ENVIRONMENTAL AND SOCIAL ASSESSMENT

Electrification of the East-West Region and Rural Electrification

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Abstract

This document presents the findings of the Environmental and Social Assessment performed through this consultancy.

Contents

List of abbreviations and terms

Abbreviations	Meaning
ACT-S	Amazon Conservation Team Suriname.
BIC	Bestuurs Informatie Centrum (Management Information Center)
NV EBS	NV Energie Bedrijven Suriname (Energy Companies Suriname)
IDB	Inter-American Development Bank.
KPI	Key Performance Indicator.
KRI	Key Risk Indicator.
MZ	Medical mission (Medische Zending)
SIA	Social Impact Analysis.
SRA	Social Risk Analysis.
SWM	Surinaamsche Waterleiding Maatschappij (Surinamese Water infrastructure company).
Terms	**Meaning**
Bioeconomy	The bioeconomy is the knowledge-based production and use of biological resources to provide products, processes and services in all economic sectors within the frame of a sustainable economic system

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1 Executive Summary

This Environmental and Social Assessment (ESA) has been conducted for the proposed electrification project in north-eastern Suriname, aimed at improving the quality of life and supporting the sustainable development of Maroon and Indigenous communities. The project seeks to connect currently isolated energy systems to the main grid of N.V. Energie Bedrijven Suriname (EBS), reducing operational costs, improving reliability of supply, and stimulating socio-economic growth. In addition, the project contributes to Suriname's broader goals of regional energy integration, with potential benefits extending to neighboring Saint-Laurent-du-Maroni (French Guiana).

1.1 *Project Scope and Objectives*

The project has four main components:

1. **Construction of a 127 km, 110 kV Overhead Line (OHL)** from Peperpot Substation to Albina.
2. **Development of two new substations** (Moengo and Albina) and the **expansion of Peperpot Substation**.
3. **Connection of Wanhatti and surrounding villages** (Amaloko, Langa Uku 1 & 2, Lantiwee, Pikin Santi, Pinatjarimi, Tamarin, Abaadu Konde, Akale Konde, Benati Mofo) to the main grid through new distribution and low-voltage networks.
4. **Construction of a 1.6 MW solar PV plant in Moengo** with full SCADA integration, providing hybrid grid-renewable energy solutions.

Together, these interventions will replace costly and unreliable diesel generation, extend reliable electricity to urban centers (Moengo, Albina) and remote villages, and strengthen the resilience of Suriname's electricity sector.

1.2 *Key Environmental and Social Considerations*

Environmental Challenges
The ESA identifies a range of environmental risks:

- **Deforestation and habitat disruption** from transmission line clearing and substation construction, with potential impacts on biodiversity, wetlands, and secondary forests.
- Risks to **cultural heritage landscapes**, notably the Fraga Tiki sacred site in Langa Uku.
- **Water and soil contamination risks** from construction runoff, hazardous waste, and inadequate disposal facilities, especially near the Cottica River and Albina wetlands.
- **Air and noise pollution** affecting residents and schools in Tamarin and Abaadu Konde.
- **Climate change risks**: Moengo and Albina face high flood exposure, Alfonsdorp substantial risk, and Pierrekondre moderate risk, requiring climate-resilient design and adaptive planning.

Positive impacts include reduced greenhouse gas emissions through substitution of diesel generation, improved waste management systems, opportunities for biodiversity monitoring, and enhanced community environmental awareness.

Social Challenges

The social analysis highlights both opportunities and risks:

- **Financial sustainability** remains uncertain; many households may struggle with tariffs and O&M costs without tailored ownership and subsidy models.
- **Community skepticism and trust deficits** are pronounced in Wanhatti and Tamarin due to previous unfulfilled political promises.
- **Indigenous and Tribal Peoples (ITPs)** are especially vulnerable due to lack of recognized collective land rights, raising risks of exclusion.
- **Gender inequality and GBV/SEA risks**: women are underrepresented in leadership and technical roles, while the influx of workers increases risks of gender-based violence and harassment.
- **Vulnerable groups** (female-headed households, youth, elderly, persons with disabilities, LGBTQI+ minorities) risk marginalization if not proactively included.
- **Health and safety risks** include construction-related traffic accidents, dust exposure, and psychosocial stress linked to affordability concerns.

Despite these challenges, communities consistently view electrification as an essential enabler of improved health, education, clean water, enterprise development, and reduced isolation.

1.3 *Mitigation Strategies and Recommendations*

To address these challenges, the Environmental and Social Management Plan (ESMP) outlines key recommendations:

Environmental Measures

- Conduct Critical Habitat Assessments (CHA) and avoid disturbance of sensitive ecological or cultural areas (e.g., Fraga Tiki).
- Establish buffer zones and wildlife corridors, and implement reforestation where clearing is unavoidable.
- Strengthen pollution control and waste management, with improved hazardous waste protocols and disposal facilities in Moengo and Albina.
- Apply noise and dust mitigation near schools, and implement traffic management plans.
- Integrate climate resilience into all infrastructure, with elevated substations, robust drainage, and periodic risk reviews.

Social Measures

- Facilitate krutu-based consultations to define locally acceptable ownership and tariff models, ensuring affordability.
- Institutionalize Free, Prior, and Informed Consent (FPIC) with structured village-specific protocols and transparent communications.
- Strengthen gender inclusion through hiring targets, training programs, entrepreneurship support, and zero-tolerance GBV/SEA policies.
- Establish accessible grievance redress mechanisms (GRM) with special provisions for women, youth, and vulnerable groups.
- Support capacity building and livelihoods, training local workers in O&M and fostering new business opportunities in agro-processing, ICT, tourism, and small-scale enterprises.

1.4 *Project Implementation and Funding*

The project is funded by the **Inter-American Development Bank (IDB)** and executed by **N.V. EBS**, under the supervision of the **Ministry of Natural Resources (NH)**. Implementation will follow a phased approach:

- **Information gathering and baseline studies (2020–2025)**
- **Detailed planning and design (2025)**
- **Project execution (second half of 2025 onwards)**

Through a strategic approach to environmental and social management, this project aims to enhance energy security, improve quality of life, and drive sustainable development in Suriname's rural communities.

1.5 *Overall Conclusion*

The ESA concludes that the project is **technically feasible, socially desirable, and environmentally manageable**. It has the potential to transform energy access in north-eastern Suriname, but its success depends on rigorous application of safeguards, financial and governance arrangements that ensure inclusivity, and sustained community participation. If implemented accordingly, the project can serve as a **regional model for sustainable and inclusive electrification** in Latin America and the Caribbean.

2. Introduction and Background

2.1. Introduction

This report presents the results of the Environmental and Social Assessment (ESA) for a proposed electrification project in north-eastern Suriname, designed to support the sustainable development of Maroon and Indigenous peoples living in rural Amazonian communities. The project aims to connect currently isolated energy systems to the national grid operated by N.V. Energie Bedrijven Suriname (EBS), thereby reducing operational costs, improving the reliability of electricity supply, and enabling long-term socio-economic development.

The general objective of the project is to promote inclusive and sustainable growth for Maroon and Indigenous villages in the north-east of Suriname by providing reliable access to affordable electricity. Specifically, the project seeks to reduce the high costs of electricity generation in Moengo and Albina, which are currently isolated from the main grid and depend on costly diesel-based generation.

The project consists of four interrelated components:

- **Component 1:** Construction of approximately 127 km of 110 kV Overhead Line (OHL) from Peperpot Substation (SS/PP) to Albina.
- **Component 2:** Construction of two new substations (Moengo and Albina) and expansion of the existing Peperpot Substation.
- **Component 3:** Connection of Wanhatti and seven surrounding villages to the grid, including new distribution facilities and low-voltage (LV) networks in accordance with EBS standards.
- **Component 4:** Construction of a 1.6 MW solar PV plant in Moengo with SCADA integration, providing a hybrid renewable-grid solution to reduce reliance on diesel generation.

The ESA covered rural and urban communities in the Marowijne and Commewijne districts, grouped into three clusters:

- **Cluster I (Cottica River Villages):** Amaloko Konde, Langa Uku 1 and 2, Lantiwee, Pikin Santi, Pinatjarimi, and Tamarin, as well as villages located near Moengo and along the East–West connection road.
- **Cluster II (Upper Cottica Villages):** Abaadu Konde, Akale Konde, and Benati Mofo.
- **Cluster III (Moengo and Albina Area):** The urban centers of Moengo and Albina, together with surrounding Indigenous villages including **Alfonsdorp, Marijkedorp, and Pierrekondre**. These communities are socio-economically diverse, with Albina serving as a regional hub at the border with French Guiana, Moengo functioning as a critical energy and services node for the wider Cottica River area, and the Indigenous villages representing culturally significant communities with specific land tenure and climate vulnerability concerns.

The clusters are characterized by close social and kinship ties, similar living conditions, and shared vulnerabilities, though Cluster III presents additional complexities due to urban–rural linkages, cross-border dynamics, and Indigenous land rights considerations.

The project will be implemented in the following phases:

1. **Information gathering and baseline studies (2020–2025).**
2. **Preparation and planning (2025).**
3. **Project execution (second half of 2025 onwards).**

The ESA was prepared using a multi-method approach:

- Literature Review:
  A detailed review of existing baseline data, policy frameworks, strategies, and legislation was undertaken. This included analysis of national energy and environmental policies, IDB safeguards policies, and international environmental and social standards. Reports of prior stakeholder engagements were also reviewed.

- Site Visits:
  Field visits were carried out in Wanhatti, Abaadu Konde, Moengo, Albina, Nieuw Amsterdam, and surrounding Indigenous villages including Alfonsdorp, Marijkedorp, and Pierrekondre. These visits enabled first-hand observations of living conditions, environmental sensitivities, and community perspectives, ensuring that local voices and contexts were integrated into the assessmen

2.2. Background Information

The interconnection line between EPAR, Moengo and Albina is envisaged to support investments and promote the development of Moengo and Albina areas and will also contribute to the reduction of the recovery cost of electricity generation in general and reduce the total cost in these two areas, where nowadays very expensive diesel local generators are the only sources of electricity. It is also foreseen that the Project will contribute to strengthening of the rural electrification to at least the main villages located along the corridor of the new infrastructure and could be the first step towards the interconnection with Saint-Laurent-du-Maroni (French Guiana).

Initially, project benefits would come from replacing local small thermal generation, based on diesel, with the less expensive generation produced in the EPAR system: this is valid both for Moengo and Albina areas with rural villages like Abaadu Konde, Akalekonde and Benhati-mofo, but also for those rural villages, Wanhatti, Amaloko Konde, Langa Uku 1 and 2, Lantiwee, Pinatjarimi, Pikin Santi and Tamarin where today the electricity is produced by small diesel generators and it is available only for a limited number of hours per day (normally in the evening, between 6 p.m. to 12 p.m.) or 24/7.
The transmission line would also make it possible for Suriname to coordinate and promote the interconnection with Sint Laurant (French Guyana), in order to optimize the availability of resources, increase the security of supply and minimize the cost of energy production making possible bilateral power exchanges on a regional level.

IDB

The Inter-American Development Bank (IDB) is the primary source of financing for sustainable social, economic, and institutional development in Latin America and the Caribbean. In Suriname, the IDB has initiated, among other projects, an energy, water, and telecommunications initiative aimed at the sustainable development of Maroon and Indigenous communities living in various villages and two small towns in the eastern region of the country.

The project focuses on three clusters of communities:

- **Cluster I (Cottica River Villages):** Wanhatti and surrounding villages including Amaloko Konde, Lantiwee, Langa Uku I and II, Pikin Santi, Pinatjarimi, and Tamarin.
- **Cluster II (Upper Cottica Villages):** Abaadu Konde, Akale Konde, and Benati Mofo.
- **Cluster III (Moengo and Albina Area):** The towns of Moengo and Albina, together with nearby Indigenous villages including Alfonsdorp, Marijkedorp, and Pierrekondre.

These clusters together represent the core beneficiary communities of the project, spanning both rural Maroon villages along the Cottica River and the urban–rural interface of Moengo and Albina, where Indigenous and Maroon populations live side by side.

N.V. EBS

N.V. EBS (National Energy Company) operates under the Ministry of Natural Resources (NH), which is responsible for energy supply in Suriname. However, this responsibility has been delegated to N.V. Energie Bedrijven Suriname (EBS). EBS is in charge of electricity production, transmission, and distribution.

Due to the country's relatively low population density and challenging accessibility, some areas remain unconnected to the EBS grid. Until now, a separate department of the Ministry of Natural Resources, known as Dienst Electriciteitsvoorziening (DEV), has provided electricity to isolated villages using small diesel generators, typically for 3 to 5 hours per day.

EBS has identified this project—whose pre-feasibility and detailed feasibility studies have been completed—as an opportunity to connect isolated systems to the main EBS grid, thereby reducing operational costs.[1]

[1] Electrification East to West Region and Rural Electrification. Jerry Aseja

3. Project Description

Description of the Program
This Program is the second operation of the Conditional Credit Line for Investment Programs (CCLIP), whose general objective is to support the Government of Suriname (GoS) in its efforts to foster socio-economic development by the promotion of clean and sustainable services under a just energy transition.

Objectives:
The general objective of this operation is to strengthen energy security and reduce dependence on fossil fuels in Suriname's electricity sector. The specific objectives are to:

1. Increase power transmission capacity to facilitate the integration of renewable energy into the national interconnected system.
2. Provide rural communities with reliable access to electricity
3. Strengthen institutional capacity for planning transmission and generation investment projects.

Project Components
Component 1. Infrastructure Investments
This component will finance critical infrastructure related to the upgrade and expansion of transmission and distribution infrastructure in the EBS network with emphasis on networks that supply rural districts.
Details of the route:

- The project starts from the Peperpot Substation in Commewijne and ends at the Albina Substation.
- The route has been divided into three stretches:
- Stretch 1: SS-Peperpot – SS-La Paix

Figure 1 Location Substation Peperpot

Construction of approximately 127 km of 110 kV OHL from substation Peperpot. Construction of three new substations te Moengoe, Wanhatti and Albina and upgrade of the existing substation Peperpot.
In the eastern part of Suriname from Stolkersijver until Albina which is approximately 100 km, almost all villages and communities that are easily accessible by road have 24/7 electricity. Within the scope of this project, one village is identified to receive 24/7 electricity along the east west road. During the initial definition of the project more villages were included in the scope but the NV EBS has facilitate connection of these villages to the grid already via 12kV distribution network.

Currently two isolated systems serve the clients in Moengo and Albina with 24/7 electricity. In both systems, the energy is produced with generating units running on diesel fuel.

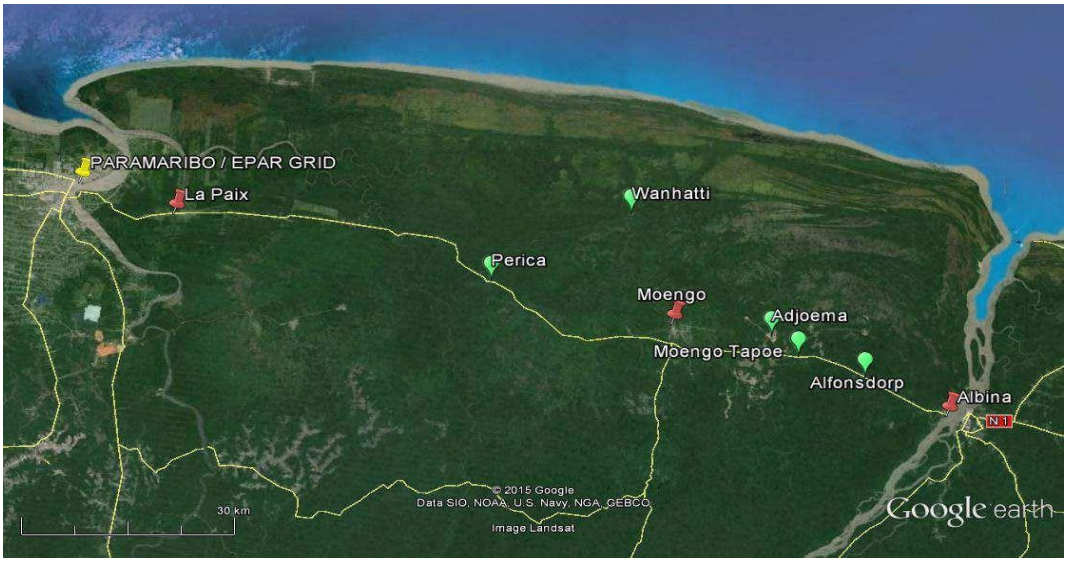


Figure 2 Projected Interconnection and electrification

The EPAR system extends in the eastern part of Suriname on 33kV level until La Paix substation, and then continues further on 12kV level until Stolkerstijver/ Perica. The isolated systems Moengo and Albina also supply the customers via their respectively12kV local distribution grid.

- Stretch 2: SS-LaPaix – SS-Moengo

To effectively supply the regions with electricity from the main system and to replace the generation in Moengo and Albina, as mentioned before, 3 substations are envisioned in the project110/33/12 kV substation Moengo; - 110/12 kV substation Albina; - 33/12kV substation Wanhatti. Connection of Wanhatti to the grid including distribution and LV networks according EBS standards. Not only Wanhatti will be connected but also the 8 surrounding small villages. Also the existing substation Peperpot needs to be upgraded.

The villages already connected to the NV EBS grid are Perica; Adjoema Kondre; Moengo tapoe and Alfonds dorp.

- Stretch 3: SS-Moengo – SS-Albina

Figure 3 Location Substation Albina

The power plant of Albina is located in the urban area and there is no space for the enlargement. Therefore, the connection of the Albina power system will be performed in another place, close to the main road, preferably at the entrance of the urban area.
At this purpose, it should be important to have the electrical characteristics of the 12.6 kV lines close to the main road at the entrance of Albina (length, rate, etc.) in order to evaluate the need to reinforce the grid in this area. [2]

In conclusion, this project will be implemented through the following three subcomponents:

1. Subcomponent 1: Transmission line EPAR–Moengo–Albina. This subcomponent will cover the construction of a new 110 kV / 50 MW, 127 km transmission line (TL) to interconnect the EPAR system with Albina, installed along the existing road corridor. It will also include complementary works and digitalization initiatives for network management, control, and supervision, incorporating cybersecurity measures. In addition, funding will be allocated to:
    - upgrade of the existing Peperpot substation,
    - construction of two new substations in Moengo and Albina, and
    - development of a new 33 kV, 34 km distribution line connecting Moengo and Perica.
2. Subcomponent 2: Last-mile rural electrification in Wanhatti. This subcomponent will cover the required distribution infrastructure to connect new users in Wanhatti, meeting the increasing electricity demand of the village and surrounding communities, while ensuring a highly reliable supply.
3. Subcomponent 3: Solar PV plant in Moengo. This subcomponent will cover the installation of a 1.6 MW grid-tied solar photovoltaic (PV) power plant in Moengo. It will be connected to the new Moengo substation and thus to the EPAR system through the existing 12 kV distribution

[2] Scoping report Jerry Aseja

line. By integrating this solar PV plant into the main grid, the project will expand the supply of renewable energy, improving the quality, security, and reliability of electricity in Albina, Moengo, Wanhatti, and surrounding villages. The PV plant will also feature a modern SCADA monitoring and control system to enable real-time performance tracking and fault detection.

Component 2. Institutional Capacity

This component will support EBS transformation and modernization by strengthening its technical capacity in energy planning. It will cover:

- Training in the fields of innovative and disruptive technologies, transition to renewable energy (RE) systems, and power transmission and energy generation planning.
- Specialized technical support for the design, coordination, and supervision of the works.
- Management of environmental and social considerations of projects.

4. Regulatory Framework

According to Suriname's draft Energy Policy Plan 2013-2033, the peak energy demand of the country's population is between 150 and 250 Mega Watt (MW). The needs in the energy sector such as access and security, are significant and require a coordinated and systematic approach in order to ensure sustainability. The GoS has prioritized the expansion, provision, and enhancement of basic amenities in both urban and rural areas across the country.

The Medium-Term Development Plan (MOP) for the period 2022-2026 underscores the importance of creating conditions conducive to sustainable development. One of the intended outcomes from this plan is the implementation of programs to reduce CO2 emissions through the utilization of renewable sources or connection of isolated systems to the EBS main grid for electricity generation. With a steadily growing annual energy demand, governmental actions are needed in order to ensure smooth economic growth within the country. It is therefore the objective of the Government to guarantee the country's electrical energy supply on a short as well as long term basis.

The Environmental Framework act and the project Classification guidelines form the basis for the required Environmental and Social Management System (ESMS). Where national legislation does not sufficiently address the potential damage, reference to international conventions will be guiding.
As of the actual implementation phase, the labor act is guiding, and for ITPs zone, the absence of collective rights diverts the GO to deal with jurisprudent. In cases where national legislation does not adequately address potential environmental or social damage, reference to relevant international conventions will inform decision-making and mitigation measures. During the actual implementation phase, adherence to labor laws governs the project's labor practices. Additionally, for Indigenous and Tribal Peoples (ITPs) zones, where collective rights may be absent, the government addresses any legal matters through jurisprudence and established legal precedents.

The **Electricity Act** and the **Energy Authority Suriname (EAS) Act** were adopted by the National Assembly in 2016. With this, the first steps were taken in the restructuring and regulation of the electricity supply sector. The Energy Authority Suriname is responsible for regulation, enforcement, information dissemination, and advisory functions.
The Energy Authority Suriname must, at least once every five years, in consultation with the electricity supply sector, prepare an Electricity Sector Plan (ESP), which can be adopted by government decree.

The ESP includes both the:

- Strategic plan, which looks at least 20 years ahead regarding further sustainability of the sector, as well as
- Technical plan, which maps out the needs for capacity expansion in production, transmission, and distribution for a period of 5 years.
- In addition, a Regulatory plan, which ensures that the implementation and oversight of regulation in the sector by the EAS are based on predictable business considerations. Not only technical and financial considerations, but especially environmentally friendly generation, transmission, and distribution systems.

Energie Bedrijven Suriname (EBS) serves as the leading utility company tasked with energy production and distribution throughout Suriname. Its responsibilities in these areas have expanded in recent years. While the Ministry of Natural Resources previously managed rural electrification through a dedicated division (DEV-Electrification Division), EBS is now transitioning to become a comprehensive energy provider nationwide. The EBS has several departments to address the following:

- Electricity Generation: Operates power plants to generate electricity using various sources such as thermal (using fossil fuels like diesel or heavy fuel oil) and hydroelectric power (utilizing the country's rivers and water resources).
- Transmission: Manages the transmission of electricity from power generation plants to distribution sub-stations using a network of transmission lines and infrastructure. This involves ensuring the efficient and reliable transfer of electricity over long distances.
- Distribution: Responsible for distributing electricity from substations to consumers, including residential, commercial, and industrial customers. This entails maintaining a network of distribution lines, transformers, and other equipment to deliver electricity to end-users.
- Customer Service: Supports its customers, including billing, metering, and responding to inquiries or complaints related to electricity supply.
- Infrastructure Maintenance: Maintains and upgrades its infrastructure, including power plants, transmission lines, substations, and distribution networks, to ensure the reliability and safety of the electricity supply.

Overall, EBS plays a crucial role in ensuring the availability, reliability, and accessibility of electricity to the population of Suriname through its activities in energy production and distribution.

The Legislative Framework for the National Biodiversity Action Plan is built on the following acts:

- The **Nature Conservation Legislation** (1954-Protected Areas designated and the management of those), predominantly keeping both levels' responsibility at the central Government. Although coordination between stakeholders is key in a MUMA (-IUCN category 6) the interpretation is not consistent and thus is the GOS once again in the lead. There is a draft act underway, which acknowledges the importance of inclusion of private lands and ICA (Indigenous designated and Managed lands).
  The challenge is that ITPs have no collective rights nor inclusion in land tenure system. Because this process is ongoing for decades, ITPS have used and managed their ancestral lands by themselves. Organically mapping their territories and managing with community rangers to prevent intrusion of their livelihoods was the aim. Currently about 45 community rangers in central and south Suriname are trained and well equipped to monitor the immediate lands within 5-10 kilometers from their village.
- The **Mining and Logging acts** allow the business to encroach on the ITP ancestral lands mainly because of the centralized licensing policies. These are threats to the biodiversity and human settlements. The forest depended community is suffering from the impact of deforestation, degradation and social eruptions due to the quick transformation of human and ecological habitat. Map depicts a larger area which represented the field situation early 2022. Both land use activities result in expansion of the road network, which allows for unregulated intrusion and poaching of the south. Without at least a local corps of rangers, the safety issues, regarding ecosystem and biodiversity loss cannot be adressed.
- The **Environmental Framework act** allows for preventive, mitigation and creative measures to enforce and to ensure that the quest from Suriname to gain economic prosperity for all remain a sustainable process. The authority to monitor and execute is in the making.
- **Tourism act** is recently approved in Parliament and provides opportunities for a more coordinated and environmental and social sound development of the industry. Given the opportunities CBT (Community based Tourism) – conducting ESIAs remain important

Description of Permits, Certifications

The Nationaal Institute for Environment and Development in Suriname (NIMOS) was a Surinamese government agency, owned by the Ministry of Spatial Planning and Environment. The purpose of NIMOS is to produce and enforce legislation and regulations in the field of the environment. In addition, it has an advisory role to both the government itself and private entities. Since July 2024, its tasks have been taken over by the Nationale Milieu Autoriteit (NMA). The NMA is named as the entity responsible for monitoring and enforcing the Environmental Impact Assessment Procedures.

The environmental impact analysis procedures originate from the approved "Environmental Framework Act" (Act of 7 May 2020, containing rules for sustainable environmental management, S.B.2020 no. 97), which states that the performance of an Environmental Impact Analysis (MEA) is mandatory for project activities that will have an adverse effect on the environment.

Before the permit (any permit) is granted, the NMA receives the permit application. If an MEA is required, the NMA discusses the procedures for conducting an MEA with the applicant. Only after the EIA has been completed does the NMA respond to the issuance of the permit by the licensing authority. It should be clear that application of this process does not exempt the applicant from complying with other regulations or standard practices in the sector.

Overview of the process:

1. Screenings phase - Screening refers to the activity of the MEA process designed to decide whether or not an MEA is required and, if so, to determine its nature and extent.
2. Scoping phase - Scoping is the activity in the MEA process that is designed to establish the appropriate TOR for the MEA of each specific project proposal.
3. Analysis phase - In the analysis phase, the EIA is carried out by an EIA team consisting of a qualified consultant or consultancy firm on behalf of the applicant. The environmental and social impacts, both positive and negative, must be assessed, as well as the significance of the impacts and mitigating measures must be indicated.

Environmental Certification

An I-REC for Electricity is referred to as an I-REC(E) and is an exchangeable Energy Attribute Certificate (EAC) that conveys information about the production of a unit of renewable electricity (with the 'renewable' being defined by the International Energy Agency (IEA) (World Energy Outlook 2023) such as where the electricity was produced, the capacity of the Production Facility, and the energy source.

I-REC(E) can be used for a variety of (voluntary) requirements including Scope 2 reporting, national energy reporting, and general End-user claims, and allows all electricity users to make a conscious and evidence-based choice for electricity, in any country where service providers have been Accredited by the International Tracking Standard Foundation.[3]

The Accredited I-REC(E) Issuer in Suriname is the Suriname Energy Chamber (SEC).[4]

Existing/Planned energy certificate systems:

Currently there is no certificate system in Suriname. The I-REC standard will be adopted without regulatory restrictions. The Suriname Energy Chamber (SEC) is the proposed entity to act as the I-RECs

[3] https://www.trackingstandard.org/product-code/electricity/
[4] https://www.trackingstandard.org/world-map/

local issuer. The SEC currently established a basis, in collaboration with the EBS (public-private initiative), to promote Energy Management at the end-user level, especially considering the commercial and Industrial end-users (key-accounts), through the implementation of Energy Management Systems (e.g. following the ISO 50001 principles), thus including monitoring systems for power balance assessments. This would serve as a vehicle for eligibility for "green funding" for RE investments, and green certification. Thus, information to verify registration, installed RE capacity and generated RE volumes of RE installations will be made publicly available on annual basis through energy balance assessments (energy monitoring and management). The idea of implementing the I-REC Standard has already been discussed and supported by the EAS.[5]

Existing Environmental and Social Framework

<table>
<tr><td>1. Impact Identification and Mitigation Measures</td><td>Environmental Impacts and mitigation measures:

<table>
<tr><th>Environmental Impact</th><th>Description</th><th>Mitigation Measures</th></tr>
<tr><td>Deforestation</td><td>Tree clearing for transmission lines and substations.</td><td>Minimize tree cutting, implement reforestation, optimize routing.</td></tr>
<tr><td>Soil Erosion</td><td>Land clearing may lead to soil degradation.</td><td>Install erosion control barriers, replant vegetation.</td></tr>
<tr><td>Water Pollution</td><td>Risk of contamination in rivers and wetlands.</td><td>Implement sediment control, prevent hazardous material spills.</td></tr>
<tr><td>Biodiversity Loss</td><td>Disruption of habitats along the transmission route.</td><td>Ecological monitoring, creation of wildlife corridors.</td></tr>
<tr><td>Air & Noise Pollution</td><td>Dust and noise generated during construction.</td><td>Dust suppression techniques, restrict working hours.</td></tr>
</table>

Social Impacts and mitigation measures:

<table>
<tr><th>Social Impact</th><th>Description</th><th>Mitigation Measures</th></tr>
<tr><td>Land Acquisition & Resettlement</td><td>Project affects private and Indigenous lands.</td><td>Conduct FPIC process, ensure fair compensation.</td></tr>
<tr><td>Community Health & Safety</td><td>Increased road traffic, construction hazards.</td><td>Implement traffic management plan, enforce safety protocols.</td></tr>
<tr><td>Indigenous and Tribal Peoples (ITPs)</td><td>Cultural and livelihood disruptions.</td><td>Engage traditional leaders, respect heritage sites.</td></tr>
<tr><td>Employment & Labor Rights</td><td>Risk of unfair treatment of workers.</td><td>Enforce IDB labor standards, provide fair wages.</td></tr>
<tr><td>Gender-Based Violence (GBV)</td><td>Risks related to construction labor influx.</td><td>Implement GBV prevention programs, strengthen reporting mechanisms.</td></tr>
</table>
</td></tr>
<tr><td>2. Environmental and Social</td><td>A continuous monitoring and reporting structure is implemented to ensure compliance with environmental and social standards.

Environmental Monitoring:</td></tr>
</table>

[5] https://www.trackingstandard.org/wp-content/uploads/IRSFB_MD_23.22_b__Suriname_Country-Assessment.pdf

<table>
<tr><td>Monitoring and Reporting Procedures</td><td>

Deforestation and biodiversity monitoring in collaboration with conservation organizations.
Water and air quality assessments near construction sites.
Soil erosion control inspections in land-clearing areas.

Social Monitoring:

Labor compliance checks to ensure fair treatment of workers.
Community feedback sessions to address local concerns.
Monitoring of grievance resolution cases through the Grievance Redress Mechanism (GRM).

Reporting Procedures:
<table>
<tr><th>Report Type</th><th>Frequency</th><th>Responsible Party</th></tr>
<tr><td>Environmental Audit</td><td>Bi-annual</td><td>NIMOS, NV EBS</td></tr>
<tr><td>Social Impact Report</td><td>Quarterly</td><td>IDB, Local Authorities</td></tr>
<tr><td>Safety Inspections</td><td>Monthly</td><td>Contractors, EBS</td></tr>
</table>
</td></tr>
<tr><td>3. Stakeholder Engagement and Consultation Plan</td><td>
A transparent and inclusive stakeholder engagement strategy is critical to the project’s success.
Key Engagement Strategies:

Regular community consultations in Peperpot, Moengo, Albina, and Wanhatti including surrounding villages.
FPIC (Free, Prior, and Informed Consent) process for Indigenous and Tribal Peoples.
Public information sessions and awareness campaigns on project benefits.
Grievance Redress Mechanism (GRM) for conflict resolution and community concerns.

</td></tr>
<tr><td>4. Emergency Response Plan (ERP)</td><td>
An Emergency Response Plan (ERP) is established to prevent and respond to accidents, environmental disasters, and safety incidents during project execution.
ERP Components:

Risk assessment and emergency scenarios (floods, fires, hazardous material spills).
Emergency response teams trained to handle incidents efficiently.
Communication protocol with local authorities for crisis management.

</td></tr>
<tr><td>5. Biodiversity and Habitat Protection Measures</td><td>
The transmission line passes through high-biodiversity areas, requiring special conservation measures.

Avoidance of critical habitats through optimized routing.
Implementation of wildlife corridors to maintain ecological balance.
Compensatory reforestation programs to restore affected areas.

</td></tr>
<tr><td>6. Labor and Working</td><td>
The project adheres to IDB’s Environmental and Social Performance Standard 2 (ESPS 2) and Suriname’s labor laws to ensure fair and safe working conditions.
Labor Standards and Workplace Safety:
</td></tr>
</table>

Conditions Framework	• Fair wages and contractual transparency for all workers. • Mandatory health and safety training for construction and operations personnel. • Zero tolerance for child labor and forced labor in compliance with international labor laws.

Table 1. Existing Environmental and Social Framework.

Environmental and Social Framework and the Responsible Institutions	
Environmental and Social Framework	**Responsible Institutions**
1. Impact Identification and Mitigation Measures	NV EBS, NIMOS, IDB, Local Authorities, Contractors
2. Environmental and Social Monitoring and Reporting Procedures	NIMOS, other Environmental Agencies, NV EBS, IDB, Local Authorities, Contractors
3. Stakeholder Engagement and Consultation Plan	IDB, Local Authorities
4. Emergency Response Plan (ERP)	NCCR, NV EBS, Local Authorities, IDB
5. Biodiversity and Habitat Protection Measures	NIMOS, other Environmental Agencies, Local Authorities, NV EBS
6. Labor and Working Conditions Framework	NV EBS, Ministry of Labor, Employment and Youth, IDB, other relevant authorities

Table 2. Environmental and Social Framework and the Responsible Institutions

Gaps between local Laws and IDB ESPS Requirements

Table 3 . Gaps analysis between local laws and ESPS requirements

ESPS	Local Legislation	Gap	How to Address
ESPS 1: Assessment and Management of Environmental and Social Risks and Impacts	The Environmental Framework Act requires an Environmental Impact Assessment (MEA) for projects with significant effects. The MEA has screening, scoping, and analysis phases. However, social aspects are not always assessed in detail.	- MEA is not always equivalent to the broader ESIA required by ESPS, particularly regarding social impacts, cumulative impacts, gender, and vulnerable groups. - There is no explicit requirement for a project-wide Environmental and Social Management System (ESMS).	- Expand the ESA to fully cover all ESPS elements (social dimension, stakeholder engagement, cumulative impacts). - Establish a project specific ESMS including monitoring and corrective actions.

ESPS 2: Labor and Working Conditions	The Labor Act regulates working conditions but does not fully align with international labor standards (e.g., freedom of association, non-discrimination, project-level occupational health and safety).	- No formal grievance mechanism for workers. - Contractors and subcontractors are not always held to the same requirements.	- Establish a grievance redress mechanism for all workers. - Require contractors to comply with ESPS 2 through occupational health and safety plans.
ESPS 4: Community Health, Safety, and Security	The MEA addresses health and safety mainly indirectly. There is no mandatory community emergency preparedness plan.	- No systematic community engagement on risks (e.g., transmission lines, disasters). - Security arrangements are not explicitly regulated.	- Develop a Community Health and Safety Plan, including emergency preparedness (aligned with the DRMP). - Train security providers following the Voluntary Principles on Security and Human Rights.
ESPS 5: Land Acquisition and Involuntary Resettlement	There is no framework for voluntary and involuntary resettlement with full compensation. Indigenous & Tribal Peoples (ITPs) do not have collective land rights recognized by law.	- No legal recognition of ITP collective rights. - No mandatory resettlement planning process aligned with international standards.	- Fully apply a Resettlement Policy Framework (RPF) and Livelihood Restoration Plan (LRP) in line with ESPS 5. - Conduct consultations with ITPs following FPIC (Free, Prior and Informed Consent) principles.
ESPS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The Nature Conservation Legislation (1954) protects MUMAs and reserves, but enforcement is inconsistent.	- No consistent application of Critical Habitat Assessments. - Mining and logging licenses can be granted by central government in ITP territories without local oversight.	- Conduct a Critical Habitat Assessment and prepare a Biodiversity Action Plan (BAP) in accordance with ESPS 6.- Collaborate with community rangers in ITP territories.
ESPS 7: Indigenous Peoples	There is no legislation recognizing collective rights of Indigenous & Tribal Peoples.	- No formal FPIC process. - No mandatory participation of ITPs in decisions affecting their land.	- Fully implement FPIC.- Develop an Indigenous Peoples Plan (IPP) if the project affects ITP territories.

5. Diagnosis and Socio-Environmental Characterization of the Area of Influence and Beneficiaries

5.1. Socio-Environmental Conditions

This section describes the current socio-environmental conditions of the project area, defining both the Area of Direct Influence (ADI) and the Area of Indirect Influence (AII).

Environmental conditions:

(i) Geology, geomorphology, soil quality;

- Ecosystems: Swamps have been observed in Sinabo, Siparipabo, near Stolkertsijver, and Perica.
- Swamps: are vulnerable ecosystems that require a regular influx of water to maintain biodiversity.
- Savannah forests: on bleached soils are found in Alfonsdorp, Moiwana, and Albina. Pine plantations have been identified in Akale Konde, Moengo, and Ricanau. Savannahs serve as shallow (surface) aquifers, which are important sources of drinking water.
- Vegetation: Throughout the stretch from Peperpot to Albina, secondary forests are present, sometimes located behind production areas—starting about 300–400 meters from the road and extending directly to the roadside. These forests are interspersed with shrubbery, pastures, and grasslands, as well as swamps, savannah forests, and planted pine areas.
  Notable species: Kankantries, awara palms, Mauritius palms, pina palms, planted pines, manja trees, and bamboo stands, often clustered in Belasoir, Sinabo, Siparipabo, and Stolkertsijver. Cecropia spp. (bospapaja) is characteristic of the many dormant farming plots, which typically measure less than 2 hectares, between Stolkertsijver and Albina.
- Horticultural activities: Roadside cultivation is common, with land cultivated up to approximately 500 meters on either side of the road. Crops include cassava, bananas, citrus, yard long beans, cabbage, pineapple, peppers, and bitter melon. Fruit trees are also noticeable along the stretch.
- Deforested and burned forest: In some areas, forests have been cleared and burned, likely for horticultural activities, subsistence farming (mainly along settlement strips), charcoal production, and the construction of camps and houses.

