeting adjourned by Chairperson at 10:30 am
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Emmanuel Orach	LC5 Chairperson Nwoya District	0784314355

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**MINUTES OF A COURTESY MEETING WITH THE RESIDENT DISTRICT COMMISSIONER, NWOYA DISTRICT ON TUESDAY FEBRUARY 6 2024 AT NWOYA DISTRICT HEADQUARTERS, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	Adam Walusimbi - Communications Assistant	
3	Christopher Omara – RDC Nwoya District	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The RDC officially welcomed the the team to Nwoya District
3	<b>Introduction letter</b>	The communications consultant delivered a copy of UETCL's official introduction letter to the RDC who acknowledged receipt.
4	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
5		
6	<b>Pledge of security and support</b>	The RDC informed the team that all the necessary security personnel are going to be informed of the project's activities in the district and the project team should expect no hinderances during the conducting of their duties.
7	<b>Adjournment</b>	Meeting adjourned by Chairperson
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Christopher Omara	RDC Nwoya District	0772473599

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**MINUTES OF A COURTESY MEETING WITH THE COMMUNITY DEVELOPMENT OFFICER, NWOYA DISTRICT ON THURSDAY, FEBRUARY 1, 2024 FROM 11:00AM TO 11:30AM AT NWOYA DISTRICT HEADQUARTERS, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	CDO Nwoya
2	Adam Walusimbi - Communications Consultant	
3	Okot Sam – Youth Councillor Nwoya District	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Introductions</b>	All
2	<b>Welcoming remarks</b>	The Youth Councillor on behalf of the CDO officially welcomed the UETCL team to Nwoya District and wished them a hospitable and productive stay.
3	<b>Introduction letter</b>	The communications consultant delivered UETCL's official introduction letter to the CDO which was received by the Youth Councillor who acknowledged receipt.
4	<b>Purpose of the visit</b>	The communications consultant gave a brief overview of the project, the purpose of the sensitization meetings and the voluntary social survey / data collection to be carried out among PAPs in the area.
6	<b>Support for sensitization and survey</b>	The Youth Councillor on behalf of the CDO presented to the team a mobilization plan for all PAPs in the district and the locations and time when to meet them. He reiterated the district's support for the project.
7	<b>Adjournment</b>	Meeting adjourned by Chairperson at 11:30 am
	<b>NEXT MEETING</b>	The next meeting will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Okot Sam	Youth Councillor Nwoya District	0783125395

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### OLWIYO-NIMULE POWER PROJECT

#### NWOYA DISTRICT MINUTES

#### MINUTES OF A SENSITIZATION MEETING HELD ON SATURDAY, FEBRUARY 10, 2024 AT ALERO SUBCOUNTY HEADQUARTERS, NWOYA DISTRICT, NORTHERN UGANDA.

	PRESENT	ABSENT WITH APOLOGIES
1	Denis Jjuuko - Communications Consultant	
2	John Banga - Assistant Valuer	
3	Ocen Simon - Community Mobiliser	
4	Olwenyi Thomas - Secretary Okura LCI	
5	Oryang Martine - Chairman LCI Bwobo Nam	
6	Okot Justine - Chairman LCII Bwobo Nam Parish	
7	Anek Margaret - Chairperson LCI Oyinya village	
8	Ojara Justine - LCIII Chairperson Alero Subcounty	
10	PAPs from Alero Subcounty, Nwoya District	
11	Adam Walusimbi - Communication Assistant	

NO.	ITEM	DECISIONS AND ACTIONS
1	Opening Prayer	
2	Introductions	
3	Welcoming remarks	Mr. Ojara Justine welcomed the project team to Alero Subcounty and promised full support from the subcounty leadership.
4	Overview of the project	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. He also informed attendees about the Land survey, Valuation and social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	Reports update method	Oloya Dennis inquired whether to updating of the reports will be done in the field or just on paper.  PAPs were informed that teams will be making field visits to update the reports and as such PAPs were encouraged to be present on their land
6	PAPs not willing to sell their land	Ochera Norbert asked what will be done for PAPs who are not willing to sell off their land to government.  PAPs were informed that it is a government project and that the law provides for procedures to acquire private land if it is in public interest including compulsory purchase but with adequate compensation.
7	Letters of Administration  Communally Owned Land	Nyeko Charles inquired whether Letters of Administration will be required for PAPs who were captured in 2019 but are now deceased  PAPs were informed that one of the purposes of updating the reports is to ascertain if there are any deceased PAPs so that the report can be updated to reflect those that are living.  Nyeko further inquired on who gets paid for affected property for land which is communally owned.  PAPs were informed that the land will be registered in the CLAN head will the property on the land will be registered on the persons who put up the property and in the report, the property owners will captured as Licensees
8	Diversions Vs the Original proposed Line	Aciro Hellen Odongpiny inquired whether the project is now going to accommodate both the original section and the diverted portion.

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		PAPs were informed that where the line has been diverted, the project will only consider the diverted sections and the portions initially surveyed will revert back to the owners.
9	<b>Combined pieces of Land initially captured as one</b>	Okello Juspine inquired how pieces of land owned by different persons that were combined during the first survey will be treated.  PAPs were informed that the consultant's survey and valuation teams will subdivide the portions that were initially captured as one.
10	<b>Land Values</b>	Otim Ongwech inquired whether the land values in Nwoya District will be uniform.  PAPs were informed that the current market values for land for each area will be considered and that land values will not be uniform.
11	<b>Danger associated with the Power Line</b>	Okello Eric inquired if it is not dangerous for people to pass below the power line after construction.  PAPs were informed that it is safe to pass below the power line and that it is the continued exposure to the Electro Magnetic Waves which is dangerous and that is why people cannot be allowed to stay under the power line.
	<b>NEXT MEETINGS</b>	The next meetings will be communicated in due course.

**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
Ocen Simon –	Community Mobiliser	0775 278401
Olwenyi Thomas –	Secretary Okura LCI	0775 171598
Oryang Martine –	Chairman LCI Bwobo Nam	0777 914203/0777 238586
Okot Justine –	Chairman LCII Bwobo Nam Parish	0765 338488
Anek Margaret –	Chairperson LCI Oyinya village	0782 299326
Ojara Justine –	LCIII Chairperson Alero Subcounty	0778 881260

Photos





*Photo 15-8 Alero sensitization meeting*



Photo 15-9 Alero sensitization meeting



*Photo 15-10 Alero sensitization meeting*

**MINUTES OF A SENSITIZATION MEETING HELD ON FRIDAY, FEBRUARY 9, 2024 AT ANAKA TOWN COUNCIL HEADQUARTERS, CEKE WARD, NWOYA DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	John Banga - Assistant Valuer	
3	Komugisha Monica - Vice Chairperson LCIII Anaka Town Council	
4	Auma Christine – Councillor LC5 Nwoya District Local Government	
5	Odong Keffa Councillor LCIII Ceke Ward	
6	Okello Walter – LCII Ceke Ward	
7	Komakech Anthony – Chairman LCI Owak Cell	
8	Nyeko Fred Latim - Chairman LCI Lamogi Cell	
9	Ocan William - Chairman LCI Olony Cell	
10	PAPs from Anaka Town Council, Nwoya District	
11	Adam Walusimbi – Communication Assistant	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Opening Prayer</b>	
2	<b>Introductions</b>	
3	<b>Welcoming remarks</b>	Mr. Odong Keffa welcomed the project team to Anaka Town Council and promised full support from the Town Council leadership.
4	<b>Overview of the project</b>	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. He also informed attendees about the Land survey, Valuation and social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	<b>Graves</b>	Okello John inquired if graves will be paid for in order to be relocated.  PAPs were informed that graves within the Right of Way will be assessed for relocation and UETCL in consultation with the cultural leaders will ascertain any relocation assistance required on top of the compensation assessed.
6	<b>Compensation Rates</b>  <b>Payment Period</b>  <b>Moving with Local leaders</b>	Okello Patrick inquired which rates will be adopted.  PAPs were informed that the current compensation rates to adopted are those of Nwoya District.  Okello Patrick asked whether compensation payment will be made before construction of the power line since the Nwoya-Gulu 132Kv was constructed before PAPs were paid.  PAPs were informed that construction of the power line will only begin after PAPs have been paid  Okello Patrick further asked if the field teams will be moving with the local leaders.  PAPs were informed that all field teams will be moving with the local leaders.
7	<b>Compensation Rates for Town Council Vs District Compensation Rates</b>	Oola Robert inquired whether rates to be applied for crops/trees within Anaka Town Council will be the same across the entire district.  The PAPs were informed that district compensation rates which are prepared by the District Land Board are supposed to be used for the entire district.
8	<b>Deceased Persons</b>	The Area Councillor asked what will be done to property that was captured in the names of PAPs who have since passed on.  PAPs were informed that the consultancy team is on ground to update the data that was captured in 2020 including updating of the names to reflect the current owners who are living.
9	<b>Vulnerable PAPs</b>	Ojera Basil inquired how persons with disabilities will be treated

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		PAPs were informed that vulnerable PAPs like PWDs, the elderly and minor led families will be given special treatment like constructing for them houses for those who will be found to be owning residential houses within the project corridor
10	<b>Multiple Ownership</b>	Teobel Dennis inquired how a PAP owning multiple plots of land in different villages/cells will be compensated  PAPs were informed that each affected plot will be captured and assessed under that village/cell where it falls.
	<b>NEXT MEETINGS</b>	The next meetings will be communicated in due course.

**IMPORTANT CONTACTS**

<b>NAMES</b>	<b>DESIGNATION</b>	<b>CONTACT</b>
Dennis Okema	Chairman LCIII Anaka Town Council	0788 380132
Komugisha Monica	Vice Chairperson LCIII Anaka Town Council	0783 152192
Juma Muhammed	CDO Anaka Town	0772 601066
Auma Christine	Women Councillor LC5 Nwoya District Local Government	0777 363237
Komakech Anthony	Chairman LCI Owak Cell	0784 132003
Nyeko Fred Latim	Chairman LCI Lamogi Cell	0778 293422
Ocan William	Chairman LCI Olony Cell	0762 202617

**Photos**



*Photo 15-11 Anaka Town Council Meeting*



*Photo 15-12 Anaka Town Council Meeting*



*Photo 15-13 Anaka Town Council Meeting*



**MINUTES OF A SENSITIZATION MEETING HELD ON THURSDAY, FEBRUARY 9, 2024 AT BELKECH MEETING PLACE, PAROMO PARISH, PURONGO SUBCOUNTY, NWOYA DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	John Banga - Assistant Valuer	
3	Adok Irene – Parish Chief	
4	Odong Walter Acellam – Parish Chief Paromo	
5	Amono Jascinta - Councillor	
6	Okello Charles - Councillor	
7	Okot William – Chairman LC!	
8	PAPs from Belkech Village, Purongo Subcounty, Nwoya District	
9	Adam Walusimbi – Communication Assistant	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Opening Prayer</b>	
2	<b>Introductions</b>	
3	<b>Welcoming remarks</b>	Mr. Okello Charles welcomed the project team to Belkech Village and promised full support from the Town Council leadership.
4	<b>Overview of the project</b>	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. He also informed attendees about the Land survey, Valuation and social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	<b>Control Points</b>	Okello Dennis inquired what the concrete marks that have been placed in the PAPs land meant.  PAPs were informed that the concrete marks that have placed in their land are called control points and they are the ones the survey team is using to be able to survey the line. All were advised to leave them and tell children not to play with them.
6	<b>Line Diversion</b>	Erumayo inquired whether the power line was also being diverted in Belkech village.  PAPs were informed that the line was not being diverted in Belkech village
7	<b>Access Roads to Corridor</b>  <b>Disturbance Allowance</b>	Arop Dennis inquired what will be done in case the contractor needs to access the corridor where there are no existing access roads.  PAPs were informed that in case the contractor needs to create access roads where there are no existing roads, then the contractor will have to negotiate with the land owners in order to create temporary access.  Arop Dennis further asked whether the total compensation award will include disturbance allowance.  PAPs were informed that disturbance allowance will be calculated separately and finally added to the total compensation award and it will be disclosed to the PAPs at the time of disclosure before PAPs are paid in order to consent.
8	<b>New Developments within the corridor</b>	Wilfred Kilama informed the consultant’s team that PAPs had put up new developments and planted trees within the corridor since they thought the government had abandoned the project.  PAPs were informed that the valuation team will update the report by capturing all the new developments that will be found on ground.
<b>NEXT MEETINGS</b>		The next meetings will be communicated in due course.

**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
Adok Irene	Parish Chief – Pawat Omero	0787588470/0782636691

Photos



Photo 15-14 Purongo meeting

**MINUTES OF A SENSITIZATION MEETING HELD ON THURSDAY, FEBRUARY 8, 2024 AT PATIRA MEETING PLACE, PATIRA PARISH, PURONGO SUBCOUNTY, NWOYA DISTRICT, NORTHERN UGANDA.**

	PRESENT	ABSENT WITH APOLOGIES
1	Denis Jjuuko - Communications Consultant	
2	John Banga - Assistant Valuer	
3	Adok Irene – Parish Chief	
4	Okello Oscar Yusuf – Councillor PWDs	
5	Ojara George – Chairman LCI Patira East	
6	Onyut Albino – Pawat Omero East village	
7	Oryem Franco – Secretary Patira East Village	
8	PAPs from Patira East and Pawat Omero East Villages, Purongo Subcounty, Nwoya District	
9	Adam Walusimbi – Communication Assistant	

NO.	ITEM	DECISIONS AND ACTIONS
1	Opening Prayer	
2	Introductions	
3	Welcoming remarks	Mr. Oryem Franco welcomed the project team to Patira and promised full support from the Town Council leadership.
4	Overview of the project	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. He also informed attendees about the Land survey, Valuation and social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	Delayed Compensation  Two lines through PAPs land	Binansio asked the team why government had taken long to compensate the PAPs.  PAPs were informed that the COVID-19 Pandemic contributed a lot in the project delays.  Binansio also highlighted cases of pieces of land already being affected by the Nwoya-Gulu 132Kv power line.  PAPs were informed that it is the reason why there are diversions in some places.
6	Absentee PAPs	Komakech John inquired what will be done for PAPs who are in jail  PAPs were advised to get powers of attorney to be able to represent such PAPs who are in jail or out of the country.
<b>NEXT MEETINGS</b>		The next meetings will be communicated in due course.

**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
Adok Irene	Parish Chief – Pawat Omero	0787588470/0782636691
Okello Oscar Yusuf –	Councillor PWDs	0777 358827
Ojara George –	Chairman LCI Patira East	0783 308529
Onyut Albino –	Pawat Omero East village	0777 204363
Oryem Franco –	Secretary Patira East Village	0782 871412

Photos



*Photo 15-15 Purongo meeting*



Photo 15-16 Purongo Sensitization Meeting



Photo 15-17 Purongo Sensitization Meeting

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**MINUTES OF A SENSITIZATION MEETING HELD ON SATURDAY, FEBRUARY 10, 2024 AT PAMINYAI SUBCOUNTY HEADQUARTERS, NWOYA DISTRICT, NORTHERN UGANDA.**

	PRESENT	ABSENT WITH APOLOGIES
1	Denis Jjuuko - Communications Consultant	
2	John Banga - Assistant Valuer	
3	Oringa John Kenneth – Subcounty Speaker	
4	Akello Cecilia – Vice Chairperson Amola	
6	PAPs from Paminyai Subcounty, Nwoya District	
7	Adam Walusimbi – Communication Assistant	

NO.	ITEM	DECISIONS AND ACTIONS
1	Opening Prayer	
2	Introductions	
3	Welcoming remarks	Mr. Oringa John Kenneth welcomed the project team to Paminyai Subcounty and promised full support from the subcounty leadership.
4	Overview of the project	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. He also informed attendees about the Land survey, Valuation and social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	Deceased PAP	Okumu Ayela said his father passed on and inquired if he will be registered in place of his father since he is the eldest son.  PAPs were informed that replacing a deceased PAP will depend on the advice of the clan and local leadership.
6	National Identity Cards	Lakot Betty said the National Identity Card for her husband was never returned from NIRA. She inquired if she can be allowed to replace her husband.  PAPs were informed that as long as the husband consents to his name being replaced with that of his wife then there is no problem otherwise was advised to get an ID from NIRA
7	Filling of Data Capture Forms	Atube inquired if PAPs will be charged a fee for filling of the data capture forms by the valuation teams and participation in the social survey.  PAPs were informed that filling of the data capture forms and social survey is free of charge
8	Using land after pegging	Adong Rose inquired if people can continue using their land after the surveyors have pegged the corridor.  PAPs were informed that can still use their land for seasonal cropping up to the time they will be paid.
9	Crops captured before, now not available	Rose Kilama asked how the team will treat crops that were captured in 2019 but are no longer on ground. She gave an example of her banana plants which died out.  PAPs were informed that crops will still be considered as long as they are captured in the report.
<b>NEXT MEETINGS</b>		The next meetings will be communicated in due course.

**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
Akello Cecelia	Vice Chairperson Amola LCI	0774 509745
Oringa John Kenneth	Subcounty Council Speaker	0786 695242



*Photo 15-18 Paminyai Sensitization Meeting*



*Photo 12 Paminyai Sensitization Meeting*



**MINUTES OF A SENSITIZATION MEETING HELD ON FRIDAY, FEBRUARY 9, 2024 AT LACEK PRIMARY SCHOOL, LULANGO PARISH, LUNGULU SUBCOUNTY, NWOYA DISTRICT, NORTHERN UGANDA.**

	<b>PRESENT</b>	<b>ABSENT WITH APOLOGIES</b>
1	Denis Jjuuko - Communications Consultant	
2	John Banga - Assistant Valuer	
3	Olobo Wilfred – Chairman LCI Lacek	
4	Komakech Michael – Chairman LCI Gwenotwom	
5	Ojok Charles Kagwa – Chairman LCI Lagur	
6	PAPs from Lungulu Subcounty, Nwoya District	
7	Adam Walusimbi – Communication Assitant	

<b>NO.</b>	<b>ITEM</b>	<b>DECISIONS AND ACTIONS</b>
1	<b>Opening Prayer</b>	
2	<b>Introductions</b>	
3	<b>Welcoming remarks</b>	Mr. Olobo Wilfred welcomed the project team to Lungulu Subcounty and promised full support from the Town Council leadership.
4	<b>Overview of the project</b>	The communication consultant gave an overview of the project with the help of an Acholi language interpreter. He also informed attendees about the Land survey, Valuation and social survey and urged PAPs to voluntarily take part and provide accurate information.
<b>KEY ISSUES RAISED</b>		
5	<b>Disputed Land</b>	Odongo Dick inquired how disputed land will be treated.  The PAPs were informed for any disputed land, the parties involved will be recorded in the report and an assessment will be made but the compensation award will only be paid after the disputing parties have resolved the matter.
6	<b>Newly constructed Houses</b>  <b>Certificates of Customary Ownership</b>	Otema Alex raised an issue of PAPs who demolished their houses in the old corridor and reconstructed new houses outside but find their new houses falling in the new diverted corridor  PAPs were informed that the consultancy team will capture all the developments including crops/trees in the new diversion and will be compensated  Otema Alex inquired about PAPs who are in possession of Certificates of Customary Ownership for their land  The PAPs were informed that the certificates will be put into consideration and requested those with the certificates to make photocopies of the documents and submit them to the valuation team which will be capturing field data
7	<b>Missed out Property</b>	Opio Robert and Odongpiny inquired about the PAPs and property that was missed out during the 2020 survey  PAPs were informed that all PAPs and property that was missed out during the 2020 survey will now be captured for inclusion in the report.
8	<b>Lost National Identity Cards</b>	Opio Samuel inquired what will be done for PAPs who lost their National Identity cards.  PAPs who lost their National Identity Cards were advised apply for the replacement of their cards.
9	<b>Tower Spot at Boundary</b>	Oloya Juspino asked which PAP will be paid in case a Tower Spot falls on the boundary of two pieces of land.  The PAPs were informed that the compensation doesn't depend on where the tower spot is rather whether their land will be affected by the project.
10	<b>Land already sold out</b>	Francis Opio inquired how land which is already sold out will be treated.

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		PAPs were informed that the PAP who sold off his land will be replaced by the person who bought the land. The new owner is the one to receive the payment.
	<b>NEXT MEETINGS</b>	The next meetings will be communicated in due course.

**IMPORTANT CONTACTS**

NAMES	DESIGNATION	CONTACT
	Chairman LC3 Lungulu Subcounty	0783 117574
Olobo Wilfred	Chairman LCI Lacek	0778 469886/0762 059703
Komakech Michael	Chairman LCI Gwentwom	0779 235371
Ojok Charles Kagwa	Chairman LCI Lagur	0787 070662

Photos



Photo 13 Lungulu meeting



Photo 14 Meeting in Lungulu



Photo 15 Meeting in Lungulu

Participant List:

Feasibility Study, Detailed Design and Preparation of Tender Documents; Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for the Uganda (Olwiy) – South Sudan (Juba) 400 kV Power Interconnection Project \_ Uganda

MINUTES OF MEETING :

District: NWOYA

County:

Sub-County ALERO

Parish: BKOBONAM

Date: 10.09.2024

Venue: NWOYA DISTRICT LOCAL GOVT, ALERO S/O HQ.

Participant List:

SN	Name	Surname	Sex (M/F)Female participation is mandatory	Position (PAP, Village Leader, Customary Authority etc...)	Signature
01	DRYANG	MARINE	M	LC I	
02	OKELLO	ERICK ACILLAM	M	LC I MOBILIZER	
03	ACIRO	FLORANCE	F	WOMEN COUNCILOR ACIRO	
04	OLOYA	DENISHA	M	PAP	
05	CANDANO	GEOFFREY	M	PAP	
06	ONEKALIT	GEORGE	M	Karam Pa Panel Karam	
07	ORANYA	KASSIM	M	PAP	

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Participant List:

SN	Name	Surname	Sex (M/F)Female participation is mandatory	Position (PAP, Village Leader, Customary Authority etc...)	Signature
5	OKOT	JUSTICE	M	LC II	
6	ONEN	DENISH	M	ROTK	
07	ADONG	HELLEN	F	PAP	
08	AMONY	GRACE	F	PAP	
9	ACAYO	MARGRET	F	PAP	
10	OKELLO	ROSCO	M	Pres of Karam	
11	Uma	YAKOBO	M	Catechist	
12	ATTO	BICENTINA	F	PAP	
13	NGININGINI	CHARLES NYIRO	M	PAT	
14	OSORA	Richard	M	PAP	
15	Okono Adong	Ray VICTO	M	PAP	
16	Odong OPIYO	VICTOR GOT-FYO	M	PAP	
17	OCIRO	NOBERTT	M	PAP	
18	OPITO	JOLLY JOE	M	PAP	
19	OLOYA	ALBIN	M	PAP	
20	OKELLO	GEOFFREY OKOT	M	PAP	

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Participant List:

SN	Name	Surname	Sex (M/F)Female participation is mandatory	Position (PAP, Village Leader, Customary Authority etc...)	Signature
	KIMYERA	RONALD OBUH	m	Affected person	
	ORIEMA	GEORGEY	m	Affected person	
	CANIKURU	DAVID	m	Affected person	
	ORIEMA	WALTER LUNGA	m	<del>ORIEMA</del> Affected person	
	ALOYO	EUARLINE	F	Affected person	ALOYO
	ODONG	GAS	m	Affected person	odong
	ACEM	JACKLINE	F	Affected person	Jacky
	OILOI	JUSTINE	m	Affected person	
	ARATIO	SABINA	F	Affected person	
	ARACH	ROSE	F	Affected person	ARACH
	ADONG	FLORANCE	F	Affected person	
	AKELLO	ESTER	F	Affected person	
	AYE (ATIM SANTIINA)	CATHERINE	F	Affected person	
	UHUHU	FRANCIS	m	Affected person	
	KIMYERA	STEPHEN	F	Affected person	
	AKELLO	FLORANCE	F	Affected person	AKELLO
	OKUMU	CHARLES	m	Affected person	

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Participant List:

SN	Name	Surname	Sex (M/F)Female participation is mandatory	Position (PAP, Village Leader, Customary Authority etc...)	Signature
	OCIRA	COSMAS	m	Affected person	OCIRA
	ORIEMA	Simone	m	Affected person	OKUMU
	ODOKI MUKI	MICHAEL	m	Affected person	
	JURA	WITRED	m	Affected person	OMU
	OJERA	BAZIL	m	Affected person	
	ACIRO	LILLY OKUMU	F	Affected person	ACIRO
	OPHO	FRANCIS OYOL	m	Affected person	OPHO
	ORIEMA	PHILLIP'S	m	Affected person	
	OILOI	SANTO	m	Affected person	
	AKUMU	FILDA	F	Affected person	AKUMU
	OKELLO	DENIS	m	Affected person	OKELLO
	OKELLO	SAMUEL	m	Affected person	SAMUEL
	ONEN	PATRICK CAMMENG	m	Affected person	
	LAKOLO	ARFRED	m	Affected person	AKUMU
	ARATIO	LUCY	F	Affected person	ARATIO
	ADOK	CONCY	F	Affected person	ADOK
	OYEI	WALTER	m	Affected person	OYEI

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Participant List:

SN	Name	Surname	Sex (M/F)Female participation is mandatory	Position (PAP, Village Leader, Customary Authority etc...)	Signature
	OKUMU	SAMUEL	M	Affected person	Okumu
	ATWOM	JAMES	M	Affected person	Atwom
	OCAIA	PETER	M	Affected person	Ocaia
	AKENA	WALTER KENNETH	M	Affected person	Akena
	ONEN	CHARLES	M	Affected person	Onen
	OPINO	GIRASSIMAS	M	Affected person	Opino
	OOLA	ROBARTH	M	Affected person	Oola
	LAMIERO	CHRISTINE	F	Affected person	Lamiero
	RUBANGAKENG	FRANCIS	M	Affected person	Rubangakeng
	LAMIERO	GLADIES	F	Affected person	Lamiero
	ALDJO	GRACE	F	Affected person	Aldjo
	ORACH	GAODENICIO	M	Affected person	Orach
	ACIRO	ALICE	F	Affected person	Aciro
	ODONG	CHRISTOPHER	M	Affected person	Odong
	ADONG	CAROLINE AIGE RWOT	F	Affected person	Adong
	ATIM	MARGRETH	F	Affected person	Atim
	ORECH	KONALD	M	Affected person	Orech

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Participant List:

SN	Name	Surname	Sex (M/F)Female participation is mandatory	Position (PAP, Village Leader, Customary Authority etc...)	Signature
	OMONI	SAMUEL	M	Affected person	Sam
	ORLEM	JOHN BOSCO	M	Affected person	Orlem
	OYAI	BOSCO LAKORO	M	Affected person	Oyat
	OPENI	BOSCO BONGOMIN	M	Affected person	Openi
	LAKONY	JOLLY	M	Affected person	Lakony
	ACIRO	SANTA	F	Affected person	Aciro
	OCAIA	JIMA PATRIEK	M	Affected person	Ocaia
	OBWONA	SAMUEL	M	Affected person	Obwona
	OKELO	WALTER	M	Affected person	Okelo
	OJOK	DONALD	M	Affected person	Ojok
	OKOT	David Kiteya	M	Affected person	Okot
	OJOK	AMOS	M	Affected person	Ojok
	OLA	Denis	M	Affected person	Ola
	AKENA	WALTER	M	Affected person	Akena
	OKELO	VINCENT	M	Affected person	Okelo
	LUKWYA	TOBBY	M	Affected person	Lukwya
	KUMALECH	OSCAR	M	Affected person	Kumalech

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## 19. ANNEX 8: MAP OF LINE ALTERNATIVES

## 20. ANNEX 9: WATER ANALYSIS RESULTS (2024)

## 21. ANNEX 10: FLORA AND WILDLIFE REPORTS (2024)

## 22. ANNEX 11: EMA COMMENTS AND ANSWERS

Comment	Answer
<p>(a) Carryout comprehensive consultations with the key stakeholders including Electricity Regulatory Authority, the respective District Local of Nwoya, Omoro, Amuru, Gulu, Adjumani and Lamwo in the project area of influence and the communities living within the project area of influence, and develop a clear stakeholder engagement plan for the entire project cycle to regularly respond to stakeholder concerns in a timely manner. Ensure that the views/concerns of the stakeholders consulted are well documented and addressed in the report and lists of persons consulted appended to the ESIA report.</p>	<p>The consultations undertaken are included in the chapter 6 and Annex 7.</p>
<p>(b) Provide details of the geographical boundaries of the project area of influence including total area to be covered by <b>names of villages, parish, and corresponding Geographical Positioning Systems (GPS) coordinates (in UTM format)</b> marking the location of the key components (substations, among others) of the project.</p>	<p>Table 3-3 presents Direct Area of Influence calculations based on parish-level administrative boundaries; the highest level currently supported by available GIS data. Village-level data is not currently available. Further data acquisition efforts are planned to refine the analysis.</p>
<p>(c) Provide clear, colored satellite images and photos of the project area of influence, its environs including accurate GPS coordinates indicating the area to be traversed by the powerline.</p>	<p>Relevant cartography with satellite images of the project area of influence, including grid coordinates, is included in Annex 1.</p>
<p>(d) Carry out comprehensive evaluation of the negative environmental and Social Risks, cumulative and residual impacts associated with the project area of influence.</p>	<p>Included in chapter 8.</p>
<p>(e) Provide a comprehensive Environmental Management and Monitoring Plan that addresses the identified environmental and residual impacts of the project, with clear roles of stakeholders in the monitoring process. In particular, the following issues should be adequately assessed and appropriate mitigation actions provided in the ESIA.</p> <p>(i) Occupational health and safety issues (ii) All potential solid waste stream from the project operations and measures for management of waste (iii) Impact on biodiversity (iv) Noise and dust emissions sources, impacts and mitigation</p>	<p>Included in chapter 9 and 10.</p>
<p>(f) Include the Total cost of the Project based upon estimates provided by and copy of certificate of valuation issued by a certified valuer, in accordance with Regulation 19(1) of the National Environment (Environment and Social Assessment) Regulations, S.I. No. 143/2020.</p>	<p>Costs are included in chapter 11.</p>

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Comment	Answer
(g) Accompany the ESIA report submission with evidence of payment of the 30% ESIA fees, in accordance with Regulation 49 of the National Environment (Environment and Social Assessment) Regulations, S.I. No. 143 of 2020.	This action will be implemented by UETCL after the approval of the Report.

## 23. ANNEX 12: NON-TECHNICAL SUMMARY

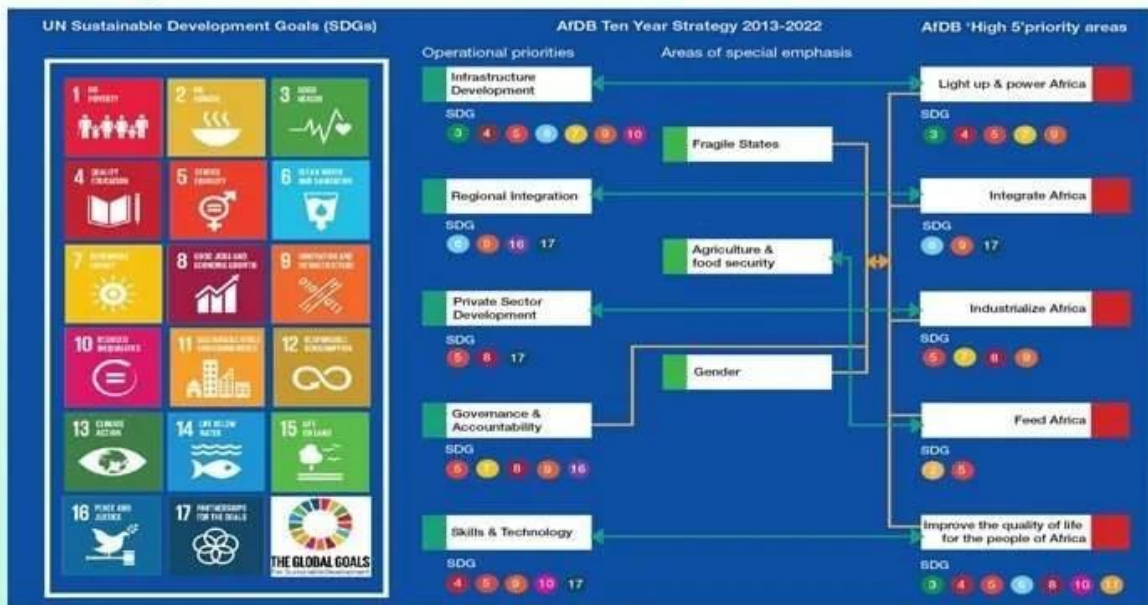


## 24. ANNEX 13: GENDER EQUALITY

**INTRODUCTION**

The African Development Bank’s High 5 priority areas are intended to support African countries’ achievement of the SDGs. They are: Feed Africa; Light up Africa; Industrialise Africa; Integrate Africa; and Improve the Quality of Life for the people of Africa.

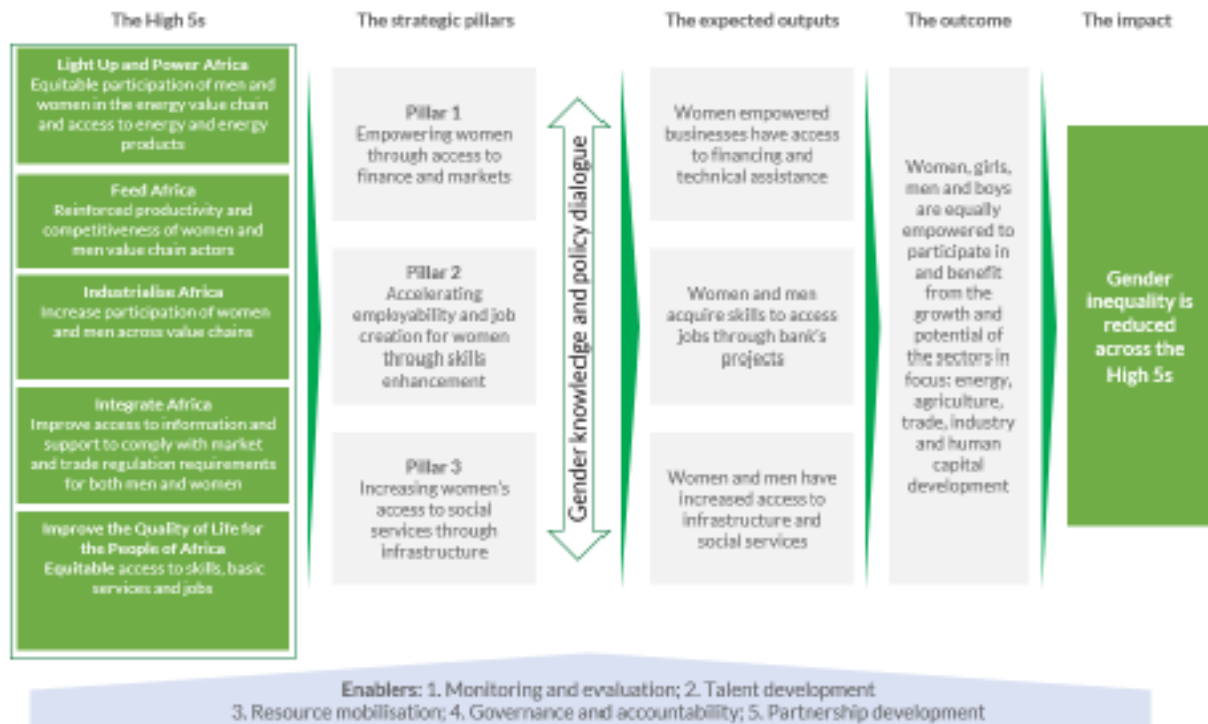
## Strategic Framework



The Bank like other international development institutions recognises that gender equality and women and girls’ empowerment is not only a critical human rights issue for women and girls, it is a prerequisite for the achievement of broader development goals, effective humanitarian response and sustainable peace and security. Therefore, due to the persistent challenges that hinder women’s economic empowerment in Africa, the Bank has increasingly focused on mainstreaming gender in its operations to ensure gender equality and women and girl’s empowerment at regional and national levels. Over the years, the Bank has demonstrated its commitment to promote gender equality and women and girls’ empowerment in Africa through various policy frameworks and institutional mechanisms.

The Gender Strategy 2021-2025 aims to strengthen the Bank’s commitment to do more to address the above challenges and push forward gender equality and women and girls’ empowerment in Africa. The Bank will do so focusing on three pillars:

- Empowering women through access to finance and markets;
- Accelerating employability and job creation for women through skills enhancement;
- Increasing women’s access to social services through infrastructure.