(ii) Climatology and weather;

Suriname has a tropical rainforest climate characterized by warm temperatures, high humidity, and substantial rainfall throughout the year. Temperatures typically range from 24°C to 32°C (75°F to 90°F), while humidity levels frequently exceed 80%, especially during the rainy seasons. The climate remains relatively stable, with minimal seasonal variation.
The country receives abundant rainfall, with two distinct rainy seasons: from April to August and from November to February. Annual precipitation can exceed 2,500 millimeters (100 inches) in some regions, with the interior rainforests receiving the heaviest rainfall. However, in recent years, these established weather patterns have been shifting, reflecting the growing impact of climate change.

(iii) Vegetation and Land use

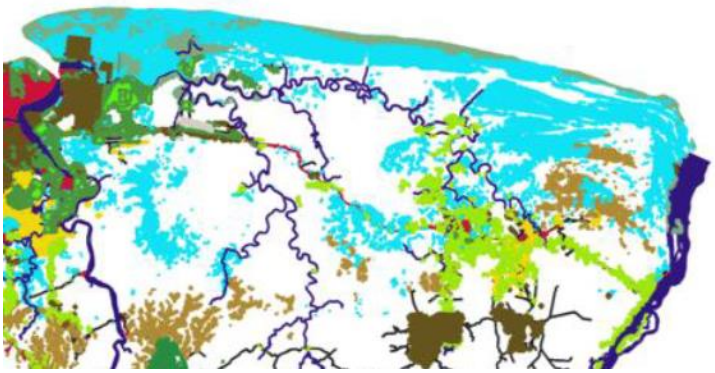
The Commewijne District exemplifies the transformation of historic cultivated plantations into small farms, horticultural zones, and secondary forests. In contrast, Marowijne was historically

known for plantations, primarily in the Cottica area. In the past, key agricultural products included coffee, cacao, sugarcane, cotton, citrus, and rice. However, in the post-plantation era, there has been a shift toward horticulture, focusing on fruit and vegetable cultivation. The district's rich plantation history has also contributed to a thriving tourism sector. As former plantations transitioned into residential areas, sections of natural forest (savanna and swamp forests) and swamps have been preserved.

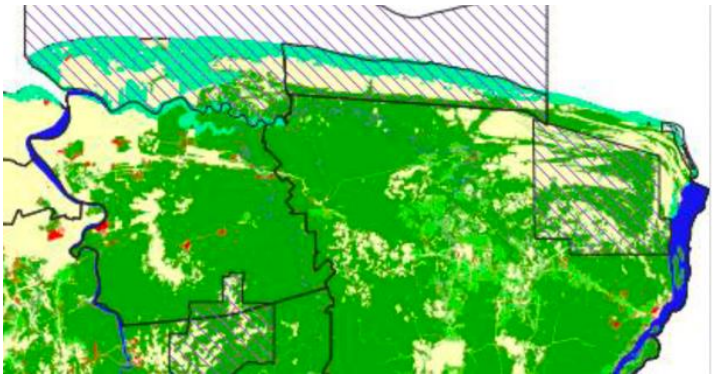
Marowijne is also recognized for its logging plantations and bauxite mining, around which the town of Moengo developed. To support the workforce, dairy and poultry farms were established, with incentives to encourage local food production. During the colonial period, tropical research efforts led to the creation of several pine plantations in the district. Traditional Indigenous and Maroon villages continue to rely on subsistence farming, hunting, and fishing, contributing to the development of administrative hubs with schools and commercial centers, particularly in Moengo.

As a border town, Albina has experienced significant growth and serves as a key center for trade, education, healthcare, and other essential services. Functioning as a transportation hub, Albina facilitates the movement of people and goods to both northern and southern rural areas, as well as to French Guiana, reinforcing its role in regional connectivity and commerce.

This analysis highlights patches of non-forest areas, including residential areas and businesses, as well as predominantly forested lands comprising secondary forests and swamp forests, with locally established plantations, along the East-West Road.



The map indicates the presence of swamps, rivers (open waters), and adapted vegetation such as swamp forests. A closer examination of the study area reveals a considerable stretch of shifting cultivation zones along the road. In these areas, settlements primarily consist of Maroons and villages inhabited by Indigenous and Tribal Peoples (ITPs).



This map shows the Wane Hill Nature reserve north of the East West Road.

Figure 4. (Maps 3-5): LULC (Land Use Land Cover) maps period 2000-2015 (Source: presentation from SBB, 2019: The Contribution of Suriname's NFMS to Blue Carbon NDC) (Kasanpawiro, 2019).

(iv) Air and Noise;

The villagers have no problem with the dust and noise during the construction phase of the project. Only at the school sites in the villages Tamarin and Abaadu Konde.

(v) Biodiversity;

Natural, modified, and critical habitats - as defined by ESPS 6. Including consideration of threatened, endemic, and migratory species, protected natural areas, highly threatened or

unique, ecosystems and areas of international importance (e.g. IBAs, RAMSAR wetlands, KBAs, AZEs, etc.), and visual and aesthetic/landscape resources;

(vi) Cultural Sites;

In Langa Uku 1 and Langa Uku 2 they want the area of the "Fraga Tiki", not to be entered.

(vii) Possible Environmental Liabilities.

The only environmental liabilities are the noise and dust disturbances close by the school in Tamarin. In the village Abaadu Konde the villagers have the same concerns about noise and dust close by the school. The location for the constructing of the Wanhatti under station is on the main road, the East-West connection. There want be no need to build in the village of Wanhatti, the same applies to the villages of Abaadu Konde, Akale Konde and Benati Mofu.

Social Characterization:

i. Demographic Conditions: Age and Gender of the Beneficiary Population

The demographic conditions of the beneficiary population across the villages exhibit notable variations in gender distribution and age composition. In most villages, men outnumber women, although some exceptions exist where the ratio is more balanced. The presence of children also varies significantly, with certain villages having very few or no children residing there.

- Tamarin: 7 men, 7 women, and 6 children.
- Pinatjarimi: 5 males and 6 females.
- Lantiwee: 25 males, 25 females, 10 children.
- Langa Uku 2: 1 woman, 11 men.
- Langa Uku 1: There are 11 men, 9 women, and 5 children residing in the village.
- Amalokokondre: 8 women and 11 men reside in the village. The children attend school in Moengo and have their own homes there.

ii. Socio-Cultural Conditions: Ethnic Distribution

The villagers of Wanhatti and the surrounding villages, including Abaadu Konde, Akale Konde, and Benhati Mofo, belong to the Aucan tribe.

iii. Presence of Vulnerable or Minority Groups, Including Sexual and Gender Minorities

In Wanhatti and the surrounding Aucan Maroon villages of Abaadu Konde, Akale Konde, and Benhati Mofo, several population groups face increased vulnerability due to a combination of socio-cultural norms, limited access to services, and economic constraints. These include women and girls, particularly female-headed households, adolescent girls and youth (both in and out of school), older adults with limited mobility and income, and people with disabilities (physical, sensory, and cognitive). Low-income households that rely on informal or seasonal income sources are particularly vulnerable to shocks. As indigenous and tribal peoples (ITPs), Aucan communities experience additional vulnerabilities related to property and culture, coupled with the absence of legally recognized collective land rights. Sexual and gender minorities (LGBTQI+) are present, but often not openly visible due to conservative norms; stigma and fear of discrimination can limit their participation in social and economic life. The project construction period can also indirectly impact the partners and dependents of migrant or temporary workers. These categories are not mutually exclusive; individuals can belong to

multiple groups simultaneously, which increases the risks (for example, a young lesbian woman with a disability).

Sexual and gender minorities face specific barriers that warrant careful, confidential treatment. Visibility is limited by social expectations and conservative attitudes, and disclosing sexual orientation or gender identity can pose safety and social risks, including harassment, family rejection, and loss of livelihood. Access to support services is limited: safe spaces, allies, and referral networks are scarce locally; poor phone and internet coverage and low rights awareness further limit access to healthcare, psychosocial support, justice, and employment. Explicit or implicit discrimination can exclude SGM from training and employment in the construction or operational sectors, while fear of exposure can prevent them from attending consultations or using complaint channels. The influx of workers can increase exposure to harassment, sexual exploitation, abuse, and intimidation, hate speech, and, where connectivity exists, cyberbullying. Given these sensitivities, data collection on sexual orientation, gender identity/expression, or sex characteristics should be strictly voluntary, confidential, and anonymized; where possible, proxy indicators should be used instead of direct questions.

This dynamic is reinforced by traditional village leadership structures (captains and bashas), where public discussion of gender-nonconforming identities or sexual orientations is uncommon and sometimes discouraged. Consequently, SGM individuals can feel pressured to conform to prevailing norms and avoid visibility in the community. The lack of formal support networks and the limited availability of information or advocacy on LGBTQI+ rights contribute to low awareness and acceptance, which in turn reduces help-seeking and undermines inclusion in decision-making regarding local development and service delivery.

In this context, the project must adopt a non-harmful and culturally appropriate approach to engagement and benefit sharing. Consultations must offer safe, accessible options that protect privacy and avoid coercive disclosure; complaint procedures must be confidential, targeted at victims of social and sexual orientation, and allow for the reporting of retaliation. Non-discrimination obligations in the management of contractors and personnel, inclusive communication in local languages, and targeted access measures for women, youth, people with disabilities, low-income households are essential to ensure fair participation and mitigate disproportionate impacts during both construction and operations.

iv. Languages spoken, nationalities or other relevant key cultural aspects;

The primary language spoken in these villages is Sranan. Additionally, Aucan, one of the main Maroon languages, is widely spoken. Dutch, the official language of Suriname, is understood by some but is not the dominant language in daily communication. The residents are predominantly Surinamese. These villages follow a traditional Maroon leadership system, with a Kapitein (village chief) and Basjas (assistants) playing key roles in decision-making and conflict resolution. Strong communal ties exist, and collective decision-making is an important part of village life. Extended families often live close to each other and share responsibilities. The villages maintain a strong connection to their ancestral lands, which are essential for their cultural identity, livelihood, and way of life. Respect

for nature and traditional knowledge in resource management are deeply ingrained in their customs.

v. Characterization of Socio-economic Conditions such as economic sectors, formal and informal employment, land tenure;

The Aucan Maroons in northeastern Suriname have been part of the money economy for decades. While traditional activities like small-scale agriculture and fishing remain, both men and women engage in additional income-generating activities such as açaí sales, land clearing, and government jobs. Formal employment is limited, with most relying on informal work, making economic stability dependent on seasonal factors. Land is managed collectively under traditional Aucan land rights, with little individual ownership, which affects economic development opportunities. Their integration into the money economy provides financial flexibility but also exposes them to market fluctuations and limited access to formal financial systems.

vi. Land Use;

These villages primarily use their land for residential, agricultural, and traditional purposes. The houses in most of the villages are in a modern western style from wood and stone. A lot of villagers tend to leave and move to Paramaribo or Moengo because they have better access to basic needs there. Agriculture plays a vital role in these communities, with small-scale farming of crops like cassava, bananas, acai, and vegetables mainly for subsistence and occasional market sales. Fishing and hunting remain essential livelihoods, relying on the surrounding forests and rivers for sustenance.

vii. Information on Archaeological Resources (findings) and historical resources, sites of cultural (tangible and intangible) and spiritual interest, practices and vulnerabilities;

The villages are rich in cultural, historical, and spiritual resources that are integral to the identity and heritage of their communities. The cultural heritage of these villages is strongly rooted in Maroon traditions, with oral histories, music, dance, craftsmanship, and local knowledge being passed down through generations. However, this heritage faces challenges, as younger generations may be less engaged in traditional practices, and the influence of modern life poses a risk to its continuity. In addition to these cultural elements, the villages are home to spiritual sites, including sacred spaces burial grounds and natural areas used for ceremonies or rituals such as "Fraga Tiki" in Langa Uku 1 & 2 . These places are deeply meaningful to the community, but they are vulnerable to encroachment and environmental degradation. The loss of these sacred sites would not only diminish the spiritual connection of the people to their land but also threaten the preservation of their cultural identity.

viii. Analysis of the use of natural resources and ecosystem services by different groups and communities;

In these villages, natural resources and ecosystem services play a crucial role in daily life, supporting activities such as fishing, agriculture, hunting, and the collection of forest products. The river is a vital resource, providing water for household use and for transportation. Forests supply essential materials for construction, firewood, and traditional medicine, while also serving as hunting grounds. Agriculture, including the cultivation of crops like cassava and bananas, is a key livelihood. Some community members engage in small-scale mining, which, while economically beneficial, also brings environmental concerns such as deforestation and water pollution

ix. Key stakeholder in the area of influence of the project, including social and environmental organizations at the local and national levels;

The key stakeholders within the area of influence of the project include both local and national social and environmental organizations. At the **local level**, village leaders (captains and basjas) play a crucial role in decision-making and ensuring that community concerns are addressed. Additionally, local community groups and cooperatives may be involved in advocating for better infrastructure, electricity access, and sustainable resource management. Women's and youth organizations, if present, could also be key stakeholders in discussions on equitable service access and capacity-building initiatives. At the **national level**, government agencies such as the Ministry of Natural Resources (NH), the Ministry of Regional Development and Sport (ROS), and the Ministry of Land and Forest Management (GBB) influence policies on electrification, land rights, and environmental conservation. Additionally, NGOs and advocacy groups focusing on environmental sustainability, indigenous and tribal rights, and rural development may also have an interest in ensuring that the project aligns with social and environmental safeguards. The Ministry of NH is responsible for the energy supply in Suriname, but responsibility for this task has been assigned to the NV Energy Companies Suriname, the EBS. The EBS is the company in charge of production, transport and distribution of electricity.

x. Possible Social Liabilities;

In the villages the unreliable electricity supply frequently causes electrical devices to break down, disrupting daily life and economic activities. Additionally, poor phone reception across these villages' limits access to emergency services and opportunities beyond their communities. For all villages, optimizing electricity and energy supply remains a key concern. Furthermore, in some villages, emotional distress arises from uncertainties about securing the necessary funds for infrastructure projects. This financial insecurity creates stress and instability for residents.

xi. Evaluation of Health aspects of the population that may be impacted by the works of the project program within the areas of influence, mainly vulnerable groups and;

They have no problems with any noise pollution and dust spreading, but this should not happen near schools during opening hours.

xii. Analysis of Existing consultation and community participation mechanisms. Include maps and figures at appropriate scale.

In the villages community consultation and participation mechanisms are primarily facilitated through traditional leadership structures, where village chiefs and elders play a central role in decision-making. Krutus (Community meetings) are the most common form of consultation. These meetings allow for community input, participation levels vary depending on the subject, with topics related to infrastructure and essential services attracting more engagement. However, certain challenges limit effective community participation. Younger generations are less involved in decision-making, partly because many migrate to urban areas for education or employment.

5.2. Environmental and Social Baseline

This paragraph provides a description of the environmental and social baseline conditions within the communities of Wanhatti and surrounding villages and also Abaadu Konde, Akale Konde and Benati Mofo.

5.2.1. **Baseline Social Assessment**

The baseline social assessment focuses on the potential affected environment, specifically examining the socio-cultural and household characteristics related to energy, water, and telecommunications services. This assessment considers direct, indirect, and cumulative impacts on key human receptors, including governance structures, belief systems, demographics, and community well-being. The findings contribute to identifying potential effects on ecosystem services, landscapes, and cultural heritage, where applicable.

5.2.1.1. Abadu Konde, Akale Konde and Benatti Mofo

Socio-cultural characterization:

Traditional structures

The traditional structure in the Maroon villages Abaadu Konde, Akale Konde and Benhati Mofo is that the village captain is head of the village. One village can have multiple captains. Every captain has 1 or 2 basja's available to help organize events and spread the message of the captain in the village.

Villages	Function	Family name & First name
Abaadu Konde	Captain	Lantvelt Adonus
	Basja	Pinas Lucia
Akale Konde	Captain	Poeloedja Herman
	Basja	Faisel Mario
	Basja	Pika Benito
Benati Mofo	Captain	Francis Mamboi
	Basja	Francis Agnes

Table 4. Key stakeholders.

Household characteristics:

Traditional gender roles.

In all Maroon[6] communities in Suriname there were historically traditional gender roles: the men hunted to provide food for their family and the women fetched water, cook and take care of the children. But the Maroons living in the north - east of Suriname and belonging to the Aucan tribe are

[6] Maroons are descendants of enslaved people from Africa, who fled and initially lived in tribes in the interior of Suriname.

since decades part of the money economy. Besides the traditional tasks, both the men and the women also have other hustles as a means of income: Acai sales, land clearing or a government job.

Belief systems:

The villages Abaadu Konde and Benhattimofo are predominantly followers of the Roman Catholic church. Akale Konde belong to the Presbyterian church. Historically the Aucans used traditional shamanic healing methods. In general, even if they are baptized the Aucans still have the knowledge of traditional medicine, but many of them don't use the knowledge anymore, only for villagers and at the request of the basja. There are no known active traditional clinics in those villages.

Government structures:

Normally a Maroon village have official government workers: below the district commissioners there are board supervisors (B.O.) and assistant board supervisors at the village level. Their official tasks are listed in table 4 and table 5.

Official tasks of the Board supervisor:
1. Receives assignments and instruction from the district-secretary and in some cases from the district-commissioner.
2. Is tasked with inventorying, discussing, and suggesting solutions administratively in their resort.
3. Monitors the construction, repair, and maintenance of secondary and tertiary roads.
4. Monitors the regular maintenance works; cleaning maintenance of roadsides, squares, strips, cemeteries and, waste sites.
5. Checks the operation of regularly maintenance of civil/build/technical activities in consultation with the Technical Staff.
6. Checks, in consultation with the civil engineering department, the work performance of third parties, according to the specific conditions;
7. Conducts research into permit requests for setting up and exploiting industries, businesses, shops, and retail companies.
8. Checks the compliance of permit conditions of industries, businesses, shops, and retail companies.
9. Conducts research before giving advice to the district-secretary and/or district-commissioner.
10. Is present for meetings/'krutus', with people of the resort and/or villagers to inventorize and give solutions to specific problems.
11. Supervises for optimal waste disposal and cleaning services in their resort.
12. Mediates in simple civil cases.
13. Attends audiences at the district-commissariat.
14. Prepares for visits to their resort from state official and policymakers.
15. Takes care of the administrative processing for documents pertaining to their resort.
16. Regularly prepares reports pertaining to social, cultural, economic, and ecological developments in their resort for the district-commissioner or the district-secretary.

17. Takes care of the proper functioning of the board service in their resort.
18. Is intimately involved in the general, free, and secret elections in their district/resort.
19. Takes care of order in the resort.
20. Stays on top of managerial developments.
21. Delivers advice/opinions to the district-commissioner, district-secretary, and the adjunct district-secretary.
22. Conducts all activities in the extension of their function.

Table 5. Official tasks of the Board supervisor.

Official tasks of the Assistant Board Supervisor
1. Makes an inventory, discusses or advises on (possible) solution(s) at the administrative level in his/her jurisdiction;
2. Also supervises the construction, repair and maintenance of secondary and tertiary roads and the regular maintenance and/or cleaning of roadsides, strips, squares, general cemeteries, rubbish dumps, etc.;
3. Also checks the implementation and regular maintenance of various Civil, Construction/Technical activities;
4. Also supervises, in collaboration with the Civil Engineering Department, the proper execution of work by third parties and others in accordance with specifications;
5. Co-investigates(s) license applications for setting up and operating industries, companies, companies, retail companies, etc. and also checks compliance with permit conditions of industries, companies, companies, retail companies, etc.;
6. Be closely involved in organizing the general, free and secret elections in the relevant district/administrative district;
7. Participate in field research before issuing an advice to the Board Overseer;
8. Attends meetings/krutus with resort and/or villagers to make an inventory or possibly propose solutions to various problems and also mediates in simple civil matters;
9. Supervises an optimal waste collection and cleaning service in the relevant resort;
10. Attends co-audiences at the district commissariat;
11. Helps prepare official visits by policy and/or state officials
12. To the district/administrative resort or resort;
13. Is also responsible for the overall administrative processing of documents from the relevant jurisdiction and is also responsible for the overall order and peace in the district/administrative jurisdiction or jurisdiction;
14. Keeps himself regularly informed of developments in the field of public administration;
15. Regularly reports both orally and in writing to the Board Overseer;
16. Carry out all activities related to the position.

Table 6. Official tasks of the Assistant Board Supervisor.

Demographics:

In table 6 the population number and household info as gathered during krutu sessions.

Village	Population and household info
Abaadu Konde	100 people, 50 households.
Akale Konde	100 people, 25 households.
Benhati Mofo	200 people. 30-60 households

Table 7. Population and household information per location.

Other socio-cultural observations:

All 3 villages already have electricity via the EBS and water via the SWM and are close to a town, Moengo. Everybody is earning money and is already paying normal tariffs for electricity. There is an elementary school across the village Abaadu Konde and in front of the village Benhati Mofo. Till 2000 there was also a boarding school established at the school, for children from the surrounding villages. At the school yard there are also teacher houses, the office of an NGO the Pater Ahlbrinck Stichting (the father Ahlbrinck foundation), a container workshop for drop outs, a workshop for carpenters to make doors and window frames. After elementary school the children attend school in nearby Moengo.

5.2.1.2. Wanhatti and surrounding villages

Socio-cultural characterization:

Traditional structures:

The traditional structure in the Maroon villages Amalokko kondre, Langa-oekoe 1, Langa Uku 2, Lantiwee, Pikin Santi, Pinatjarimi, Tamarin and Wanhatti is the village captain is head of the village. One village can have multiple captains. Every captain has 1 or 2 basja's available to help organize events and spread the message of the captain in the village.

Villages	Function	Family name & First name
Amolokokondre	**Captian**	**Thalea Makka**
	Basja	**Velanti Rudi**
Langa Uku 1	**Captian**	**Asinga Paulis**
	Basja	**Velanti Ervin**
Langa Uku 2	**Captian**	**Pinas Djoel**
	Captain	**Boeki Kownoe**
	Basja	**Prika Kenneth**
Lantiwee	**Captian**	**Francis Stenfanus**
	Basja	**Pinas Jona**
Pinatjarimi	**Captian**	**Vogelland**
	Basja	**Awana Boyke**
Pikin Santi	**Captian**	**Atjong**
	Basja	**Boisa**
Tamarin	**Captian**	**Pinas Alwin**
	Basja	**Maitel Virginia**
Wanhatti	**Captian**	**Afania Charles**
	Basja	**Domini Carlo**
Resort B.O.	**Administrative supervisor**	**Botai**

Table 8. Key stakeholders.

Household characterization:

Traditional gender roles.

In all Maroon[7] communities in Suriname there were historically traditional gender roles: the men hunted to provide food for their family and the women fetched water, cooked and took care of the

[7] Maroons are descendants of enslaved people who fled and initially lived in tribes in the interior of Suriname.

children. But the Maroons living in the north-east of Suriname and belonging to the Aucan tribe are since decades part of the money economy. So besides the traditional tasks, both men and women also have other hustles as a means of income: Acai sales, land clearing, but also government jobs like board supervisor and assistant-board supervisor.

Belief systems:

The villages Amalokko kondre, Langa-oekoe 1, Langa Uku 2, Lantiwee, Pikin Santi, Pinatjarimi, Tamarin and Wanhatti belong predominantly to the Roman Catholic church. Akale Konde belong to the Presbyterian church. Historically the Aucans used traditional shamanic healing methods. In general, even if they are baptized the Aucans still have the knowledge of traditional medicine, but many of them don't use the knowledge anymore, only "for villagers and at the request of the basja". There are no known traditional clinics active today in those villages.

Government structures:

The government structure is the same in all the tribal villages.

Demographics:

In table 10 the population number and household info as gathered during krutu sessions.

Village	Population of the village	Households per village
Amaloko kondre	19	10
Langa Uku I	32	32
Langa Uku 2	12	50
Lantiwee	60	30
Pikin Santi	60	50
Pinatjarimi	15	7
Tamarin	21	19
Wanhatti	450	150

Table 9. Cluster I.

Other socio-cultural observations:

Wanhatti is the biggest village alongside the Cottica river and from the unpaved secondary road to the village; the surrounding villages can be reached via forest roads. One village, Pikin Santi is at the right sight of the river. All the villages can also be reached via the Cottica river from the jetty in Moengo. The houses in most of the villages are in a modern western style from wood and stone. A lot of villagers tend to leave and move to Paramaribo or Moengo because they have better access to basic needs there.

5.2.1.3. Moengo, Albina and surrounding villages- (cluster3)

Socio-cultural characterization:

Traditional structures:

Leadership in Moengo and the surrounding villages combines traditional and modern governance.

Moengo: While historically a Maroon settlement, Moengo has developed into a regional center with mixed urban and tribal influences. Traditional captains remain present in certain neighborhoods, but administrative authority lies largely with the District Commissioner's office, supported by local board supervisors and state institutions such as the police and fire brigade.

Alfonsdorp: Captain Margriet Biswane heads the village and presides over krutu meetings, assisted by basjas who support in community organization and communication.

Marijkedorp: Captain Grace Watamaleo is the village leader. Marijkedorp is also part of KLIM (Kalina, Lokono in Marowijne), a federation uniting eight Indigenous village leaders, ensuring collective representation in regional affairs.

Pierre Kondre: Governed by a traditional captain and basjas, who mediate local matters and represent the community in external decision-making

Villages	Function	Family name & First name
Moengo	Administrative supervisor (Resort B.O.)	District Commissioner Anatou; DR-member André T.; Jerry Aseyfu; Faye Graanoogst
Moengo	Local captains (various neighborhoods)	Not fully documented
Alfonsdorp	Captain	Margriet Biswane
Alfonsdorp	Basjas	Not specified
Marijkedorp	Captain	Grace Watamaleo
Marijkedorp	Village federation (KLIM)	KLIM (Kalina, Lokono in Marowijne) – umbrella of 8 Indigenous leaders
Marijkedorp	Chairman KLIM	Gumther Erowarte
Pierre Kondre	Captain	[Name not documented]
Pierre Kondre	Basjas	[Names not documented]

Table 10. Key stakeholders.

Household characterization:

Traditional gender roles.

In all four communities, households are typically organized in extended family units. Traditional gender roles—men hunting, farming, or fishing, and women engaged in household duties and child-rearing—still exist, but they are increasingly complemented by modern income-generating activities.

Moengo: Residents are engaged in wage employment, small businesses, and services. The departure of Suralco left behind skilled labor capacity, which is now underutilized. Approximately 40–45 residents are employed, and diesel use (9,500–10,500 liters weekly) provides around 40 hours of electricity supply for the town. Women play an active role in small-scale commerce and service work.

Alfonsdorp & Marijkedorp: Women highlighted that easier access to clean water and electricity would significantly reduce their daily workload, enabling them to invest more time in small businesses (sewing, tailoring, retail) or wage labor. Men expressed interest in improved refrigeration, which would allow them to preserve hunted meat for sale in surrounding areas.

Pierre Kondre: Household patterns are similar to neighboring Indigenous villages, relying on subsistence farming, hunting, and fishing, with gradual integration of modern services

Belief systems:

Religious practice across the villages reflects a blend of Christianity and Indigenous traditions.
- In Alfonsdorp and Marijkedorp, the majority of residents identify as Roman Catholic or Protestant, though traditional Kalina and Lokono beliefs and sacred areas remain important to community life.
- Moengo has greater religious diversity due to its semi-urban character, with Roman Catholic, Protestant, and Evangelical congregations represented. Traditional healing practices are known, though less frequently practiced than in earlier generations.
- Pierre Kondre maintains Indigenous belief systems alongside Christian faith, with strong emphasis on respecting sacred sites and land.

Government structures:

Moengo is characterized by hybrid governance, where state authorities (District Commissioner, administrative board, police, fire brigade) manage daily administration, while traditional captains retain community influence in cultural and neighborhood matters.

In Alfonsdorp, Marijkedorp, and Pierre Kondre, the captain and basjas remain central in decision-making. Village-wide decisions are taken through krutu meetings, with final authority resting with the captain. In Marijkedorp, KLIM provides additional collective representation for Indigenous leadership.

Demographics:

In table 10 the population number and household info as gathered during krutu sessions.

Village	Population (approx.)	Households	Houses	Captain / Key Leadership
Moengo	Several thousand (various neighborhoods)	N/A	Mixed housing (wood/concrete)	District Commissioner Anatou; DR-member André T.; local captains

				(not fully documented)
Alfonsdorp	~300	~100	~100	Captain Margriet Biswane
Marijkedorp	~400	~180	~120	Captain Grace Watamaleo; KLIM (Chairman: Gumther Erowarte)
Pierre Kondre	Small settlement; no exact figures	–	–	Captain [Name not documented]

Table 11. Cluster I.

Other socio-cultural observations:

Moengo: As the largest settlement in the region, Moengo serves as an administrative and service hub for Marowijne. Electricity outages remain frequent, waste management is insufficient (weekly collection; incinerators non-functional), and water billing problems force residents to travel to Paramaribo. Despite these issues, Moengo retains potential as a development model due to existing infrastructure, skilled labor, and accessibility via road and river.

Alfonsdorp: Connected to the EBS grid in 2021; residents widely use modern appliances such as refrigerators, televisions, and laptops. Concerns exist about petty theft, youth unemployment, and alcohol abuse. Sacred lands and personal property boundaries are considered sensitive for infrastructure development.

Marijkedorp: Residents emphasize inclusive and participatory development. Electricity is welcomed not only for lighting but for improving food preservation and education. Concerns were raised about over-chlorination of tap water, deforestation, and shifting gender roles. Community members expressed strong interest in learning how to operate and maintain new systems themselves.

Pierre Kondre: While less documented, the village shares characteristics with neighboring Indigenous settlements. Subsistence agriculture, hunting, and fishing remain primary activities. Residents are cautious but open to modern utilities if introduced respectfully and with adequate training.

Across all villages, a common theme is the willingness to adopt modern energy, water, and telecom systems if implemented in ways that respect cultural identity, environmental integrity, and traditional authority.

5.2.2. Baseline Environmental Assessment

The baseline environmental assessment provides an overview of the current energy, water, and telecommunications conditions across a number of villages in the interior and eastern regions of Suriname. This includes Wanhatti and its surrounding communities, as well as Abaadu Konde, Akale Konde, and Benati Mofo, and further extends to Moengo and the wider Albina area. In this context, the reference to Albina does not solely pertain to the town itself but specifically to the nearby villages of Marijkedorp, Alfonsdorp, and Pierre Kondre, which form part of the broader Albina region. The assessment highlights the challenges these communities face in accessing reliable electricity, clean water, and modern communication infrastructure. The data presented reflects existing limitations, such as dependence on costly and inconsistent energy sources, inadequate water supply and sanitation systems, and poor telecommunication coverage and reliability. By identifying these critical issues, the assessment serves as a foundation for future development initiatives aimed at improving quality of life, supporting economic opportunities, and enhancing environmental and social sustainability in these villages. Tables 11 and 12 present the baseline environmental assessment in relation to energy, water, and telecommunications services per village.

Baseline environmental assessment			
Village	**Energy**	**Water**	**Telecommunications**
Amalokokondre	The energy situation in Amolokokondre is marked by an inconsistent electricity supply. Access to electricity remains limited, with most households relying on costly and unreliable sources such as generators. This reliance contributes to economic instability within the community. The existing energy supply is insufficient to meet the village's demand, affecting local businesses, health services, and essential community functions.	Amolokokondre experiences challenges in accessing clean and potable water. The community primarily relies on rivers and wells, which are often contaminated or insufficient during dry periods. Limited water availability affects health, hygiene, and overall well-being within the community	Telecommunication infrastructure in Amolokokondre is limited, with poor access to mobile and internet services. This affects communication, access to information, and the ability to connect with external markets or government services. Limited connectivity also poses challenges for education, healthcare services, economic opportunities, and social participation in regional and national development.
Langa-oekoe 1	Energy access remains limited, particularly in rural and isolated areas, where reliable and sustainable electricity is scarce. Many communities experience frequent power outages and rely heavily on non-renewable energy sources, contributing to environmental and economic challenges. The existing infrastructure is	Water access remains inconsistent, with many communities relying on underdeveloped or poorly maintained infrastructure. This results in an unreliable supply and quality concerns, often forcing residents to use unsafe water sources, increasing the risk of waterborne diseases. In some areas, the absence of water treatment facilities and the limitations of existing	Telecommunication services remain limited and inconsistent, particularly in rural and remote regions. While urban areas have relatively stable mobile and internet connectivity, many rural areas experience poor signal strength, low broadband speeds, and restricted access to mobile networks. This affects communication, access to information, and participation in digital economies. The absence of

	often outdated, leading to inefficiencies and higher operational costs. As a result, many households depend on generators or other alternatives, increasing the cost of living and affecting local economic activities	systems make it difficult to meet the growing demand for clean water, particularly in rural and remote locations.	reliable telecommunications infrastructure also poses challenges for implementing social services and emergency response systems in underserved areas
Langa-oekoe 2	The energy situation in the community is marked by limited access to reliable electricity. Many households experience inconsistent power supply, causing disruptions in daily activities and affecting economic and social development. The infrastructure remains underdeveloped, with some areas relying on costly and environmentally unfriendly alternatives such as generators. In certain areas, energy demand exceeds supply, leading to further challenges in connectivity to the national grid and the adoption of sustainable energy solutions	Access to clean and reliable water remains a challenge in the community. While some water sources are available, the quality and consistency of supply are often inadequate. Limited water treatment facilities contribute to health risks from contaminated sources. Many households depend on surface water or wells, which are not always safe. Insufficient infrastructure and water management further impact the sustainability of the water supply and overall community health	Telecommunication infrastructure remains underdeveloped, with limited access to reliable mobile networks and internet services. Connectivity is often slow or unavailable, particularly in remote areas. The lack of consistent communication channels affects social interaction, access to information, and economic opportunities. While some residents use mobile phones, the absence of broadband and internet access restricts educational and business prospects. Insufficient telecommunications infrastructure continues to pose challenges for connectivity and access to information and communication technologies.
Lantiwee	The village primarily relies on diesel generators for electricity, which are costly and provide limited supply. Power is only available for a few hours per day, restricting household activities, businesses, and essential services. There is no connection to a stable electricity grid, and renewable energy sources such as solar power are minimal or non-existent. The community faces frequent power shortages, affecting refrigeration, lighting, and overall productivity	Residents rely on rainwater harvesting and river water for daily use. There is no structured water distribution system, and access to clean drinking water is inconsistent. During dry periods, water shortages occur, increasing dependence on untreated sources, which poses health risks. The lack of water purification infrastructure results in concerns about waterborne diseases.	The village has limited or no mobile network coverage, making communication with external areas difficult. Internet access is scarce, with only a few locations having weak connectivity. This restricts access to information, emergency communication, education, and economic opportunities. Dependence on physical travel for communication remains high, leading to delays in coordination and access to services.

Pikin Santi	The village currently lacks reliable electricity. Residents express a strong desire for household electricity, as well as community lighting for safety, especially at night. There is no infrastructure for consistent electrical power, and villagers rely on limited alternative sources, such as generators or other manual means. The absence of electricity hampers daily activities, including extended working hours, food preservation (refrigeration), and other essential needs. The villagers also express a strong interest in having access to electricity, which would significantly improve their quality of life, provide greater safety, and support business and economic development (e.g., tourism opportunities).	The village faces significant challenges regarding clean drinking water. The current water source (river water) is contaminated, leading to illnesses like diarrhea, which is a common health concern. There is a lack of a clean water system, with water scarcity affecting agricultural productivity, especially in the dry season. Clean water is needed to improve crop yield and reduce contamination-related health risks. The villagers express a need for a clean and reliable water supply, which would significantly enhance public health and agricultural practices, as well as overall community well-being.	The village has limited or no reliable telecommunications access. While some residents express an interest in owning cellphones, there is no detailed information about universal access or use. Access to a phone is considered important for safety and emergency communication. However, the lack of consistent network coverage or phone infrastructure limits connectivity. There is also a desire for radio access for entertainment and information, but no mention of universal availability of radios or broadcast services within the village. The lack of telecommunications infrastructure hampers both emergency response efforts (e.g., medical access) and social connectivity, limiting opportunities for residents to stay informed and connected.
Pinatjarimi	The current energy usage in Dorp Pina Tyari Mi is not well-documented, but there is a noticeable interest in transitioning to more modern energy systems, such as solar power. The community is willing to support the installation and maintenance of solar systems. However, there is no significant existing infrastructure for a consistent energy supply, highlighting the challenges of relying on the current system and the lack of sustainable energy sources	Water quality measurements were not specified, but the community shows openness to changes in the water system, particularly with the implementation of new technologies. While water access is not explicitly discussed, the absence of baseline data indicates that water systems may face challenges, including inconsistent supply and a lack of quality monitoring	There is a clear interest in improving telecommunications, with the community showing enthusiasm for better access. The desire to upgrade infrastructure and involve locals in construction suggests that current telecommunications services may face gaps in coverage or service quality, though no specific details on existing infrastructure have been provided
Tamarin	The village relies on diesel generators for electricity, which are expensive to operate and have limited	The primary water sources are rainwater collection, wells, and nearby rivers. During dry seasons, water shortages occur,	Mobile network coverage is limited and unreliable, with frequent signal disruptions. Internet access is scarce, with only

	availability. Electricity supply is not continuous, leading to power outages that affect daily activities and economic opportunities. Some households use solar panels, but these are not sufficient to meet all energy needs. There is no formal grid connection, and maintenance of the existing energy sources is inconsistent. Lack of access to reliable electricity limits education, business development, and household productivity.	affecting hygiene, agriculture, and daily consumption. Water quality is a concern, with reports of contamination risks due to poor sanitation and environmental factors. No centralized water distribution system exists, and treatment options are limited. Some households use filtration methods, but access to clean and safe drinking water remains a challenge.	a few residents using mobile data when available. Lack of stable telecommunications infrastructure restricts education, business, and emergency communication. Many residents rely on word-of-mouth and informal networks for information dissemination
Wanhatti	The village receives electricity from a diesel generator, which operates from 6:00 PM to 6:00 AM. Households use candles and battery-powered lamps outside of generator hours. Electrical appliances such as refrigerators and televisions are used when electricity is available.	Drinking water is supplied through the SWM network, and households use river water for bathing and household tasks. There is no existing water quality monitoring for non-drinking water sources.	Mobile phones are widely owned, but network coverage is weak, with frequent service disruptions. Wired internet access is limited, primarily available to teachers. Radio reception is absent, restricting access to information and emergency broadcasts.