**APPLICABLE POLICIES**

**National Gender Policy (1997)**

The overall goal of this policy is to mainstream gender concerns in the national development process to improve the social, legal/ civic, political, economic, and cultural conditions of the people of Uganda, particularly women. Thus, in the context of the power sector, this policy aims to redress imbalances which arise from existing gender inequalities and promotes participation of both women and men in all stages of energy project cycle, equal access to, and control over significant economic resources and benefits.

This policy would especially apply to recruitment of transmission line construction labour where women should have equal opportunity as men for available jobs. This policy also requires provision of a working environment that is conducive to women as well as for men in addition to gender-disaggregated impacts and vulnerabilities.

This policy would especially apply to recruitment of construction labour for transmission line construction where women should have equal opportunity as men for available jobs. This policy also requires provision of a work environment that is safe and conducive to women as is for men considering gender-disaggregated differences and vulnerabilities. This, for example, applies to onsite worker’s sanitation facilities where women should have separate facilities from men’s.

**NBI Gender mainstreaming Policy and Guidelines, 2012**

The purpose of the NBI gender mainstreaming Policy and Strategy is to achieve gender equality and women’s empowerment in all NBI policies, strategies, processes, programs and projects through capacity building, rationalization and harmonization, research, resource mobilization, partnership development and advocacy. Guiding principles for the implementation of the NBI Gender mainstreaming Policy and Strategy: a) Gender Equality and non-discrimination: Working towards equity and justice by ensuring that everyone irrespective of sex, age, race, color, ethnicity, class and religion has an equal opportunity to express and utilize her/his potential;

- b) Gender mainstreaming: Considering gender concerns systematically from planning through implementation strategies and programs to outcomes;
- c) Inclusiveness: this policy stresses paying attention to special needs and the disadvantaged groups;
- d) Partnership and collaboration of all stakeholders at all levels;
- e) Sensitivity to socio-cultural diversity in the Nile Basin region.

The strategy forms an integral part of projects activities and aims at providing a view of the gender goals and to facilitate a process of learning and increased capacity to analyse and mainstream gender in the course of the work.

### **East African Community (EAC) Gender Policy, 2018**

This Policy provides a framework, intended to accelerate the realization of gender equality, fairness between men and women, non-discrimination, and fundamental rights in East Africa. The Policy framework is a tool to facilitate the advancement of East Africa's political and social economic integration, guarantee that gender issues are included in the East African Community agenda, accelerate gender mainstreaming, contribute to higher living standards, and enhance the efforts exerted by the East African people to play their rightful role in a globalizing world. The EAC is committed to increase access to affordable energy for men and women to increase economic development and improve standards of living. Gender, Energy and Lighting is a priority action area of the Gender policy, and the commitment of increasing access to energy for men and women is expressed in the Project.

### **The IGAD Regional Gender Equality Strategy (2023-2030)**

The IGAD Gender Equality Strategy sets the strategic framework for priority interventions areas of the implementation of IGAD's Vision 2050 and builds on several ongoing programs established to develop resilient ecosystems and economic growth. The gender strategy outlines an approach that intends to translate IGAD's commitments to gender equality, inclusion, and empowerment into demonstrable results and impacts. The priorities of the strategy include:

- Increase women's participation in sustainable management of natural resources, resilience building, food, and nutrition security;
- Advance gender equality in regional trade and economic integration;
- Increase equitable access to health and basic social services for gender transformation;
- Increase the participation of women in peace building and conflict management and protect women living in situations of conflict;
- Advance efforts to eliminate all forms of violence against all women and girls in public and private spheres, including trafficking, sexual exploitation, and all other forms of exploitation;
- Strengthen IGAD's institutional capacity for leadership and coordination of Gender Equality and Women's Empowerment interventions

The Project aims to promote gender equality in regional trade and economic integration by improving energy accessibility in remote areas. This will enable women to start new trades at a local level or connect existing ones to the rest of the country. Availability of energy will also improve the access of women to technology, education, and health.

### **The African Development Bank Group Gender Strategy (2021-2025)**

The African Development Bank has made gender equality and women central to its activities through developing and implementing strategies that integrate women's concerns into the Bank's internal and

external operations and engagement. The Gender Strategy 2021-2025 will prioritize the need to reduce gender inequalities across Africa by increasing access to finance and technical assistance, enhancing technical skills and gender-responsive infrastructure. In recognition of the opportunity to further enhance gender equality and women and girl's empowerment on the continent, the Bank, through its High 5s, intends to accelerate the continent's economic and social transformation. The 5s are: Light up and Power Africa, Feed Africa, Industrialize Africa, Integrate Africa, Improve the Quality of Life for the People of Africa.

In a country such as Uganda and South Sudan, where gender inequalities are prevalent, this Project will provide women in relatively isolated areas with access to electricity. This resource will contribute to the development of their local businesses and economy, ensuring a higher level of security. The Project is placed into the first High 5, Light up and Power Africa, with the aim of empowering women increasing access to social services through infrastructure and creating job opportunities.

### PROFILE OF DIRECT AFFECTED HOUSEHOLDS

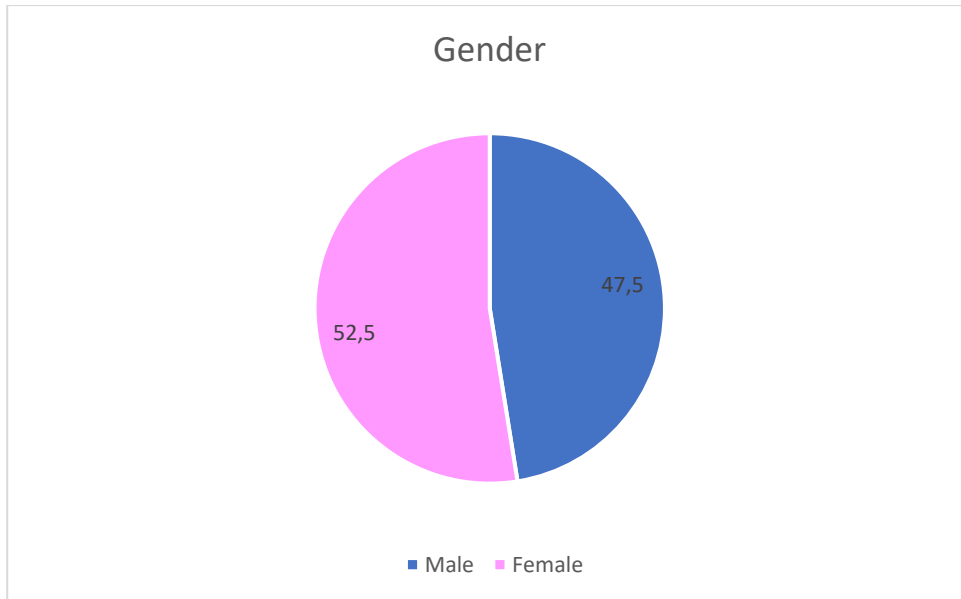
Northern Uganda faced decades of conflict due to the Lord's Resistance Army insurgency, which led to widespread displacement, loss of lives, and destruction of infrastructure. The war destabilized the entire northern region, displacing 90% of the population. Many people were forced into displacement camps and could not access their land. When the war ended and people returned to their home communities, numerous competing claims on land emerged.

This conflict disproportionately affected women, who often faced sexual violence, abduction, and other forms of trauma. Since the cessation of major conflict, efforts have been made to rebuild the region. However, the process has been slow and challenging. Development projects aim to improve infrastructure, access to education, healthcare, and economic opportunities for women.

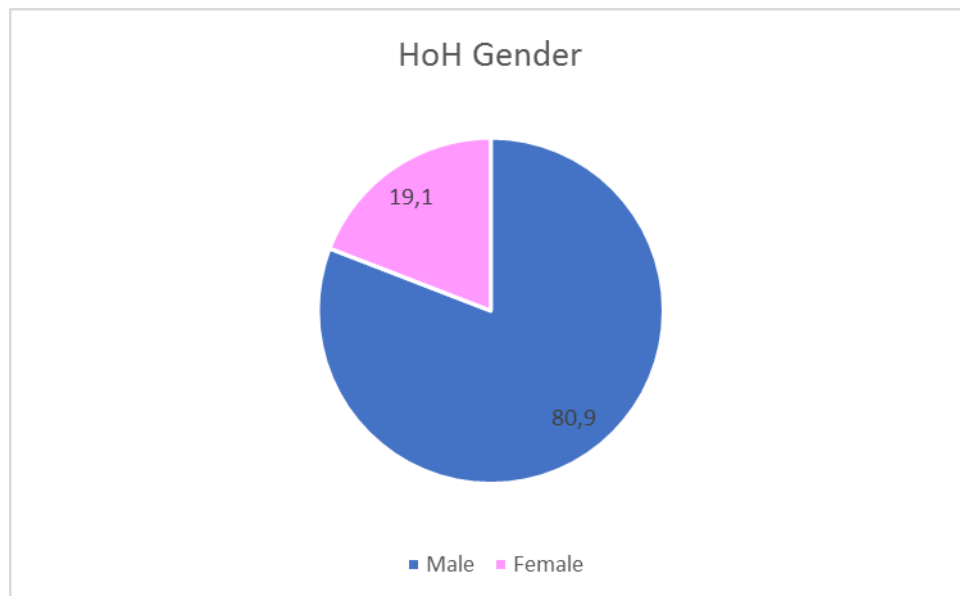
Access to education has improved, but challenges remain, especially in rural areas. Cultural factors, poverty, and early marriages can hinder girls' access to education. Efforts to promote girls' education and literacy are ongoing but face various obstacles. Access to healthcare, particularly maternal and reproductive healthcare, remains a concern. Women in rural areas often have limited access to quality healthcare facilities, leading to high maternal mortality rates and inadequate family planning services. Economic opportunities for women are expanding, but unemployment and underemployment remain significant issues. Microfinance initiatives, vocational training programs, and women's cooperatives are being promoted to enhance economic empowerment.

Traditional gender roles and patriarchal norms still influence the lives of women in Northern Uganda. Women are often responsible for household chores, childcare, and agricultural work, with limited decision-making power within their families and communities. Despite improvements in security, women continue to face various forms of violence, including domestic violence, sexual assault, and gender-based discrimination. Efforts to address these issues include legal reforms, awareness campaigns, and support services for survivors. Women's participation in politics and decision-making processes is increasing, albeit slowly. Efforts to promote women's leadership and representation in governance structures are underway, but women still face barriers such as cultural norms and limited resources.

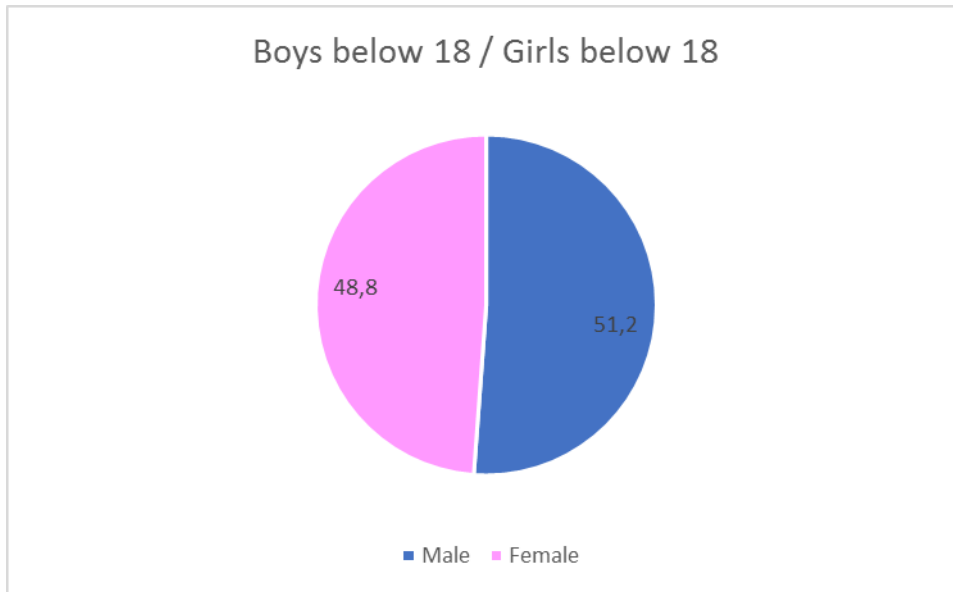
Overall, while progress has been made in improving the living conditions for women in Northern Uganda, significant challenges persist. Sustainable development efforts must address these challenges comprehensively, taking into account the complex interplay of social, economic, and cultural factors impacting women's lives in the region.