Table 12. Baseline environmental assessment Wanhatti and surrounding villages.

Baseline environmental assessment			
Village	**Energy**	**Water**	**Telecommunications**
Abaadu Konde, Akale Konde and Benhattimofo	The villages receive electricity from Moengo, but the supply is not optimal, often leading to appliance failures. At the boarding school, several refrigerators have already broken down. Despite reporting these issues to EBS, there has been no response, nor is there a formal process to file a claim. Electricity is essential for the village, driving development—particularly for schoolchildren who depend on it for studying. It also plays a vital role in	SWM water has been installed, but it is not yet available in the houses. Residents currently bathe in river and creek water. They feel the need for alternative sources of clean water.	Telecom services from Digicel and Telesur are available, but reception is not always strong. Some households have wired internet, while others rely on mobile internet. Radio remains an important source of news and global updates. Improved electricity would enhance access to telecommunications, ensuring better phone connectivity and expanding available options. Greater accessibility to certain activities would also be possible. Residents, especially younger people, are eager to learn how to use new technologies. Nearly everyone is familiar with the

	safety. Frequent power outages cause food spoilage, further disrupting daily life. Residents strongly prefer a stable household electricity supply, as they aspire to live in a modern world with reliable power.		internet and Wi-Fi. They believe that having access to telecom services gives them equal opportunities as those in the city.

Table 13. Baseline environmental assessment Abaadu Konde, Akale Konde and Benhattimofo.

Baseline environmental assessment			
Village	**Energy**	**Water**	**Telecommunications**
Moengo	**Moengo has access to electricity; however, the supply remains inconsistent. Certain areas experience frequent outages while others benefit from relatively stable service. The existing infrastructure primarily consists of roadside poles, with additional land occasionally purchased for installations. Diesel generators continue to supplement electricity provision, with an estimated consumption of 9,500–10,500 liters, sufficient for approximately 40 hours of power per week. In the absence of electricity, households rely on candles and battery-powered lamps. The demand for reliable and continuous electricity is substantial, particularly to enable refrigeration for the storage of fruits, crops, and hunted game. Nighttime lighting is strongly associated with safety and overall wellbeing, and residents emphasize the importance of safe placement of poles and adherence to established technical standards.**	**Drinking water is accessed primarily through the SWM office, though billing errors occasionally require residents to travel to Paramaribo to resolve issues. Alternative storage and distribution systems are limited or absent. The current drinking water supply is associated with illnesses such as diarrhea and pneumonia, highlighting significant health risks. Community members perceive access to clean and reliable water as essential not only for improving health outcomes but also for enhancing agricultural productivity, particularly during the dry season. Improved water access is also expected to reduce domestic burdens, especially for women, who carry the primary responsibility for fetching and preparing water.**	**Telecommunications infrastructure in Moengo is limited and fragmented. Phones, radios, and mobile internet are in use, yet coverage is inconsistent and maintenance arrangements are unclear. Community members highlight the role of phones and radios in improving personal safety, providing access to information, and supporting leisure activities. Telecommunications are also considered essential for accessing medical services in emergencies and for maintaining social connections with family members in urban areas. Demand for enhanced services is high, particularly for improved phone, radio, and internet access. Internet connectivity is viewed as critical for both education and training, offering opportunities for children as well as adults to develop new skills.**

Table 14: Baseline environmental assessment Moengo

Baseline environmental assessment			
Village	**Energy**	**Water**	**Telecommunications**
Albina - Alfonsdorp	**Alfonsdorp has been connected to the national electricity grid operated by EBS since 2021. Household connections are in place, and payments are made through the national billing system (via GODO), which aligns with urban service models. Despite this, the community has limited awareness of alternative energy sources such as solar power, and no solar systems are currently in operation. Community members highlight the importance of reliable electricity supply, particularly for household lighting and appliances. Public lighting during the night is perceived as a critical safety measure, reducing risks associated with theft, alcohol-related disturbances, and encounters with snakes and other wildlife.**	**The community obtains its drinking and bathing water from the Surinaamsche Waterleiding Maatschappij (SWM) network, which treats and distributes river water. While this system provides a basic level of service, residents emphasize the need for improvements to ensure both quality and reliability. Access to water is viewed as essential not only for domestic purposes but also for agricultural activities, which currently remain constrained by limited infrastructure. Concerns were raised regarding the long-term sustainability of the system, particularly during dry seasons when demand increases.**	**Telecommunication services in Alfonsdorp are functional but underdeveloped. Mobile phone reception is available, although internet access remains limited and is primarily accessed via mobile devices. Radio services are accessible, and most households own basic electronic appliances such as radios, televisions, and refrigerators. Residents express strong demand for improved telecommunication services, highlighting their role in enhancing education, safety, and economic opportunities.**
Albina-Marijkedorp	**Marijkedorp is also connected to the EBS grid; however, residents report that the quality of service is weak and inconsistent. Frequent interruptions in supply compel households to rely on candles and battery-operated devices as backup sources of lighting. Similar to Alfonsdorp, solar systems are not in use, and the community has little prior knowledge of this technology. Reliable electricity access is considered a priority by residents, particularly for refrigeration and other household appliances that directly contribute to food preservation, health, and safety.**	**The SWM system also supplies water to Marijkedorp, but concerns were raised regarding water quality. Residents report that the water often contains excessive chlorine, making it less desirable for consumption. While the system provides for basic household needs, the absence of designated infrastructure for agricultural water supply limits the village's potential for small-scale farming. Seasonal flooding during spring tides, particularly in areas near the park and Anjoemarakreek, exacerbates water-related vulnerabilities and contributes to broader environmental risks. Community members recognize the need for improved water management systems to enhance both household well-being and agricultural productivity.**	**Telecommunication infrastructure in Marijkedorp is limited. Mobile coverage is weak, and internet access is largely restricted to mobile phones. Radio services are minimal, with residents reporting access only to the national station SRS and a few French broadcasters. The community strongly emphasizes the need for improved telecommunications infrastructure, viewing it as essential for advancing education, expanding business opportunities, and improving household safety.**
Albina- Pierre Kondre	**Pierre Kondre is connected to the national EBS grid, with**	**Water supply in Pierre Kondre is provided by the SWM network.**	**Telecommunication services in Pierre Kondre are provided by Telesur. Both**

	residents reporting a generally consistent supply of electricity, though occasional outages occur. As in the other villages, solar energy systems are neither available nor familiar to the community. Household-level electricity is strongly preferred over communal lighting solutions, as it supports the use of refrigeration and other appliances that directly benefit domestic needs and food security.	**While this system delivers basic access to drinking and bathing water, residents note occasional outages, particularly in the evenings. To compensate for these interruptions, many households use Durotanks for water storage, ensuring continuity of supply. No major concerns were reported regarding water quality, although the lack of agricultural water infrastructure remains a limiting factor for productive activities.**	**mobile phone and internet services are available, though the signal is occasionally weak. Radio reception is reliable and forms an important source of information and entertainment. Internet use is primarily mobile-based, similar to the other two villages. Residents emphasize the importance of maintaining and expanding these services, particularly in support of education and communication.**

Table 15 : Baseline environmental assessment Albina region nearby villages of Marijkedorp, Alfonsdorp, and Pierre Kondre

6. Impact and risk assessment

This section focuses on assessing these risks and impacts in alignment with the second element of the Environmental and Social Management System (ESMS): Identification of Risks and Impacts. This element, as outlined in Section 7 of the requirements of ESPS 1, requires the Borrower to establish and maintain a process for identifying the environmental and social risks and impacts of the project.

6.1. ESPS 1 Requirements: Assessment and Management of Environmental and Social Risks and Impacts

6.1.1. Overview

KPI's are metrics used to evaluate whether the environmental theory of change can be met by IDB's energy infrastructure project on tribal Maroon land in the East of Suriname. Figure 2 shows the Key Performance Indicators (KPI's) that were extracted from interview results of identical communities.

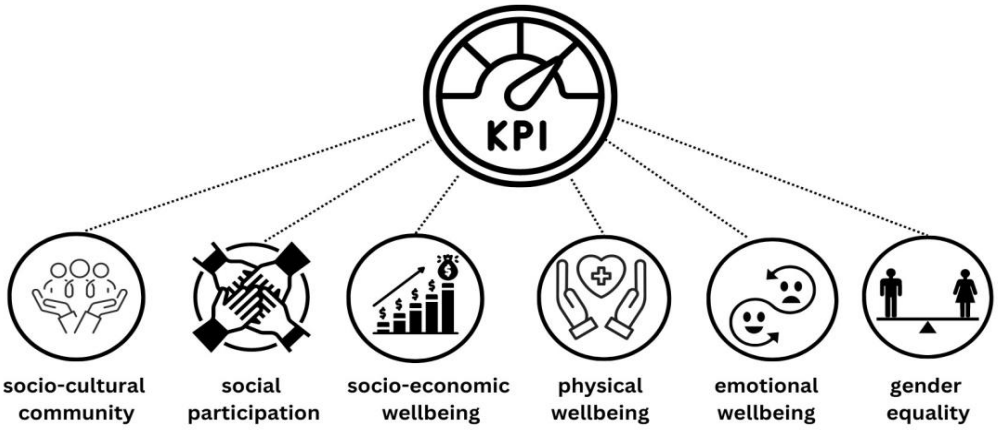


Figure 5. KPI's for the development of energy infrastructure on tribal Maroon land in the East of Suriname.

In order to rate the KPI, a **3-level positive impact analysis** was done to see what **potential positive impacts** could occur (high, medium or low potential positive impact, see table 13).

Potential positive Impact rating	Description	Proceed with:
High potential positive impact.	Certain to benefit the social group and/or solves a major issue they are dealing with.	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated.
Medium potential positive impact.	May benefit the social group and/or may solve minor issues they are dealing with.	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated.
Low potential positive impact.	Can benefit the social group, but may not solve any issues they are dealing with.	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated.

Table 16. Potential positive impact rating.

From the KPI's, Key Risk Indicators (KRI's) were extrapolated (figure 3). KRI's are metrics that can evaluate potential risks that could **negatively impact** the environmental theory of change for IDB's energy infrastructure projects on tribal Maroon land in the East of Suriname.

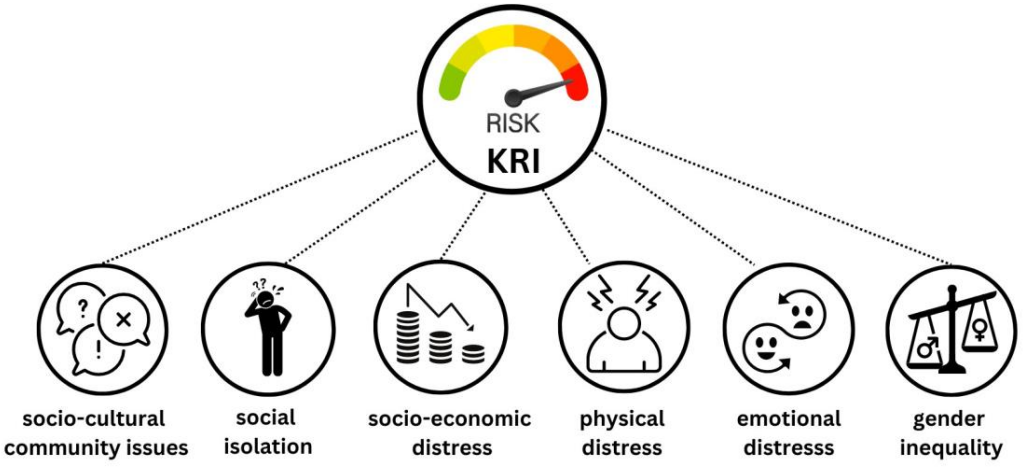


Figure 6. KRI's for the development of energy infrastructure on tribal Maroon land in the East of Suriname.

A risk analysis was carried for these KRI's by:

- Rating the potential negative impact (table 14).
- Rating the likelihood of this negative impact; likelihood is the level of probability that a risk will occur (table 15).
- Evaluating the risk with a risk matrix (risk= potential negative impact x likelihood) (table 16). The potential risks are defined by 4 categories: low risk, moderate risk, substantial risk and high risk.
  The risk per category is described in table 17, with subsequent plan of actions.

Potential negative Impact rating	Description	Proceed with:
Very high negative impact	Irreparable damage to social functions, processes or cultural items.	Risk analysis
High negative impact	Significant damage to social functions, processes or cultural items.	Risk analysis.
Medium negative impact	Considerable damage to social functions, processes or cultural items.	Risk analysis.
Low negative impact	No or insignificant damage to social functions, processes or cultural items.	Risk analysis.

Table 17. Potential negative impact rating.

Likelihood	Description
Very likely	Certain to occur
Likely	Can occur
Possible	May occur
Unlikely	Almost never occur

Table 18. Likelihood rating.

Likelihood- very likely	**Moderate**	**Substantial**	**High**	**High**
Likely	**Low**	**Moderate**	**Substantial**	**High**
Possible	**Low**	**Moderate**	**Moderate**	**Substantial**
Unlikely	**Low**	**Low**	**Low**	**Moderate**
Negative impact	**.low**	**Medium**	**High**	**Very High**

Table 19. Risk matrix.

Risk rating	Description	Actions
High	Energy infrastructure activities may cause irreparable direct or indirect damage to tribal Maroons' socio-cultural community, social participation, socio-economic wellbeing, physical wellbeing, emotional wellbeing or gender equality.	Risk mitigation: The risk can be avoided, reduced to as low as reasonably practical (ALARP), or transferred. The risk is not acceptable. Safeguards should be formulated.
Substantial	Energy infrastructure activities may cause significant direct or indirect damage to tribal Maroons' socio-cultural community, social participation, socio-economic wellbeing, physical wellbeing, emotional wellbeing, or gender equality.	Risk mitigation: The risk can be avoided, reduced to as low as reasonably practical (ALARP), transferred or retained. The risk may be acceptable. Safeguards should be formulated.
Moderate	Energy infrastructure activities may cause considerable direct or indirect damage to tribal Maroons' socio-cultural community, social participation, socio-economic wellbeing, physical wellbeing, emotional wellbeing or gender equality.	Risk mitigation: The risk can be avoided, reduced to as low as reasonably practical (ALARP), transferred or retained. The risk may be acceptable. Safeguards should be formulated.
Low	Energy infrastructure activities cause no or insignificant damage to tribal Maroons' socio-cultural community, social participation, socio-economic wellbeing, physical wellbeing, emotional wellbeing or gender equality.	Further risk reducing measures may not be needed. Guidelines could be formulated.

Table 20. Social risk rating and action plan.

6.1.2. Results: Potential Social Positive Impact Analysis and Risk Analysis

6.1.2.1. Potential Social Positive Impact Cluster 1

In order to rate the KPI, a 3-level positive impact analysis was done to see what potential positive impacts could occur (high, medium or low potential positive impact).

The following tables show the potential positive impact analysis per location.

Cluster I: Abaadu Konde, Akale Konde and Benhati Mofo		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	**Medium**	The electricity supply currently comes from the EBS station in Moengo. While electricity is available, it is not optimal, occasionally causing devices to break down without an apparent reason. SWM water has been installed, but it is not yet available inside their homes. Additionally, phone reception is poor. Improved telecom services would provide easier access to the city or nearby villages in case of emergencies.
2. Engagement method in place.	**High.**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3. Cultural heritage and territories maintained.	**High.**	There are no restricted areas in the village. With optimal electricity and water in the house, women have less work and more free time to relax. The women would still want to cook on fire to save gas and because it tastes good.
Social participation		
4. Easy access to the city for family.	**High**	Yes, they noted that calling or reaching family more easily is one of the reasons why they would like the project to be executed as soon as possible. They have family members that live in the city, Paramaribo and in Moengo. Better lighting and access to energy can contribute to safer travel conditions within and outside villages, which can promote connectivity with urban areas.
5. Feeling supported.	**High**	Actual fruition of this project would make them feel very supported. Access to energy can lead to improved education and health facilities, which will benefit social cohesion and support within the villages. The way in which the communities are involved in the electrification project through Free, Prior and Informed Consent (FPIC) also determine how supported the residents feel in the decision-making and implementation.
6. Willing to accommodate workers to achieve project goals.	**Low**	The community is open to training opportunities, because they want to learn and maintain these systems themselves. They are willing to accommodate workers to achieve project goals.
7. Willing to be trained for operation and maintenance.	**High**	There is a certain willingness within the community to take a training, especially a technical one, because no one in the village has experience with the electricity system. They prefer

		an accessible training that suits the learning style of the local population.
8. Increased personal development.	**high**	The villagers are very eager to get training to be able to maintain the services which would help their personal development. In addition, many residents see an optimal electricity supply and telephone reception as an opportunity for personal growth, for example through better study opportunities (more lighting and access to digital learning platforms).
9. Increased sense of equal rights.	**high**	They would like to be up to date with the news like the rest of the world. They do not want to be "held back and live old-fashioned". They want to participate and have access to services like the rest of the country. They are eager to have better access to electricity and also clean water and telecom.
10. Willing to learn new technologies.	**High**	They are eager to learn more about the Internet and are open to training on the operation and maintenance of the systems.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High**	They are willing to work for the energy project.
12. Increased business opportunity.	**Medium**	The women in the communities see the potential to develop tourism, and selling their medicinal products. Perhaps the men do not.
13. Elevation of existing business	**High**	Optimal electricity can enable participation in a wider range of activities. They can work longer hours if they had optimal(electric) light at night.
14. Use of new tools.	**Medium**	With a reliable electricity supply, they would be able to use their devices without the risk of damage.
Physical wellbeing		
15. Improved medical care.		No information.
16. Improved health and nutrition status.	**High.**	With optimal electricity they could preserve food longer and improve their nutritional intake.
17. Improved food security.	**High.**	With improved energy access they could buy freezers to save food longer and also sell their game. The women would buy a rice cooker for quicker food access if they had the funds.
18. Improved sense of leisure.	**Medium**	With better access to water and optimal electricity at home, women have more time to relax. However, men will hunt more.
Emotional wellbeing		
19. Improved sense of safety.	**High**	Better lighting in and around homes would help with general safety and also protection from snakes, if they do appear they can see it in time.
20. Less stress.	**High**	Access to electricity enables households to generate additional income, such as storing refrigerated food for sale, which helps reduce financial stress. With reliable electricity and good reception, they can access radio, television, and the internet, which are not only educational but also provide entertainment and help reduce stress. Additionally, women have more time to relax when they can use electrical appliances to ease household tasks.
Gender equality		

21. More business opportunity for women.	**Medium**	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: Business opportunity: Improved energy access could potentiate the development of tourism which could lead to more business opportunity for women. They could serve as tour guides, cooks, cleaners
22. Improved physical wellbeing for women.	**High**	The women can use electrical appliances to do part of the daily work.
23. Men having more time for family or household activities.	**Low**	Men will hunt more and work longer hours.

Table 21. positive impact analysis of cluster I: Abaadu Konde, Akale Konde and Benhati Mofo

6.1.2.2. Potential Social Positive Impact Cluster 2

Village: Amaloko kondre		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1.Optimizing their way of life.	**High**	Amaloko kondre source of electricity currently is a generator system that is used in the village from 7 PM to 11 PM, if they have fuel. What deepens their risk is that they also have no access to potable water options. Their drinking water consists of creek water, rain water. Their phone reception is not working well. With a better telecom service they would have easier access to the city or other villages for emergencies.
2.Engagement method in place.	**High.**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3.Cultural heritage and territories maintained.	**High.**	There are no restricted areas in the village. The women would still want to cook the traditional herbal baths with medical leaves on fire.
Social participation		
4. Easy access to the city for family.	**Medium**	Yes, they noted that calling or reaching family more easily is one of the reasons why they would like the project to be executed as soon as possible. They want their children to eat well. They have family members that live in the city, Paramaribo and in Moengo. They have phones but the reception is poor.
5. Feeling supported.	**High**	Actual fruition of this project would make them feel very supported.
6. Willing to accommodate workers to achieve project goals.	**Low**	Good for training possibilities because they want to learn. However, they do not want to be deceived.
7. Willing to be trained for operation and maintenance.	**High**	They are willing to let people come and train them. They are open to follow up training via videos/ video calls. They insisted on periodic training to help with maintaining the services.
8. Increased personal development.	**high**	The villagers are very eager to get training to be able to maintain the services which would help their personal development.
9. Increased sense of equal rights.	**high**	They would like to be up to date with the news like the rest of the world. They do not want to be "held back and live old-fashioned". They want to participate and have access to services like the rest of the country. They are eager to have access to electricity and also clean water and telecom.
10. Willing to learn new technologies.	**High**	They would like the younger villagers to learn about the internet. They are open to being trained online once people have shown them the basics of operation and maintenance. None of this is possible without funds for computers or electronic devices enabling internet connection.
Socio-economic wellbeing		

11. Willingness to work for operation and maintenance.	**High**	Men as well as women want to work for the energy project.
12. Increased business opportunity.	**Medium**	With support, there is potential to develop tourism.
13. Elevation of existing businesses.	**High**	With improved energy they have more potential to develop tourism and other businesses
14. Use of new tools.	**High**	The women did mention that if they had the funds, they would buy a rice-cooker. They could use this to cook food quicker in the future.
Physical wellbeing		
15. Improved medical care.	**High**	Better energy access such as light at night could improve their emergency health care.
16. Improved health and nutrition status.	**High.**	With improved energy access they could store food longer and improve on their nutrition intake.
17. Improved food security.	**High.**	With improved energy access they could buy freezers to save food longer. The women would buy a rice cooker for quicker food access if they had the funds.
18. Improved sense of leisure.	**High.**	With the ability to save food in freezers, the men would have to hunt less.
Emotional wellbeing		
19. Improved sense of safety.	**Low**	Light would help with spotting dangerous animals: "Yes because in the dark you can't see everything and snakes are a danger." They think that light at night will probably make this animal appear less frequently and if it appears they can spot it in time.
20. Less stress.	**High**	Especially for the women who can use more electrical appliances.
Gender equality		
21. More business opportunity for women.	**Medium**	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Direct business opportunity: The women are willing to work for operation and maintenance of the projects. If the women are actively included in gender-environment nexus during project building work and are given compensation for contributing to the waste management and recycling team of building workers or other site workers. • Indirect business opportunity: Improved energy access could potentiate the development of tourism which could lead to more business opportunity for women. They could serve as tour guides, cooks, cleaners
22. Improved physical wellbeing for women.	**High**	The women can use electrical appliances to do part of the daily work.
23.Men having more time for family or household activities.	**Low**	The men would have increased sense of leisure.

Table 22. Positive impact analysis of Amalokokondre

Village: Langa-oekoe 1		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	**High**	Langa Uku 1 has electricity with a diesel generator and a telecom network from Telesur. For water the village is still dependent on rain, creek and river water. The creek near the agricultural lands is also used as a water source. Sometimes villagers get sick from the water, especially from the river water. Not everyone cooks their water before drinking. Clean water is very important for the health of the villagers. -They are not happy with their diesel generator as they have only limited light and sometimes no light at all if there is no diesel delivered.
2. Engagement method in place.	**High.**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3. Cultural heritage and -territories maintained.	**High.**	-The cultural heritage the "Fraga Tiki', is in the middle of the village, in plain sight, so they are not worried. -"We will always keep boiling our medical leaves with fire", krutu participants.
Social participation		
4. Easy access to the city for family.	**Medium**	They already have phones and easy access to family but the reception is poor.
5. Feeling supported.	**High**	-They strongly agree that they would feel supported. Because they would have the same possibilities as the people in the city. -Politicians promised electricity 24/7 but it never happened so they do not trust the government and want to see first.
6. Willing to accommodate workers to achieve project goals.	**Medium**	They are willing, but would rather work their selves on the project.
7. Willing to be trained for operation and maintenance.	**High**	They want to help with building and they are willing to let people come and train them, at least the youngsters in the village.
8. Increased personal development.	**High**	They want to assist with building work, collecting local material in the forest and they would prefer to do all the minor maintenance themselves.
9. Increased sense of equal rights.	**Medium**	Electricity is a beginning. Water is also important
10. Willing to learn new technologies.	**High**	Villagers are open to being trained and also have the young adults learn the basics of operation and maintenance.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High**	Yes, they want to do minor maintenance themselves and if possible also operations.
12. Increased business opportunity.	**Medium**	With support, there is potential to develop tourism because historical sight (Fort Boekoe).
13. Elevation of existing businesses.	**Medium**	With improved energy they have more potential to develop tourism

14. Use of new tools.	**High**	They will buy household appliances, so the household tasks become easier and time saving.
Physical wellbeing		
15. Improved medical care: safety	**Medium**	They have light until 1 in the morning.
16. Improved health and nutrition status.	**High.**	With the possibility to store fresh food, fruit in the fridge and improve intake of healthy food.
17. Improved food security.	**High**	Possibilities to increase income, by assisting in the project and executing new business ideas
18. Improved sense of leisure.	**High.**	With improved energy access, the women would have more time for leisure.
Emotional wellbeing		
19. Improved sense of safety.	**Low**	They already have light from 18.00 to 1 at night
20. Less stress.	**Medium**	Less worries about safety.
Gender equality		
21. More business opportunities for women.	**High**	Since Langa Uku 1 and 2 are very close in distance and in family ties they have almost the same circumstances. With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Direct business opportunity: if the women are actively included in gender-environment nexus during project building work and are given compensation for contributing to the waste management and recycling team of building workers or other site workers. • Indirect business opportunity: Improved energy potentiate the development of tourism which could lead to more business opportunities for women. They could serve as tour guides and cook meals or other tasks in the hospitality business. Improved energy could lead to investment opportunities.
22. Improved physical wellbeing for women.	**High**	The women can use electrical appliances to do part of the daily work.
23. Men having more time for family or household activities.	**low**	N.A.

Table 23. Positive impact analysis of Langa-oekoe 1.

Village: Langa-oekoe 2		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	**High**	Langa Uku 2 has electricity with a diesel generator from 18.00u till 1 in the morning and a telecom network from Telesur. For water the village is still dependent on rain, creek and river water. The creek near the agricultural lands is also used as a water source. Sometimes villagers get sick from the water, especially from the river water. Not everyone cooks their water before drinking. Clean water is very important for the health of the villagers. They are not happy with their diesel generator as they have only limited light and sometimes no light at all if there is no diesel delivered.
2. Engagement method in place.	**High.**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3. Cultural heritage and -territories maintained.	**High.**	The cultural heritage the "Fraga Tiki', is in the middle of the village, in plain sight, so they are not worried. They will always keep boiling frequently used medical leaves with fire, krutu participants.
Social participation		
4. Easy access to the city for family.	**Medium**	They already have phones and easy access to family but the reception is poor.
5. Feeling supported.	**High**	-They strongly agree that they would feel supported. Because they would have the same possibilities as the people in the city. -Politicians promised electricity 24/7 but it never happened so they do not trust the government and want to see first.
6. Willing to accommodate workers to achieve project goals.	**Medium**	They are willing, but would rather work their selves on the project.
7. Willing to be trained for operation and maintenance.	**High**	They want to help with building and they are willing to let people come and train them, at least the youngsters in the village.
8. Increased personal development.	**High**	They want to assist with building work, collecting local material in the forest and they would prefer to do all the minor maintenance themselves.
9. Increased sense of equal rights.	**Medium**	Electricity is a beginning. Water is also important
10. Willing to learn new technologies.	**High**	Villagers are open to being trained and also have the young adults learn the basics of operation and maintenance.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High**	Yes, they want to do minor maintenance themselves and if possible also operations.
12. Increased business opportunity.	**Medium**	With support, there is potential to develop tourism because historical sight (Fort Boekoe).
13. Elevation of existing businesses.	**Medium**	With improved energy they have more potential to develop tourism
14. Use of new tools.	**High**	They will buy household appliances, so the household tasks become easier and time saving.

Physical wellbeing		
15. Improved medical care: safety	**Medium**	They have light until 1uur pm.
16. Improved health and nutrition status.	**High.**	With the possibility to store fresh food, fruit in the fridge and improve intake of healthy food.
17. Improved food security.	**High**	Possibilities to increase income, by assisting in the project and executing new business ideas
18. Improved sense of leisure.	**High.**	With improved energy access, the women would have more time for leisure.
Emotional wellbeing		
19. Improved sense of safety.	**Low**	They already have light from 18.00 to 1 at night
20. Less stress.	**Medium**	Less worries about safety at night
Gender equality		
21. More business opportunities for women.	**High**	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Direct business opportunity: if the women are actively included in gender-environment nexus during project building work and are given compensation for contributing to the waste management and recycling team of building workers or other site workers. • Indirect business opportunity: Improved energy potentiate the development of tourism which could lead to more business opportunities for women. They could serve as tour guides and cook meals or other tasks in the hospitality business. Improved energy could lead to investment opportunities.
22. Improved physical wellbeing for women.	**High**	The women can use electrical appliances to do part of the daily work.
23. Men having more time for family or household activities.	**Low**	N.A.

Table 24. Positive impact analysis of Langa Uku 2.

Village: Lantiwee		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	**High**	Lantiwee has a generator from 6 till 11 at night. There is a telecom network from Telesur with a poor signal. For water the village is still dependent on rain and river water. Rainwater stored in duro tanks; sometimes river water is used for drinking. Electricity is very important for the village as it is seen as a catalyst for development, especially for schoolchildren who would be able to study. It would also stimulate entrepreneurial activities. The use of TVs would also offer educational benefits.
2. Engagement method in place.	**High.**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3. Cultural heritage and -territories maintained.	**High.**	There are no restricted areas in the village. The women would still want to cook the traditional herbal baths with medical leaves on fire. Territories will be maintained because project sites will be chosen in consultation with the villagers.
Social participation		
4. Easy access to the city for family.	**Medium**	Every household has a cell phone but the reception is poor.
5. Feeling supported.	**High**	Yes, they would feel supported. False promises were made in the past by the Health department.
6. Willing to accommodate workers to achieve project goals.	**Medium**	They are willing.
7. Willing to be trained for operation and maintenance.	**High**	Yes, they want maintenance by EBS with local community involvement. They are willing to learn about maintenance and operations.
8. Increased personal development.	**high**	They want their youngsters to learn new things and say the children can have a better future. New opportunities for personal development are also there with freed up time when less physical manual labor that is necessary to chop wood and to hunt for fresh food.
9. Increased sense of equal rights.	**Medium**	Yes but not fully
10. Willing to learn new technologies.	**Medium**	For their children they are open to online trainings.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High**	They indicated a willingness.
12. Increased business opportunity.	**Medium**	With support, there is potential to develop tourism.
13. Elevation of existing businesses.	**High**	With improved energy they have more potential to develop tourism and other businesses
14. Use of new tools.	**High**	They did not mention use of new tools in the krutu's, but with improved energy they could use household appliances.
Physical wellbeing		

15. Improved medical care	**High**	There is poor telecom (phone reception) available in Lantiwee. The women say that with the possibility of light at night could improve the way they respond to medical emergencies such as with births. Improved water and energy access could improve their medical care.
16. Improved health and nutrition status.	**High.**	With improved water quality and access they would have improved physical wellbeing. With energy access to more households they could have improved nutrition, as they could save their foods instead of smoking it to preserve for a few days.
17. Improved food security.	**High**	Cleaner water and more energy access will enable them to buy more freezers to save food.
18. Improved sense of leisure.	**Medium**	There is already tap water available in the village. The men might hunt or fish less if there was more food security (food chilling options per household).
Emotional wellbeing		
19. Improved sense of safety.	**Medium**	More light at night could help them prevent accidents.
20. Less stress.	**Medium**	A feeling of safety regarding snakes at night or strangers.
Gender equality		
21. More business opportunity for women.	**Medium**	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Direct business opportunity: The women are willing to work for operation and maintenance of the projects. If the women are actively included in gender-environment nexus during project building work and are given compensation for contributing to the waste management and recycling team of building workers or other site workers. • Indirect business opportunity: Improved energy could potentiate the development of tourism which could lead to more business opportunity for women. They could serve as tour guides, cook meals and other work in the hospitality business.
22. Improved physical wellbeing for women.	**High**	The women will have less physical work because of the household appliances they can use.
23. Men having more time for family or household activities.	**Low**	N.A.

Table 25. Positive impact analysis of Lantiwee.

Village: Pikin Santi		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	**High**	They already have a generator in the village, but it's not working as regularly as they would like. At the moment the generator is defect so they are in the dark. Water from the SWM, the Surinam Water Company operates on electricity. So as long as the generator is defect they have no access to potable water. There is not always enough water available 24/7.
2. Engagement method in place.	**High.**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutus.
3. Cultural heritage and - territories maintained.	**High.**	Territories for building purposes will be chosen in consultation with the villagers. There are no restricted areas in the village. The women would still want to cook the traditional herbal baths with medical leaves on fire.
Social participation		
4. Easy access to the city for family.	**Medium**	N.A. They already have phones and access to family via ACT's wifi/telecom.
5. Feeling supported.	**High**	Yes, they would feel supported. False promises were made in the past by political parties.
6. Willing to accommodate workers to achieve project goals.	**Medium**	They are willing.
7. Willing to be trained for operation and maintenance.	**Medium**	Yes, they are willing to learn as much as possible about operation and maintenance. They would also like to get paid for it. Online trainings would be more difficult because the majority of the krutu participants did not know what a computer is and have not been on the internet.
8. Increased personal development.	**High**	They would like to learn.
9. Increased sense of equal rights.	**Medium**	Yes but not fully
10. Willing to learn new technologies.	**Medium**	For their children they are open to online trainings.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**Medium**	Yes, for maintenance
12. Increased business opportunity.	**High**	With support, there is potential to develop tourism. Yes, tourism is a potential opportunity. The village boasts the most beautiful beach. Additionally, the location can be used in the context of historical significance, particularly for Fort Boekoe.
13. Elevation of existing businesses.	**High**	Tourism can become important because of history.
14. Use of new tools.	**High**	The men and woman say that with 24/7 electricity the men would buy a circular saw and a planer to make planks. The women can use electrical household appliances.
Physical wellbeing		

15. Improved medical care	**High**	Improved water and energy access could improve the response to emergency medical care.
16. Improved health and nutrition status.	**High.**	With improved water quality and access they would have improved physical wellbeing. With energy access to more households they could have improved nutrition, as they could save their foods instead of smoking it to preserve for a few days. It is important that there is meat for children that go to school. The way it is now we often have to throw away meat that has gone bad. With closer water access the women would not have to fetch water from the creek or river.
17. Improved food security.	**High**	Clean water and more energy access will enable them to buy freezers to save food.
18. Improved sense of leisure.	**High**	The women would like a service where they do not have to go back and forth to fetch water, as there is no water from 6pm onwards. In general men and women would like entertainment on tv or radio, mainly to be able to hear the news.
Emotional wellbeing		
19. Improved sense of safety.	**Medium**	More light at night could help them prevent accidents.
20. Less stress.	**Medium**	Especially regarding their water quality and related health issues.
Gender equality		
21. More business opportunity for women.	**Low**	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Direct business opportunity: The women are willing to work for operation and maintenance of the projects. if the women are actively included in gender-environment nexus during project building work and are given compensation for contributing to the waste management and recycling team of building workers or other site workers. • Indirect business opportunity: Improved energy and water access could potentiate the development of tourism which could lead to more business opportunity for women. They could serve as tour guides, sell their arts and crafts, honey and tea products or cook meals.
22. Improved physical wellbeing for women.	**Medium**	The women already have improved physical wellbeing due to tap water (if electricity is working). For the electricity they will have less physical work because of the household appliances they can use.
23. Men having more time for family or household activities.	**Low**	N.A.

Table 26. Positive impact analysis of Pikin Santi.

Village: Pinatjarimi		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	**High**	They have a generator and electricity from 7 till 11. The generator is used for household electricity needs in the evening. So they have a freezer Food is conserved by storing in the freezer (only power 5 hours a day) and also by smoking and to salt meat So they have freezers but not enough capacity to store their food. Their drinking water is rainwater and river water and can cause illness.
2. Engagement method in place.	**High.**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3. Cultural heritage and - territories maintained.	**High.**	Territories for building purposes will be chosen in consultation with the villagers. There are no restricted areas in the village. The women would still want to cook the traditional herbal baths with medical leaves on fire.
Social participation		
4. Easy access to the city for family.	**Medium**	N.A. They have phones and access to family via Telesur but with poor signal and in busy period like weekend or holidays no access at all.
5. Feeling supported.	**High**	Yes, they would feel partly supported. **Yes, it will improve living conditions and develop the village.** A lot of false promises have been made in the past.
6. Willing to accommodate workers to achieve project goals.	**Medium**	They are willing.
7. Willing to be trained for operation and maintenance.	**High**	Yes, they are willing to learn for maintenance together with people from EBS.
8. Increased personal development.	**High**	The villagers want to be trained on the job.
9. Increased sense of equal rights.	**High**	Yes, they want the same services as other people also for water. They do not want to have to work so hard for light and water. We would like it to be a given, just like people in the city
10. Willing to learn new technologies.	**High**	Villagers are open to being trained and also have the young adults learn the basics of operation and maintenance
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High**	Yes they want to work and learn. They want to get paid for it.
12. Increased business opportunity.	**Medium**	There is an opportunity to develop tourism with the right support. They would want to further develop in tourism by selling souvenirs to tourists or give tours. The women would like to sell and cook food for tourists.
13. Elevation of existing businesses.		No Info.