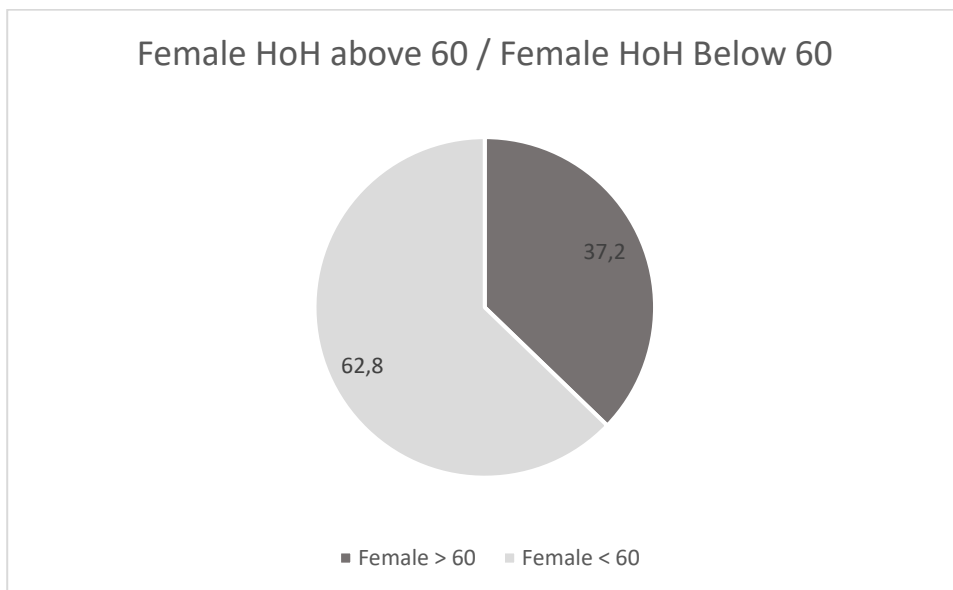
*Project Population distribution by gender*



*Household Head distribution by gender*

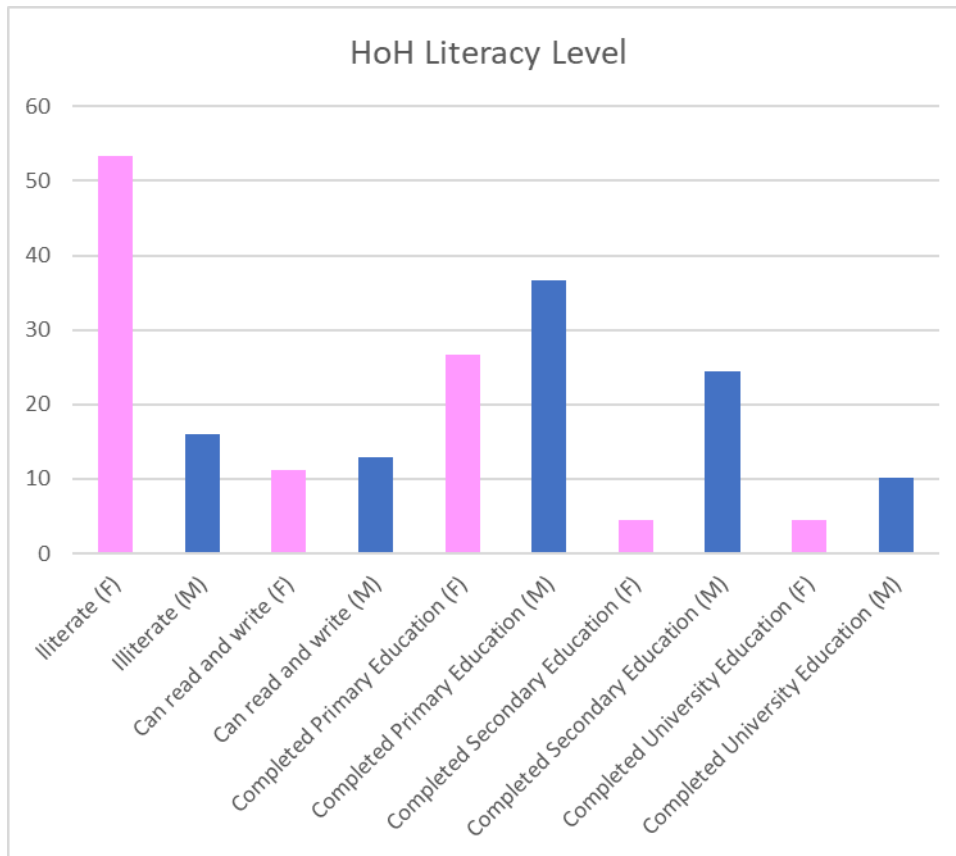


*Project Population distribution below 18 by gender*



*Household head distribution by gender and age*

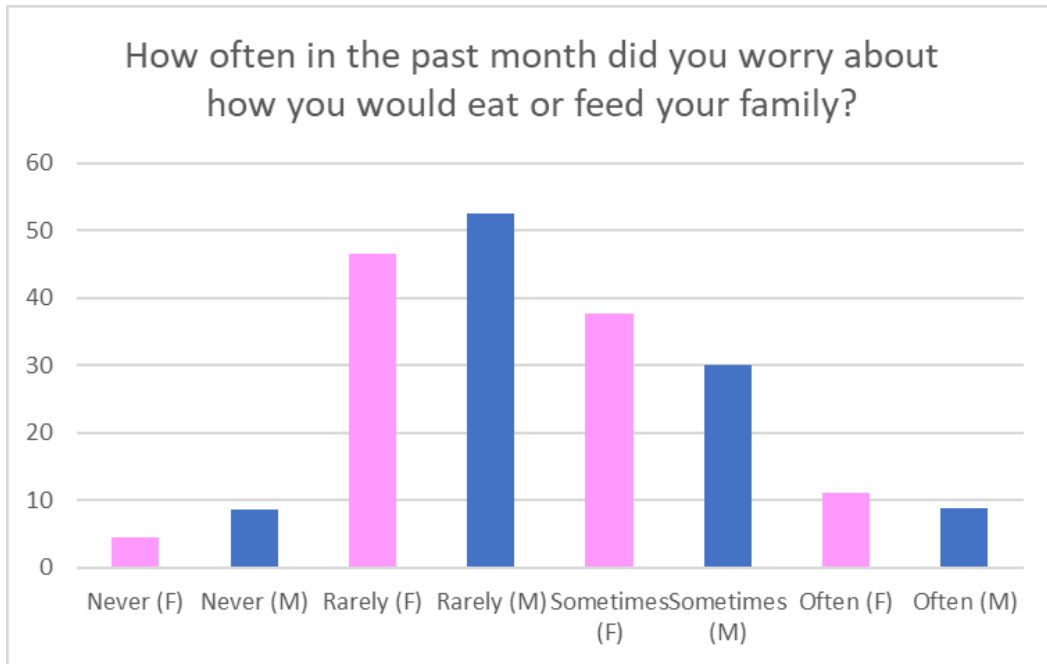
Gender disparities in literacy rates persist in Northern Uganda, with women generally lagging men in literacy and educational attainment. Cultural norms, early marriage, household responsibilities, and economic constraints often contribute to lower school enrolment and higher dropout rates among girls.



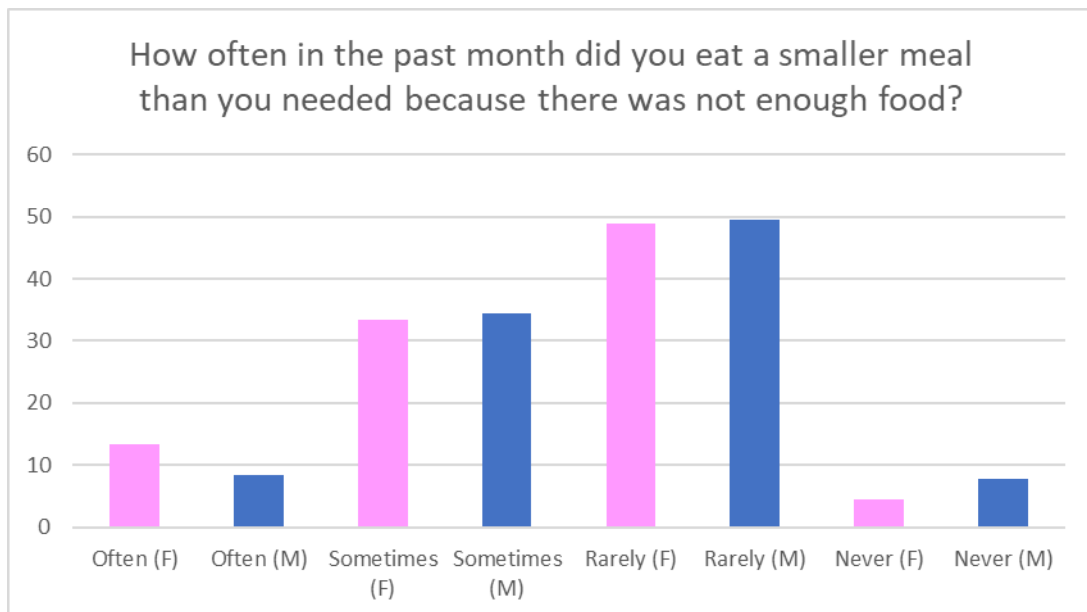
Households literacy level.

Food security for women in Northern Uganda is influenced by various factors, including access to land, agricultural resources, income, education, and social support systems. Agriculture is the primary source of livelihood for the majority of people in Northern Uganda, including women. Women play crucial roles in agricultural production, including planting, weeding, harvesting, and processing crops. However, their contributions are often undervalued, and they may have less access to productive resources such as land, seeds, fertilizers, and extension services compared to men.

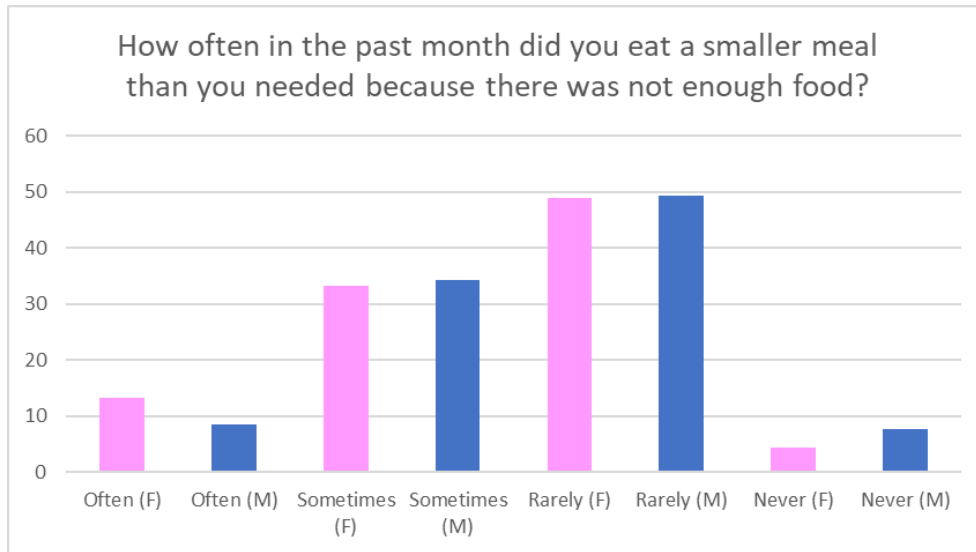




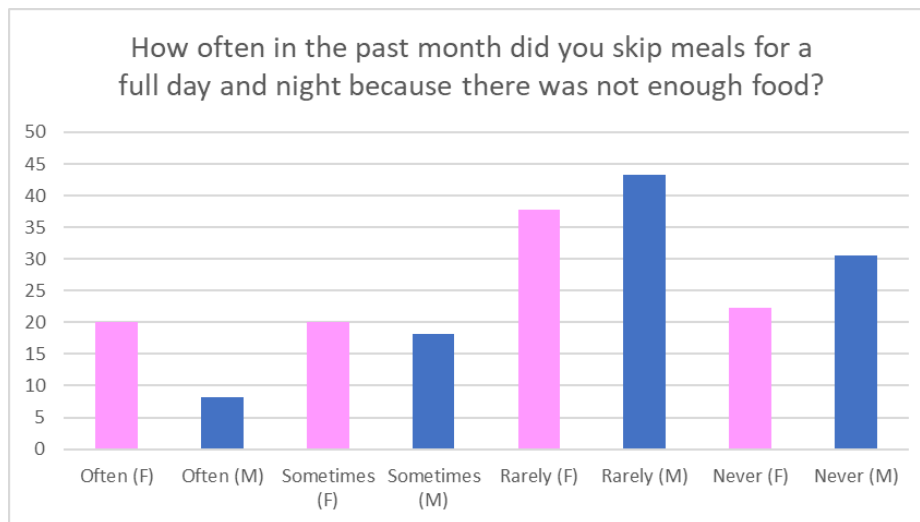
Comparison between male and female households on the food security in the project area.