14. Use of new tools.	**High**	Use of electric household appliances and technical tools
Physical wellbeing		
15. Improved medical care.	**High**	Improved energy access could improve the response to emergency medical care.
16. Improved health and nutrition status.	**High.**	More and diverse food available because of a fridge to store food
17. Improved food security.	**High**	Food can be stored in the fridge and also bread, fruit , milk. A better diet is possible.
18. Improved sense of leisure.	**High**	The women say they would have an improved sense of leisure.
Emotional wellbeing		
19. Improved sense of safety.	**Medium**	Yes, because they can see dangers in time, like snakes.
20. Less stress.	**Medium**	.Feeling safe at night
Gender equality		
21. More business opportunity for women.	**High**	With the help of ngo's of other organizations
22. Improved physical wellbeing for women.	**High**	Because of the use of electrical appliances
23. Men having more time for family or household activities.	**Medium**	Indirect impact. Yes, the women noted that with more food chilling capacity and food safety, the men would hunt less and have more time for their family.

Table 27. Positive impact analysis of Pinatjarimi.

Village: Tamarin		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1.Optimizing their way of life.	**High**	Tamrin source of electricity currently is a generator system that is used in the village from 18.30 PM to 11.30 PM, if they have fuel. There is no electricity in daytime so the school does not have access to electricity. What deepens their risk is that they also have no access to potable water options. Their drinking water consists of rain water and if accessible creek water. Their phone reception is not working well. The Telesur mast is in Pikin Santi, a nearby village.
2.Engagement method in place.	**High**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3.Cultural heritage and -territories maintained.	**High**	There are no restricted areas in the village. The women would still want to cook the traditional herbal baths with medical leaves on fire using coal and woods.
Social participation		
4.Easy access to the city for family.	**Medium**	They have phones and access to family via Telesur but with poor signal and in busy period like weekend or holidays no access at all.
5.Feeling supported.	**Medium**	-They agree that they would feel supported. Because they would have the same possibilities for electricity as the people in the city. -Politicians promised electricity 24/7 but it never happened so they do not trust the government and want to see first.
6.Willing to accommodate workers to achieve project goals.	**High**	Yes
7. Willing to be trained for operation and maintenance.	**High**	Yes
8. Increased personal development.	**High**	Yes ,they want to be trained. Learn how to use a computer
9. Increased sense of equal rights.	**High**	They feel that they have the same rights
10. Willing to learn new technologies.	**High**	They would like to learn about the internet. They are open to being trained online once people have shown them the basics of operation and maintenance. None of this is possible without funds for computers or electronic devices enabling internet connection
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High**	yes
12. Increased business opportunity.	**Medium**	There in an opportunity to develop tourism with the right support. The fort Boekoe location is in this area and already tourists from Afrika and other countries came to visit. So the villagers need ngo's and other business organizations to help develop the tourist sector.
13. Elevation of existing businesses.	**High**	The tourism business can elevate because of the historical site located in that area. The selling of agricultural goods for the tourism business, the development of the hospitality business, fishing and hunting sales

14. Use of new tools.	**High**	With improved energy they can use all kinds of household appliances, also water cooker so they have boil the rain and river water more easier.
Physical wellbeing		
15. Improved medical care	**High**	Currently they have to go to Lantiwee for medical emergencies. They can charge the phones so they will be able to reach first aide medical help quickly in emergency cases.
16. Improved health and nutrition status.	**High.**	Yes they noted they need electricity for better food security and better quality drinking water. They can store food in the fridge and they do not have to salt their fish and meat. Too much salt is bad for their health.
17. Improved food security.	**High**	Energy access would improve their food security. They can keep food longer, store it in the fridge. They can buy more divers food; it last longer if it is stored.
18. Improved sense of leisure.		Not answered.
Emotional wellbeing		
19. Improved sense of safety.	**High**	They currently do not feel safe at night. Because there is no light at night and they cannot see snakes.
20. Less stress.	**High**	No worries about safety, no hard physical work because of the use of washing machines, rice cookers, water cookers, radio, and TV.
Gender equality		
21. More business opportunity for women.	**Medium**	With improved energy and boiled water access, tourism could be developed in this village and this area. It can be used to be a stopping area for tourists where women could make food and drinks as refreshments. They could have traveling camps for tourists and be a tour guide.
22. Improved physical wellbeing for women.	**HIgh**	They will have less physical work because of the household appliances they can use.
23. Men having more time for family or household activities.	**low**	Not answered.

Table 28. Positive impact analysis of Tamarin.

Village: Wanhatti		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	**High**	Now they have a generator that operates from 6:00 PM to 6:00 AM. Previously, it ran from 6:00 PM to midnight. The village has access to drinking water through an SWM network. The water is purified river water There is a telecom provider Telesur, but the system is weak. During busy periods or holidays, there is no reception at all.
2. Engagement method in place.	**High**	The traditional krutu method serve as the best way to engage with the villagers. Project purposes, planning and goals can be discussed during krutu's.
3. Cultural heritage and -territories maintained.	**High**	There are no restricted areas in the village. The women would still want to cook the traditional herbal baths with medical leaves on fire using coal and woods.
Social participation		
4. Easy access to the city for family.	**Medium**	N.A. They have phones but because of a weak Telesur connection, the access is not optimal.
5. Feeling supported.	**High**	Yes, if the project is executed. They are looking forward to the improvement. False promises were made, so they don't trust the government.
6. Willing to accommodate workers to achieve project goals.	**Medium**	They are willing.
7.Willing to be trained for operation and maintenance.	**High**	Small maintenance they would like to do and get trained and work together with the professional workers of the EBS.
8. Increased personal development.	**High**	The villagers would like to help and work with the potential of project activities. With longer energy access, they could be even more productive.
9. Increased sense of equal rights.	**Low**	They said they already feel a sense of equal rights but the telecom has a weak signal.
10. Willing to learn new technologies.	**High**	They are willing to learn and to be trained online for project and more. They would like for the school children to make use of the possibility to be trained on line. They are willing to learn new technologies.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High**	Yes they are willing.
12. Increased business opportunity.	**Medium**	They are willing to explore the potential of tourism development and medicinal plants.
13. Elevation of existing businesses.	**High**	With improved energy access they could expand tourism which can improve sales of their locally made products such as traditional medicine.
14. Use of new tools.	**High**	They did not mention use of new tools in the krutus, but with improved energy and water systems they could cook quicker to sell food to potential tourists.

Physical wellbeing		
15. Improved medical care.	**High**	They have light at night so in case of an emergency they can move easier .
16. Improved health and nutrition status.	**High.**	More and diverse food available because of a fridge to store food
17. Improved food security.	**High**	Energy access would improve their food security. They can keep food longer, store it in the fridge. They can buy more divers food; it last longer if it is stored.
18. Improved sense of leisure.	**High**	The women say they would have an improved sense of leisure. With improved energy access, the women would have more time for leisure
Emotional wellbeing		
19.Improved sense of safety.	**Low**	They have light at night and they say it helps them feel safer.
20. Less stress.	**High**	The women say they would have less stress and be more peaceful if they could use electric appliances in doing the household work. And they can watch television and listen to the radio to relax.
Gender equality		
21. More business opportunity for women.	**Medium**	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Direct business opportunity: The women are willing to work for operation and maintenance of the projects. Further women are actively included in gender-environment nexus during project building work and are given compensation for contributing to the waste management and recycling team of building workers or other site workers. • Indirect business opportunity: Improved energy and access to water could potentiate the development of tourism which could lead to more business opportunity for women. They could serve as tour guides. or cook meals. They could look into ways of developing traditional medicine as a business opportunity, especially if optimal electricity is available. With electricity, more people will stay permanently, which will naturally lead to more business activities.
22. Improved physical wellbeing for women.	**HIgh**	They can make use of all electrical appliances and save hard physical work. Washing machines, rice cooker, freezers and fridges.
23. Men having more time for family or household activities.	**medium**	The women say that with their improved energy access, the men are able to help more with household and wicker work.

Table 29. Positive impact analysis of Wanhatti.

6.1.2.3. Potential Social Positive Impact Cluster 3

Village: Moengo		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	High Positive Impact	The provision of reliable energy, clean water, and telecommunications will structurally improve the efficiency of daily routines in Moengo. By reducing time-intensive activities such as fetching water or coping with blackouts, households will have more available time for income generation, education, and community participation. This optimization represents a substantial shift towards improved quality of life and socio-economic resilience.
2. Engagement method in place.	**Medium Positive Impact**	Strengthening existing decision-making processes, such as the Krutu and local governance structures, provides a platform for participatory planning. Such mechanisms institutionalize transparency, foster collective responsibility, and build trust between community members and external stakeholders. This enhances procedural equity and increases social acceptance of project outcomes.
3. Cultural heritage and -territories maintained.	**Medium Positive Impact**	The explicit recognition of sacred and culturally significant areas within project design safeguards Moengo's intangible heritage. Respecting cultural practices while introducing modern infrastructure ensures that development is not perceived as cultural erosion, but rather as complementary to traditional values. This alignment strengthens community identity and supports intergenerational cultural continuity.
Social participation		
4. Easy access to the city for family.	**High Positive Impact**	Enhanced telecommunications and energy access will reduce reliance on costly and time-consuming physical travel to urban centers. Improved connectivity enables regular contact with family members in the city, thereby mitigating social isolation and reinforcing kinship networks that are essential for emotional and social well-being.
5. Feeling supported.	**Medium Positive Impact**	Transparent communication, combined with capacity-building programs, generates a strong sense of institutional support. By ensuring that information flows are consistent and inclusive, community members will experience reduced uncertainty and increased confidence in both project governance and long-term benefits. This fosters a sense of collective security and belonging.
6. Willing to accommodate workers to achieve project goals.	**Medium Positive Impact**	Moengo residents indicated willingness to accommodate external workers, conditional on respect for cultural and environmental sensitivities. This openness contributes to smoother implementation processes, while also creating opportunities for intercultural knowledge exchange and social cohesion between residents and project staff.
7.Willing to be trained for operation and maintenance.	**High Positive Impact**	A strong community interest in training for infrastructure operation and maintenance presents a strategic opportunity for local capacity development. By equipping residents with technical knowledge, the project fosters self-reliance, reduces external dependency, and ensures sustainability of service provision over the long term.

8. Increased personal development.	**High Positive Impact**	Access to electricity and digital tools extends learning opportunities for both children and adults. Evening study hours, video-based training, and online resources enhance human capital development, improve employability, and expand horizons for lifelong learning. These factors contribute directly to individual empowerment and socio-economic mobility.
9. Increased sense of equal rights.	**Medium Positive Impact**	Although not always articulated explicitly by respondents, improved access to water, energy, and telecom infrastructure directly reduces disparities between urban and rural populations. This convergence in service provision reinforces perceptions of equity and citizenship, thereby strengthening the social contract between marginalized communities and the state.
10. Willing to learn new technologies.	**High Positive Impact**	The enthusiasm expressed for using mobile phones, computers, and internet-enabled tools indicates high absorptive capacity for technological innovation. Such willingness to adapt fosters digital inclusion, enhances resilience to future economic shifts, and positions Moengo as a community capable of participating in the digital economy.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High Positive Impact**	The community's readiness to contribute labor and oversight to system maintenance signals strong ownership potential. Local participation in upkeep reduces risks of neglect, lowers operational costs, and ensures that the project benefits are embedded within community structures. This enhances sustainability and creates accountability at the grassroots level.
12. Increased business opportunity.	**High Positive Impact**	Reliable electricity and water access create an enabling environment for entrepreneurship, particularly in agro-processing, cold storage, and small-scale retail. These business opportunities generate new income streams, reduce vulnerability to external shocks, and stimulate local economic diversification.
13. Elevation of existing businesses.	**High Positive Impact**	The modernization of infrastructure directly enhances the operational efficiency of existing enterprises. For example, small shops and vendors will be able to preserve perishable goods, extend working hours, and provide higher quality services. This elevation of local business capacity contributes to broader economic resilience.
14. Use of new tools.	**Medium Positive Impact**	With access to computers, mobile phones, and digital training programs, residents will be able to engage with new forms of knowledge and innovation. The integration of these tools strengthens human capital formation and facilitates intergenerational transfer of technical skills.
Physical wellbeing		
15. Improved medical care.	**High Positive Impact**	Enhanced electricity and telecommunications will significantly improve healthcare outcomes by enabling refrigeration of vaccines and medicines, ensuring effective communication during emergencies, and facilitating remote consultations with medical professionals. This strengthens the resilience of the community's health system.
16. Improved health and nutrition status.	**High Positive Impact**	Safe drinking water, coupled with refrigeration for food preservation, will reduce the prevalence of waterborne diseases and food-related illnesses. Improved nutrition security leads to better physical development, lower child morbidity, and enhanced productivity among adults.
17. Improved food security.	**High Positive Impact**	The combination of clean water for agriculture and reliable cold storage capacity increases both the quantity and longevity of food supplies. This reduces seasonal vulnerabilities, supports household

		self-sufficiency, and mitigates risks of hunger during dry periods or emergencies.
18. Improved sense of leisure.	**Medium Positive Impact**	Access to radios, televisions, and cold beverages introduces new avenues for relaxation and cultural participation. Leisure opportunities strengthen mental well-being, encourage cultural expression, and contribute to overall quality of life.
Emotional wellbeing		
19.Improved sense of safety.	**High Positive Impact**	The installation of lighting infrastructure reduces risks of theft, enhances visibility at night, and facilitates early detection of snakes and other wild animals. These improvements generate significant perceived and actual increases in community safety.
20. Less stress.	**Medium Positive Impact**	Reducing the daily burden of fetching water, coping with outages, and living in isolation alleviates stress for households. Greater access to communication and reliable services allows individuals to reallocate energy toward productive or recreational activities, improving psychosocial well-being.
Gender equality		
21. More business opportunity for women.	**High Positive Impact**	Reduced workloads from improved water access and energy services create space for women to engage in entrepreneurial activities. Refrigeration and digital tools enable new female-led enterprises, promoting gender-inclusive economic growth.
22. Improved physical wellbeing for women.	**High Positive Impact**	By lessening the physical strain of manual water collection and reducing dependence on firewood, women will experience improved physical health. Energy access also reduces exposure to indoor air pollution from traditional cooking methods, further strengthening women's wellbeing.
23. Men having more time for family or household activities.	**Medium Positive Impact**	Energy and refrigeration reduce the need for extended hunting trips and labor-intensive subsistence tasks. This reallocation of male time creates opportunities for greater involvement in domestic responsibilities and family life, contributing to gender balance and improved household cohesion.

Table 30 : Positive impact analysis of Moengo

Village: Albina - Alfonsdorp		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	High Positive Impact	Since the village has been connected to the EBS grid since 2021, residents already experience benefits of electrification, including refrigeration, lighting, and household appliances. Optimizing these services through reliable water and telecom systems further reduces time burdens and improves daily life efficiency.
2. Engagement method in place.	**Medium Positive Impact**	Decision-making through traditional authority and Krutu ensures that community voices guide project implementation. Embedding engagement in culturally appropriate governance structures increases transparency, inclusivity, and ownership of development processes.

3. Cultural heritage and -territories maintained.	**Medium Positive Impact**	While residents welcome modernization, they emphasized the importance of protecting personal property and respecting traditional norms. Incorporating these boundaries within project planning safeguards cultural continuity and reduces risks of social tension.
Social participation		
4. Easy access to the city for family.	**High Positive Impact**	Energy and telecom connections enhance communication with relatives in urban centers, decreasing dependence on physical travel. This strengthens kinship ties, mitigates isolation, and aligns rural households more closely with national social networks.
5. Feeling supported.	**Medium Positive Impact**	The introduction of reliable energy, water, and telecom systems fosters a perception of institutional responsiveness. If paired with transparent information-sharing and regular updates, residents will feel more supported by project stakeholders and national institutions.
6. Willing to accommodate workers to achieve project goals.	**Medium Positive Impact**	Community responses indicate openness to external workforce presence, conditional on respect for traditional authority. This willingness facilitates smoother project implementation and fosters collaboration between external actors and villagers.
7.Willing to be trained for operation and maintenance.	**High Positive Impact**	The survey indicated limited familiarity with solar systems. Introducing targeted training can bridge this capacity gap, enabling residents to maintain installations, thus building technical self-sufficiency and local expertise.
8. Increased personal development.	**High Positive Impact**	Access to electricity already supports education, including computer literacy among pupils. Expanding infrastructure and providing digital training will further enhance learning opportunities, foster entrepreneurship, and broaden socio-economic mobility.
9. Increased sense of equal rights.	**Medium Positive Impact**	Access to modern infrastructure reduces disparities between rural residents and urban populations. Even though not explicitly highlighted in responses, service provision fosters perceptions of equity, dignity, and full participation in national development.
10. Willing to learn new technologies.	**High Positive Impact**	Pupils were described as eager to learn computer skills, and adults expressed willingness to use digital tools. This demonstrates strong absorptive capacity for technological innovation, which will enable Alfonsdorp to benefit from the digital economy.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**Medium Positive Impact**	While not directly stated, residents' willingness to pay for services and contribute financially implies readiness to engage in shared responsibility. If structured training is provided, this can translate into active participation in maintenance.
12. Increased business opportunity.	**High Positive Impact**	Respondents identified multiple opportunities to finance service costs through agriculture, hunting, fishing, sewing, tailoring, retail, and pensions. Reliable infrastructure enables growth of these small-scale enterprises and may stimulate tourism development.

13. Elevation of existing businesses.	**High Positive Impact**	With access to refrigeration and other appliances, households can store products for sale and expand existing retail. This increases profitability, reduces wastage, and improves the resilience of household income sources.
14. Use of new tools.	**Medium Positive Impact**	Access to computers, mobile phones, and internet will increase digital literacy, particularly for youth. The ability to use modern tools strengthens human capital formation and bridges rural–urban knowledge gaps.
Physical wellbeing		
15. Improved medical care.	**High Positive Impact**	Electricity enables the use of refrigerators for medicine storage, while reliable telecom systems allow faster communication with health providers. This will improve emergency response times and enhance public health outcomes.
16. Improved health and nutrition status.	**High Positive Impact**	With potable water already available through the SWM system, future improvements will further secure public health. Refrigeration of hunted products and agricultural produce ensures safer nutrition, reduces spoilage, and strengthens food-based resilience.
17. Improved food security.	**High Positive Impact**	Cold storage capacity allows households to store reserves for longer periods, reducing vulnerability to seasonal food shortages. This supports both household consumption and small-scale trade in surplus products.
18. Improved sense of leisure.	**Medium Positive Impact**	Residents strongly expressed desire for radios, televisions, and cold beverages, which improve leisure opportunities. These amenities provide psychological relief, increase social cohesion, and improve general quality of life.
Emotional wellbeing		
19.Improved sense of safety.	**High Positive Impact**	Respondents identified light at night as a key factor in reducing theft, alcohol-related disturbances, and improving community safety. Lighting contributes significantly to physical security and community well-being.
20. Less stress.	**Medium Positive Impact**	Reliable water and energy services reduce the burdens of manual labor and uncertainty related to outages. Access to leisure tools such as radios also helps reduce daily stressors, improving emotional resilience.
Gender equality		
21. More business opportunity for women.	**High Positive Impact**	Women, who often carry responsibility for food preparation and domestic work, benefit directly from refrigeration and energy access. These resources open pathways for female-led microenterprises and economic empowerment.
22. Improved physical wellbeing for women.	**High Positive Impact**	Improved infrastructure reduces women's physical workload (e.g., less manual labor for water and food storage). Reduced exposure to physically strenuous tasks improves health, energy, and long-term wellbeing.
23. Men having more time for family or household activities.	**Medium Positive Impact**	With cold storage and reliable energy, men may dedicate less time to hunting and manual food provision. This reallocation of time increases potential engagement in family care and shared domestic responsibilities.

Table 31: Positive impact analysis of Albina - Alfonsdorp

Village: Albina - Marijkedorp		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	High Positive Impact	The integration of reliable electricity, clean water systems, and improved telecommunications is expected to significantly optimize daily life in Marijkedorp. Currently, households spend considerable time and physical effort on basic tasks such as fetching and boiling water, preserving food without adequate refrigeration, and relying on candles or kerosene lamps for lighting. Access to modern utilities will reduce these burdens, enhance efficiency, and allow residents to reallocate time to education, cultural activities, and productive economic ventures. This transformation represents a fundamental step toward improving quality of life, household resilience, and social well-being.
2. Engagement method in place.	High Positive Impact	The village possesses a robust participatory decision-making structure based on traditional krutu meetings, house-to-house communication, and increasingly the use of digital platforms such as WhatsApp. These mechanisms ensure transparency, inclusivity, and collective agreement in decision-making processes. The existence of such structured engagement methods enhances the community's readiness for participatory development and provides a strong foundation for project implementation, monitoring, and grievance management. This participatory governance strengthens social cohesion and enhances trust between the community, government, and external stakeholders.
3. Cultural heritage and -territories maintained.	**Medium Positive Impact**	Residents have explicitly emphasized the importance of protecting sacred areas and traditional lands during the roll-out of modern infrastructure. By integrating cultural protocols and mapping of protected zones into project design, development can proceed without undermining indigenous practices, knowledge systems, or spiritual heritage. This dual approach ensures cultural continuity while allowing communities to access the benefits of modernization, thereby fostering both heritage preservation and adaptive resilience.
Social participation		
4. Easy access to the city for family.	**Medium Positive Impact**	The enhancement of telecommunications infrastructure (e.g., mobile coverage, internet connectivity) will substantially improve communication with relatives living in Paramaribo, Albina, and French Guiana. These connections strengthen kinship ties, facilitate the coordination of remittances, and improve access to information on employment, education, and health services available in urban areas. By reducing rural–urban isolation, the project enhances social integration and provides families with stronger support networks.

5. Feeling supported.	**High Positive Impact**	Anticipation of access to modern utilities reflects that residents view these projects as recognition of their long-standing needs and priorities. Their implementation will enhance the perception that rural communities are included in national development strategies. A sense of external recognition and institutional support reinforces community morale, builds trust in public institutions, and increases willingness to actively engage in long-term project sustainability.
6. Willing to accommodate workers to achieve project goals.	**Medium Positive Impact**	The expressed willingness of villagers to host external workers during the implementation phase reflects a strong cooperative spirit and openness to collaboration. This willingness will facilitate efficient project execution, foster exchange of knowledge between local residents and technical experts, and strengthen relationships with external actors. Such collaboration enhances social capital while supporting the transfer of skills that will benefit the community beyond the duration of the project.
7.Willing to be trained for operation and maintenance.	**High Positive Impact**	There is strong community interest in acquiring technical skills to operate and maintain new infrastructure. Training will reduce long-term dependency on external technicians, lower operational costs, and build a sense of ownership over infrastructure assets. This capacity-building element not only strengthens sustainability of the project but also empowers individuals through the development of transferrable technical skills, contributing to broader socio-economic resilience.
8. Increased personal development.	**High Positive Impact**	Improved access to electricity and internet will expand opportunities for both formal and informal education. Children will benefit from extended study hours and digital learning tools, while adults can participate in vocational training through online platforms or video-based instruction. These developments enhance human capital, promote lifelong learning, and increase opportunities for upward socio-economic mobility.
9. Increased sense of equal rights.	**Medium Positive Impact**	Access to energy, water, and telecommunications comparable to urban populations reduces disparities between rural and urban living standards. For residents, this creates a stronger perception of equality, dignity, and recognition within national development processes. The narrowing of the rural–urban divide also reinforces social inclusion and mitigates perceptions of marginalization.
10. Willing to learn new technologies.	**High Positive Impact**	Community members, particularly younger generations, have expressed interest in learning how to use computers, mobile devices, and online platforms. This openness to adopting new technologies enables the village to integrate into digital economies, expand learning opportunities, and improve communication with the broader world. Early adoption of digital tools contributes to resilience in a rapidly digitizing global economy.
Socio-economic wellbeing		

11. Willingness to work for operation and maintenance.	**High Positive Impact**	Residents have indicated willingness to contribute labor and resources to support the long-term functioning of infrastructure. By investing their own effort into operations and maintenance, the community strengthens ownership, accountability, and sustainability. This reduces risks of neglect, enhances cost-sharing arrangements, and fosters a culture of self-reliance in infrastructure management.
12. Increased business opportunity.	**High Positive Impact**	Reliable electricity, water, and internet will stimulate local entrepreneurship by enabling new forms of income generation such as catering, refrigeration-based businesses, tailoring, small-scale manufacturing, and boat transport services. Increased access to energy reduces entry barriers for entrepreneurs and expands the village's economic base. These developments create new jobs, diversify income sources, and contribute to rural economic resilience.
13. Elevation of existing businesses.	**High Positive Impact**	Current small-scale economic activities (e.g., podosiri harvesting, artisanal food production, tailoring) will be enhanced by improved infrastructure. Reliable electricity supports refrigeration and extended working hours, while internet access expands market reach through digital platforms. The elevation of existing businesses strengthens the local economy and builds on established entrepreneurial practices, ensuring continuity while scaling productivity.
14. Use of new tools.	**High Positive Impact**	Electricity and telecommunications enable the introduction of modern equipment such as computers, welding machines, agricultural tools, and refrigeration units. Adoption of these technologies improves efficiency, enhances productivity, and fosters innovation in agriculture, construction, and services. Access to new tools also supports youth engagement, reducing migration pressures by creating modern employment pathways within the community.
Physical wellbeing		
15. Improved medical care.	**High Positive Impact**	Telecommunications will allow faster communication with medical facilities, while electricity will enable refrigeration of medicines and vaccines. Access to clean water reduces the prevalence of waterborne diseases such as diarrhea and pneumonia. Together, these improvements strengthen preventive healthcare, reduce response times to emergencies, and contribute to a healthier population with lower morbidity and mortality rates.
16. Improved health and nutrition status.	**High Positive Impact**	Clean water access eliminates the need to consume untreated or chemically imbalanced sources, thereby reducing health risks. Electricity and refrigeration improve dietary diversity by enabling safe storage of fresh food, including fruits, vegetables, and protein sources such as fish and wild meat. Better nutrition contributes to improved child development, adult productivity, and long-term community health outcomes.
17. Improved food security.	**High Positive Impact**	Refrigeration and better storage facilities reduce spoilage of crops and animal products, allowing households to maintain food reserves during lean seasons. This increases household resilience against shocks such as droughts or floods and

		reduces dependence on external markets. Enhanced food security directly improves quality of life and provides surplus production that can be sold, creating additional income streams.
18. Improved sense of leisure.	**Medium Positive Impact**	Access to radios, televisions, and internet enhances cultural participation, relaxation, and social exchange. Entertainment options reduce daily stress, provide educational content, and create new avenues for community cohesion. Leisure activities contribute to overall well-being by balancing work and rest, particularly among youth and women who currently experience high workloads.
Emotional wellbeing		
19.Improved sense of safety.	**High Positive Impact**	Street lighting and household electricity reduce risks associated with darkness, including theft and encounters with wild animals. Improved visibility at night enhances perceptions of security, encourages safe mobility after dark, and reduces fear-based restrictions on movement. Enhanced safety also contributes to community stability and psychological well-being.
20. Less stress.	**Medium Positive Impact**	The reduction of physical burdens (fetching water, food insecurity, inadequate lighting) alleviates daily stressors. Improved access to reliable utilities allows households to redirect energy to productive, educational, or leisure activities. Lower stress improves mental health, strengthens family relations, and enhances long-term resilience against socio-economic shocks.
Gender equality		
21. More business opportunity for women.	**High Positive Impact**	Women will experience reduced workloads through improved water access and energy-efficient cooking, enabling them to participate more actively in entrepreneurship and income-generating activities. Expanded business opportunities for women support gender equality, enhance household incomes, and strengthen community economic resilience.
22. Improved physical wellbeing for women.	**High Positive Impact**	Access to modern infrastructure directly reduces the physical strain associated with traditional household activities, such as carrying heavy loads of water or firewood. This improvement lowers risks of musculoskeletal injury and fatigue, while also creating time for rest, childcare, or economic activities. Improved health outcomes among women benefit entire households and communities.
23. Men having more time for family or household activities.	**Medium Positive Impact**	Refrigeration reduces the frequency of hunting, and improved water systems reduce daily survival burdens, thereby freeing time traditionally spent on subsistence activities. Men are likely to reallocate this time toward family life, childcare, and community participation. This shift contributes to more balanced gender roles, stronger family cohesion, and improved child development outcomes.

Table 32: Positive impact analysis of Albina – Marijke dorp

Village: Albina – Pierre Kondre		
Key Performance Indicator	**Potential positive impact rating**	**Comments**
Socio-cultural community		
1. Optimizing their way of life.	High Positive Impact	The introduction of electricity, clean water, and telecommunications will modernize daily living in Pierre Kondre. Currently, reliance on traditional methods for cooking, lighting, and food preservation imposes time and health burdens. Access to reliable utilities will improve efficiency, reduce physical strain, and allow villagers to pursue education, cultural practices, and entrepreneurial activities. This transition optimizes overall well-being and creates opportunities for sustainable development.
2. Engagement method in place.	High Positive Impact	The village employs traditional decision-making mechanisms led by the captain and supported by krutu meetings. These structures facilitate collective discussion and consensus, ensuring legitimacy of decisions. Strengthened engagement mechanisms promote inclusivity and provide a culturally appropriate governance model for project planning, conflict resolution, and long-term monitoring.
3. Cultural heritage and -territories maintained.	**Medium Positive Impact**	Residents have emphasized the importance of protecting sacred sites, traditional territories, and culturally significant spaces. Infrastructure projects that respect these boundaries will support cultural preservation while still delivering development benefits. This dual approach ensures that modernization does not erode spiritual and cultural identity, but rather complements it.
Social participation		
4. Easy access to the city for family.	**Medium Positive Impact**	Improved telecommunications will enhance communication with relatives in Albina, Paramaribo, and French Guiana. Stronger family connections reduce social isolation, increase support networks, and facilitate information-sharing on education, employment, and healthcare. Enhanced connectivity fosters integration with urban systems without undermining village autonomy.
5. Feeling supported.	**High Positive Impact**	Anticipation of access to utilities demonstrates that villagers feel acknowledged by government and external actors. Delivery of these services will reinforce perceptions of inclusion, reduce marginalization, and create trust in development institutions. This support enhances social cohesion and increases community motivation to participate in long-term sustainability.
6. Willing to accommodate workers to achieve project goals.	**Medium Positive Impact**	Residents have expressed willingness to collaborate with and host external workers during project implementation. This openness reduces barriers to infrastructure deployment, facilitates exchange of knowledge, and fosters trust-building

		with external stakeholders. Such collaboration enhances social capital and strengthens cross-community learning.
7.Willing to be trained for operation and maintenance.	**High Positive Impact**	Villagers have indicated interest in acquiring technical knowledge to manage new infrastructure. Training programs will reduce dependency on external providers, enhance local ownership, and ensure sustainability of the systems. The creation of a skilled local workforce also provides long-term benefits beyond the immediate project.
8. Increased personal development.	**High Positive Impact**	Access to electricity and telecommunications will enable formal and informal education opportunities. Children will benefit from extended study hours, while adults will be able to participate in remote training, vocational courses, and digital literacy programs. This capacity building directly improves human capital and enhances socio-economic mobility.
9. Increased sense of equal rights.	**Medium Positive Impact**	Access to the same quality of utilities as urban residents will reduce the rural–urban divide and foster a stronger sense of equality and inclusion. Perceived parity in infrastructure access enhances dignity, mitigates marginalization, and strengthens villagers' sense of citizenship.
10. Willing to learn new technologies.	**High Positive Impact**	Community members, particularly youth, have expressed enthusiasm for adopting new technologies such as mobile phones, computers, and internet platforms. This openness creates pathways for digital inclusion, economic innovation, and enhanced access to knowledge. It also supports intergenerational learning and prepares the community for integration into broader digital economies.
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	**High Positive Impact**	Willingness to contribute labor toward upkeep of infrastructure strengthens local ownership and accountability. This proactive attitude reduces long-term costs, mitigates risks of system neglect, and fosters a sustainable culture of self-reliance.
12. Increased business opportunity.	**High Positive Impact**	Access to electricity and water will enable small-scale enterprises such as food processing, refrigeration, tailoring, retail services, and agricultural value chains. These activities diversify income sources, strengthen local economic resilience, and reduce dependence on subsistence-only livelihoods.
13. Elevation of existing businesses.	**High Positive Impact**	Current activities such as hunting, fishing, small-scale agriculture, and informal retail will be elevated through access to modern utilities. Refrigeration extends product shelf life, lighting enables longer working hours, and internet access expands market outreach. These factors strengthen competitiveness and profitability of existing businesses.
14. Use of new tools.	**High Positive Impact**	Electricity facilitates the introduction of modern tools and equipment, such as welding machines, computers, refrigeration, and agricultural appliances. The adoption of these tools improves efficiency, productivity, and quality of outputs. This contributes to long-term economic modernization and skills transfer within the village.
Physical wellbeing		

15. Improved medical care.	**High Positive Impact**	Enhanced telecommunications will improve coordination with medical facilities during emergencies, while electricity will allow storage of vaccines and medicines. Access to clean water reduces disease burden from contaminated sources. Together, these interventions improve preventive healthcare, response times, and overall population health outcomes.
16. Improved health and nutrition status.	**High Positive Impact**	Reliable water access ensures reduced exposure to waterborne diseases, while refrigeration enhances food preservation and dietary diversity. Improved nutrition contributes to stronger child development, reduced malnutrition, and higher adult productivity. Healthier populations are more resilient to shocks and can participate more actively in economic life.
17. Improved food security.	**High Positive Impact**	Refrigeration and cold storage allow households to store food for longer periods, reducing waste and ensuring reserves during dry seasons or market disruptions. Improved food security enhances household resilience, reduces vulnerability, and creates opportunities for surplus sales.
18. Improved sense of leisure.	**Medium Positive Impact**	Access to radios, televisions, and internet introduces opportunities for leisure, cultural participation, and education. Leisure options improve social well-being, reduce stress, and strengthen community cohesion. They also provide youth with constructive engagement that reduces risks of delinquency.
Emotional wellbeing		
19.Improved sense of safety.	**High Positive Impact**	Night lighting will enhance visibility, deter theft, and reduce risks associated with wild animals. Improved safety fosters community stability, encourages safe nighttime activities, and reduces fear-related restrictions on movement. This directly contributes to improved psychological well-being.
20. Less stress.	**Medium Positive Impact**	Reduced physical burdens from water collection, better food storage, and improved access to healthcare and communication will lower daily stress levels. Less stress translates into improved mental health, stronger family dynamics, and increased capacity for long-term resilience.
Gender equality		
21. More business opportunity for women.	**High Positive Impact**	Women will benefit from reduced workloads and increased access to energy-efficient appliances, allowing them to engage in income-generating activities. Greater participation of women in entrepreneurship enhances household incomes, supports gender equality, and fosters broader community resilience.
22. Improved physical wellbeing for women.	**High Positive Impact**	Access to clean water and electricity significantly reduces physically demanding tasks such as carrying heavy loads or cooking with firewood. These improvements improve women's health, reduce fatigue, and free time for childcare, rest, or economic participation.
23. Men having more time for family or household activities.	**Medium Positive Impact**	Reduced dependence on daily hunting and subsistence activities, enabled by refrigeration and food storage, allows men to dedicate more time to childcare, family responsibilities, and community activities. This supports more balanced gender roles, improved family cohesion, and child development.

Table 33: Positive impact analysis of Albina -Pierre Kondre

6.1.3. Results: Social Risk Analysis

6.1.3.1. Social Risk Analysis Cluster I

From the KPI's, Key Risk Indicators (KRI's) were extrapolated. KRI's are metrics that can evaluate potential risks that could negatively impact the environmental theory of change.
A risk analysis was carried for these KRI's by:

- Rating the potential negative impact.
- Rating the likelihood of this negative impact; likelihood is the level of probability that a risk will occur.
- Evaluating the risk with a risk matrix (risk= potential negative impact x likelihood). The potential risks is defined by 4 categories: low risk, moderate risk, substantial risk and high risk. The risk per category is described in table below, with subsequent plan of actions.