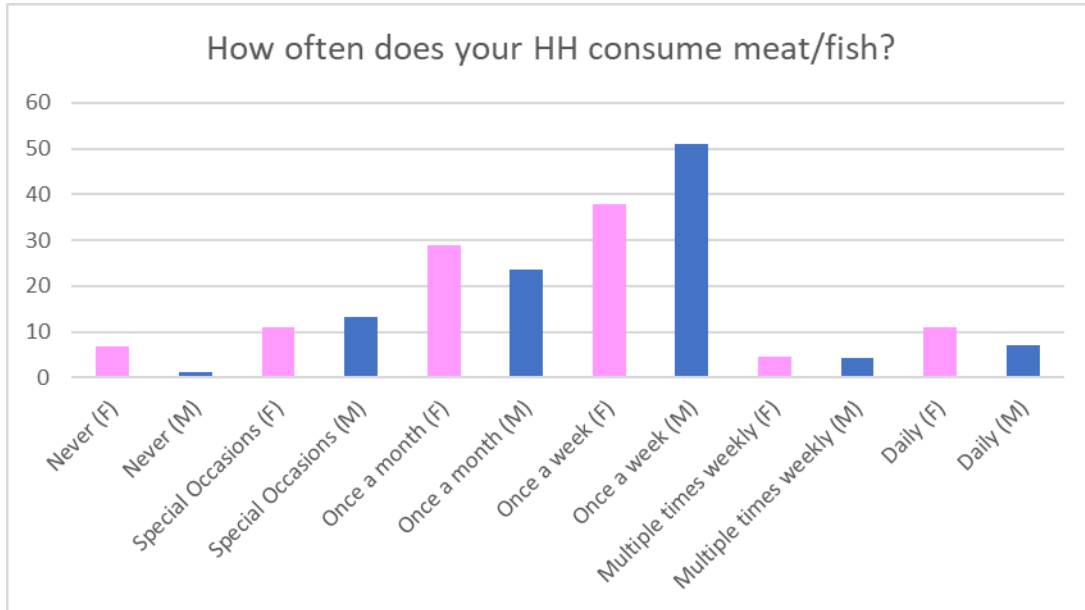
Comparison between male and female households on the frequency of smaller meals eaten in the project area due to insufficient food.



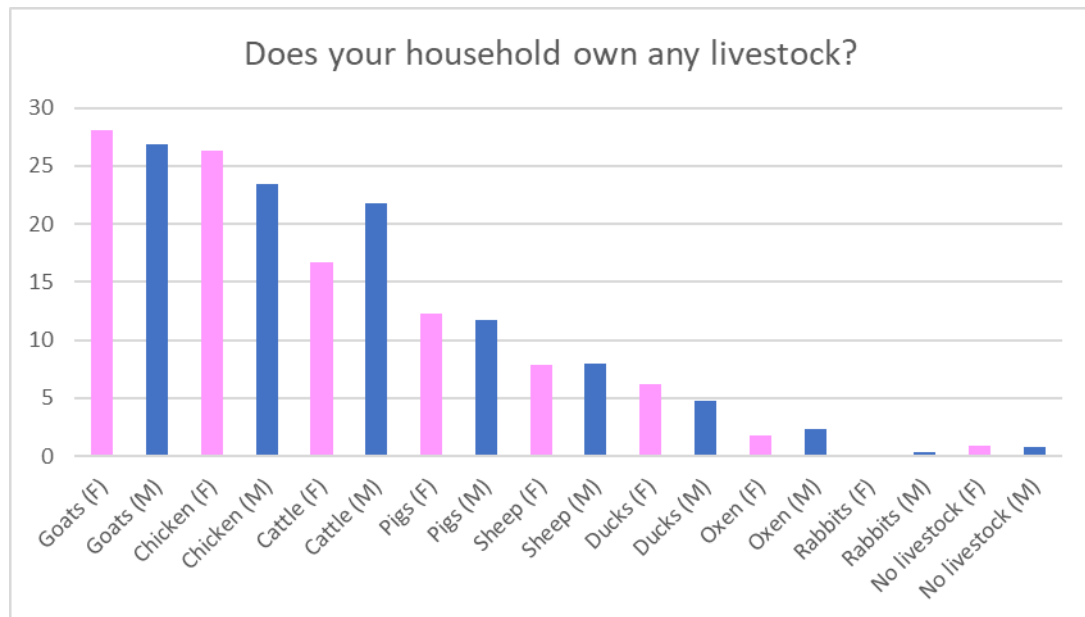
*Comparison between male and female households on the frequency of fewer meals eaten in the project area due to insufficient food.*



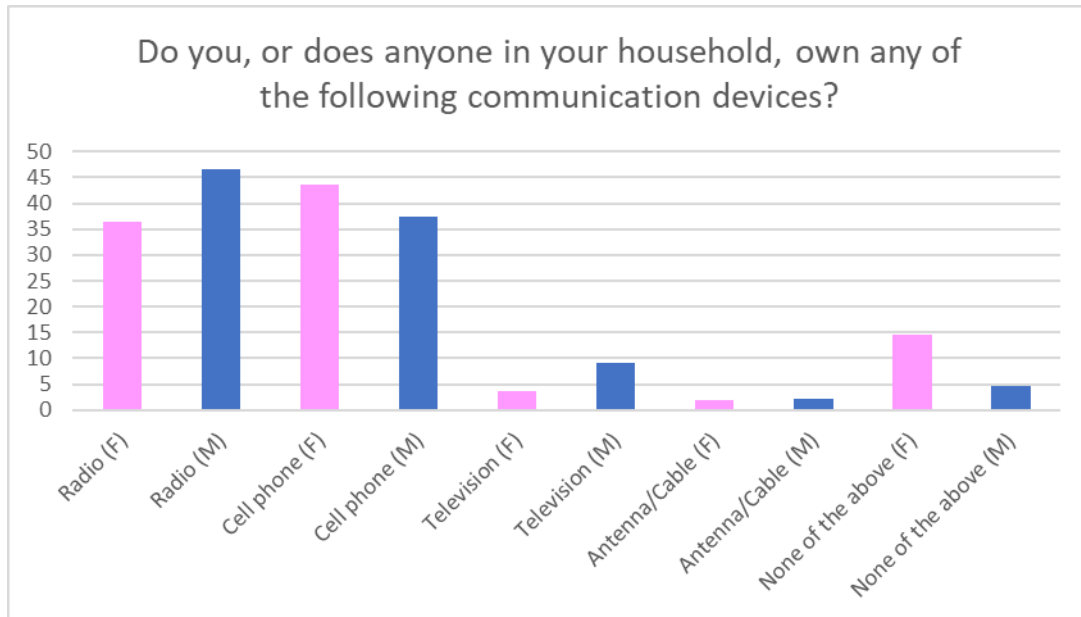
*Comparison between male and female households on the frequency of meals skipped for a full day in the project area due to insufficient food.*



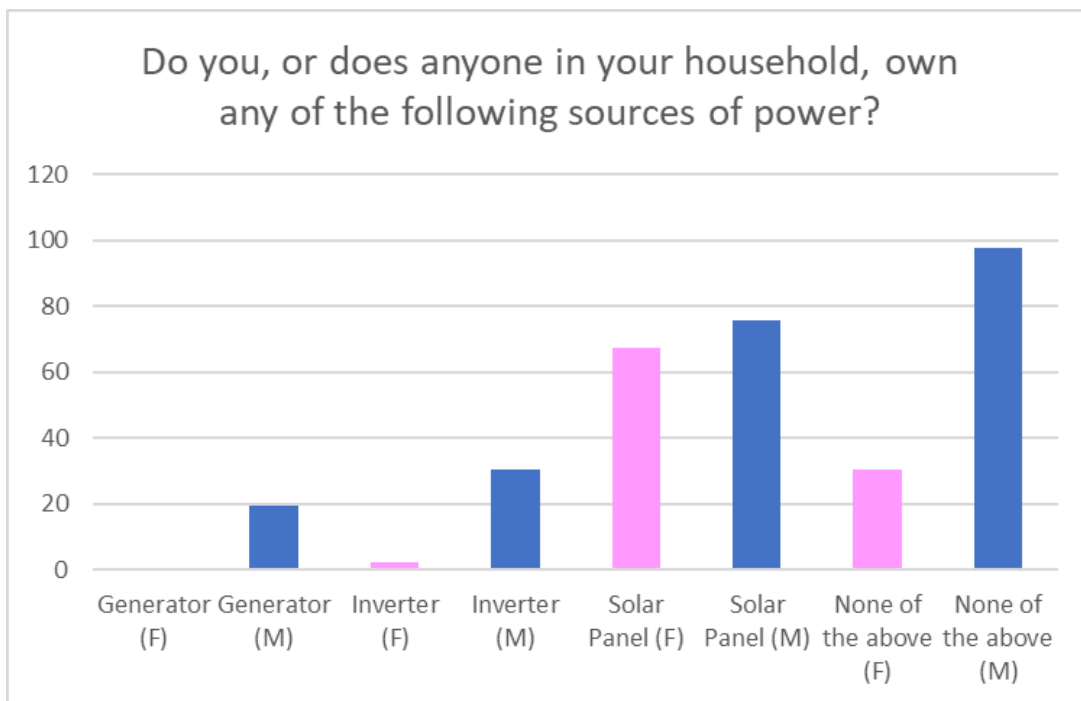
Comparison between male and female households on the frequency of fish and meat meals in the project area.



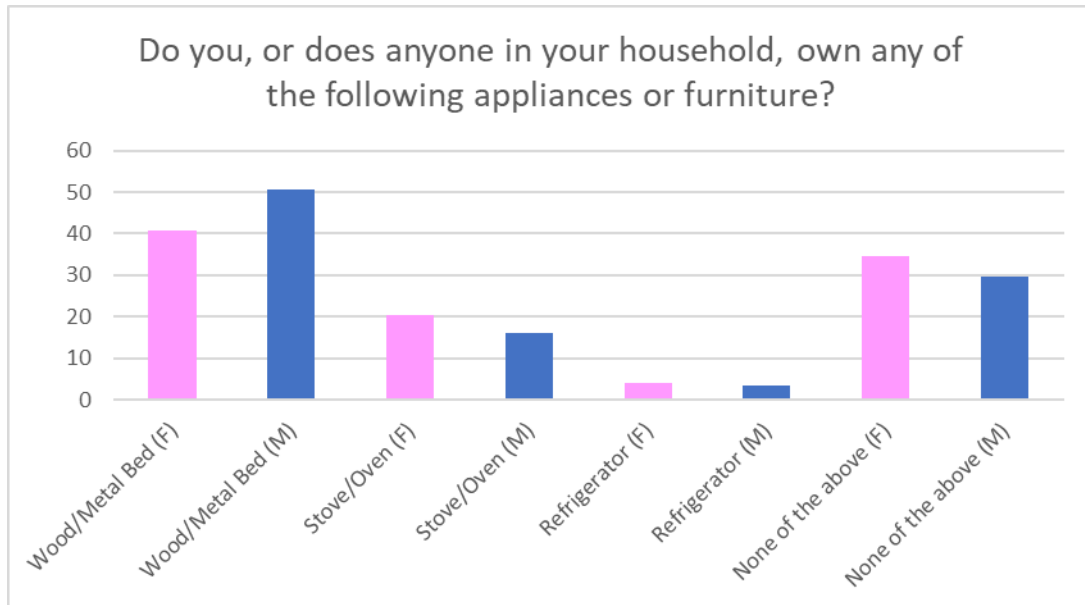
Comparison between male and female households on livestock ownership in the project area.