Cluster II: Abaadu Konde, Akale Konde and Benhattimofo	**Risk analysis**			
Key Risk indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
Socio-cultural community issues				
1. Indecision about community ownership models.	**High negative impact**	**Likely**	**Substantial**	**Uncertainty or disagreement about how the community should manage and maintain energy, water and telecom services can lead to delays in project implementation. Men in communities express a desire to pay for maintenance themselves, while women prefer external financing. This can lead to a lack of clear accountability, which can result in systems not being managed properly after installation. they do not decide on an ownership model or plan as a community, project goals could be slowed down and conflict could occur in the community.** **They currently use a model that everyone who uses it should pay for it and that usage are measured per household, just like in the city.**
2. Temporary displacement due to project building activities.	**Low**	**unlikely**	**Low**	**Is unlikely to occur. People will not have to move from their current location due to the construction work of the project.**
Social isolation				

3. Unequal distribution of water, energy or telecom services.	Low	unlikely	low	The electricity supply to the villages currently comes from the EBS station in Moengo. Although electricity is available, it is not optimal, causing appliances to break down for no apparent reason. SWM water has been installed, but it is not yet available in their homes. In addition, telephone reception is poor. Improved access to services would benefit the communities, as it would the rest of the country.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	Substantial	The community is dependent on outside sources for maintenance and technical expertise, which can lead to operational disruptions if these services are not consistently available. The lack of local knowledge or trained personnel to maintain systems such as electricity or water can create dependency on outside experts or outside intervention. There is a need for training in maintaining and operating the system among the communities.
5. Lack of trust due to past false promises.	Low	unlikely	low	They have complete trust in the project.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Medium	Likely	Moderate	Many people in the communities rely on hustles as a means of income, mainly through Acai sales and land clearing. To cover operational and maintenance costs, they use these sources of income, and those without paid employment pay with their AOV (old age pension) money or ask their children for help. However, women in the community have indicated that they cannot always afford to cover these costs. This reveals the economic distress and limited financial resources available to meet essential needs. The lack of paid employment and workers contributes significantly to socio-economic distress, as there are few opportunities for stable income. This leads to challenges in covering essential expenses, such as

				maintaining infrastructure (such as electricity and water systems).
7. Inability to buy freezers, electronic devices or other electrical tools.	Medium	Very likely	Substanial	The positive effect of food security with improved energy access is dependent on their ability to buy food chilling equipment such as freezers or fridges. Their ability to cook food quicker for quick food access is depends on their ability to buy cooking devices. The positive effect of better physical wellbeing by reaching medical help quicker is dependent on their ability to buy phones or other electronic devices. Despite having access to electricity, many villagers have appliances that they do not use or that are broken due to the sub-optimal electricity supply. Due to the lack of income, they cannot afford new appliances or appliances to replace the broken ones.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.
9. Noise disturbance at critical locations.	Low	Likely	Low	The villagers are okay with it. Noise should only be avoided near schools.
10. Distance for fetching water too far, especially for the elderly.				N.A./ not answered.
11. Dust production during building activities.	Low	Possible	Low	The villagers are okay with it. Dust should only be avoided near schools.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	Low	Very likely	moderate	Considering the hustle work of the villagers, there can be a sense of uncertainty about how to secure funding for the maintenance. If they do not have enough funds, they will

				not be able to maintain the services or upkeep the maintenance.
13. Temporary distress due to project building activities.	Low	Possible	Low	Villagers said they would be okay with some distress to reach project goals such as dust or noise production.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	Low	Likely	Low	Men as well as women have job and can help to pay for maintenance or operation costs of energy, water or telecom services. Gender equality is an ongoing process and is something to be taken into account for all villages.
15. Gender inequality in potential job creation.	Low	likely	Low	In the environmental field, only men want to help with project building objectives, the women do not. There could be options for women in the field of tourism.

Table 34. Social Risk analysis of cluster I: Abaadu Konde, Akale Konde and Benhattimofo

6.1.3.2. Social Risk Analysis Cluster 2

Village: Amaloko kondre	Risk analysis			
Key Risk Indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecisiveness about community ownership models.	Low	Possible	Low	They decided that their payment model would be that everyone who uses it should pay for it and that usage should be measured per household, just like in the city.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur. People will not have to move from their current location due to the construction work of the project.
Social isolation				
3. Unequal distribution of energy services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	Substantial	There is no technical local expertise for energy, water or telecom operations. Maintenance could be done by the villagers if they are trained. There is a need for training in maintaining and operating the system among the communities.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	They have complete confidence in the project.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Medium	Possible	Moderate	The men said that they have no objection to paying for electricity each month with their own income, including small farming costs and selling hunting products (Hustle). Also, Podisiri and people working in Moengo. They want to pay individually for their usage.
7. Inability to buy freezers, electronic devices or other electrical tools.	Low	Possible	Low	Not anwered, but can be possible due to lack of income. Perhaps they already have electrical tools.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.

9. Noise disturbance at critical locations.	Low	Possible	Low	The villagers are okay with it.
10. Distance for fetching water too far, especially for the elderly.				N.A./ not answered.
11. Dust production during building activities.	Low	Possible	Low	The villagers are okay with it.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	Medium	Likely	moderate	The neutral response to financial concerns suggests that there is no strong concern, but also no complete certainty about the financing of the project. If they do not have enough funds, they will not be able to maintain the services or upkeep the maintenance.
13. Temporary distress due to project building activities.	Low	Possible	Low	Villagers said they would be okay with dust or noise production to reach project goals.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	Low	Likely	Low	Both men and women have jobs and can contribute to the maintenance or operating costs of energy, water or telecom services. Although there are more men than women working in the village and the men have no objection to paying for the services.
15. Gender inequality in potential job creation.	Low	Possible	Low	The villagers want to help with project building objectives. There could be options for women and men in the field of tourism.

Table 35. Social Risk analysis of Amaloko kondre.

Village: Langa-oekoe 1.	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecision about community ownership models.	Low	Possible	Low	They decided that their payment model would be that everyone who uses it should pay for it and that usage should be measured per household, just like in the city.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur. People will not have to move from their current location due to the construction work of the project.
Social isolation				
3. Unequal distribution of water, energy or telecom services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	Medium	Likely	Moderate	There is no technical local expertise for energy, water or telecom operations. There is only some expertise there, as they have been trained twice by the Ministry of Natural Resources about working on their generator, but this is minor. They are willing to be trained for maintenance or operation of the systems.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	The political parties have promised a lot of services, but have not completed those projects. However they have trust in this project.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Medium	Possible	Moderate	The men have no objection to paying for electricity each month with their own income, including small farming costs and selling hunting products (Hustle). Also, Podisiri and people working in Moengo.
7. Inability to buy freezers, electronic devices or other electrical tools.	Low	Possible	Low	Not anwered, but can be possible due to lack of income. Perhaps they already have electrical tools.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.

9. Noise disturbance at critical locations.	Low	Possible	Low	The villagers are okay with it.
10. Distance for fetching water too far, especially for the elderly.				N.A./ not answered.
11. Dust production during building activities.	Low	Possible	Low	The villagers are okay with it.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	High	Likely	Substantial	Yes, the villagers are stressed about this.
13. Temporary distress due to project building activities.	Low	Possible	Low	They are okay with temporary distress as long as builders take the school and church into account in the case of any nuisances.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	Low	Likely	Low	Both men and women have jobs and can contribute to the maintenance or operating costs of energy, water or telecom services. Although there are more men than women working in the village and the men have no objection to paying for the services.
15. Gender inequality in potential job creation.	Low	Possible	Low	The villagers want to help with project building objectives. There could be options for women and men in the field of tourism.

Table 36. Social Risk analysis of Langa-oekoe 1.

Village: Langa-oekoe 2.	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecision about community ownership models.	Low	Possible	Low	They decided that their payment model would be that everyone who uses it should pay for it and that usage should be measured per household, just like in the city.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur. People will not have to move from their current location due to the construction work of the project.
Social isolation				
3. Unequal distribution of water, energy or telecom services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	Medium	Likely	Moderate	There is no technical local expertise for energy, water or telecom operations. There is only some expertise there, as they have been trained twice by the Ministry of Natural Resources about working on their generator, but this is minor. They are willing to be trained for maintenance or operation of the systems.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	They have complete confidence in the project.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Medium	Possible	Moderate	The men have no objection to paying for electricity each month with their own income, including small farming costs and selling hunting products (Hustle). Also, Podisiri and people working in Moengo.
7. Inability to buy freezers, electronic devices or other eletrical tools.	Low	Possible	Low	Not anwered, but can be possible due to lack of income. Perhaps they already have electrical tools.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.

9. Noise disturbance at critical locations.	Low	Possible	Low	The villagers are okay with it.
10. Distance for fetching water too far, especially for the elderly.				Not answered.
11. Dust production during building activities.	Low	Possible	Low	The villagers are okay with it.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	Medium	Likely	Moderate	The neutral response to financial concerns suggests that there is no strong concern, but also no complete certainty about the financing of the project. If they do not have enough funds, they will not be able to maintain the services or upkeep the maintenance.
13. Temporary distress due to project building activities.	Low	Possible	Low	They are okay with some minor temporary distress such as noise or dust.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	Low	Likely	Low	Both men and women have jobs and can contribute to the maintenance or operating costs of energy, water or telecom services. Although there are more men than women working in the village and the men have no objection to paying for the services.
15. Gender inequality in potential job creation.	Low	Possible	Low	The villagers want to help with project building objectives. There could be options for women and men in the field of tourism.

Table 37. Social Risk analysis of Langa-oekoe 2.

Village: Lantiwee	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecision about community ownership models.	Low	Possible	Low	The villagers decided to pay the operational and maintenance costs collectively as a community.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur.
Social isolation				
3. Unequal distribution of water, energy or telecom services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	Substantial	Depends on the individuals they are willing to learn as much as possible to do operation and minor maintenance. However they do not have existing frameworks for maintenance or technical capacity.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	They have been made false promises before by the Health Department. However they have trust in the project.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Medium	Possible	Moderate	The villagers derive their income from agricultural and forestry products (Hustle). However, they are not concerned about the costs associated with regular operation and maintenance.
7. Inability to buy freezers, electronic devices or other eletrical tools.	Low	Possible	Low	Not anwered, but can be possible due to lack of income.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.
9. Noise disturbance at critical locations.	Low	Possible	Low	The villagers are okay with it.
10. Distance for fetching water too far, especially for the elderly.				No info. They only said that Water access is very important for daily survival.

11. Dust production during building activities.	**Low**	**Possible**	**Low**	**The villagers are okay with it.**
Emotional distress				
12. Worries and stress about generating the finances for the projects.	**Low**	**Unlikely**	**Low**	**No. The villagers are not worried.**
13. Temporary distress due to project building activities.	**Low**	**Possible**	**Low**	**They are okay with some minor temporary distress such as noise or dust.**
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.				**Not answered.**
15. Gender inequality in potential job creation.	**Low**	**Possible**	**Low**	**There could be options for women in the field of tourism or in the field.**

Table 38. Social Risk analysis of Lantiwee.

Village: Pikin Santi	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecision about community ownership models.				Not answered.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur.
Social isolation				
3. Unequal distribution of water, energy or telecom services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	Substantial	Depends on the individuals they are willing to learn as much as possible to do operation and minor maintenance. However they do not have existing frameworks for maintenance or technical capacity.
5. Lack of trust due to past false promises.				Not answered.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.				Not answered.
7. Inability to buy freezers, electronic devices or other electrical tools.				Not answered.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.
9. Noise disturbance at critical locations.	Low	Possible	Low	The villagers are okay with it.
10. Distance for fetching water too far, especially for the elderly.				No info. They only said that Water access is very important for daily survival.
11. Dust production during building activities.	Low	Possible	Low	The villagers are okay with it.

Emotional distress				
12. Worries and stress about generating the finances for the projects.	**Low**	**Unlikely**	**Low**	**There are no worries about the finances.**
13. Temporary distress due to project building activities.	**Low**	**Possible**	**Low**	**They are okay with some minor temporary distress such as noise or dust.**
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.				**Not answered.**
15. Gender inequality in potential job creation.	**Low**	**Possible**	**Low**	**There could be options for women in the field of tourism or in the field.**

Table 39. Social Risk analysis of Pikin Santi.

Village: Pinatjarmi	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecision about community ownership models.				Not answered.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur.
Social isolation				
3. Unequal distribution of water, energy or telecom services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	Substantial	Depends on the individuals they are willing to learn as much as possible to do operation and minor maintenance. However they do not have existing frameworks for maintenance or technical capacity.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	The political parties have promised a lot of services, but have not completed those projects.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.				Not answered.
7. Inability to buy freezers, electronic devices or other electrical tools.				Not answered.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.
9. Noise disturbance at critical locations.	Low	Possible	Low	The villagers are okay with it.
10. Distance for fetching water too far, especially for the elderly.				No info. They only said that Water access is very important for daily survival.
11. Dust production during building activities.	Low	Possible	Low	The villagers are okay with it.
Emotional distress				

12. Worries and stress about generating the finances for the projects.	**Low**	**Unlikely**	**Low**	**There are no worries about the finances.**
13. Temporary distress due to project building activities.	**Low**	**Possible**	**Low**	**They are okay with some minor temporary distress such as noise or dust.**
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.				**Not answered.**
15. Gender inequality in potential job creation.	**Low**	**Possible**	**Low**	**There could be options for women in the field of tourism or in the field.**

Table 40. Social Risk analysis of Pinatjarimi.

Village: Tamarin	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecision about community ownership models.	Low	Possible	Low	They decided that their payment model would be that everyone who uses it should pay for it individually.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur.
Social isolation				
3. Unequal distribution of water, energy or telecom services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	Substantial	There is no technical local expertise for energy, water or telecom operations. Maintenance could be done by the villagers if they are trained. There is a need for training in maintaining and operating the system among the communities.
5. Lack of trust due to past false promises.	High	Likely	Substantial	The political parties have promised many services but have not completed those projects. Because of this, they do not have fully trust in this project will be good for their village.
Socio-economic distress				
6. Lack of paid jobs or employed vilagers to upkeep ongoing costs.	Low	Possible	Low	There is income in the village.
7. Inability to buy freezers, electronic devices or other eletrical tools.	Low	Possible	Low	There is income but can be possible due to lack of income.
Physical distress				
8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.
9. Noise disturbance at critical locations.	Medium	Possible	Moderate	They are okay with it, but would rather not have disturbance close to the school.

10. Distance for fetching water too far, especially for the elderly.				**Not anwered.**
11. Dust production during building activities.	**Medium**	**Possible**	**Moderate**	**They are okay with it, but would rather not have disturbance close to the school.**
Emotional distress				
12. Worries and stress about generating the finances for the projects.				**Not answered.**
13. Temporary distress due to project building activities.	**Low**	**Possible**	**Low**	**They are okay with some temporary distress.**
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.				**Not answered.**
15. Gender inequality in potential job creation.	**Low**	**Possible**	**Low**	**There could be options for women in the field of tourism or in the field.**

Table 41. Social Risk analysis of Tamarin.

Village: Wanhatti	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
Socio-cultural community issues				
1. Indecision about community ownership models.	Low	Possible	Low	They decided that their payment model would be that everyone who uses it should pay for it using their personal income.
2. Temporary displacement due to project building activities.	Low	unlikely	Low	Is unlikely to occur.
Social isolation				
3. Unequal distribution of water, energy or telecom services.				N.A.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	Substantial	There is no technical local expertise for energy, water or telecom operations. Maintenance could be done by the villagers if they are trained. There is a need for training in maintaining and operating the system among the communities.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	There have been false promises made by the government. However they have trust in the project.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Low	Possible	Low	The villagers have a personal income and they are not concerned about the costs associated with regular operation and maintenance.
7. Inability to buy freezers, electronic devices or other eletrical tools.	Medium	possible	moderate	Not full answered. But there are already freezers in the village and the acuteness of this risk has most likely been resolved.
Physical distress				

8. Physical injury while supporting project objectives.	Low	Possible	Low	N.A. right now, but may occur.
9. Noise disturbance at critical locations.	Low	Possible	Low	The villagers are okay with it.
10. Distance for fetching water too far, especially for the elderly.				Not answered.
11. Dust production during building activities.	Low	Possible	Low	The villagers are okay with it.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	Low	Unlikely	Low	There are no worries about the finances.
13. Temporary distress due to project building activities.	Low	Possible	Low	They are okay with some temporary distress, just not close to the school or in the middle of the village.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.				Not answered.
15. Gender inequality in potential job creation.	Low	Possible	Low	There could be options for women in the field of tourism or in the field.

Table 42. Social Risk analysis of Wanhatti

6.1.3.3. Social Risk Analysis Cluster 3

Village: Moengo	Risk analysis			
Key Risk Indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
Socio-cultural community issues				
1. Indecisiveness about community ownership models.	**Low**	**Possible**	**low**	Community governance is centralized through the village board and DC/BIC channels; expectations for prior notification and safety protocols are explicit, indicating relatively clear decision pathways. Residual indecision risk exists due to multiple neighborhoods requiring coordination (e.g., Santén, Wonoredjo, Julianadorp, etc.).
2. Temporary displacement due to project building activities.	Medium	Possible	Moderate	Installation of poles/lines typically uses road berms or purchased strips; displacement risk is low but non-zero during civil works and road construction phases flagged by the community as safety-critical.
Social isolation				
3. Unequal distribution of energy services.	High	Likely	Substantial	Moengo experiences regular outages and uneven reliability across areas, which could entrench intra-village disparities in service quality.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	Medium	Likely	Substantial	Regionally, skilled staff attrition is reported; however, Moengo retains some local cadre and 40–45 employees after industrial downsizing, suggesting partial capacity. Residual skill gaps remain for specialized O&M.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	The community expects **transparent advance information** and has defined channels for announcements; trust is contingent on prior notice and visible compliance with safety norms.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	medium	Possible	Moderate	Diesel consumption (~9,500–10,500 L for ~40 h/day supply) indicates significant energy spending; stable O&M funding may be strained without local jobs; municipal waste services have also degraded, signaling fiscal stress.

7. Inability to buy freezers, electronic devices or other electrical tools.	Medium	Possible	Moderate	Many households still rely on candles/battery lights at night, implying constrained purchasing power; risk of unequal uptake of productive appliances.
Physical distress				
8. Physical injury while supporting project objectives.	High	Possible	Substantial	Community asks for clear safety zones during road and electrical works; risk pertains to proximity of lines and work sites.
9. Noise disturbance at critical locations.	Medium	Likely	Substantial	The community wants schools/sacred areas protected from construction noise and traffic.
10. Distance for fetching water too far, especially for the elderly.	Medium	Possible	Moderate	Drinking water interactions involve the SWM office; billing problems sometimes require travel to Paramaribo—an access burden for vulnerable groups.
11. Dust production during building activities.	Medium	Likely	Substantial	Anticipated by the community; requires proactive mitigation and grievance routing.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	Medium	Likely	Substantial	Finance concerns appear in concluding statements/analyses; risk of psychosocial stress and opposition if tariffs/payment points are inaccessible.
13. Temporary distress due to project building activities.	Medium	Likely	Substantial	Anticipated inconveniences (noise/dust/traffic) and need for prior information noted by residents.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	**low**	**Possible**	**Low**	Survey materials do not flag major gender imbalance in Moengo; nonetheless, payment access barriers (digital/city travel) may differentially affect women caregivers.
15. Gender inequality in potential job creation.	**Medium**	**Possible**	**Moderate**	No explicit barrier reported, but typical construction trades skew male; risk that women miss early hiring/training waves.

Table 43: Social Risk analysis of Moengo

Village: Albina - Alfonsdorp	Risk analysis			
Key Risk Indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
Socio-cultural community issues				
1. Indecisiveness about community ownership models.	**Medium**	**Possible**	**Moderate**	Community shows willingness to participate but also mixed views and concerns (finances/environment/roles), which can translate into governance hesitation if roles aren't codified.
2. Temporary displacement due to project building activities.	Medium	Possible	Moderate	Utility poles are being installed now; no relocation flagged, but works pass through residential areas, posing short-term access restrictions.
Social isolation				
3. Unequal distribution of energy services.	Medium	Possible	Moderate	EBS since 2021 via GODO payments; occasional evening water outages; if expansions prioritize some blocks, inequity perceptions may arise.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	Medium	Likely	Substantial	Interest in training is high, but current familiarity with solar systems is limited; risk of underperformance without structured capacity building.
5. Lack of trust due to past false promises.	Medium	Possible	Moderate	Mixed optimism with explicit worries about finances/deforestation/wildlife; maintaining trust requires consistent disclosure and delivery.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	High	Likley	Substantial	Unemployment and youth social unrest were noted as stressors; without project jobs, tariff compliance and O&M funding could suffer.
7. Inability to buy freezers, electronic devices or other electrical tools.	Medium	Possible	Moderate	Many households own appliances, but affordability constraints persist for new purchases or replacements; risk of exclusion from productive use.
Physical distress				
8. Physical injury while supporting project objectives.	High	Possible	Substantial	Construction/line works in community space imply typical electrical/civil risks; community already highlights safety and maintenance importance.
9. Noise disturbance at critical locations.	Medium	Likely	Substantial	Concerns about wildlife noise and general disturbance were voiced; protect sensitive sites (schools/sacred areas).

10. Distance for fetching water too far, especially for the elderly.	medium	Possible	Moderate	Water via SWM network; outages in evenings can force alternative fetching/storage, placing disproportionate burden on elderly.
11. Dust production during building activities.	Medium	Likely	Substantial	Predictable during pole setting/road access; requires ESMP controls and grievance handling.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	Medium	Likely	Substantial	Financial anxiety explicitly noted in concluding attitudes; tariff/payment clarity will be pivotal to acceptance.
13. Temporary distress due to project building activities.	Medium	Likely	Substantial	Anticipated as part of the works; psychosocial stress may rise if communication is weak.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	**Medium**	**Possible**	**Moderate**	Some concern about shifting roles; risk that fee collection or O&M time burdens fall unevenly on women.
15. Gender inequality in potential job creation.	**Medium**	**Likely**	**Substantial**	Without targets, early construction jobs may skew male; women could miss training and income benefits.

Table 44: Social Risk analysis of Albina- Alfonsdorp

Village: Albina – Marijke dorp	**Risk analysis**			
Key Risk Indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
Socio-cultural community issues				
1. Indecisiveness about community ownership models.	**Medium**	**Likely**	**Substantial**	Community wants inclusive planning and capacity-building; ownership preferences are forming but not yet codified, creating uncertainty on O&M roles and tariffs.
2. Temporary displacement due to project building activities.	Medium	Possible	**Moderate**	Safety concerns about siting poles close to homes imply potential micro-re-siting; Albina areas need tailored

				plans; no explicit willingness to relocate.
Social isolation				
3. Unequal distribution of energy services.	High	Likely	**Substantial**	Electricity quality varies; some rely on candles/battery lights → risk of intra-village inequity and exclusion from 24/7 services.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	High	Likely	**Substantial**	Villagers want training; unfamiliar with solar; O&M burden could outstrip skills without structured capacity program.
5. Lack of trust due to past false promises.	Medium	Possible	**Moderate**	Community stresses need for guidance, transparency and information; trust exists but is contingent on delivery.
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Medium	Likely	**Substantial**	Willingness to pay exists but affordability is fragile; need entrepreneurship to meet bills; risk of arrears.
7. Inability to buy freezers, electronic devices or other electrical tools.	Medium	Likely	**Substantial**	Many still depend on candles/batteries; appliance uptake (e.g., freezer) may be constrained by income, limiting project benefits.
Physical distress				
8. Physical injury while supporting project objectives.	Medium	Possible	**Moderate**	Community safety concerns about pole proximity; road-work safety emphasized.
9. Noise disturbance at critical locations.	Low	Likely	**Moderate**	Grievance text flags noise/dust concerns and protection of schools/sacred places.
10. Distance for fetching water too far, especially for the elderly.	Medium	Possible	**Moderate**	SWM network exists but quality issues (chlorine); if outages occur, vulnerable groups may walk farther.
11. Dust production during building activities.	Low	Likely	**Moderate**	Anticipated by community; roads and school areas sensitive.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	High	Likely	**Substantial**	Financial worry is explicitly reported; affordability anxiety can reduce uptake/compliance.

13. Temporary distress due to project building activities.	Medium	Likely	**Substantial**	Anticipated inconveniences (noise, dust, traffic); strong desire for prior information to reduce distress.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	Medium	Possible	**Moderate**	Gender concerns present but not dominant; income control may be unequal, risking differential access.
15. Gender inequality in potential job creation.	Medium	Possible	**Moderate**	If recruitment favors external/technical profiles, women may be sidelined from paid roles.

Table 45: Social Risk analysis of Albina - Marijkedorp

Village: Albina - Pierrekondre	**Risk analysis**			
Key Risk Indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
Socio-cultural community issues				
1. Indecisiveness about community ownership models.	Medium	Possible	**Moderate**	Community shows proactive stance toward local ownership but needs formal model to avoid later disputes.
2. Temporary displacement due to project building activities.	High	Likely	**Substantial**	Residents *refuse relocation* for poles on their land; insist infrastructure be outside private property—conflict risk if routing ignores this.
Social isolation				
3. Unequal distribution of energy services.	Medium	Possible	**Moderate**	Already EBS-connected but outages occur; payment access barriers can produce inequitable continuity.
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems.	Medium	Likely	**Substantial**	Regional shortage of technical staff due to out-migration; jeopardizes sustained maintenance.
5. Lack of trust due to past false promises.	Medium	Possible	**Moderate**	Trust generally high but contingent on transparent governance and affordability mechanisms.
Socio-economic distress				

6. Lack of paid jobs or employed villagers to upkeep ongoing costs.	Medium	Likely	**Substantial**	Willingness to pay exists, but practical payment access is limited; arrears risk even with high device usage.
7. Inability to buy freezers, electronic devices or other electrical tools.	Low	Unlikely	**Low**	Most households already own and use many appliances; barrier is relatively low here.
Physical distress				
8. Physical injury while supporting project objectives.	Medium	Possible	**Moderate**	Safety acceptable if lines not close to homes; risk arises during installation if clearances ignored.
9. Noise disturbance at critical locations.	Low	Possible	**Low**	No specific hotspots flagged; general sensitivity applies.
10. Distance for fetching water too far, especially for the elderly.	Low	Possible	**Low**	Drinking water via SWM with storage (durotanks); occasional evening outages noted.
11. Dust production during building activities.	Low	Likely	**Moderate**	Routine construction dust expected in access roads.
Emotional distress				
12. Worries and stress about generating the finances for the projects.	High	Likely	**Substantial**	Payment accessibility challenges (digital exclusion, travel) can create persistent financial stress despite willingness to pay.
13. Temporary distress due to project building activities.	Medium	Likely	**Substantial**	Outages during tie-ins and site activity may disrupt daily appliance-dependent routines.
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.	Medium	Possible	**Moderate**	If payment points/hours are inaccessible, women caregivers may face disproportionate burden.
15. Medium	Medium	Possible	**Moderate**	Regional technical-skills shortage plus external hiring could bias jobs away from local women.

Table 46: Social Risk analysis of Albina – Pierre Kondre

6.1.4. Results: Potential Environmental Positive Impact analysis and Risk Analysis

6.1.4.1. Environmental Positive impact Cluster I

In order to rate the KPI, a 3-level positive impact analysis was done to see what the potential positive environmental impacts are that could occur (high, medium or low potential positive impact).
The following tables show the potential positive environmental impact analysis per location.

Cluster I: Abaadu Konde, Akale Konde and Benhati Mofo	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	Medium	The community is open to scientific research on wildlife and biodiversity, which can help protect ecosystems and wildlife. The community's willingness to engage in scientific research on wildlife and biodiversity provides an opportunity to monitor and protect the local ecosystem. By integrating biodiversity assessments into development projects, the community can take a proactive role in preserving the habitat and species, which is crucial for long-term environmental health.
2. Clean water.	High	Improved access to clean water would reduce health risks, improve hygiene, and boost agricultural productivity. The current lack of reliable access to clean water presents serious health risks, especially for vulnerable groups. Expanding water access to households would directly improve sanitation, reducing waterborne diseases. Additionally, consistent access to clean water would enhance agricultural productivity by providing a more stable water supply, benefiting both household consumption and crop irrigation.
3. Cleaner energy.	High	Potential shift to renewable energy sources (e.g., solar or wind) would reduce reliance on fossil fuels and promote sustainability. The transition to renewable energy could significantly reduce the environmental impact of the current energy infrastructure, which relies on unreliable and potentially harmful sources. By shifting towards solar or wind power, the community could decrease its carbon footprint and reduce the need for fossil fuel consumption, contributing to global sustainability efforts. This would also ensure a more stable and resilient energy supply for the village.
4. Waste management systems.	medium	Establishing a waste management and recycling system would reduce pollution and improve local cleanliness. The absence of an organized waste collection system is contributing to local pollution and environmental degradation. By establishing a formal waste management and recycling system, the community can significantly reduce waste-related pollution. This initiative could also promote recycling, further minimizing waste and contributing to cleaner, healthier living conditions. Addressing the waste management challenge would also prevent the contamination of local water sources and land.
5. Use of natural resources.	Medium	Reducing wood use for cooking by adopting electric appliances would decrease deforestation and protect local forests. The current reliance on wood for cooking places pressure on local forests, leading to deforestation and habitat loss. By shifting to electric cooking methods, the community could reduce its dependency on wood, thereby decreasing deforestation rates and protecting vital forest ecosystems. This shift would contribute to the conservation of biodiversity and reduce the carbon emissions associated with burning wood.

6. Environmental awareness.	medium	The community's engagement in scientific research and traditional knowledge sharing indicates strong environmental awareness. The community's openness to scientific research and willingness to share traditional knowledge highlight a strong foundation for environmental awareness. By promoting education on sustainability practices and incorporating local ecological knowledge, the community can better understand and address environmental challenges. Increasing environmental awareness could also foster eco-tourism opportunities, where local resources are managed responsibly.
7. Gender Equality	Medium	Less time spent fetching water due to improved access could empower women to engage in economic or educational activities. The current burden of water collection disproportionately falls on women, limiting their time for other important activities. Improving access to clean water would significantly reduce the time women spend on this task, giving them more opportunities to engage in income-generating activities, pursue education, or participate in community decision-making processes. This would support gender equality and empower women to play a more active role in the development of the community.

Table 47. Environmental positive impact cluster 1.

6.1.4.2. Environmental Positive impact Cluster 2

Amalokokondre	Positive impact analysis	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	High	Connecting to a more sustainable energy system could reduce dependence on wood for energy, decreasing deforestation and improving biodiversity protection. The integration of cleaner energy sources like the grid would decrease the use of wood-burning stoves and diesel generators, which are primary contributors to deforestation in rural areas. This would directly help preserve forest ecosystems and biodiversity by reducing the demand for wood as a fuel source.
2. Clean water.	Medium	Improved energy supply could lead to more efficient water treatment systems and better sanitation, improving access to clean drinking water. With reliable energy, the village would be able to operate water treatment plants or sanitation facilities more effectively. This would result in cleaner, safer drinking water and better overall water management. However, the direct environmental impact on water resources depends on the successful implementation of these systems.
3. Cleaner energy.	High	Integration into a cleaner energy grid would reduce the use of diesel generators and wood-burning, leading to lower air pollution and reduced CO_2 emissions. By transitioning to a cleaner energy grid, the village can reduce its reliance on fossil fuels like diesel and the burning of wood. This transition will significantly lower air pollution levels and greenhouse gas emissions, directly contributing to climate change mitigation efforts.
4. Waste management systems.	Medium	With a stable energy supply, structured waste management systems, such as waste separation or composting, could be more effectively implemented. Access to consistent energy would enable the village to implement waste management practices such as composting and recycling. With better infrastructure, waste could be managed more efficiently, reducing environmental pollution. However, the success of this depends on community engagement and proper waste infrastructure.
5. Use of natural resources.	Medium	More efficient energy use can reduce pressure on natural resources like firewood and water, resulting in a lighter environmental footprint. As the community shifts to more energy-efficient practices, the demand for firewood and other natural resources would decrease. This would help conserve forest resources and reduce the strain on local ecosystems. However, the overall impact is contingent on how energy-efficient technologies are adopted.
6. Environmental awareness.	medium	The introduction of sustainable energy and improved infrastructure could provide opportunities for environmental education and awareness, leading to better protection of natural resources. The transition to cleaner energy and the introduction of more sustainable practices can raise awareness within the community about environmental issues. Through workshops and education, people will be more informed about the importance of protecting natural resources, which can foster a culture of environmental stewardship.

7. Gender Equality	Medium	Improved access to energy and clean water can reduce women's workload, providing more time for education, entrepreneurship, and community activities. Women in the village spend a significant amount of time collecting firewood and water. By reducing these tasks through better energy access and water infrastructure, women would have more time for education, economic activities, and social participation. This empowerment can improve gender equality and contribute to broader social benefits.

Table 48. Environmental positive impact Amalokokondre.

Langa Uku 1	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	High	Introduction of energy-efficient lighting and clean water systems could reduce dependency on unsustainable practices like logging for firewood.
2. Clean water.	Medium	Access to clean water from treated sources would improve public health and reduce contamination of local water systems. It could also reduce dependency on river water, lessening the environmental burden.
3. Cleaner energy.	High	Adoption of solar energy or other renewable energy sources can replace diesel-powered generators, significantly reducing carbon emissions and pollution in the area.
4. Waste management systems.	Medium	Implementing proper waste management systems can reduce the amount of waste dumped into the environment, contributing to better soil and water quality. Recycling and waste reduction initiatives could also mitigate environmental pollution.
5. Use of natural resources.	Medium	Introduction of alternative energy sources (such as solar) and water conservation practices could reduce the overuse of natural resources like firewood and water. This would promote more sustainable living and resource management.
6. Environmental awareness.	High	Increased community education on environmental issues can drive local support for conservation practices, such as forest protection and waste management. This would foster better community engagement in environmental protection initiatives.
7. Gender Equality	Low	Promoting gender equality in resource management can lead to more inclusive decision-making regarding environmental protection and resource usage. Women's involvement in environmental projects may lead to more balanced, sustainable practices.

Table 49. Environmental positive impact Langa-Oekoe 1.

Langa Hoekoe 2	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	High	Protection of forests and biodiversity by implementing sustainable forest management practices and establishing protected areas. Protecting forests and biodiversity is crucial for preserving ecosystems that regulate local climates and provide habitats for species. Sustainable management ensures the preservation of these vital resources for future generations.

2. Clean water.	High	Implementation of clean water treatment systems and the protection of water sources to ensure access to clean and safe drinking water. Clean water access prevents waterborne diseases and helps preserve the integrity of water ecosystems. Additionally, protecting water sources reduces the risk of contamination, benefiting both the community and the environment.
3. Cleaner energy.	Medium	Transition to cleaner energy sources such as solar or wind energy to reduce reliance on fossil fuels and decrease greenhouse gas emissions. Shifting to cleaner energy reduces air pollution and carbon emissions, helping mitigate climate change. While it contributes positively, the impact may be less immediate compared to other environmental initiatives.
4. Waste management systems.	Medium	Introduction of efficient waste management practices, such as recycling and composting, to reduce waste sent to landfills and prevent soil and water pollution. Effective waste management reduces environmental pollution by keeping landfills from overflowing and preventing harmful chemicals from leaking into the soil and water. These practices contribute to a cleaner and healthier environment.
5. Use of natural resources.	High	Sustainable use and management of natural resources such as water, land, and energy. Practices like resource recycling and responsible consumption will help ensure these resources are available for future generations. Sustainable resource use ensures the longevity of natural resources. By carefully managing water, land, and energy, the community can reduce environmental strain and contribute to long-term ecological balance.
6. Environmental awareness.	Medium	Raising awareness about environmental conservation practices, leading to more eco-friendly behaviors and decision-making among the community. Building environmental awareness empowers communities to make more sustainable decisions in daily life. While this impact is critical for long-term change, it may take time for behaviors to shift across the entire community.
7. Gender Equality	Low	Inclusion of gender equality in environmental decision-making processes, ensuring that both women and men are equally involved in environmental conservation efforts. Gender equality promotes broader community engagement, which can lead to more effective and inclusive environmental policies. While important, its direct impact on the environment is more social than ecological, contributing to equitable participation in sustainability efforts.

Table 50. Environmental positive impact Langa-Oekoe 2.

Lantiwee	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	Medium	Community engagement could help improve biodiversity monitoring. The community shows openness to scientific research on wildlife and biodiversity impacts. There's potential for biodiversity monitoring and conservation efforts in the future, particularly with involvement in the solar project.
2. Clean water.	High	Access to cleaner water will greatly enhance health and daily living conditions Lantiwee faces challenges with clean water access. However, the desire for improved water systems aligns with potential projects for better

		water quality management, including solar-powered water systems and better water storage
3. Cleaner energy.	High	Solar energy offers significant environmental benefits and reduces reliance on non-renewable energy Lantiwee shows a strong interest in alternative energy sources, especially solar energy. Solar power can replace the diesel-powered generator, reducing dependence on fossil fuels and improving sustainability.
4. Waste management systems.	Medium	There is a need for education and infrastructure to improve waste management practices. While current waste management practices include some recycling and disposal methods (burying batteries, etc.), there is potential for introducing better waste management and recycling practices. This could help reduce environmental pollution.
5. Use of natural resources.	Medium	The community's openness to modern technology could lead to more sustainable resource use. There is no specific data on resource use for construction, but the community's growing interest in sustainable technologies such as solar energy could help reduce overuse of local natural resources.
6. Environmental awareness.	medium	With more exposure to sustainable technologies, environmental awareness could grow in the community The community has shown an openness to scientific research and discussions on environmental protection. Improved energy, water, and telecom systems could help raise awareness of environmental issues.
7. Gender Equality	Medium	Improved infrastructure may contribute to more equitable gender roles, especially related to work distribution. Women will benefit from improved water access and reduced workloads. There is potential for shifting gender roles as men might take on more responsibility in food preservation if refrigeration is introduced.

Table 51. Environmental positive impact Lantiwee.