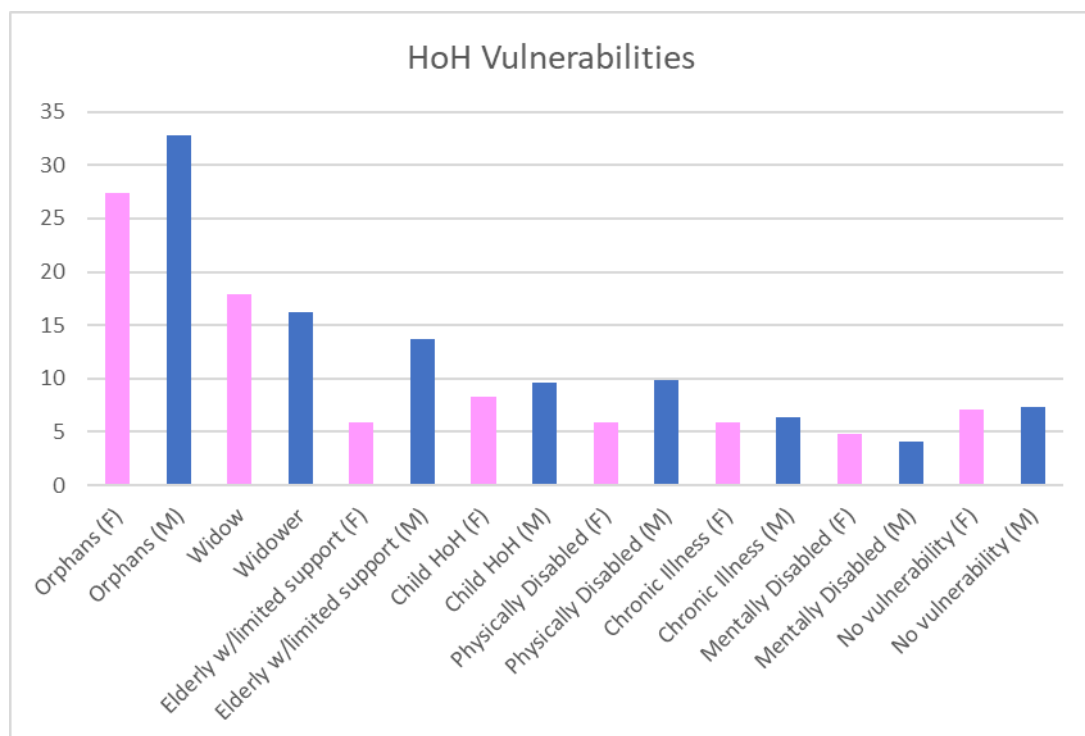
Comparison between male and female households on the ownership of communication devices in the project area.



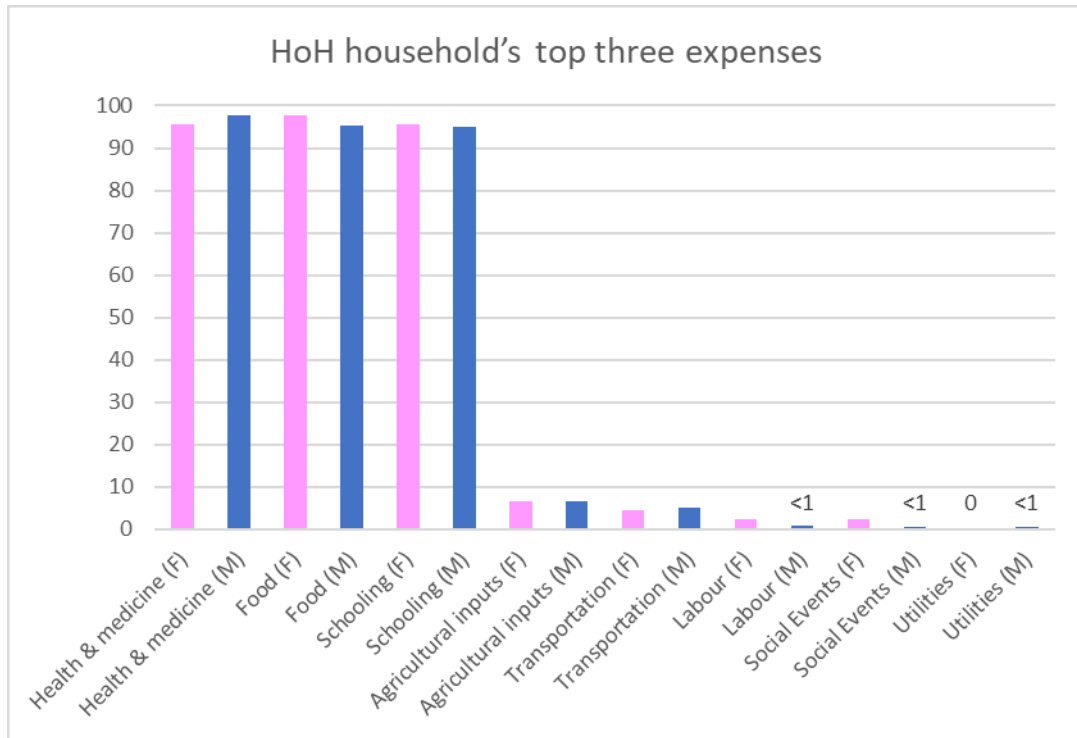
Comparison between male and female households on the ownership of source of power in the project area.



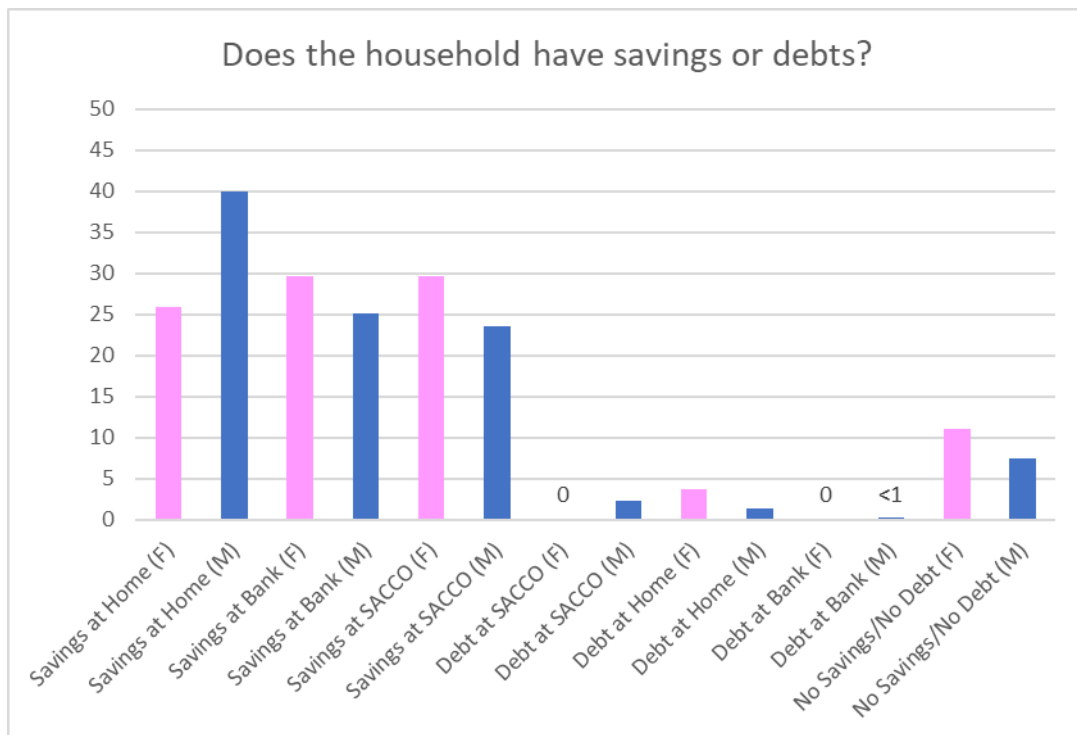
Comparison between male and female households on the ownership of appliances or furniture in the project area.



Comparison between male and female households on the types of vulnerabilities of project population.



Comparison between male and female households on the top three expenses in the project area.



Comparison between male and female households on the savings or debts in the project area.

**IMPACTS**

Employment and Income

Positive opportunities for PAPs and communities can be in the form of temporary employment, as casual labour, cooking, and cleaning services. It is expected that some jobs will be available during construction of the power transmission line for the local population, mainly as casual workers. However, these employment opportunities are expected to be temporary and benefit the community in the short term only. There will be a moderately positive impact on employment, since limited number of people are likely to be employed. Nevertheless, it is a good opportunity in consideration of the poverty level in the region.

#### Small business opportunities

As for job opportunities, small business can raise during the construction phase, for all what concern the provision of services like the sale of food and other consumable goods to workers from other parts of the country and abroad.

#### Sexual Harassment

Large influx of male labor may also lead to an increase in exploitative sexual relationships and human trafficking whereby women and girls are forced into sex work. The impact will be continuous during all the project construction and it will have a local extension, the intensity is considered high since the Acholi Region is one of the areas with the highest rates of physical and sexual violence on women and men.

For two decades, the region was severely affected by conflict. According to different studies, these communities experienced sexual and physical violence at the hands of the insurgents, through abduction of children as sex slaves or as child soldiers, and indiscriminate mutilation and murders. Sensitivity therefore is considered high as well and the impact irreversible, nevertheless still manageable through prevention and proper awareness training, workers code of conducts and effective GRM.

#### Increase of social conflicts

The risk of social conflicts in the project area can be triggered either by land conflicts or by the influx of workers with different lifestyles or cultural backgrounds on the host community, in particular issues such as religious or other cultural proscriptions, local traditions and community structure and the relationship between men, women and youths. It is worth of noting that Customary leadership of the Acholi was severely affected by the long conflict in Northern Uganda. When the camps were disbanded and people began to return to their land, customary rules not always had the answers to some of the problems faced by Acholi people. For this reason, the intensity of the impact is considered medium and the sensitivity medium high, nevertheless with a good GRM, stakeholder engagement and workers awareness the impact is mitigable.

#### Increase of STD and VBD

As reported in the baseline chapter, Uganda's population of 47 million has always been heavily impacted by illness and disease, with communicable diseases accounting for over 50% of deaths in the country. Malaria, tuberculosis (TB) and HIV/AIDS are three of the top diseases impacting Uganda and are among the leading causes of death. In consideration of the actual situation, the influx of workers from abroad or from other parts of Uganda can increase the transmission of HIV and TB through contact with local communities, while poor management of water resources in camp or construction sited could increase the spread of malaria mosquitos. The community of the project is well aware on the risk and prevention practices of these diseases though awareness campaigns conducted by the Government and NGOs. Hence, the impact has been considered medium highly sensitive, irreversible. Nevertheless, mitigation

effectiveness has been considered high, because with an Occupational and Community Health and Safety in place the risk can be extremely reduced and managed.

### Child Labor

Child labor has increased substantially over the last years in Uganda. In 2017, 14% or 2 million children between the age of 5 and 17 were found in child labour<sup>1</sup>. In 2022, this was risen to 39.5% (37.9% girls and 40.9% boys) or 6.2 million children. In rural areas the prevalence is 42.3%, with Karamoja (55.6%), Lango (52%), Elgon (47%), Busoga (46%) and Acholi (45.7%) as the subregions with the highest prevalence. Child labor is found in many economic sectors and predominantly in the agricultural sector. Agricultural sectors in which child labor is reported are sugarcane, rice, tea, coffee, tobacco, livestock, and fishing. Other economic sectors who suffer from child labor are the extractive industry (gold mining, sand mining and stone quarrying), construction, domestic services, and commercial sexual exploitation. Contractor will require local workforce for casual labor and in consideration of this trend the potential risk for the project to increase child labor is high and the impact highly frequent, highly intense, and irreversible. Construction works, or quarry activities are considered as heavy work that can compromise the development of children, therefore also the residual impact remain high.