Pinatjarimi	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	High	Electrification reduces dependence on wood for fuel, helping to protect forests and preserve biodiversity The shift from wood-based energy sources to electricity directly reduces deforestation, preserving natural forest cover and protecting wildlife habitats. This helps maintain biodiversity and contributes to climate resilience by ensuring the continuity of ecosystem services such as carbon sequestration, soil stabilization, and water regulation. Additionally, the decreased use of firewood reduces the risk of forest fires caused by uncontrolled burning.
2. Clean water.	Medium	Electricity enables water purification and pumping systems, improving access to clean drinking water and reducing reliance on surface water sources. Access to electricity allows for the installation of water filtration and pumping systems, leading to safer drinking water and reducing the risk of waterborne diseases. It also minimizes dependence on unclean water sources such as rivers or stagnant water bodies, which may be contaminated by industrial or household waste. Additionally, stable electricity supports the operation of

		sanitation infrastructure, improving hygiene and overall public health in the community.
3. Cleaner energy.	High	Transitioning to a stable electricity supply reduces reliance on diesel generators and wood burning, lowering CO_2 emissions and air pollution. The availability of electricity promotes a shift from diesel and biomass-based energy to cleaner and more sustainable alternatives, significantly reducing greenhouse gas emissions. Lower particulate matter from wood combustion also improves indoor and outdoor air quality, leading to fewer respiratory diseases, especially among children and the elderly. Furthermore, the reduced demand for fossil fuels decreases dependency on expensive and environmentally harmful diesel transportation and storage.
4. Waste management systems.	Medium	Electricity facilitates better waste management solutions, such as recycling and controlled waste processing, reducing environmental pollution and health risks. The presence of electricity enables the introduction of waste sorting, recycling, and proper disposal methods. This reduces the uncontrolled dumping and burning of waste, which can cause air, soil, and water contamination. Proper waste management systems also limit the spread of disease and contribute to a cleaner and more sustainable living environment. The potential for waste-to-energy initiatives, such as biogas production, could further enhance sustainability efforts in the village.
5. Use of natural resources.	Medium	Electrification promotes more efficient use of natural resources like wood and water by enabling alternative technologies, such as electric stoves and pumps. The introduction of electricity reduces reliance on non-renewable natural resources, such as firewood and diesel, and promotes the use of sustainable energy alternatives. Electric appliances, such as cooking stoves, significantly decrease deforestation rates, while electric water pumps allow for more efficient irrigation and household water use. Additionally, by reducing the demand for wood-based energy sources, the local ecosystem is given time to regenerate, enhancing environmental sustainability.
6. Environmental awareness.	Medium	Access to electricity supports education and awareness programs through media and the internet, fostering greater environmental consciousness in the community. With electricity, the community gains access to digital resources, radio, television, and internet-based platforms that provide environmental education. This exposure can lead to improved awareness of sustainable practices, conservation efforts, and the importance of protecting natural resources. Schools and community centers can integrate environmental education into their programs, leading to long-term behavioral changes that promote sustainability. Electrification also supports research and data collection, enabling better monitoring and protection of local ecosystems.
7. Gender Equality	Medium	Improved electricity access provides women with more economic opportunities, such as home-based work and entrepreneurship, and enhances safety through better lighting. Electrification empowers women by improving their access to information, education, and employment opportunities. It enables home-based businesses, such as tailoring, food production, or digital work, reducing economic dependence and fostering financial independence. Additionally, street and household lighting enhances safety, particularly for women and girls who

		may otherwise be vulnerable to harassment or violence in poorly lit areas. Electrification also reduces the time spent on household chores like firewood collection and water retrieval, allowing women to participate more actively in community development and education.

Table 52. Environmental positive impact Pinatjarimi.

Pikin Santi	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	medium	Deforestation impacts can be mitigated with reforestation and conservation efforts. There is an opportunity for Pikin Santi to incorporate forest conservation practices, including the establishment of protected areas or reforestation initiatives.
2. Clean water.	High	Clean water access will improve health outcomes, reducing waterborne diseases and improving quality of life. Access to clean water is vital for public health, and the potential positive impact is high. This initiative could have a long-lasting effect on the well-being of residents.
3. Cleaner energy.	High	Clean energy (solar power) will reduce reliance on fossil fuels, providing reliable energy and reducing environmental impact. Solar energy adoption will enhance sustainability in Pikin Santi, making the village more energy-independent while reducing the carbon footprint.
4. Waste management systems.	medium	Formal waste management will decrease pollution, but success depends on community involvement and infrastructure. A sustainable waste management system would significantly reduce environmental hazards, but its implementation depends on community awareness and proper infrastructure.
5. Use of natural resources.	Medium	Sustainable energy and water use can reduce pressure on local natural resources, but the shift must be managed carefully Transitioning to cleaner energy and improved water usage is key, but it will be important to monitor and manage resource use to prevent over-exploitation.
6. Environmental awareness.	medium	Environmental education will foster sustainability, but this requires active engagement and investment in awareness programs. Raising awareness about environmental issues will promote sustainable practices, but community engagement is essential for long-term change.
7. Gender Equality	High	Improved access to water and energy will alleviate women's burdens, promoting gender equality and social participation. By reducing the daily tasks that women face, such as water collection and cooking, these projects will allow women to engage more fully in education and the workforce.

Table 53. Environmental positive impact Pikin Santi.

Tamarin	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity	medium	There is potential for the village to engage in sustainable land use practices, especially if the development of solar,

protection.		water, and telecom systems is implemented in a way that minimizes deforestation. Moreover, interest in park ranger positions for wildlife protection could help mitigate environmental damage and promote biodiversity conservation. While the community is open to development, the sustainability of land use and biodiversity protection remains a concern that needs careful management.
2. Clean water.	High	Clean water is a significant need for rural communities, and addressing this through project development would have a direct, positive effect on health and well-being. If the project includes the development of water systems (such as clean water supply), it could lead to improved water access and quality for the village, reducing the reliance on natural water sources that may be susceptible to contamination.
3. Cleaner energy.	High	Cleaner energy solutions would have a major positive environmental impact by reducing carbon emissions and deforestation. ransitioning from wood and charcoal to electric appliances for cooking could significantly reduce deforestation and pollution. The development of renewable energy sources such as solar power would also decrease the community's reliance on traditional biomass fuels.
4. Waste management systems.	medium	Introducing waste management systems and educating the community about recycling and proper waste disposal could improve environmental quality. There's also potential for better handling of fuel carriers and old batteries, which are current environmental hazards. Effective waste management would address current environmental gaps and prevent long-term pollution, but it will require community engagement and infrastructure development.
5. Use of natural resources.	Medium	The community's willingness to use local materials and repurpose resources, such as wood, could contribute to a more sustainable approach to construction and development. However, it is crucial that resource extraction does not exacerbate deforestation or lead to unsustainable practices While the community is open to using local resources, this must be managed to ensure sustainability and prevent over-extraction of natural resources.
6. Environmental awareness.	medium	The project could provide opportunities to increase environmental awareness, especially in areas like waste management and sustainable resource use. The absence of waste disposal clarity suggests a need for education on best practices for environmental sustainability. Raising environmental awareness through educational initiatives will contribute to long-term positive impacts, though it may require ongoing effort and support.
7. Gender Equality	Medium	Gender equality could be enhanced if women are actively involved in environmental protection and project-related activities, particularly in roles such as park rangers or community leaders. This could help bridge gender gaps and empower women in the village. Promoting gender equality would improve social dynamics and community involvement, but the actual impact depends on the inclusivity of the project and opportunities provided.

Table 54:Environmental positive impact Tamarin

Wanhatti	Positive impact analysis	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	medium	Open to biodiversity assessments and a shift to alternative energy solutions could have a moderate impact on forest conservation. The community's willingness to engage in scientific assessments of biodiversity could foster more sustainable environmental practices. Transitioning to cleaner energy sources, such as solar power, would reduce reliance on firewood and fossil fuels, helping to protect surrounding forests and biodiversity. However, this shift will depend on adequate education and training about sustainable practices.
2. Clean water.	Medium	Improvement in water systems could significantly enhance clean water access and health security, with ongoing monitoring necessary for sustainability. Although the community currently has access to purified river water, future upgrades to water systems (e.g., sustainable filtration, storage, and treatment) would have a medium-level impact on improving public health. Regular monitoring and proactive management will be essential for the long-term sustainability of clean water access, especially given the community's dependence on natural water sources.
3. Cleaner energy.	High	The community's demand for solar power could reduce fossil fuel dependence and contribute significantly to cleaner energy use. Solar energy solutions could have a high positive impact by reducing the reliance on diesel generators and non-renewable energy sources. Implementing solar power could lower greenhouse gas emissions, reduce air pollution, and provide a cleaner, more sustainable energy solution for the village. As the community has already expressed interest in solar power, the adoption of this technology could lead to substantial environmental benefits.
4. Waste management systems.	medium	Waste management could be improved with proper systems, reducing environmental risks and promoting recycling. The current waste disposal practices, such as burying non-recyclable materials, present potential environmental risks, such as soil and water contamination. Introducing organized waste management systems, including recycling and composting, would mitigate these risks and help reduce pollution. While the community has not fully developed a waste management system, creating awareness and implementing sustainable waste practices could have a medium-level positive impact on environmental quality.
5. Use of natural resources.	Medium	Reduced reliance on wood for fuel with expanded electricity access could lead to more sustainable natural resource use. With the expansion of electricity access, the community's reliance on firewood for cooking and heating could decrease. This shift would help conserve local forests and reduce deforestation. However, the community's adaptation to electricity and alternative energy sources will require education on efficient resource use to maximize long-term sustainability. As such, the potential positive impact on natural resources is considered medium, depending on the pace of this transition.

6. Environmental awareness.	medium	Educational initiatives and engagement in environmental monitoring could strengthen community-wide environmental awareness. There is a clear opportunity for increasing environmental awareness within the community, particularly through education on sustainability and conservation. By fostering a better understanding of local environmental issues (such as deforestation, biodiversity, and waste), the community could take more proactive measures to protect their environment. The impact of these initiatives could be medium, as it would depend on how effectively awareness programs are implemented and embraced.
7. Gender Equality	Medium	Improved access to energy, water, and telecommunications will empower women and potentially lead to greater gender equality in the community. Access to reliable energy, clean water, and communication technologies will likely reduce the time and physical labor traditionally shouldered by women in the community. This empowerment could enhance their social and economic roles, offering greater opportunities for personal development, education, and participation in decision-making. Over time, these infrastructural improvements could contribute to reducing gender disparities, although full gender equality will require broader social changes beyond infrastructure.

Table 55. Environmental positive impact Wanhatti.

6.1.4.3. Environmental Positive impact Cluster 3

Moengo	Positive impact analysis	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	High	**The implementation of solar energy and improved utility systems in Moengo holds the potential to reduce reliance on diesel fuel and kerosene, which are currently used extensively. This transition will directly lower local air emissions and reduce the risk of fuel-related contamination. Furthermore, the community's openness to biodiversity research as an environmental safeguard indicates a willingness to integrate conservation into development. Reduced dependency on firewood for cooking, if electricity and alternative appliances become available, could further lessen local deforestation pressures. These combined measures can help maintain surrounding forest ecosystems and protect wildlife habitats.**
2. Clean water.	High	**Moengo faces recurrent challenges with access to safe drinking water, leading to health risks such as diarrhea and pneumonia. The introduction of modernized clean water systems would not only improve health outcomes but also reduce the need for households to boil water using firewood, which has an additional environmental benefit. Cleaner water access is also expected to enhance agricultural productivity, contributing to local food security while minimizing harmful practices such as reliance on unsafe water sources. In addition, reducing the burden of long-distance water collection will free up time and reduce stress, particularly for women.**
3. Cleaner energy.	High	**The shift from diesel generators and kerosene lamps to solar energy represents a significant positive environmental outcome. Current energy use in Moengo is diesel-intensive (approx. 9,500–10,500 liters monthly for 40 hours of supply per week), contributing to emissions, noise, and local air pollution. Solar energy will provide a sustainable, low-emission alternative, reduce fuel dependency, and mitigate the environmental risks of fuel transportation and disposal. The improved reliability of electricity supply will also support refrigeration, education, and communication, indirectly strengthening community resilience.**
4. Waste management systems.	Medium	**Waste management remains a critical concern in Moengo, with limited collection and a full dumpsite near Albina intersection. The project presents opportunities to integrate improved waste systems alongside energy and water infrastructure. If combined with community education and the reactivation or replacement of non-functional incinerators, the project could contribute to safer disposal of hazardous materials such as batteries and fuel containers. Stronger waste practices would reduce pollution, prevent land degradation, and contribute to healthier living conditions.**
5. Use of natural resources.	Medium High	**The availability of electricity is likely to reduce dependence on unsustainable resource use, particularly firewood for cooking and boiling water. This shift will conserve wood resources, which can then be used for other cultural or economic purposes. In addition, improved access to refrigeration reduces the need for**

		frequent hunting trips, potentially alleviating pressure on local wildlife populations. Sustainable use of local materials for project construction, if encouraged, could also foster a balance between traditional practices and modern resource management.
6. Environmental awareness.	Medium	**Residents of Moengo expressed interest in learning how to operate and maintain solar, water, and telecom systems, as well as willingness to host biodiversity and environmental research. This creates a strong platform for building long-term environmental awareness. With the introduction of new infrastructure, coupled with training and transparent communication, community members can develop a deeper understanding of resource efficiency, pollution prevention, and biodiversity protection. This will not only support project sustainability but also strengthen local stewardship of natural resources.**
7. Gender Equality	High	**Women in Moengo highlighted that closer water access would significantly reduce their workload, freeing time for other activities such as income generation or education. Access to energy and appliances (e.g., electric stoves, refrigeration) will similarly reduce domestic burdens, while equal access to communication technologies (e.g., mobile phones, internet) strengthens women's participation in decision-making and community life. These changes contribute both to gender equality and to a more inclusive approach to environmental and social development.**

Table 56: Environmental positive impact Moengo

Albina- Alfonsdorp	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	Medium	The community expressed willingness to allow scientific biodiversity research during project implementation, supporting conservation-oriented planning. The introduction of renewable energy and electric appliances (e.g., fridges, stoves) can reduce reliance on hunting and firewood, alleviating pressure on forests and wildlife habitats. Residents also showed confidence in controlled development with minimal deforestation.
2. Clean water.	High	Residents rely on purified river water via the SWM network but highlighted the importance of improved clean water systems. Enhanced access would reduce risks of waterborne diseases, improve agricultural production, and relieve women of labor-intensive tasks, thereby contributing to food security and public health.
3. Cleaner energy.	High	Since 2021 the village is connected to the EBS grid, but familiarity with solar remains low. Interest in renewable energy is strong. Solar and cleaner energy can reduce fossil fuel dependency, lower indoor pollution, enable refrigeration of food/medicine, and support economic opportunities (tourism, entrepreneurship, education).
4. Waste management systems.	Medium	Waste is already collected weekly, which provides a foundation for structured waste management. Transition to modernized systems may reduce hazardous waste (e.g., batteries, kerosene, fuel residues) and support future recycling or organized waste handling, lowering local pollution risks.
5. Use of natural resources.	Medium	Reduced reliance on firewood for cooking would allow wood to be repurposed for construction and community

		development. Improved refrigeration reduces immediate need for hunting, supports food storage, and encourages more sustainable resource use.
6. Environmental awareness.	Medium	Villagers showed cautious openness to biodiversity studies and environmental monitoring during project works. Their recognition of risks such as noise and wildlife disturbance indicates a growing environmental awareness that can be strengthened through training and engagement.
7. Gender Equality	High	Women directly linked improved water access to a reduced workload, freeing time for income-generating and educational activities. Electricity and telecom enhance women's safety, communication, and participation in village decision-making, contributing to empowerment and balancing traditional gender roles.

Table 57: Environmental positive impact Albina- Alfonsdorp

Albina – Marijke dorp	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	High	The community demonstrates awareness of the ecological and spiritual value of their surroundings, including designated sacred park areas and concerns about wildlife preservation. By introducing renewable energy (solar) and reducing reliance on wood for cooking, pressure on local forest resources may decrease. Refrigeration also reduces the need for continuous hunting, which can indirectly relieve pressure on wildlife populations if managed sustainably. Furthermore, openness to biodiversity monitoring and collaboration with researchers provides an opportunity for scientific conservation safeguards.
2. Clean water.	High	The community strongly emphasizes the importance of access to clean water for both health and agricultural productivity. Current reliance on chlorinated water and untreated alternatives presents health risks. Improved clean water systems will significantly reduce waterborne illnesses, improve sanitation, and free up time for other productive or educational activities. For women in particular, closer water access will reduce domestic burdens and enhance well-being. This will have both direct environmental health benefits and indirect social benefits.
3. Cleaner energy.	High	The transition to solar power and more stable electricity is expected to reduce reliance on diesel, kerosene, candles, and batteries, thereby lowering greenhouse gas emissions and reducing household-level pollution. It will also improve food security through refrigeration, enable longer study hours for children, and enhance community safety at night through reliable lighting. Reduced dependence on biomass and fossil fuels also aligns with sustainable energy transition goals.
4. Waste management systems.	Medium	Currently, batteries and old motors are often discarded in the village, creating risks of soil and water contamination. The introduction of structured infrastructure projects creates the opportunity to integrate proper waste collection and recycling systems. Twice-weekly waste collection already exists, which can be expanded or formalized. Community training and project-linked waste

		handling systems may strengthen environmental safeguards and reduce pollution risks.
5. Use of natural resources.	Medium to High Positive	With access to electricity and clean water systems, reliance on unsustainable extraction of wood for cooking and untreated water sources will diminish. Freed-up wood resources could instead be used for construction or cultural purposes. Moreover, refrigeration allows for more efficient use of hunted game, reducing waste. Improved infrastructure may also support eco-tourism, creating incentives to conserve natural landscapes and biodiversity.
6. Environmental awareness.	High	Residents expressed interest in learning how to maintain solar, water, and telecom installations. This training, combined with openness to biodiversity monitoring and participatory decision-making, suggests a readiness to increase environmental awareness and stewardship. By integrating environmental education into project training modules, long-term environmental responsibility can be fostered within the community.
7. Gender Equality	High	Access to clean water closer to households significantly reduces the workload of women, who are traditionally responsible for water collection. The adoption of modern appliances (e.g., electric stoves) will free up time for women to engage in other economic, social, or educational activities. Meanwhile, men benefit from refrigeration in terms of expanded hunting practices and trade opportunities. Both genders expressed interest in mobile phones and internet, enabling equal access to communication and training. The project therefore contributes positively to reducing gender-based burdens and creating more balanced opportunities.

Table 58: Environmental positive impac Albina – Marijke dorp

Albina – Pierre Kondre	**Positive impact analysis**	
Key Performance Indicator	**Potential impact description: High/medium/low**	**Comments**
1. Forest and biodiversity protection.	High	Transition to solar energy eliminates reliance on ~25,000 liters of fossil fuel annually, reducing emissions, spills, and deforestation risks. Reduced fuel transport lowers disturbance to ecosystems. Community openness to biodiversity research strengthens protection.
2. Clean water.	High	Improved water infrastructure ensures reliability and reduces outages. Access to safe water lowers health risks, prevents minor waterborne illnesses, and reduces need for boiling water with wood, thereby protecting forests and reducing indoor air pollution.
3. Cleaner energy.	High	Solar electrification provides stable and clean energy, reducing dependency on diesel/kerosene. It lowers greenhouse gas emissions, supports food/medicine refrigeration, safer night conditions, and educational opportunities through extended lighting hours.
4. Waste management systems.	Medium	Currently, waste disposal (batteries, fuel containers, motors) is unmanaged. Project enables introduction of structured waste management and recycling. Community willingness to self-manage systems creates opportunity for sustainable disposal practices.

5. Use of natural resources.	Medium	Reduced reliance on wood fuel and diesel lowers pressure on forest ecosystems. Use of local materials in construction reduces transport emissions and enhances efficiency. Cleaner technologies promote sustainable use of resources.
6. Environmental awareness.	High	Villagers are open to biodiversity monitoring and environmental safeguards. Positive but cautious attitude toward deforestation indicates awareness. Training linked to system maintenance will enhance long-term stewardship and community-based conservation.
7. Gender Equality	Medium	Access to clean water and energy reduces women's workload, freeing time for education, childcare, and community involvement. Equal access to mobile phones and training enhances women's role in resource management and environmental decision-making.

Table 59: Environmental positive impact Albina – Pierre Kondre

6.1.5. Results: Environmental Risk Analysis

6.1.5.1. Environmental Risk analysis Cluster I

cluster I: Abaadu Konde, Akale Konde and Benhattimofo	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
1. Climate heavy rainfall	High	Very Likely	Substantial	Increased rainfall may lead to flooding, soil erosion, and damage to infrastructure. Heavy rainfall is a common climatic factor in the region, and with ongoing infrastructure development, the likelihood of flooding and soil erosion increases. Unstable or poorly planned infrastructure may exacerbate these effects, disrupting local ecosystems, damaging crops, and causing infrastructure failures such as roads and bridges. This could result in significant economic losses and challenges for the community.
2. Deforestation and biodiversity loss	Very High	Likely	High	Infrastructure projects, such as energy systems and telecom installations, may lead to deforestation, threatening local biodiversity. The potential negative impact of infrastructure development, particularly in forested areas, includes deforestation and loss of biodiversity. Construction activities may disrupt the habitat of local wildlife, contributing to the fragmentation of ecosystems. Without proper environmental assessments and mitigation measures, these projects could threaten endangered species and disrupt ecological balance, undermining long-term environmental sustainability.
3. Noise disturbance	Medium	Likely	Moderate	Construction activities and machinery could create persistent noise pollution, affecting both human wellbeing and wildlife. The noise generated by construction activities and the use of heavy machinery may cause disturbances to both villagers and wildlife. Prolonged exposure to noise can lead to stress and anxiety, affecting the community's emotional wellbeing. Moreover, wildlife may be driven away from critical habitats, which could disrupt local ecosystems. Noise pollution is particularly concerning in sensitive areas such as schools or homes.

4. Airpollution dust production	Medium	Likely	High	Dust from construction and transportation activities can contribute to air pollution, impacting human health and vegetation. The construction of infrastructure and the movement of heavy vehicles often create significant dust. This dust can have serious health implications, especially for individuals with respiratory conditions. It can also negatively impact vegetation, harming local agricultural production and biodiversity. In the long term, dust pollution could affect air quality, leading to a deterioration of living conditions in the area.
5. Waterpollution:	Very High	Likely	High	Contamination of water sources due to improper waste disposal, chemicals from agriculture, or other pollutants. The improper disposal of waste, use of harmful chemicals in agriculture, and inadequate management of water resources can lead to contamination of local water sources. Polluted water can harm both human health and aquatic ecosystems. Villagers rely on these water sources for drinking, bathing, and agriculture, so water pollution poses significant risks. Contaminated water can lead to the spread of diseases, affecting the overall wellbeing of the community and their livelihoods.
6. Lack of Waste managememt	High	Very Likely	High	Without a proper waste management system, pollution from waste accumulation could degrade the environment and harm public health. The absence of waste management infrastructure, such as garbage collection and recycling systems, is contributing to pollution and environmental degradation. As waste accumulates in public areas, it can contaminate local water sources and attract pests. Poor waste management can also lead to the destruction of natural habitats as waste is dumped into forests or rivers, negatively impacting biodiversity.
7. Lack of environmental awareness	Medium	Likely	Moderate	Limited understanding of environmental issues may lead to unsustainable practices and neglect of conservation efforts. A lack of environmental awareness can result in unsustainable practices such as improper waste disposal, deforestation, and overexploitation of natural resources. Without adequate education and awareness campaigns, the community may fail to understand the long-term environmental consequences of their actions. This can hinder efforts to promote

				sustainability and protect the local ecosystem.
8. Gender inequality	**Medium**	**Unlikely**	**Moderate**	**Gender imbalances may limit women's participation in environmental decision-making and sustainable practices. Gender inequality can limit women's ability to engage in environmental conservation efforts or decision-making processes related to resource management. Women may be excluded from discussions on sustainability, reducing their ability to contribute valuable insights into local environmental practices. This inequality can hinder the success of environmental initiatives by not fully utilizing the expertise and perspectives of all community members.**

Table 60. Environmental Risk analysis Cluster I

6.1.5.2. Environmental Risk analysis Cluster 2

Amolokokondre	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
1. Climate heavy rainfall	Medium	Possible	Moderate	Potential for flooding and environmental vulnerability due to unclear community awareness and response. Lack of data on specific flood-prone areas. While flooding has not been identified as a critical issue by the villagers, this may be due to a lack of awareness or communication. Further investigation is needed to assess vulnerability and develop mitigation strategies. A structured assessment of flood-prone areas should be conducted.
2. Deforestation and biodiversity loss	High	Likely	High	Unclear community stance on deforestation for solar, water, and telecom infrastructure. Potential loss of wildlife habitats. The lack of community engagement on deforestation highlights the need for consultation on potential trade-offs. Increased deforestation without proper planning could harm biodiversity and local ecosystems. Education on conservation and reforestation efforts should be prioritized.
3. Noise disturbance	Medium	Possible	Moderate	Lack of community concern about noise impacts suggests an underestimation of potential construction disturbances. The absence of reported concerns does not mean noise pollution will not be an issue. Construction-related noise could disturb the community and local wildlife. A grievance mechanism should be established to address concerns when they arise.
4. Airpollution dust production	Medium	Possible	Moderate	No explicit concerns from the community about dust pollution, but construction activities and unpaved roads could lead to respiratory issues and degraded air quality. The lack of community awareness regarding dust pollution indicates a need for proactive engagement. Dust control measures should be implemented during construction to minimize health and environmental impacts.
5. Waterpollution:	High	Likely	High	No clear data on baseline water quality from the community The lack of responses about water quality

				suggests that pollution risks may not be well understood. Awareness programs and water monitoring initiatives should be introduced to prevent contamination and assess the quality of water sources.
6. Lack of Waste managememt	High	Very Likely	Substantial	No existing structured waste management system. Lack of information on disposal of hazardous materials like fuel carriers, batteries, and motors. The introduction of new energy and telecom systems may increase waste generation. Without a formal disposal system, environmental pollution and health risks could escalate. Awareness campaigns and waste collection initiatives are urgently needed.
7. Lack of environmental awareness	Medium	Very Likely	Moderate	Lack of local engagement in biodiversity protection and unclear stance on scientific research and monitoring efforts. The community has not actively participated in conservation efforts, which could result in unsustainable resource use. Promoting education on environmental responsibility and engaging the community in biodiversity research would help mitigate this issue.
8. Gender inequality	Medium	Possibe	Moderate	While women are open to using mobile phones and more efficient cooking tools, traditional gender roles in household responsibilities still persist. Technological access for women is improving, but cultural shifts in gender roles remain slow. Targeted gender-inclusive training and employment opportunities within the project could enhance gender equality in environmental decision-making.

Table 61. Environmental Risk analysis Amalokokondre.

Langa Uku 1	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
1. Climate heavy rainfall	High	Likely	High	Flooding and erosion risks remain, but lack of mapped data hinders mitigation planning. Infrastructure damage and displacement are possible. Participatory mapping exercises could enhance climate resilience planning. Local knowledge should be integrated into adaptation strategies.
2. Deforestation and biodiversity loss	Very High	Likely	Substantial	Unclear community perceptions on deforestation and conservation. Potential logging and habitat loss. Lack of ranger presence raises concerns about monitoring. Encouraging local conservation participation (e.g., ranger programs) could help mitigate biodiversity loss.
3. Noise disturbance	Medium	Possible	Moderate	Unclear community acceptance of construction-related noise. Potential impact on wildlife and daily life. No grievance mechanisms currently identified. Further consultation is needed to determine sensitive areas (schools, cultural sites) and implement mitigation strategies.
4. Airpollution dust production	Very High	Very Likely	High	Dust from construction and transport may affect air quality. No known prior assessments or concerns from community. Proactive communication on potential dust pollution is required. Dust suppression measures should be considered.
5. Waterpollution:	High	Likely	High	Lack of baseline data on water quality makes pollution risks difficult to assess. Possible contamination from waste disposal, household activities, or external sources. Environmental monitoring is needed to track water quality, assess contamination risks, and develop mitigation strategies.
6. Lack of Waste managememt	High	Very Likely	High	No formal waste disposal practices identified, particularly for hazardous materials (batteries, fuel carriers). Community engagement is required to establish sustainable waste management strategies.
7. Lack of environmental awareness	High	Likely	Moderate	Unclear community stance on deforestation and biodiversity. No formal conservation efforts identified. Potential resistance to scientific

				research. Awareness campaigns could demonstrate the benefits of biodiversity monitoring and environmental safeguards.
8. Gender inequality	**Medium**	**Possibe**	**Moderate**	**Infrastructure improvements (e.g., water access) could reduce women's workloads, but gendered labor shifts remain uncertain. Limited mobile Gender-sensitive planning is needed to ensure equitable benefits of infrastructure projects while respecting cultural norms.**

Table 62. Environmental Risk analysis Langa-Oekoe 1.

Langa Uku 2	**Risk analysis**			
Key Risk indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
1. Climate heavy rainfall	**Medium**	**Very Likely**	**High**	**Heavy rainfall could lead to flooding, soil erosion, and damage to crops. It could also affect local infrastructure and access to clean water.**
2. Deforestation and biodiversity loss	**High**	**Possible**	**Moderate**	**There is a lack of clarity regarding hunting and fishing grounds, which may indicate unregulated land use. Additionally, villagers have not expressed concerns about deforestation, but increased construction activities could contribute to habitat loss. Engaging the community in biodiversity monitoring and sustainable land use practices is crucial.**
3. Noise disturbance	**Medium**	**Possible**	**Low**	**The community has not explicitly raised concerns about noise, but the absence of awareness does not mean there will be no impact. Construction activities, particularly in sensitive areas such as near schools or community spaces, could cause disturbances. Awareness campaigns could help mitigate any future concerns.**
4. Airpollution dust production	**Medium**	**Possible**	**Moderate**	Although there are no specific concerns from villagers regarding dust pollution, construction-related activities could lead to temporary declines in air quality.

				Regular watering of construction sites and limiting dust exposure in residential areas can help mitigate the impact.
5. Waterpollution:	**High**	**Likely**	**High**	**The community's current waste disposal practices for hazardous materials like fuel carriers and batteries are unclear. This lack of regulation could lead to water pollution, affecting both drinking water and local aquatic ecosystems. A structured waste management system should be introduced to prevent contamination**
6. Lack of Waste managememt	**High**	**Very Likely**	**High**	**The lack of a clear waste disposal system, particularly for hazardous waste like old motors and batteries, presents a significant environmental challenge. Implementing structured waste management, including recycling initiatives and safe hazardous waste disposal, is critical for preventing environmental degradation.**
7. Lack of environmental awareness	**Medium**	**Very Likely**	**Moderate**	**The community has shown passive interest in environmental protection, suggesting an opportunity for increased engagement. Park ranger programs or educational workshops could encourage more proactive environmental stewardship.**
8. Gender inequality	**Medium**	**Possible**	**Moderate**	**Women are increasingly interested in modern tools such as electric stoves and mobile phones, suggesting a shift in traditional gender roles. However, their involvement in decision-making remains unclear. Efforts should be made to ensure gender-inclusive project planning and participation to promote equitable benefits.**

Table 63. Environmental Risk analysis Langa-Oekoe 2.

Lantiwee	**Risk analysis**			
Key Risk indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
1. Climate heavy rainfall	**Medium**	**Possible**	**Moderate**	**There are no reports of flooding in the village, suggesting that Lantiwee is not prone to major flood events. However, climate change could alter weather patterns, leading to increased rainfall and potential waterlogging issues in the future.**

2. Deforestation and biodiversity loss	High	Likely	Substantial	The community supports deforestation for solar, water, and telecom infrastructure, indicating a willingness to prioritize development over environmental conservation. However, the lack of baseline water quality data suggests a gap in understanding long-term environmental impacts. Additionally, there is no formal wildlife protection in place, and no local park rangers are present.
3. Noise disturbance	Low	Likely	Low	The community appears to be generally accepting of construction noise, but there is no clear indication of specific areas where noise should be minimized (e.g., near schools or community centers). This highlights the need for a more detailed environmental management plan.
4. Airpollution dust production	Medium	Likely	Moderate	Dust from construction and transportation may impact air quality, particularly in areas where infrastructure development is planned. The community has not identified specific locations where dust should be minimized, indicating a need for further consultation on environmental health concerns.
5. Waterpollution:	High	Possible	Substantial	While the community supports infrastructure development, no baseline water quality assessments have been conducted. This creates uncertainty about how deforestation, construction, or new infrastructure could impact local water sources. Proper monitoring and protection measures are needed to prevent contamination.
6. Lack of Waste managememt	High	Likely	Substantial	The community follows some waste management practices, such as storing fuel carriers in a warehouse and returning them to the city. However, the burial of old batteries and motors in a central location could pose environmental risks. There is a need for improved waste disposal methods and education on sustainable practices.
7. Lack of environmental awareness	Medium	Likely	Moderate	The community is open to environmental research but lacks structured conservation efforts. Their willingness to engage in biodiversity monitoring suggests an opportunity for capacity-building in environmental protection. Additionally, the lack of spatial planning for restricted areas points to a need for increased awareness of land use management.
8. Gender inequality	Medium	Possibe	Moderate	The introduction of modern infrastructure (water, energy, telecom) may alter gender dynamics. Women stand to benefit from reduced workloads with improved water

				access, but their engagement with other technologies (e.g., mobile phones, electric stoves) remains unclear. Meanwhile, men's roles could shift toward increased hunting if refrigeration becomes available. These changes require further study to ensure equitable access to benefits.

Table 64. Environmental Risk analysis Lantiwee.

Tamarin	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
1. Climate heavy rainfall	High	Likely	High	The village may experience flooding that damages homes, roads, and agricultural land, exacerbating soil erosion. Sustainable land use practices, such as reforestation and improved drainage systems, are necessary to mitigate these risks.
2. Deforestation and biodiversity loss	Very High	Very Likely	Substantial	While infrastructure projects bring benefits, unchecked deforestation could lead to habitat destruction and long-term ecological imbalance. Sustainable land management strategies should be implemented to balance development and conservation.
3. Noise disturbance	Medium	Possible	Moderate	While no specific locations of concern were identified, the introduction of solar, water, and telecom systems may cause temporary noise pollution. Careful planning should ensure minimal disruption, particularly near schools and residential areas.
4. Airpollution dust production	High	Likely	High	Dust from construction sites can contribute to respiratory issues and reduce air quality. Dust suppression measures, such as regular watering of roads and vegetation barriers, should be adopted.
5. Waterpollution:	High	Likely	High	Lack of clear information on waste disposal raises concerns about potential contamination of local water sources. If hazardous waste, such as old batteries and fuel carriers, is improperly discarded, it could leach into the water supply, affecting both human and ecosystem health. A structured waste disposal system is essential to prevent pollution.
6. Lack of Waste managememt	Very High	Likely	Substantial	Absence of a clear waste disposal system may lead to land and water

				contamination The community lacks designated waste disposal areas, increasing the risk of environmental pollution. Awareness campaigns and improved infrastructure for recycling and waste collection should be prioritized.
7. Lack of environmental awareness	Medium	Likely	Moderate	Limited knowledge about sustainable waste management and environmental conservation may contribute to unsustainable practices. The lack of responses on waste disposal practices suggests a need for better education on environmental sustainability. Community engagement programs should focus on raising awareness about conservation and responsible waste management.
8. Gender inequality	Medium	Possibe	Moderate	Limited understanding of how technological changes impact gender roles may hinder equitable access to resources and opportunities. The absence of discussions on how access to water, electricity, and refrigeration affects gender roles suggests that potential inequalities may go unaddressed. Future community engagement should include gender-sensitive planning to ensure equal benefits from development projects.

Table 65: Environmental Risk analysis Lantiwee

Table 66. Environmental Risk analysis Tamarin.

Pinatjarimi	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
1. Climate heavy rainfall	Medium	Possible	Moderate	While the village does not report flooding issues, climate change could increase rainfall intensity, leading to soil erosion and infrastructure damage. lthough flooding is not currently a major concern, future climate variability could bring increased heavy rainfall. This may result in soil erosion and structural damage, particularly to roads and newly built infrastructure. Regular monitoring and adaptation strategies should be integrated into the project to mitigate future risks.
2. Deforestation and biodiversity loss	High	Very Likely	High	The community strongly supports deforestation for solar, water, and telecom systems, without detailed concern for its long-term effects. This could harm local biodiversity. The

				pragmatic approach to deforestation for infrastructure projects raises concerns about biodiversity loss. While development is necessary, alternative solutions such as selective tree cutting and reforestation programs should be considered. Additionally, the community's openness to biodiversity research provides an opportunity to integrate conservation efforts into project planning.
3. Noise disturbance	Medium	Possible	Moderate	The community is generally accepting of noise pollution, but there is a lack of clarity on whether specific areas (e.g., schools) should be protected from disturbances. While there is a degree of tolerance for noise during construction, proper planning should ensure that high-impact noise activities are limited in sensitive areas like schools or community centers. Clearer communication and grievance mechanisms are needed to address concerns as they arise.
4. Airpollution dust production	Medium	Likely	Moderate	Dust from construction activities may affect air quality, but the community has not raised major concerns. However, there is no clear plan for minimizing dust exposure in key area. Construction activities will likely generate dust, impacting air quality. Although the community is tolerant of this, specific measures should be implemented to minimize dust exposure near homes, schools, and water sources. Clear guidelines on dust control should be developed.
5. Waterpollution:	High	Likely	Substantial	There are concerns regarding the disposal of old batteries and motors, which could lead to groundwater contamination if not managed properly. While the village shows responsible practices regarding some waste materials, the burial of batteries and motors poses a significant environmental risk. These materials can leach hazardous substances into the soil and water supply. Implementing a safe disposal system for hazardous waste should be prioritized.
6. Lack of Waste managememt	High	Likely	Moderate	The mix of proactive and reactive waste management approaches means some hazardous materials are properly disposed of, while others are not. Storing fuel carriers in a warehouse and returning them to the city for disposal is a responsible practice. However, improper disposal of batteries and motors requires urgent attention. A structured waste management system, including community awareness programs,

				should be developed to ensure long-term sustainability
7. Lack of environmental awareness	Medium	Possible	Moderate	The community has not demonstrated detailed concern for long-term environmental impacts, though it is open to biodiversity research and monitoring. While there is some awareness about waste disposal and resource use, a broader environmental education program is needed. Integrating biodiversity monitoring and conservation efforts into the project could help foster long-term sustainability and awareness.
8. Gender inequality	Medium	Possibe	Moderate	Water access improvements will reduce women's workload, but changes in gender roles due to technology adoption remain unclear. The project will positively impact women by reducing their workload related to water collection. However, additional measures should be taken to ensure equal access to new technologies, such as electric stoves and mobile phones. Further discussions on gender roles and access to economic opportunities for women are necessary.

Table 67. Environmental Risk analysis Pinatjarimi.

Pikin Santi	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
1. Climate heavy rainfall	Medium	Possible	Moderate	No significant flooding has been reported, but lack of formal climate impact monitoring suggests potential underestimation of risks.
2. Deforestation and biodiversity loss	High	Very Likely	Substantial	The community prioritizes development over conservation, with low concerns about deforestation. This could lead to habitat destruction and loss of biodiversity.
3. Noise disturbance	Medium	Possible	Moderate	Construction and infrastructure development may increase noise levels, affecting both wildlife and residents.
4. Airpollution dust production	Medium	Likely	Moderate	Dust production from road construction, mining, and other activities could degrade air quality and harm respiratory health.

5. Waterpollution:	High	Likely	High	The absence of baseline water quality measurements highlights a risk of undetected contamination, particularly from waste disposal and fuel handling.
6. Lack of Waste managememt	High	Very Likely	Substantial	Transitioning from bulk waste collection to local burial suggests potential risks of soil and water contamination. A formalized waste management system is needed.
7. Lack of environmental awareness	High	Likely	Moderate	While some responsible waste disposal practices exist, there is a general lack of environmental conservation awareness, particularly regarding deforestation.
8. Gender inequality	Medium	Possible	Moderate	Women may benefit from improved infrastructure (e.g., water access), but there is limited engagement on gender roles and socio-cultural shifts.

Table 68. Environmental Risk analysis Pikin Santi.

Wanhatti	Risk analysis			
Key Risk indicators	Potential negative impact rating.	Likelihood.	Potential risk rating.	Comments.
1. Climate heavy rainfall	Low	Unlikely	Low	The absence of flooding concerns suggests that heavy rainfall is not a major risk. However, inadequate drainage infrastructure could still lead to localized issues such as soil erosion or temporary road blockages.
2. Deforestation and biodiversity loss	Medium	Possible	Moderate	The community prioritizes access to infrastructure over conservation, meaning deforestation for roads and utilities may not be a concern. However, habitat loss and wildlife disturbance could still occur.
3. Noise disturbance	Medium	Likely	Moderate	Construction noise is generally accepted, but specific areas like schools are considered sensitive. Lack of grievance mechanisms means unresolved complaints could lead to long-term disruptions.
4. Airpollution dust production	Medium	Likely	Moderate	Dust from construction and road works is recognized as a potential issue, particularly around schools. Without mitigation measures, air quality may temporarily decline.
5. Waterpollution:	Medium	Possible	Moderate	No baseline water quality monitoring exists, posing risks if pollutants from construction, gold mining, or waste disposal enter water sources. Introducing safeguards could mitigate this.
6. Lack of Waste managememt	High	Likely	High	Current reliance on centralized disposal methods (e.g., burying waste) could pose environmental hazards. Without proper regulation, soil and water contamination risks will

				increase.
7. Lack of environmental awareness	**Medium**	**Possible**	**Moderate**	**While the community is open to environmental research, there is little proactive engagement in conservation. External institutions would need to lead biodiversity protection efforts.**
8. Gender inequality	**Medium**	**Possible**	**Moderate**	**Infrastructure improvements may alter gender roles, reducing women's workload. However, gender-based technology adoption (e.g., mobile phones, electric cooking) remains unexplored.**

Table 69. Environmental Risk analysis Wanhatti.

6.1.5.3. Environmental Risk analysis Cluster 3

Moengo	**Risk analysis**			
Key Risk indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
1. Climate heavy rainfall	**High negative**	**Likely**	**High**	Seasonal flooding during heavy rains threatens infrastructure such as roads, electricity poles, and housing. This can delay project construction, damage installations, and compromise safety.
2. Deforestation and biodiversity loss	**Very High Negaive impact**	**Likely**	**High**	Expansion of infrastructure (solar, water, telecom) may require clearing forest land. Risk of habitat loss for wildlife and reduced availability of traditional hunting grounds.
3. Noise disturbance	**Medium negative impact**	**Likely**	**Substantial**	Construction activities and diesel generator use may generate disruptive noise, affecting schools, sacred sites, and wildlife. Residents are concerned about animals leaving the area due to noise.
4. Airpollution dust production	**Medium negative impact**	**Likely**	**Substantial**	Road construction, material transport, and soil excavation generate dust, especially in dry conditions. This may affect respiratory health and agriculture.
5. Waterpollution:	**High negative impact**	**Possible**	**Moderate**	Although gold extraction is not explicitly described for Moengo, upstream or regional mining activities may contaminate water sources with mercury and sediments, indirectly affecting local water quality.
6. Lack of Waste managememt	**High negative Impact**	**Very Likely**	**High**	Waste disposal is inadequate; landfill near Albina is full, incinerators are not working. Increased project activity may

				lead to more waste, including hazardous (batteries, oils, plastics).
7. Lack of environmental awareness	**Medium negative impact**	**Likely**	**Substantial**	Limited environmental education may result in misuse of new infrastructure, unsustainable practices (e.g., continued firewood use, improper waste disposal).
8. Gender inequality	**Medium negative impact**	**Possible**	**Moderate**	While water and energy access may reduce burdens on women, risks exist that men may dominate access to technology and decision-making. Unequal distribution of project benefits could deepen existing gender imbalances.

Table 70: Environmental Risk analysis Moengo

Albina - Alfonsdorp	**Risk analysis**			
Key Risk indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
1. Climate heavy rainfall	**High negative impact**	**Likely**	**Substantial**	Alfonsdorp lies in a low-lying coastal zone near Albina, making it susceptible to seasonal flooding during periods of heavy rainfall. Survey responses indicate that certain areas experience water accumulation. Flooding may damage new infrastructure (electric poles, solar systems, telecom installations), disrupt electricity supply, and increase vector-borne disease risks.
2. Deforestation and biodiversity loss	**High Negative impact**	**Likely**	**Substantial**	While villagers indicated strong agreement with allowing controlled deforestation for infrastructure, such activities can still result in habitat loss, wildlife displacement, and reduced biodiversity. Expansion of access roads, utility poles, and construction areas may accelerate forest fragmentation.
3. Noise disturbance	**Medium negative impact**	**Possible**	**Moderate**	Construction activities (installation of poles, solar units, and telecom systems) and increased human activity could produce noise that disturbs wildlife and residents. Villagers expressed some concern about animals moving away due to noise. Prolonged noise exposure may also create stress within the community.
4. Airpollution dust production	**Medium negative impact**	**Likely**	**Moderate**	Construction and maintenance activities may generate dust, particularly during dry seasons. Dust can affect air quality, increase respiratory problems, and contaminate water sources. Children and elderly residents are especially vulnerable.

5. Waterpollution:	**Very High Negtaive**	**Possible**	**Substantial**	Although the village survey did not directly identify gold mining in Alfonsdorp, the wider Marowijne region is known for artisanal mining. Potential indirect risks include mercury contamination of waterways and cumulative pollution affecting drinking water quality. If uncontrolled, it could undermine health and agricultural productivity.
6. Lack of Waste managememt	**High Negative impact**	**Likely**	**Substantial**	While waste collection occurs weekly, hazardous waste streams (old batteries, fuel containers, electronic waste) remain unmanaged. Increased access to energy and telecom will generate new waste types, leading to soil and water contamination if unmanaged.
7. Lack of environmental awareness	**Medium negative impact**	**Likely**	**Moderate**	Although the community showed openness to research, overall environmental literacy remains limited. Without awareness-building, residents may undervalue biodiversity or misuse new infrastructure (e.g., overuse of electricity, careless waste disposal).
8. Gender inequality	**Medium negative impact**	**Possible**	**Moderate**	While infrastructure may empower women, there is also risk of reinforcing gender inequalities if training, employment, and decision-making opportunities are not inclusive. Traditional gender roles may limit women's participation in technical aspects of the project.

Table 71: Environmental Risk analysis albina - Alfonsdorp

Albina – Marijke dorp	**Risk analysis**			
Key Risk indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**
1. Climate heavy rainfall	**High negative impact**	**Very likely**	**High**	**Heavy rainfall combined with seasonal flooding (e.g., in Anjoemarakreek and park areas) threatens infrastructure stability. Solar panels, telecom installations, and water systems could be damaged, and flooding may compromise water quality and agricultural activities. Increased rainfall linked to climate variability may intensify these risks.**
2. Deforestation and biodiversity loss	**High negative impact**	**Likely**	**Substantial**	**Construction of solar and water infrastructure may lead to deforestation, particularly if trees are cleared without management plans. This could disturb sacred ecological zones and hunting grounds, reducing biodiversity and disrupting traditional food sources.**

3. Noise disturbance	**Medium negative impact**	**Likely**	**Moderate**	**Construction and operation of machinery may create noise that disturbs wildlife and residents. Villagers expressed concerns that noise could drive away animals, affecting hunting and local food sources. Noise near schools or sacred sites would also be culturally unacceptable.**
4. Airpollution dust production	**Medium negative impact**	**Likely**	**Moderate**	**Construction activities, particularly roadworks, will generate dust. This may affect air quality, cause respiratory discomfort, and impact vegetation near construction sites. Vulnerable groups, such as children and the elderly, may face heightened health risks.**
5. Waterpollution:	**High negative impact**	**Possible**	**Substantial**	**Although the village survey did not identify direct mining activities in Marijkedorp, nearby gold extraction in Suriname poses risks of mercury and sediment pollution reaching the Marowijne River. Contaminants threaten aquatic biodiversity, agriculture, and human health**
6. Lack of Waste managememt	**Very High Negative**	**Very likely**	**High**	**Current practices include dumping batteries, old motors, and waste directly in the village. With increased use of solar batteries and new technologies, unmanaged waste could escalate pollution risks, contaminating soil and water sources.**
7. Lack of environmental awareness	**Medium negative impact**	**Likely**	**Moderate**	**Although villagers are open to training, current awareness about long-term environmental risks (e.g., waste disposal, biodiversity conservation) remains limited. Without sustained education, infrastructure could be misused, leading to degradation of natural resources.**
8. Gender inequality	**Medium negative impact**	**Possible**	**Moderate**	**While projects may reduce women's domestic burdens, risks remain if benefits are unequally distributed. For instance, men's hunting and trade may increase disproportionately with refrigeration, while women's roles remain undervalued. Gender-based decision-making gaps could limit women's access to phones, training, and leadership opportunities.**

Table 72: Environmental Risk analysis Albina – Marijke dorp

Albina – Pierre Kondre	**Risk analysis**			
Key Risk indicators	**Potential negative impact rating.**	**Likelihood.**	**Potential risk rating.**	**Comments.**

1. Climate heavy rainfall	**Medium negative impact**	**Likely**	**Moderate**	Seasonal flooding is reported; although it recedes quickly, construction of energy, water, and telecom infrastructure could be disrupted. Flooding may also affect the durability of installations, cause erosion, and damage foundations.
2. Deforestation and biodiversity loss	**High negative impact**	**Likely**	**Substantial**	Infrastructure development (solar panels, water lines, telecom) may cause localized clearing of land. Hunting grounds and fishing rivers may be indirectly affected. While community members agreed with some deforestation for development, cumulative biodiversity loss is a risk.
3. Noise disturbance	**Medium negative impact**	**Very Likely**	**Substantial**	Infrastructure development (solar panels, water lines, telecom) may cause localized clearing of land. Hunting grounds and fishing rivers may be indirectly affected. While community members agreed with some deforestation for development, cumulative biodiversity loss is a risk.
4. Airpollution dust production	**Medium negative impact**	**Likely**	**Moderate**	Construction activities may produce dust, affecting air quality and nearby schools or homes. Villagers noted tolerance for some dust, but prolonged exposure can cause health discomfort and environmental degradation.
5. Waterpollution:	**High negative impact**	**Possible**	**Moderate**	Although not practiced directly in Pierre Kondre, regional gold mining activities can contaminate rivers with mercury and sediments. This indirectly threatens drinking water and aquatic biodiversity.
6. Lack of Waste managememt	**High Negative impact**	**Very Likely**	**High**	Survey indicates no structured disposal system for batteries, fuel containers, or motors. With solar and telecom systems, e-waste and hazardous materials could accumulate, polluting soil and water.
7. Lack of environmental awareness	**Medium negative impact**	**Likely**	**Moderate**	While villagers show openness to biodiversity monitoring, there is limited baseline knowledge of long-term environmental management. Risk of unsustainable use of new resources exists without proper training.
8. Gender inequality	**Medium negative eimpact**	**Possible**	**Moderate**	Despite progress, there remains risk that benefits of energy, water, and telecom are not equally shared. Women may still carry disproportionate workload (water collection, household care).

Table 73: Environmental Risk analysis Albina – Pierre Kondre

6.1.5.4. Disaster Risk Assessment

Inventory of natural hazards present in cluster 1,2 and 3

Natural Hazards cluster 1,2 and 3	Hazard level	Comments.
1. Fluvial flooding	**High**	Clusters 1 and 2 consistently reported significant risks from river flooding, particularly during periods of prolonged rainfall or seasonal river swells. In Cluster 3, Marijkedorp noted localized but recurring flooding during spring tide in the park area and along the Anjoemarakreek. Although some communities reported that floodwaters recede relatively quickly, the presence of multiple low-lying and creek-adjacent zones across the clusters indicates persistent exposure. Combined with limited drainage infrastructure, this justifies maintaining a High overall rating.
2.Pluvial flooding / heavy rainfall	**High**	Heavy rainfall events affect all clusters and are among the most frequently cited hazards. Communities described surface water accumulation, overland runoff, and temporary inundation of roads and yards. In Moengo (Cluster 3), the problem is compounded by poor waste management and clogged drains, which slow water recession and increase health risks associated with stagnant water. Across the clusters, the seasonal intensity of rainfall and inadequate drainage systems reinforce a High hazard classification.
3. Fluvial erosion	**Moderate**	Evidence from all clusters points to erosion occurring along riverbanks, creeks, and disturbed land. In Cluster 3, community members expressed concern that deforestation and land use practices near watercourses are accelerating soil loss. While erosion is often localized rather than widespread, it poses risks to riverine infrastructure, farming plots, and embankments. Without mitigation, climate change-driven increases in rainfall intensity could exacerbate this hazard. The overall rating is Moderate, with localized hotspots requiring targeted measures.
4. Drought	**High-Mdoerate**	Clusters 1 and 2 identified vulnerability to dry spells and drought, particularly in terms of reduced crop yields and stress on water supply. In Cluster 3, water scarcity manifests primarily as service interruptions: for example, Pierre Kondre experiences evening outages in the SWM network, forcing households to rely on storage tanks (Durotanks). Although meteorological drought is less frequently cited, rising temperatures increase evapotranspiration and may amplify water stress during dry seasons. The hazard is therefore classified between High and

		Moderate, emphasizing functional shortages as much as climatic drought.
5. Tsunamis	**Moderate**	Although Suriname is not in a primary tsunami risk zone, all clusters lie in coastal or estuarine areas where the impacts of distant events could still be felt. Communities did not report direct tsunami experience, but geographic exposure cannot be discounted. The rating remains Moderate, mainly reflecting low-probability but potentially high-impact consequences. Awareness campaigns and basic preparedness measures are recommended.
6. Hurricanes	**Moderate**	Suriname is located outside the main Atlantic hurricane belt, but clusters may still be affected by outer bands of hurricanes or by severe local convective storms. Such events can bring intense rainfall, strong winds, and localized damage to buildings, power lines, and vegetation. Communities across clusters noted the vulnerability of rooftops, poles, and trees during storms. The hazard is rated Moderate, with an emphasis on resilient design standards for infrastructure.
7. Heat waves	**High**	All clusters are increasingly exposed to higher temperatures, which have implications for human health, energy consumption, and water quality. Heat stress was reported as a concern for both daily living and infrastructure performance. With climate projections indicating further increases in average and extreme temperatures, the risk is expected to intensify. Protective measures such as shade, ventilation, and heat-resilient design are critical. The hazard is rated High.
8. Winds	**Moderate**	Strong gusts and storm-related winds were reported across clusters, with associated risks of falling trees and damage to rooftops and utility poles. While not as consistently destructive as flooding or heat, wind hazards pose safety risks and can disrupt essential services. Proper vegetation management and structural reinforcement are necessary. The hazard is therefore rated Moderate.

Table 74. Natural hazards.

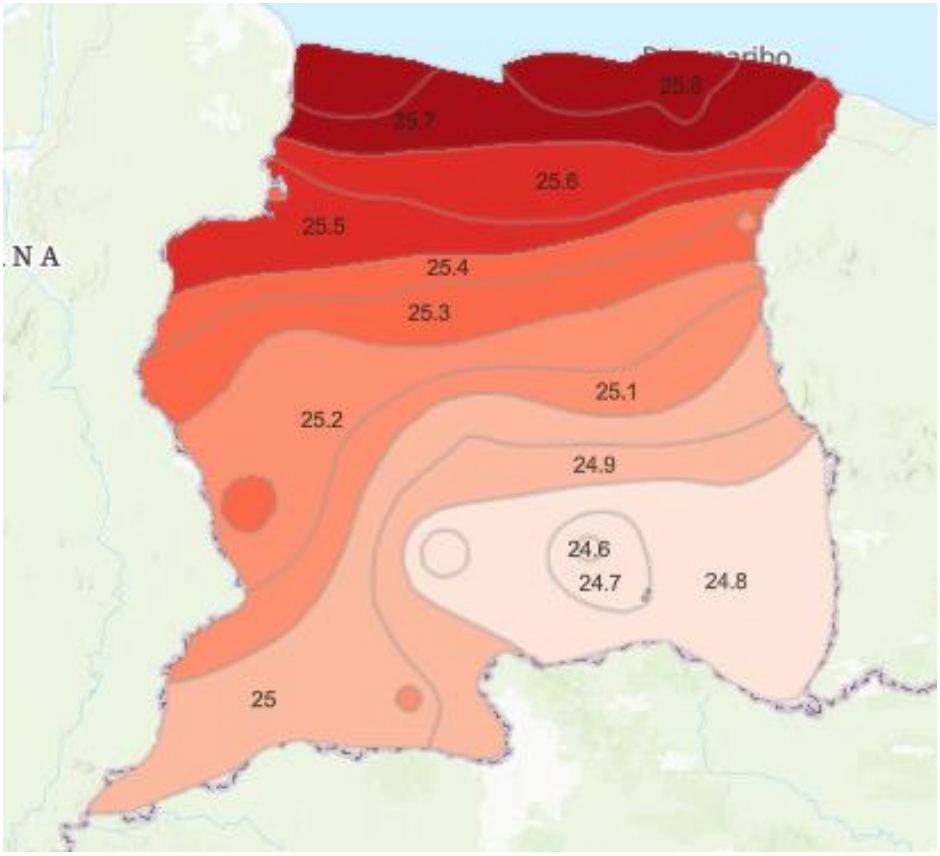


Figure 7. Average temperature in February 2025.

The project area is among the regions with the highest temperatures. The data shown is for January and February, which mark the transition between the short rainy season and the short dry season. This indicates that temperatures are likely to be even higher during the long dry season and in el Niño years.

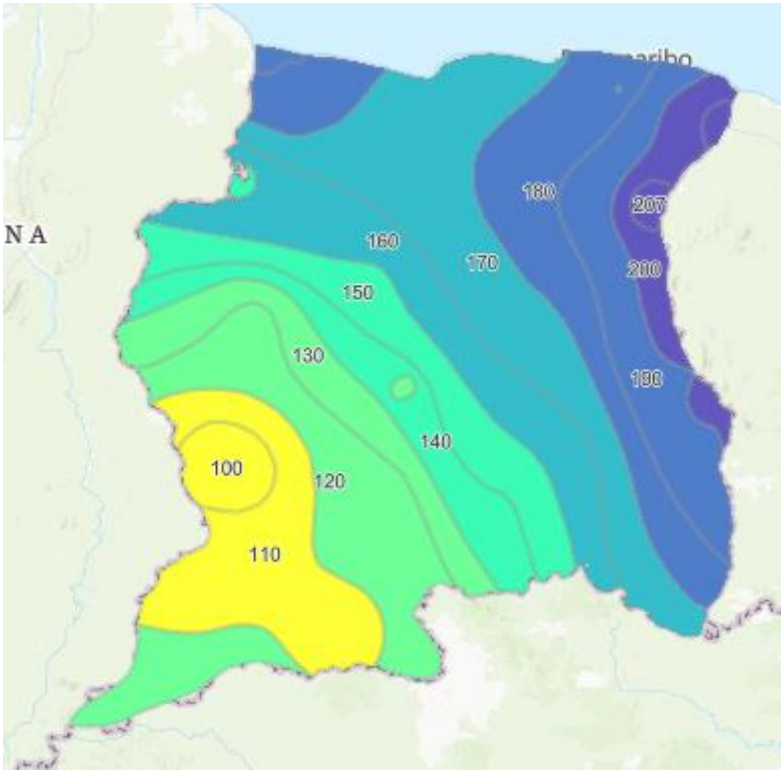


Figure 8. precipitation forecast January 2025

The precipitation forecast map for January 2025 shows that the project area is among the regions receiving the highest rainfall. This situation could worsen during a La Niña year. Climate change may further increase rainfall intensity, leading to soil erosion and potential damage to infrastructure. Although flooding is not currently a major concern, future climate variability could bring more frequent heavy rainfall events, which may result in soil erosion and structural damage, particularly to roads and newly constructed infrastructure.

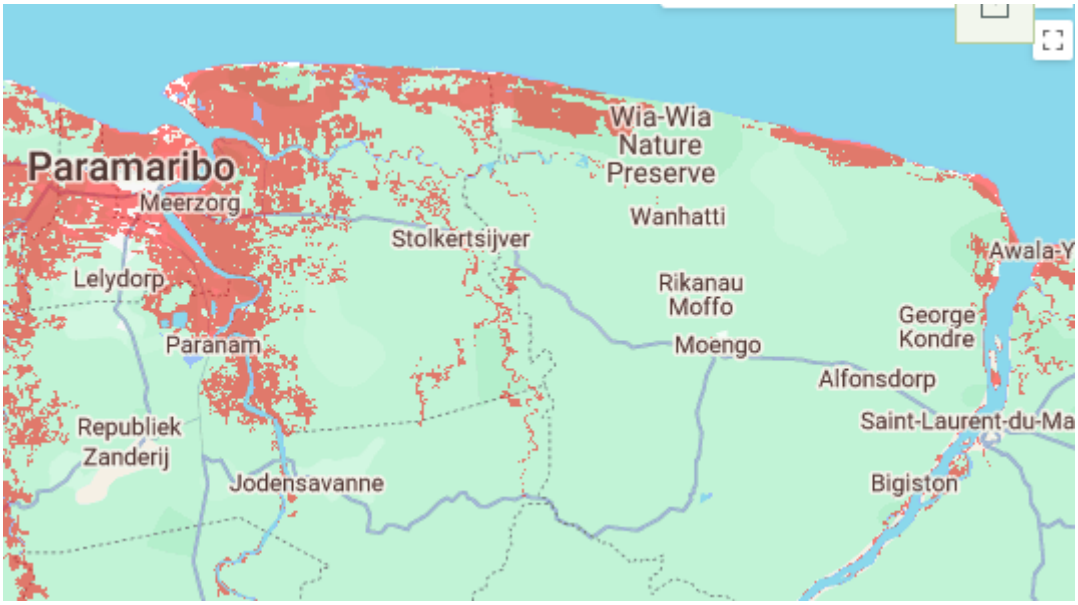


Figure 9. Sea level rise.

Suriname lies at a very low elevation, making sea-level rise a serious threat. The melting of ice sheets and glaciers is driving global sea-level rise, and along Suriname's coast, sea levels have been

increasing by an average of 4 millimeters per year over the past 30 years, higher than the global average of 3.4 millimeters per year. Rising sea levels can lead to more frequent and severe coastal flooding, saltwater intrusion into freshwater sources, and the loss of low-lying coastal land. These impacts pose significant risks to communities, ecosystems, and infrastructure, especially in areas without adequate coastal defenses.

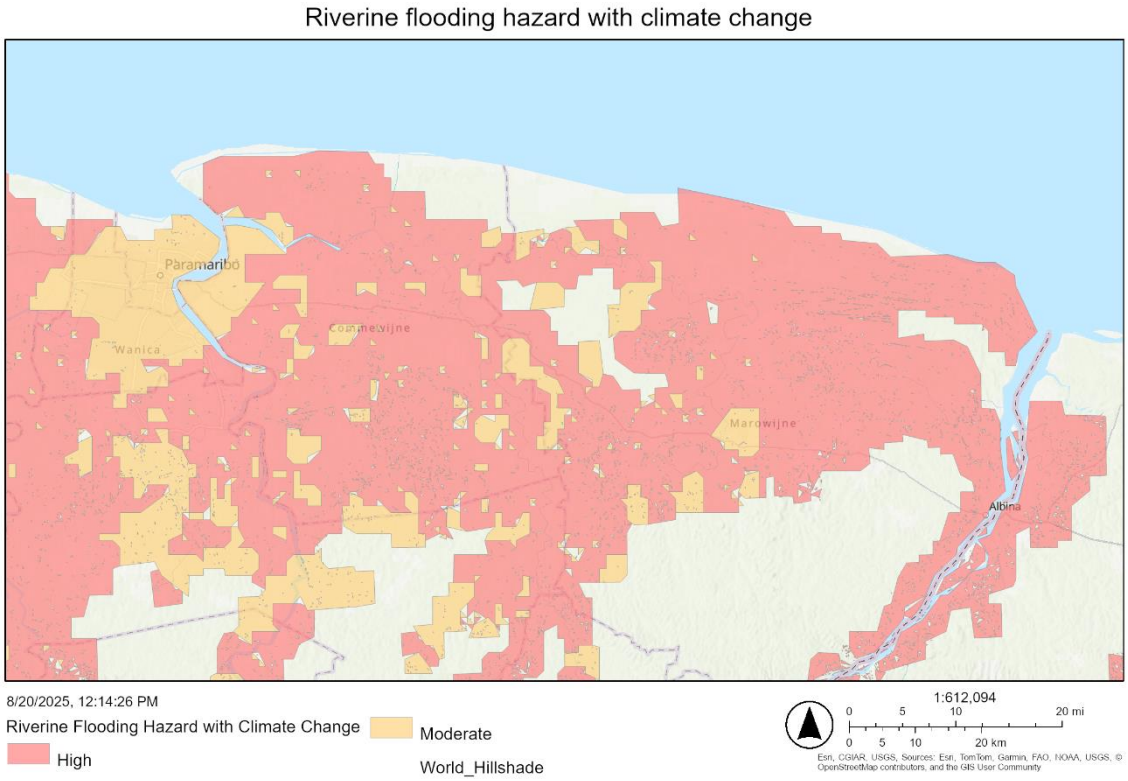


Figure. Riverine flooding hazard with climate change (source: IDB ESG Natural Hazard Viewer)

Criticality & Vulnerability Analysis for power plants

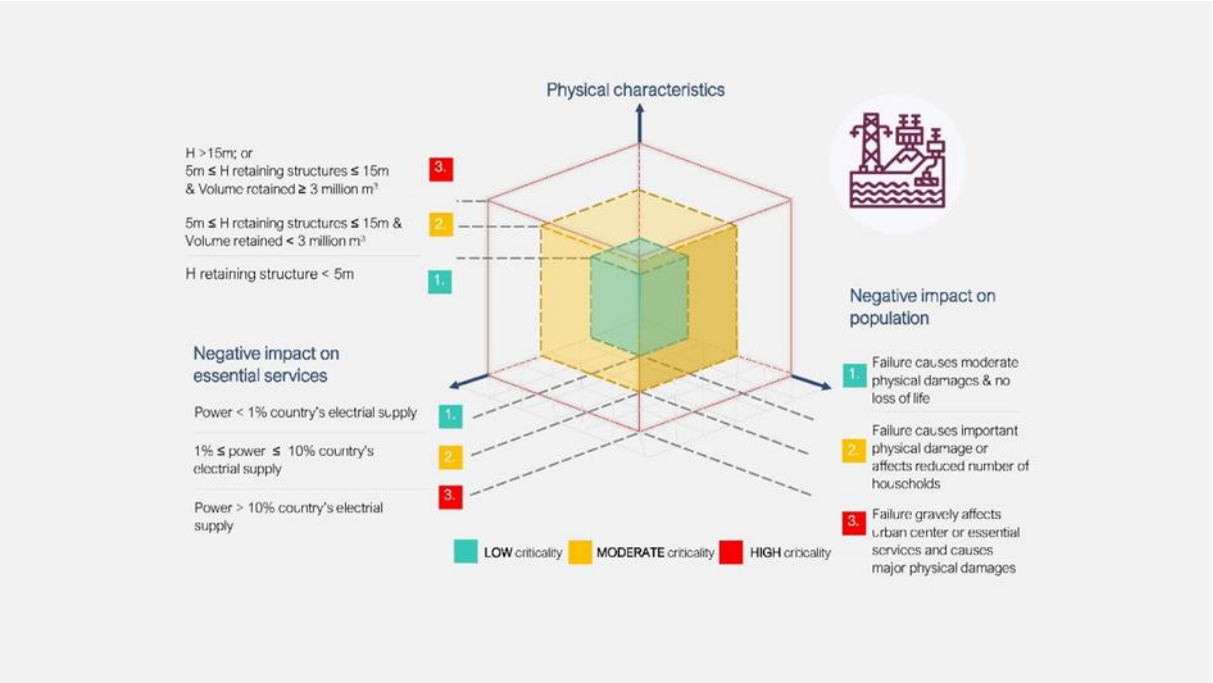


Figure. Criticality and vulnerability chart for power plants (source: IDB Disaster and Climate Change Risk Assessment Methodology)

Criteria	Criticality	Comments.
1. H retaining structure < 5m	**Low**	**The project does not involve large dams or retaining structures. Any retaining walls related to substations or minor earthworks are less than 5 m high, and their failure would not result in significant downstream flooding or large-scale damage.**
2. Negative impact on essential services: Power < 1% country's electrical supply	**Low**	**The transmission line and substations will supply a small portion of Suriname's total electrical demand (less than 1% of national supply). Therefore, a failure would not critically impact essential national services or the overall grid.**
3. Negative impact on population: Failure causes important physical damage or affects a reduced number of households	**Moderate**	**A failure could cause significant physical damage and disrupt electricity supply for approximately 1,200 households in rural villages. However, it would not severely impact urban centers or national-scale services, justifying a Moderate criticality score.**

Table 75. Criticality & Vulnerability Analysis for power plants.

Criticality & Vulnerability Analysis for transmission lines

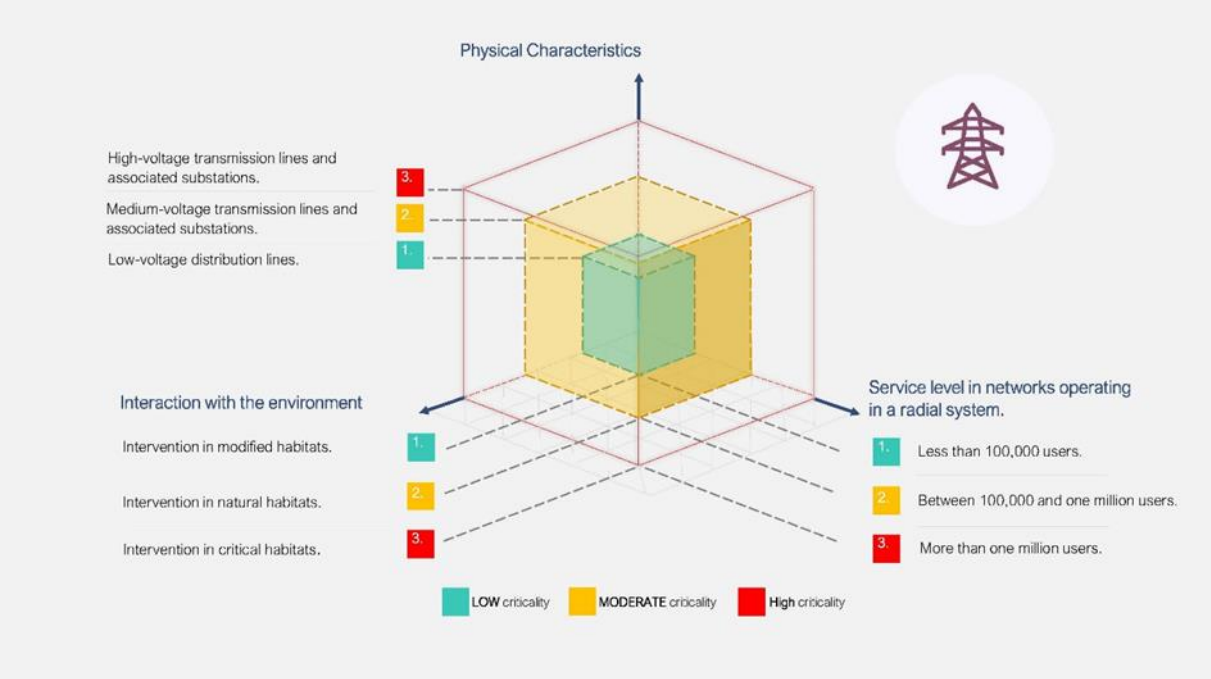


Figure. Criticality and vulnerability chart for Electric power transmission and distribution lines (source: IDB Disaster and Climate Change Risk Assessment Methodology)

Criteria	Criticality	Comments.
1. High voltage transmission lines and associated substations	**High**	**The project involves a 110 kV overhead transmission line (127 km) and associated substations.**
2. Interaction with the environment: Intervention in modified habitat	**Low**	**The transmission line will be constructed primarily along existing corridors (highway rights of way) and modified habitats, avoiding critical natural habitats. Therefore, the interaction with sensitive ecosystems is minimal**
3. Service level in networks operating in a radial system: Less than 100.000 users	**Low**	**The transmission line and substations will serve approximately 1,200 households (well below 100,000 users). There is some redundancy in the wider EBS system, and local failures would have limited national impact**

Table 76. Criticality & Vulnerability Analysis for transmission lines.

Disaster and Climate Change Risk

1. Overall Risk Context

The Disaster and Climate Change Risk Classification for the Program remains **High**, considering both the hazard levels identified in the updated consolidated inventory and the criticality of the high-tension transmission line and associated substations to be financed.

The project area is exposed to multiple natural hazards, including:

- **Fluvial flooding (High)**
- **Pluvial flooding / intense rainfall (High)**
- **Fluvial erosion (Moderate)**
- **Droughts & water scarcity (High–Moderate)**
- **Heat waves (High)**
- **Hurricanes and severe storms (Moderate)**
- **Strong winds (Moderate)**
- **Tsunamis (Moderate)**
- **Fires (Low)**

- Although Suriname is outside the main hurricane belt, the country is periodically affected by hurricane tails, severe local convective storms, and strong gales, which have historically damaged infrastructure and housing. Fluvial flooding is consistently mapped as high across the clusters, with recurring flooding reported in low-lying zones such as Marijkedorp (spring tide) and Moengo (poor drainage and waste-related blockages). Tsunami risk is mapped as moderate along the Suriname and Marowijne Rivers; while direct impact to Program assets remains unlikely, precautionary awareness measures are recommended. Because the transmission line will be built largely within an existing open highway right-of-way, which is regularly maintained, the risk of wildfires is low. However, hazards such as flooding, heat, and drought are expected to intensify under climate change.

2. Legislative and Policy Framework

Suriname has a number of policies and laws relevant to disaster risk management and climate adaptation:

- **Environmental Framework Act (2020):** Establishes the general framework for environmental protection, including requirements for EIAs and integration of climate change into project design.
- **Energy Authority Act (2016):** Regulates energy infrastructure and services, including resilience standards for transmission and generation.
- **National Disaster Risk Management Framework (NCCR):** Defines institutional responsibilities for preparedness and response; plays a key role in emergency planning for the Program.
- **Medium-Term Development Plan (2022–2026):** Prioritizes climate adaptation and energy resilience, including reducing vulnerability of infrastructure to flooding, drought, and heat stress.

3. Historical Disaster Events

Suriname has experienced recurring natural hazards in the project area:

- **Flooding:** Cottica River and nearby low-lying areas repeatedly flood during rainy seasons. In 2006, heavy rainfall caused severe flooding in eastern Suriname, including Wanhatti and surrounding villages. More recently, localized floods in May–June 2022 disrupted access and damaged crops. In Marijkedorp, spring tide flooding and creek overflow (Anjoemarakreek) have been recurrent.

- **Droughts & water scarcity:** Prolonged dry periods in 2015 and 2019 affected villages such as Tamarin, Lantiwee, and Pinatjarimi. In Pierre Kondre, water scarcity manifests as evening outages in the SWM network, forcing reliance on storage tanks.
- **Storm events:** Heavy rains and gales associated with tropical depressions have damaged rooftops and trees (2021). Communities report vulnerability of rooftops, poles, and trees to strong local storms.
- **Erosion:** Progressive riverbank erosion along the Marowijne and Cottica Rivers has affected farmlands and threatened infrastructure. Deforestation and land use changes near creeks accelerate soil loss.

4. Climate Change Influence

Climate change is expected to intensify extreme weather patterns in Suriname:

- **Rainfall intensity:** More frequent and intense rainfall events will increase risks of flooding, drainage overload, and erosion.
- **Heat:** Rising temperatures will exacerbate heat stress, impacting health, energy demand, and water quality.
- **Drought & water scarcity:** Longer dry spells and rising evapotranspiration will heighten risks, particularly in villages reliant on rain-fed or unreliable water supply.
- **Sea level rise:** Increases exposure to saltwater intrusion and flood risk in low-lying and coastal zones.

5. Information and Analysis Gaps

There are still gaps that must be addressed in subsequent assessments:

- Lack of detailed floodplain maps for the Cottica River and adjacent low-lying areas.
- Limited geotechnical data on soil stability and erosion hotspots along the alignment.
- Pending final engineering specifications for wind, flood, and seismic resistance.

6. Preliminary Risk Classification and Recommendations

Hazard	Exposure	Impact on Infrastructure
Fluvial flooding	Villages & substations along the Cottica River and other low-lying segments; recurring floods reported across Clusters 1–3, including spring tide flooding in Marijkedorp	**High**
Pluvial flooding (intense rainfall)	Entire project corridor (Peperpot–Albina) subject to intense rainfall and limited drainage; clogged drains in Moengo aggravate standing water problems	**High**
Fluvial erosion	Areas near rivers, creeks, and disturbed lands; erosion exacerbated by deforestation and land clearing	**Moderate**
Droughts / water scarcity	Villages reliant on rainwater and limited water supply systems; additional service interruptions noted in Pierre Kondre, requiring reliance on storage tanks	**High–Moderate**
Heat waves	Increasingly frequent extreme temperature events affecting all clusters	**High**
Hurricanes / severe storms	Regional influence from outer hurricane bands and local convective storms bringing intense rainfall and strong winds	**Moderate**
Strong winds	Storm gusts and falling trees pose risks along the corridor and in nearby communities	**Moderate**
Tsunamis	Coastal and estuarine areas (Suriname and Marowijne rivers) have exposure, though probability is low	**Moderate**
Fires	Vegetation fires unlikely as the highway right-of-way is maintained	**Low**

Table 77.Primary risk classifications.