### MITIGATION MEASURES

The project has defined mitigation measures that cover the needs of women and that are extracted from the main ESMP and consider the following aspects

- Engage with local communities, including women's groups and leaders, throughout the project lifecycle. Consultation processes should be inclusive, transparent, and participatory, ensuring that women's voices are heard, their concerns are addressed, and their priorities are considered in decision-making.
- Empower women with knowledge, skills, and resources to participate meaningfully in decision-making processes related to transmission line projects. Provide capacity-building initiatives, training programs, and educational opportunities that enhance women's understanding of their rights, opportunities, and responsibilities.
- Provide support for alternative livelihoods and income-generating activities for women affected by the project. This includes vocational training, access to credit and markets, support for entrepreneurship, and investment in women-led businesses and cooperatives.
- Ensure that women have secure land tenure rights and are adequately compensated for any land acquisition or right-of-way encroachment associated with transmission line construction. Transparent and equitable compensation mechanisms should consider women's contributions to land-based activities and their specific needs.
- Implement measures to protect women's health and safety during the construction and operation of transmission lines. This includes adherence to safety standards, mitigation of environmental impacts, monitoring of electromagnetic fields (EMF) exposure, and provision of healthcare services for affected communities.
- Establish social protection programs and support services that address the needs of women and vulnerable groups impacted by transmission line projects. This may include access to healthcare, counseling, legal assistance, psychosocial support, and mechanisms for reporting and addressing gender-based violence and other grievances.
- Regularly monitor and evaluate the gender impacts of transmission line projects to assess progress, identify gaps, and make informed adjustments. Collect sex-disaggregated data, conduct gender-sensitive indicators, and engage in participatory monitoring and evaluation processes involving women and other stakeholders



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Component	Target	Mitigation and Enhancement	Responsibility		Costs (USD)	Phase: Constr. (C) Oper. (O)
Resettlement	All affected households	Compensation for the loss of land and livelihood restoration through training and assistance	-	ESMD	200,000	C
Labor Equity in local employment benefits/minimize social conflicts	All National and international workers, included labor from nearby communities	Develop Project Human Resource Policy which includes provision: <ul style="list-style-type: none"> <li>▪ to prioritize local employment considering available skills in accordance with Local Authorities/Village leaders and UETCL,</li> <li>▪ to promote non-discrimination and equal opportunities,</li> <li>▪ Include women in the hiring and training process</li> <li>▪ to provide additional specialized training to local workforce in skills required by contractor (i.e. administrator, driving etc.).</li> </ul>	Contractor	ESMD	200,000	C
Labor Labor grievance mechanism	All National and international workers, included labor from nearby communities	Develop Project Grievances Mechanism for labor: <ul style="list-style-type: none"> <li>▪ Complaint from worker about unfair treatment or unsafe living or working condition;</li> <li>▪ Grievance policies and mechanism must be developed and disclosed.</li> </ul>	Contractor	ESMD	100,000	C
Security social conflict	Villages of the Project Area	<ul style="list-style-type: none"> <li>▪ Prepare a Security Management Plan with provisions for respect of Voluntary Principles on Security and Human Rights (VPSHR) and manage the influx of workers and followers through a Labor Influx Management Plan</li> <li>▪ Harmonize the above plans with:                             <ul style="list-style-type: none"> <li>▪ Local Employment Plan</li> <li>▪ Workers Code of Conduct</li> <li>▪ GBV/CAE/SEA plan, Occupational and Community Health and Safety plan</li> </ul> </li> <li>▪ Establish continuous communication with Key stakeholders and traditional leaders.</li> <li>▪ Train foreign workers on local culture and traditions</li> </ul>	Contractor	Contractor and ESMD	20,000	C
Vulnerable Groups	Villages of the Project Area	<ul style="list-style-type: none"> <li>▪ GBV and CAE</li> <li>▪ Contractors are required to have sexual harassment policies and Worker’s Code of Conduct. It is recommended that Codes of Conduct include specific prohibitions against SEA, including prohibition of sexual activities with children, defined as anyone younger than 18. This standard must hold even when</li> </ul>	Contractor	ESMD	45,000	C

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Component	Target	Mitigation and Enhancement	Responsibility		Costs (USD)	Phase: Constr. (C) Oper. (O)
		national standards, laws and policies have a younger age of consent. <ul style="list-style-type: none"> <li>▪ Worker Code of Conduct shall be translated in local language(s)</li> <li>▪ The Contractor is obliged to create and maintain an environment which prevents gender-based violence (GBV) and child abuse/exploitation (CAE) issues, and where the unacceptability of GBV and actions against children are clearly communicated to all those engaged on the project.</li> <li>▪ Complains on GBV and CAE episodes shall be channelized through the Project Grievances Redress Mechanism, it should state in simple, up-front language that perpetrators will be sanctioned. System of sanctions must be put in place that will unambiguously reflect the project's commitment to a violence-free workplace.</li> <li>▪ Standardized training against sexual harassment and GBV should be part of on-boarding procedures for all contractor's employees at site.</li> </ul>				
Stakeholder Engagement	Affected authorities from Village to Parish and County level	Develop a Stakeholder Engagement Plan which shall include at least: Chiefs of Affected Parishes and Villages Road Authorities Health authorities Forest authorities Tourist authorities Contractors UETCL Women Representatives Youth representatives Create Project Information Centre for communities	UETCL	ESMD and Contractor	45,000	P, C
			Contractor	ESMD and Contractor	45,000	P, C

**SP14: Local Employment Management Plan**

INFORMATION REQUIRED	DETAILS
Developer	Each Contractor and Subcontractor
Project Phase	Pre-Construction – Construction – Operation
Place	Entire Project Area
Social aspect	Employment
Description of Impact	Short and Medium Terms Employment
Affected Activities	All activities
Consequence	Social Unrest Abuse of local work force Decrease of workers wellbeing
Management and Measure	<p>Work with the procurement team to ensure that contracts with (sub) contractors and agencies follow national law in the country of operation, with company codes of conduct and policies, and with ILO, AfDB guidelines.</p> <p>Develop an action plan in cooperation with UETCL and local authorities to prioritize recruitment among affected communities indicating human resources needs, time schedule and provision of training.</p> <p>Directly affected women shall be taken into consideration in the definition of human resources needed for the project development</p> <p>Define a procedure to keep track of directly affected people hired by the consultant in cooperation with UETCL using a shared affect households records/database distributed by UETCL and local authorities.</p> <p>Develop a Human Resources Policy in compliance with UETCL related policy guaranteeing at least</p> <ul style="list-style-type: none"> <li>- Give equal job opportunities</li> <li>- freedom of association and collective bargaining;</li> <li>- prohibit the hiring of underage workers, as defined in relevant ILO Conventions;</li> <li>- prohibit recruitment, use and practices of forced labor and child labor;</li> <li>- prohibit discrimination in hiring practices or pay;</li> <li>- provide fair and favorable working conditions as per contract terms and make sure that conditions are transparent and understood by workers prior to recruitment;</li> <li>- avoid excessive recruitment or transportation fees, or to keep identity documents or working papers;</li> <li>- guarantee freedom of movement in and out of the workplace and workforce accommodation;</li> <li>- guarantee wages as per industry standards/minimum wage;</li> <li>- guarantee access to workforce grievance mechanisms;</li> <li>- guarantee provision of sufficient rest periods and rest days to avoid fatigue;</li> <li>- guarantee safe and healthy work place conditions;</li> <li>- guarantee provision of food and water for drinking and sanitation;</li> </ul>

INFORMATION REQUIRED	DETAILS
	<ul style="list-style-type: none"> <li>- guarantee working conditions and accommodation standards;</li> <li>- guarantee provision of appropriate personal protective equipment</li> </ul> <p>Adopt a Worker Accommodation Management Plan AS PER guidance note by IFC on Workers' accommodation. Separate accommodation and toilets for women.</p> <p>Develop a workers' grievances mechanism, a workers' code of conducts and GBV action plan.</p> <p>Contractually require all (sub)contractors to adhere to Contractor and UETCL Human Resources Policy, workers grievances mechanism, a workers' code of conducts and GBV action plan, Community and Occupational HS Plan</p>
Monitoring	<p>Consult the Contractors and Subcontractors employment logs, verify against national and international standards working hours, leave, salary, health and safety condition, lodge arrangements.</p> <p>Interviews with key informants</p> <p>Record of meetings and communication to workers</p> <p>Gender breakdown of local workforce employed by contractor and subcontractors</p>
Period of Implementation	Pre - Construction – Construction – Operation
Frequency	Quarterly Basis
Training	HS training general and specifics as per plans' needs,
Facilities, Equipment, Material and Supply	<p>PPE, Lodging, HS facilities, Sanitary facilities, Canteen</p> <p>Provide separate facilities for women</p>
Compliance	Project ESMP and related policies, standards, laws.

**SP18: GBV / SEA / CAE Plan**

INFORMATION REQUIRED	DETAILS
Developer	Each Contractor and Subcontractor
Place	Entire Project Area
Social aspect	Community Wellbeing
Description of Impact	Sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community. A large influx of male labor may also lead to an increase in exploitative sexual relationships and human trafficking whereby women and girls are forced into sex work.
Affected Activities	All activities
Consequence	Permanent health and psychological damages of victims of abuse
Management and Measure	<p>Contractors are required to have sexual harassment policies and Worker’s Code of Conduct. It is recommended that Codes of Conduct include specific prohibitions against SEA, including prohibition of sexual activities with children, defined as anyone younger than 18. This standard must hold even when national standards, laws and policies have a younger age of consent.</p> <p>Worker Code of Conduct shall be translated in local language(s)</p> <p>The Contractor is obliged to create and maintain an environment which prevents gender-based violence (GBV), sexual abuse exploitation (SEA), child abuse/exploitation (CAE) issues, and where the unacceptability of GBV and actions against children are clearly communicated to all those engaged on the project.</p> <p>Complaints on GBV and CAE episodes shall be channelized through the Project Grievances Redress Mechanism, it should state in simple, up-front language that perpetrators will be sanctioned. System of sanctions must be put in place that will unambiguously reflect the project’s commitment to a violence-free workplace.</p> <p>Standardized training against sexual harassment and GBV should be part of on-boarding procedures for all contractor’s employees at site</p> <p>Develop a “child labour monitoring” system, a three-person team of community members (such as a school teacher, mothers’ club member or retired policeman) are given training in how to monitor child labour. They then periodically visit places where children are likely to be working. If they find a child, they report the case to a specially constituted community committee, as well as to the labour inspector or local government authority for follow-up. Depending on the child’s situation, the committee will recommend a course of action,</p> <p>Protecting older children in or at risk of hazardous work offering comprehensive packages of training and services to facilitate the transition from school to decent work (skills, apprenticeships, vocational training, job counselling, enterprise development, financing)</p> <p>Raising awareness among employers of productivity gains to be achieved through improvement of working conditions to a level that is safe for young people to work.</p>

INFORMATION REQUIRED	DETAILS
	Establishing joint worker-employer safety committees, safety representatives and connections to workers' organizations to provide support for young people in the work environment. Ensuring regular inspection of enterprises regarding workplace conditions and adherence to minimum age restrictions Training frontline health-care providers to detect and document occupational injuries, illnesses of children, GBV and CAE Define Roles and Responsibilities Define a management and consultations schedule
Monitoring	Safety Audits through key informant interviews, FGD N and Records of the awareness Trainings Men & Boys Self-Assessment Form – Awareness Raising N of qualified experts involved in the management and follow up of issues related to GBV/CAE/SAE GRM log Records of community monitoring N of cases registered or reported by Health care providers
Period of Implementation	All project phases
Frequency	On quarterly Basis
Training	Awareness training for workers GBV/CAE/Child labor Monitoring training for inspectors selected from community, health providers etc.
Facilities, Equipment, Material and Supply	As per plan needs
Compliance	National Legislation, AfDB and IFC Standards

## 25. ANNEX 14: GRM LOG AND CLOSE OUT FORM





## GRIEVANCE CLOSE OUT FORM

**Project Name:**

**Project Gr Responsible:** UETCL ESMD / GRM Committee ...

**Gr. Number:**

**Source:**

**Date of Complain:**

**Applicant:**

**Type of Complain:**

**Description of the Complain:**

**Request for Problem Resolution:**

**Resolution of the Complain:**

**Evidence of Resolution:**

**Date of Resolution:**

**Status:**

***Date, Stamp and Signature***

***To: Applicant***

***Cc:***