Recommendations for advancing to a full Qualitative Risk Assessment:

Based on the updated hazard profile and the criticality of the Program's infrastructure, the following recommendations are advanced to ensure resilience and safeguard both assets and communities:

1. **Engineering and Design Integration**
    1. Incorporate **final design specifications** that strengthen resistance to floods, storms, winds, drought conditions, and heat stress.

    2. Apply **elevated foundations** in flood-prone segments and implement **drainage and slope stabilization measures** throughout the corridor.
    3. Ensure design standards account for **wind loads from hurricane tails and severe convective storms**.
2. **Flood and Drainage Management**
    1. Conduct **detailed hydrological and flood modeling** for the Cottica River and low-lying segments of the highway corridor.
    2. Construct **culverts, drainage channels, and overland flow paths** to prevent waterlogging and minimize damage during heavy rainfall.
3. **Erosion and Land Stability Measures**
    1. Implement **erosion control strategies**, including the preservation of riparian vegetation, slope stabilization, and the use of bioengineering solutions.
    2. Monitor erosion hotspots in partnership with local communities, ensuring early detection and mitigation.
4. **Community Preparedness and Water Security**
    1. Strengthen **community-based early warning systems**, particularly for floods, storms, droughts, and heat waves.
    2. Address **water security vulnerabilities** by reinforcing water supply reliability, expanding storage capacity, and encouraging conservation practices to buffer against both drought and service interruptions.
5. **Emergency Preparedness and Training**
    1. Develop and implement a **comprehensive Disaster Risk Management Plan (DRMP)** and a **simplified Emergency Preparedness, Prevention and Response Plan (EPPRP)** before construction begins.
    2. Conduct **annual preparedness drills** with NV EBS staff, contractors, and communities, and integrate lessons learned into revised protocols.
6. **Waste and Environmental Management**
    1. Address **solid waste and drainage blockages**, particularly in areas such as Moengo where stagnant water and poor waste disposal exacerbate flood risks.
    2. Promote environmentally sound **disposal systems for hazardous and electronic waste** to reduce secondary environmental hazards.
7. **Monitoring, Evaluation, and Adaptive Management**
    1. Establish **performance indicators** for disaster resilience (e.g., reduced downtime after hazard events, effectiveness of early warning alerts, number of trained responders).
    2. Carry out **annual evaluations** of hazard exposure, infrastructure performance, and community preparedness, updating safeguards as climate and hazard conditions evolve.

Emergency Preparedness, Prevention and Response Plan (EPPRP)

Table 78. Emergency Preparedness, Prevention and Response Plan (EPPRP) .

Section	Description

A. Objective	The EPPRP aims to ensure comprehensive preparedness, prevention, and effective response to natural disasters and climate-related hazards (including flooding, droughts, storms, heat waves, and strong winds), as well as operational incidents during both the construction and operation phases of the Program. The plan seeks to reduce risks to critical energy infrastructure, safeguard local communities, and enable rapid recovery after disruptive events
	The EPPRP applies to all components of the Program, ensuring that preparedness and response measures are in place wherever disaster or climate-related risks may arise. Specifically, it covers: • The high-voltage transmission line between Peperpot and Albina; • The associated substations and supporting facilities; and • The communities located along or near the project corridor that could be affected by natural hazards (such as flooding, droughts, storms, heat waves, and strong winds) or operational incidents.
C. Key Components	• Risk triggers and scenarios: Based on hazard analysis, includes fluvial and pluvial flooding, droughts, heat waves, strong winds/hurricanes, erosion, and potential fire incidents. • Preventive measures: Structural measures such as elevated tower foundations in flood-prone areas, improved drainage along the corridor, and strict right-of-way vegetation management to reduce fire and obstruction risks. • Monitoring and early warning: Integration with national weather alert systems and establishment of community-based early warning mechanisms (e.g., SMS alerts, radio communications, local leaders). • Emergency response procedures: Detailed protocols for evacuating workers and nearby communities; temporary shutdown procedures for high-voltage lines; rapid mobilization of mobile repair teams and backup power supply systems. • Training and awareness: Annual emergency preparedness drills with NV EBS teams, contractors, and communities; educational campaigns on hazard awareness and response actions. • Communication protocol: Clear chain of command and defined contact points for each stakeholder group, including district commissioners, the National Coordination Centre for Disaster Response (NCCR), NV EBS headquarters, contractors, and the IDB. • Risk triggers and scenarios: Identification of primary hazard scenarios, including fluvial and pluvial flooding, droughts, heat waves, strong winds and hurricanes, erosion, and potential fire

	incidents. Preventive measures: Structural measures such as elevated tower foundations in flood-prone areas, improved drainage systems along the corridor, slope stabilization, and strict right-of-way vegetation management to reduce fire, obstruction, and wind damage risks. • Monitoring and early warning: Integration with national weather and hazard alert systems, supplemented by community-based mechanisms (e.g., SMS alerts, radio communications, and coordination through local leaders). • Emergency response procedures: Detailed protocols for the evacuation of workers and nearby communities; temporary shutdown and restart procedures for high-voltage lines; and rapid mobilization of mobile repair teams and backup power supply systems. • Training and awareness: Annual emergency preparedness drills involving NV EBS teams, contractors, and communities; education campaigns on hazard awareness, response actions, and climate adaptation practices. • Communication protocol: Establishment of a clear chain of command with defined roles and contact points for each stakeholder group, including district commissioners, the National Coordination Centre for Disaster Response (NCCR), NV EBS headquarters, contractors, and the IDB.
D. Roles and Responsibilities	– NV EBS: Overall lead agency responsible for developing, implementing, and updating the EPPRP. – Contractors: Execute on-site preventive measures and ensure compliance with emergency protocols during construction. – Community leaders: Act as local communication focal points; mobilize communities for preparedness and evacuation when needed. – NCCR: Provide national-level coordination and logistical support during major emergencies; ensure integration with Suriname's disaster risk management framework.

Disaster Risk Management Plan (DRMP)

Table 79. Disaster Risk Management Plan (DRMP) .

Section	Description

A. Structural Measures	The DRMP emphasizes structural interventions designed to reduce the vulnerability of critical infrastructure to natural hazards and climate change. These include: - Constructing **elevated tower foundations** in flood-prone areas to minimize inundation and erosion risks; - Installing **enhanced drainage systems and slope stabilization structures** along the transmission corridor to address flooding, pluvial runoff, and erosion; - Applying **reinforced design standards** for wind and storm loads to withstand hurricane tails, strong local gales, and convective storms; and - **control (Permanent right-of-way) vegetation to reduce the risk of fire and ensure access for maintenance and emergency repairs.**
B. Non-Structural Measures	Non-structural measures complement physical interventions by enhancing preparedness, adaptability, and resilience of both infrastructure and communities. These include: - **Route optimization** to avoid alignment through high-risk flood zones, unstable slopes, or erosion-prone riverbanks; - **Integration with national early warning systems**, ensuring timely dissemination of alerts for flooding, storms, drought, and heat waves; - Development of **community-based evacuation and response plans**, created in partnership with local leaders, district commissioners, and the NCCR; and - Capacity-building and training programs to strengthen the ability of local maintenance teams and community responders to carry out emergency repairs and disaster response activities.
C. Implementation Plan	The DRMP requires a structured and phased implementation approach, ensuring that both preventive and adaptive measures are embedded throughout the project cycle. The implementation plan includes: - Establishing a **clear timeline** for implementing structural and non-structural measures during the construction and operational phases of the Program; - **Allocating dedicated budgets** for mitigation activities, procurement of emergency resources, and delivery of training programs; - Assigning oversight responsibilities to NV EBS and the Ministry of Natural Resources, with direct coordination and monitoring by district authorities and contractors; and - Incorporating flexible mechanisms that allow for mid-course corrections based on evolving climate data, community feedback, or new hazard assessments.
D. Monitoring and Evaluation	The DRMP will include a systematic monitoring and evaluation (M&E) framework to ensure accountability, effectiveness, and continuous improvement. This will involve:

	– Establishing **Key Performance Indicators (KPIs)**, such as time required for infrastructure recovery after disaster events, number of trained responders and community members, and compliance with preventive measures; – Regular progress reporting to the IDB, NV EBS, and Suriname authorities on the status of DRMP implementation and hazard mitigation effectiveness; – Conducting annual reviews and updates to adapt measures to new hazards, emerging climate trends, and evolving community needs; and – Ensuring that community feedback mechanisms are integrated into the evaluation process, thereby promoting inclusivity and locally relevant adjustments.

7. Identification of Mitigations in Accordance with the Mitigation Hierachy

7.1. Introduction

In line with the mitigation hierarchy, this chapter outlines measures to address key environmental and social risks identified in the project. The Environmental and Social (E&S) Impact Category, according to the IDB classification and in accordance with the E&S Framework Policy, is Category B and will be validated during due diligence.

The E&S Risk Rating is assessed as Moderate to High due to financial sustainability concerns, community engagement challenges, and potential environmental disturbances such as biodiversity impact and pollution risks. The Disaster and Climate Change Risk is considered Moderate, as climate-related factors—including flooding, droughts, and extreme weather events—may affect project infrastructure. However, mitigation strategies have been incorporated to enhance resilience. The following sections detail specific interventions aimed at avoiding, minimizing, restoring, and offsetting these risks to ensure the project's long-term sustainability."

The identification of mitigations in accordance with the Mitigation Hierarchy are outlined in the following paragraphs and tables

7.2. Social Risk Rating and Culturally Appropriate Mitigating Measures/ Action Plan

7.2.1. Cluster I

KPI's (figure 10) were used to assess the potential positive impact on the social groups. Table 62 and 61 shows the overview of the positive impact rating and analysis.

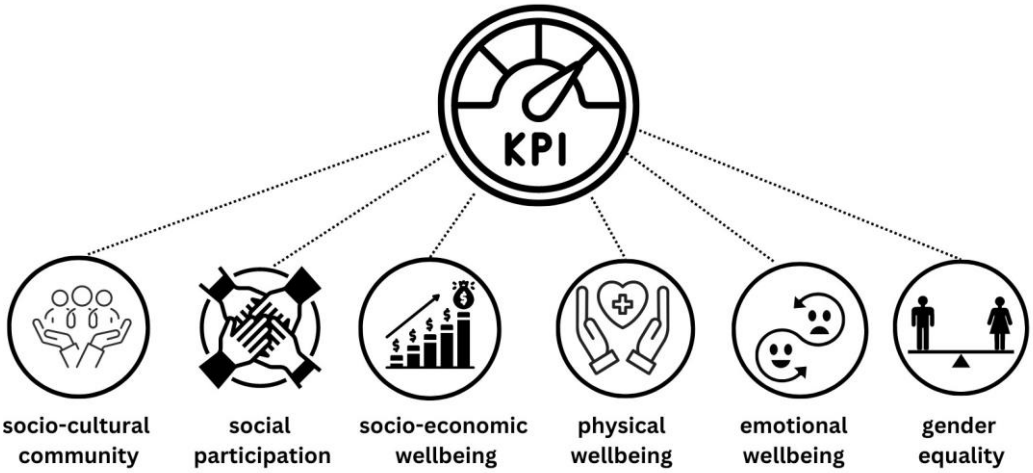


Figure 10. KPI's for the development of energy infrastructure on Maroon land in the North-East of Suriname.

Social Key Performance Indicator	Abaadu Konde	Akale Konde	Benhatimofo
Socio-cultural community			
1.Optimizing their way of life.			
2.Engagement method in place.			
3.Cultural heritage and territories maintained.			
Social participation			
4. Easy access to the city for family.			
5. Feeling supported.			
6. Willing to accommodate workers to achieve project goals.			
7. Willing to be trained for operation and maintenance.			
8. Increased personal development.			
9. Increased sense of equal rights.			
10. Willing to learn new technologies.			
Socio-economic wellbeing			
11. Willingness to work for operation and maintenance.			
12. Increased business opportunity.			

13. Elevation of existing business			
14. Use of new tools.			
Physical wellbeing			
15. Improved medical care.			
16. Improved health and nutrition status.			
17. Improved food security.			
18. Improved sense of leisure.			
Emotional wellbeing			
19. Improved sense of safety.			
20. Less stress.			
Gender equality			
21. More business opportunity for women.			
22. Improved physical wellbeing for women.			
23.Men having more time for family or household activities.			

Table 80. Potential social positive impact rating: an overview.

Legend	
	High positive potential impact.
	Medium positive potential impact.
	Low positive potential impact.
	No information.

Table 81. Positive impact color legend.

7.2.2. Opportunities to enhance positive social impact

For all positive impacts assessed the recommended social impact strategy is to absorb or transfer the impact by reducing it to ALARP by following the recommended safeguard policies and social best practices outlined in table 82.

Potential positive impact analysis overview.		
The scope that was assessed is whether the KPI's benefit the social group and/or solve a major issue they are dealing with, as verbally stated during krutu sessions and by socio-cultural assessment of the location in question.		
Key Performance Indicator	**Positive impact analysis: an overview.**	**Opportunities to enhance this positive impact.**
Socio-cultural community		
1. Optimizing their way of life.	-Abaadu Konde, Akale Konde and Benhattimofo electricity, water and phone reception needs to be especially optimized.	
2. Engagement method in place.	The traditional krutu is the best practice engagement method for all villages.	The krutu setting can be used to communicate with the villagers during project building grievances or guidelines for the villagers and their leaders.
3. Cultural heritage and -territories maintained.	Territories for building purposes will be chosen by villagers themselves. There are no restricted areas in the villages. **With optimal electricity and water in the house, women have less work and more free time to relax.** The women would still want to cook on fire **to save gas and because it tastes good.**	Being mindful of territories that are not allowed to be used or entered is an important social safeguard.
Social participation		
4. Easy access to the city for family.	The villagers already have phones but the reception is not strong. They noted that calling or reaching family more easily is one of the reasons why they would like the project to be executed as soon as possible. They have family members that live in the city, Paramaribo and in Moengo. Better lighting and access to energy can contribute to safer travel conditions within and outside villages, which can promote connectivity with urban areas.	
5. Feeling supported	All villages would feel very supported.	
6. Willingness to accommodate workers to achieve project goals.	All villages are willing to accommodate workers to achieve project goals.	

7. Willing to be trained for operation and maintenance.	There is willingness to take a training, especially a technical one, because no one in the village has experience with the electricity system. They prefer an accessible training that suits the learning style of the local population.	Recommend that tailor-made training should be created based on their education and knowledge.
8. Increased personal development.	The villagers are very eager to get training to be able to maintain the services which would help their personal development. In addition, many residents see an optimal electricity supply and telephone reception as an opportunity for personal growth, for example through better study opportunities (more lighting and access to digital learning platforms). New opportunities for personal development also arise because women have to spend less time on housework. They could be even more productive with longer energy access (light at night).	
9. Increased sense of equal rights.	The villages strongly agree that they would have an increased sense of equal rights. They want to participate and have access to services like the rest of the country.	
10. Willing to learn new technologies.	All villages are open to learning new technologies.	
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	All villages are willing to work for operation and maintenance.	Operation and maintenance by local villagers increase community ownership.
12. Increased business opportunity.	The women in the communities see the potential to develop tourism, and selling their medicinal products. Perhaps the men do not.	Tourism and the sale of medicinal products can be included in socio-economic models to sustain long term maintenance of the project building objectives.
13. Elevation of existing businesses.	In all villages, improved energy water and telecom access could improve their businesses. They can work longer **hours if they had optimal(electric) light at night.**	
	● This is because with those services' tourism could be developed that could increase the sales of their local products. ● They could expand their current businesses.	
14. Use of new tools.	With a reliable electricity supply, they would be able to use their devices without the risk of damage.	
Physical wellbeing		
15. Improved medical care.	No information.	

16. Improved health and nutrition status.	With optimal electricity they could preserve food longer and improve their nutritional intake. With improved energy access they could save food in the fridge instead of salting it.	
17. Improved food security.	With improved energy access they could buy freezers to save food longer and also sell their game. The women would buy a rice cooker for quicker food access if they had the funds.	
18. Improved sense of leisure.	Most women would experience an improved sense of leisure with water in their houses. With optimal electricity at home, women have more time to relax. However, men will hunt more.	
Emotional wellbeing		
19. Improved sense of safety.	In general, people would feel safer with night at light to prevent accidents and to see potentially dangerous animals such as snakes.	
20. Less stress.	Access to electricity enables households to generate additional income, which helps reduce financial stress. With reliable electricity and good reception, they can access radio, television, and the internet, which are not only educational but also provide entertainment and help reduce stress. Additionally, women have more time to relax when they can use electrical appliances to ease household tasks.	
Gender equality		
21. More business opportunity for women.	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Business opportunity: Improved energy access could potentiate the development of tourism which could lead to more business opportunity for women. They could serve as tour guides, cooks, cleaners. They can also sell their traditional medicine.	Women empowerment can improve community ownership models.
22. Improved physical wellbeing for women.	The women can use electrical appliances to do part of the daily work. .	
23. Men having more time for family or household activities.	**Men will hunt more and work longer hours.**	

Table 82. Potential positive impact analysis: an overview.

7.2.3. Cluster 2

KPI's (figure 11) were used to assess the potential positive impact on the social groups. Table 83 and 84 shows the overview of the positive impact rating and analysis.

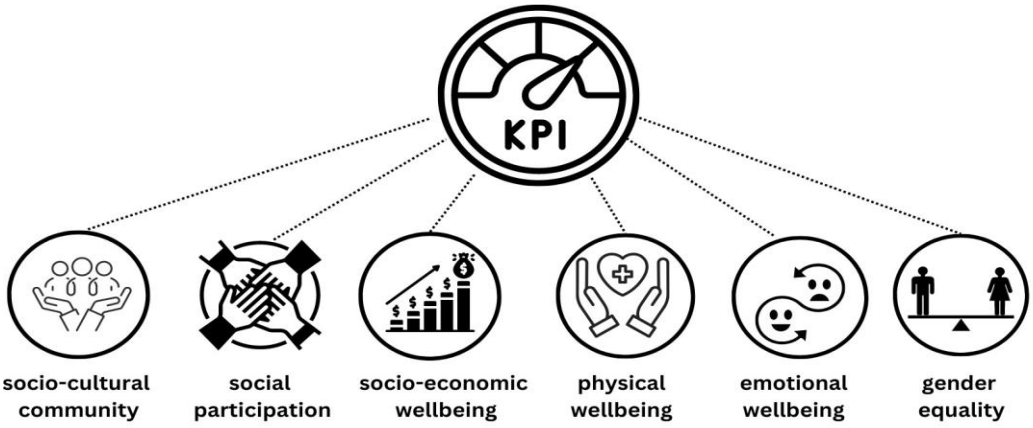


Figure 11. KPI's for the development of water, solar energy- and telecommunications infrastructure on Indigenous land in the South of Suriname.

Social Key Perfor-mance Indicator	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti
Socio-cultural community								
1.Optimizing their way of life.								
2.Engagement method in place.								
3.Cultural heritage and territories maintained.								
Social participation								
4. Easy access to the city for family.								
5. Feeling supported.								
6. Willing to accommodate workers to achieve project goals.								
7. Willing to be trained for operation and maintenance.								
8. Increased personal development.								
9. Increased sense of equal rights.								
10. Willing to learn new technologies.								

Socio-economic wellbeing								
11. Willingness to work for operation and maintenance.								
12. Increased business opportunity.								
13. Elevation of existing business								
14. Use of new tools.								
Physical wellbeing								
15. Improved medical care.								
16. Improved health and nutrition status.								
17. Improved food security.								
18. Improved sense of leisure.								
Emotional wellbeing								
19. Improved sense of safety.								
20. Less stress.								
Gender equality								
21. More business opportunity for women.								
22. Improved physical wellbeing for women.								
23.Men having more time for family or household activities.								

Table 83. Potential social positive impact rating: an overview.

Legend	
	High positive potential impact.
	Medium positive potential impact.
	Low positive potential impact.
	Not Applicable.
	No information.

Table 84. Positive impact color legend.

7.2.4. Opportunities to enhance positive social impact

For all positive impacts assessed the recommended social impact strategy is to absorb or transfer the impact by reducing it to ALARP by following the recommended safeguard policies and social best practices outlined in table 86.

Potential positive impact analysis overview.		
The scope that was assessed is whether the KPI's benefit the social group and/or solve a major issue they are dealing with, as verbally stated during krutu sessions and by socio-cultural assessment of the location in question.		
Key Performance Indicator	**Positive impact analysis: an overview.**	**Opportunities to enhance this positive impact.**
Socio-cultural community		
1. Optimizing their way of life.	-Abaadu Konde, Akale Konde and Benhattimofo electricity, water and phone reception needs to be especially optimized.	
2. Engagement method in place.	The traditional krutu is the best practice engagement method for all villages.	The krutu setting can be used to communicate with the villagers during project building grievances or guidelines for the villagers and their leaders.
3. Cultural heritage and -territories maintained.	Territories for building purposes will be chosen by villagers themselves. There are no restricted areas in the villages. **With optimal electricity and water in the house, women have less work and more free time to relax.** The women would still want to cook on fire **to save gas and because it tastes good.**	Being mindful of territories that are not allowed to be used or entered is an important social safeguard.
Social participation		
4. Easy access to the city for family.	The villagers already have phones but the reception is not strong. They noted that calling or reaching family more easily is one of the reasons why they would like the project to be executed as soon as possible. They have family members that live in the city, Paramaribo and in Moengo. Better lighting and access to energy can contribute to safer travel conditions within and outside villages, which can promote connectivity with urban areas.	
5. Feeling supported	All villages would feel very supported.	
6. Willingness to accommodate workers to achieve project goals.	All villages are willing to accommodate workers to achieve project goals.	

7. Willing to be trained for operation and maintenance.	There is willingness to take a training, especially a technical one, because no one in the village has experience with the electricity system. They prefer an accessible training that suits the learning style of the local population.	Recommend that tailor-made training should be created based on their education and knowledge.
8. Increased personal development.	The villagers are very eager to get training to be able to maintain the services which would help their personal development. In addition, many residents see an optimal electricity supply and telephone reception as an opportunity for personal growth, for example through better study opportunities (more lighting and access to digital learning platforms). New opportunities for personal development also arise because women have to spend less time on housework. They could be even more productive with longer energy access (light at night).	
9. Increased sense of equal rights.	The villages strongly agree that they would have an increased sense of equal rights. They want to participate and have access to services like the rest of the country.	
10. Willing to learn new technologies.	All villages are open to learning new technologies.	
Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	All villages are willing to work for operation and maintenance.	Operation and maintenance by local villagers increase community ownership.
12. Increased business opportunity.	The women in the communities see the potential to develop tourism, and selling their medicinal products. Perhaps the men do not.	Tourism and the sale of medicinal products can be included in socio-economic models to sustain long term maintenance of the project building objectives.
13. Elevation of existing businesses.	In all villages, improved energy water and telecom access could improve their businesses. They can work longer **hours if they had optimal(electric) light at night.**	
	● This is because with those services' tourism could be developed that could increase the sales of their local products. ● They could expand their current businesses.	
14. Use of new tools.	With a reliable electricity supply, they would be able to use their devices without the risk of damage.	
Physical wellbeing		
15. Improved medical care.	No information.	

16. Improved health and nutrition status.	With optimal electricity they could preserve food longer and improve their nutritional intake. With improved energy access they could save food in the fridge instead of salting it.	
17. Improved food security.	With improved energy access they could buy freezers to save food longer and also sell their game. The women would buy a rice cooker for quicker food access if they had the funds.	
18. Improved sense of leisure.	Most women would experience an improved sense of leisure with water in their houses. With optimal electricity at home, women have more time to relax. However, men will hunt more.	
Emotional wellbeing		
19. Improved sense of safety.	In general, people would feel safer with night at light to prevent accidents and to see potentially dangerous animals such as snakes.	
20. Less stress.	Access to electricity enables households to generate additional income, which helps reduce financial stress. With reliable electricity and good reception, they can access radio, television, and the internet, which are not only educational but also provide entertainment and help reduce stress. Additionally, women have more time to relax when they can use electrical appliances to ease household tasks.	
Gender equality		
21. More business opportunity for women.	With the right support and mindfulness of project investors and other organization, the following business opportunities could be created for women: • Business opportunity: Improved energy access could potentiate the development of tourism which could lead to more business opportunity for women. They could serve as tour guides, cooks, cleaners. They can also sell their traditional medicine.	Women empowerment can improve community ownership models.
22. Improved physical wellbeing for women.	The women can use electrical appliances to do part of the daily work. .	
23. Men having more time for family or household activities.	**Men will hunt more and work longer hours.**	

Table 85: potential positive impact analysis: an overview.

7.2.5. Cluster 3

KPI's (figure 5) were used to assess the potential positive impact on the social groups. Table 86 and 87 shows the overview of the positive impact rating and analysis.

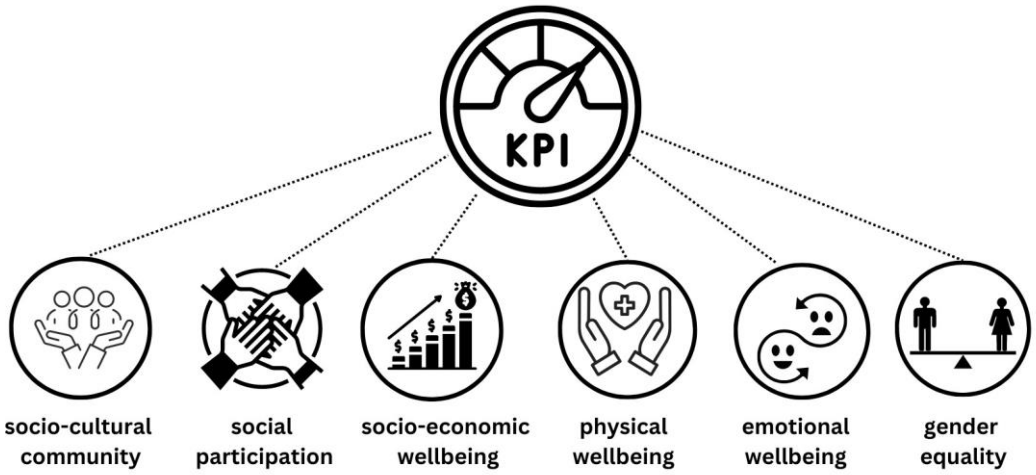


Figure 12: KPI's for the development of water, solar energy- and telecommunications infrastructure on Indigenous land in the South of Suriname.

Social Key Perfor-mance Indicator	Moengo	Albina- Alfons dorp	Albina- Marijkedorp	Albina- Pierre Kondre
Socio-cultural community				
1.Optimizing their way of life.				
2.Engagement method in place.				
3.Cultural heritage and territories maintained.				
Social participation				
4. Easy access to the city for family.				
5. Feeling supported.				
6. Willing to accommodate workers to achieve project goals.				
7. Willing to be trained for operation and maintenance.				
8. Increased personal development.				

9. Increased sense of equal rights.				
10. Willing to learn new technologies.				
Socio-economic wellbeing				
11. Willingness to work for operation and maintenance.				
12. Increased business opportunity.				
13. Elevation of existing business				
14. Use of new tools.				
Physical wellbeing				
15. Improved medical care.				
16. Improved health and nutrition status.				
17. Improved food security.				
18. Improved sense of leisure.				
Emotional wellbeing				
19. Improved sense of safety.				
20. Less stress.				
Gender equality				
21. More business opportunity for women.				
22. Improved physical wellbeing for women.				
23.Men having more time for family or household activities.				

Table 86: Potential social positive impact rating: an overview.

Legend	
	High positive potential impact.
	Medium positive potential impact.
	Low positive potential impact.
	Not Applicable.
	No information.

Table 86: Legend rating

7.2.6. Opportunities to enhance positive social impact

For all positive impacts assessed the recommended social impact strategy is to absorb or transfer the impact by reducing it to ALARP by following the recommended safeguard policies and social best practices outlined in table 88.

Potential positive impact analysis overview.		
The scope that was assessed is whether the KPI's benefit the social group and/or solve a major issue they are dealing with, as verbally stated during krutu sessions and by socio-cultural assessment of the location in question.		
Key Performance Indicator	**Positive impact analysis: an overview.**	**Opportunities to enhance this positive impact.**
Socio-cultural community		
1. Optimizing their way of life.	Access to reliable electricity, clean water, and telecommunications significantly reduces time spent on survival-related tasks such as fetching water, coping with blackouts, or preserving food without refrigeration. This allows households to reallocate time toward education, income generation, cultural participation, and social cohesion. The overall effect is a structural improvement in daily life efficiency and resilience..	Apply ESPS 4 & 7. Co-design service placement with communities. Prioritize women's time savings and workload reduction. Strategy: Absorb by embedding community-led operation and maintenance.
2. Engagement method in place.	Traditional krutu meetings and local governance mechanisms already provide structured platforms for dialogue, transparency, and collective decision-making. Strengthening these systems ensures that community voices remain central to planning, implementation, and grievance resolution, which in turn builds trust and legitimacy.	Apply ESPS 10. Institutionalize krutu as the formal FPIC mechanism. Create grievance redress channels. Provide regular updates in accessible language. Strategy: Absorb through participatory governance.
3. Cultural heritage and -terriroties maintained.	Communities have explicitly emphasized that sacred sites and culturally significant territories must be protected in parallel with modernization. Respecting these boundaries not only preserves intangible heritage but also sustains intergenerational cultural identity, reducing risks of perceived cultural erosion.	Apply ESPS 8 & 7. Map sacred sites, designate no-go zones, and integrate cultural protocols into project design and contracts. Strategy: Transfer by avoiding restricted areas and embedding respect for traditions.
Social participation		
4. Easy access to the city for family.	Improved telecommunications and reliable energy reduce dependence on costly and time-consuming travel to urban centers. This strengthens kinship ties, enables timely contact with relatives, and improves social integration, reducing rural–urban isolation and fostering stronger family networks.	Apply ESPS 2 & 10. Strengthen telecom systems, provide affordable access, and integrate digital literacy training. Strategy: Absorb by ensuring equitable and reliable connectivity.

5. Feeling supported	Communities perceive reliable utility services as recognition of their needs and inclusion in national development strategies. Transparent communication and consistent project follow-up foster institutional trust, reduce uncertainty, and strengthen community morale, leading to stronger collective ownership of the project.	Apply ESPS 10. Create local liaison committees, share accessible project updates, and build capacity for community monitoring. Strategy: Absorb by ensuring transparent communication and inclusion.
6. Willingness to accommodate workers to achieve project goals.	Residents are generally open to hosting external workers if cultural norms and environmental boundaries are respected. This willingness enables smoother project implementation and creates opportunities for intercultural learning, but also carries risks if safeguards are not observed.	Apply ESPS 2 & 4. Develop codes of conduct for workers, deliver cultural sensitivity training, and monitor temporary accommodations. Strategy: Transfer by embedding cultural and environmental respect clauses in worker contracts.
7. Willing to be trained for operation and maintenance.	Villagers show a strong interest in learning how to operate and maintain infrastructure. Such training enhances local self-reliance, reduces dependence on outside technicians, and provides transferable technical skills that strengthen employability and long-term sustainability of services.	Apply ESPS 2 & 7. Use tailored training (visual, oral, video-based). Ensure inclusion of women and youth. Certify skills to create employability opportunities. Strategy: Absorb through capacity building and local ownership.
8. Increased personal development.	Improved electricity and digital tools open up new opportunities for formal and informal education, vocational training, and lifelong learning. This enhances human capital, increases employability, and creates pathways for upward socio-economic mobility while empowering both youth and adults.	Apply ESPS 7 & 10. Provide adult literacy and vocational programs, establish e-learning hubs, and support online education access. Strategy: Absorb by embedding education initiatives into project legacy.
9. Increased sense of equal rights.	Reliable access to water, energy, and telecom reduces disparities between rural villages and urban centers. This convergence in service provision strengthens perceptions of equality, dignity, and citizenship, reinforcing social inclusion and national belonging.	Apply ESPS 7 & 10. Promote equitable access policies and monitor urban–rural parity in services. Strategy: Absorb by reinforcing inclusion and equal citizenship.
10. Willing to learn new technologies.	Younger generations and adults show enthusiasm for using mobile phones, computers, and internet-enabled platforms. This willingness accelerates digital inclusion, improves communication, and prepares communities for integration into emerging digital economies.	Apply ESPS 2 & 7. Facilitate digital literacy programs and create ICT hubs for shared use. Strategy: Absorb by equipping residents with adaptive digital skills.

Socio-economic wellbeing		
11. Willingness to work for operation and maintenance.	Communities are ready to contribute labor, oversight, or financial support for infrastructure maintenance. This demonstrates strong ownership potential, lowers long-term operational risks, and ensures that services are embedded in community structures.	Apply ESPS 2 & 10. Establish community maintenance cooperatives, ensure fair compensation, and implement cost-sharing models. Strategy: Absorb by formalizing community ownership and accountability.
12. Increased business opportunity.	Reliable utilities create enabling conditions for new entrepreneurship, including agro-processing, cold storage, tourism, and retail services. These opportunities diversify income sources, reduce vulnerability to external shocks, and stimulate local economies.	Apply ESPS 7 & 9. Provide microfinance and business support, prioritize women-led enterprises, and connect with regional markets. Strategy: Absorb by strengthening local livelihoods.
13. Elevation of existing businesses.	Modern infrastructure enhances the efficiency and competitiveness of current businesses such as farming, retail, and artisanal production. Access to refrigeration, lighting, and telecom expands productivity, reduces losses, and broadens market reach.	Apply ESPS 7 & 9. Deliver business training and digital marketing support, strengthen logistics and supply chains. Strategy: Absorb by reinforcing resilience of local enterprises.
14. Use of new tools.	Access to electricity and ICT enables the adoption of modern tools, equipment, and technologies that improve efficiency, productivity, and innovation. These skills can be transferred across generations, building long-term community capacity.	Apply ESPS 2 & 7. Provide affordable access to ICT and mechanical tools, set up training hubs for safe use. Strategy: Absorb by enabling skill development and safe use of technologies.
Physical wellbeing		
15. Improved medical care.	Reliable energy and telecom improve healthcare by ensuring medicine refrigeration, enabling remote consultations, and strengthening emergency response capacity. Access to clean water also reduces disease burden, making healthcare more effective.	Apply ESPS 4. Ensure resilient cold-chain systems, integrate telemedicine, and train local health workers in system use. Strategy: Absorb by embedding resilient community health systems.

16. Improved health and nutrition status.	Safe water and refrigeration enable healthier diets, reduced food spoilage, and fewer waterborne diseases. Improved nutrition enhances child development, adult productivity, and overall community well-being.	Apply ESPS 4 & 7. Expand clean water access, promote community nutrition education, and integrate gender-sensitive health services. Strategy: Absorb by strengthening local health systems.
17. Improved food security.	Cold storage and reliable water reduce seasonal food shortages and wastage, while enabling surplus production for trade. This strengthens resilience against shocks such as droughts or market disruptions.	Apply ESPS 4 & 7. Support agroforestry, community storage, and aquaculture programs. Strategy: Absorb by embedding sustainable food security systems.
18. Improved sense of leisure.	Utilities and communication tools allow for radios, television, and cultural activities that reduce stress, strengthen social bonds, and enhance overall quality of life.	Apply ESPS 7. Support cultural and recreational opportunities, ensure inclusive access to leisure facilities. Strategy: Absorb by embedding structured cultural participation.
Emotional wellbeing		
19. Improved sense of safety.	Lighting infrastructure improves night-time visibility, reduces risks from theft and wild animals, and allows safer mobility. This generates both perceived and actual increases in community safety and stability.	Apply ESPS 4. Install public lighting in consultation with communities, develop local safety plans. Strategy: Absorb by institutionalizing community safety systems.
20. Less stress.	Reduced burdens from water collection, unreliable energy, and food insecurity alleviate daily stress and psychosocial pressure. Communities can redirect energy toward productive, educational, or recreational activities.	Apply ESPS 4 & 10. Promote psychosocial support networks, reduce labor-intensive workloads, and encourage community wellness initiatives. Strategy: Absorb by embedding stress-reduction measures.
Gender equality		
21. More business opportunity for women.	Reduced domestic workload and improved access to energy and ICT open pathways for women's entrepreneurship in food processing, retail, and crafts. This enhances gender equality and diversifies household incomes.	Apply ESPS 9 & 7. Support women's cooperatives, provide targeted training, ensure safe working environments. Strategy: Absorb by mainstreaming women's economic empowerment.

22. Improved physical wellbeing for women.	Access to utilities reduces physically demanding tasks such as fetching water and cooking with firewood. This improves women's health, reduces fatigue, and frees time for childcare or economic activity.	Apply ESPS 9 & 4. Introduce labor-saving technologies and clean cooking solutions. Strategy: Absorb by embedding gender-sensitive health and wellbeing programs.
23. Men having more time for family or household activities.	Reduced time spent on hunting and other subsistence activities due to refrigeration and food storage enables men to engage more in family and household responsibilities. This strengthens family cohesion and contributes to balanced gender roles.	Apply ESPS 9 & 7. Promote shared household responsibilities and create family-oriented community programs. Strategy: Absorb by reinforcing equitable gender roles.

Table 87. Potential positive impact analysis: an overview.

7.3. Potential Social Risk Analysis

7.3.1. Cluster I

KRI's (figure 6) were used to assess the potential risks that could damage the social groups or cultural functions. Table 89 and 90 shows an overview of the risk rating and analysis.

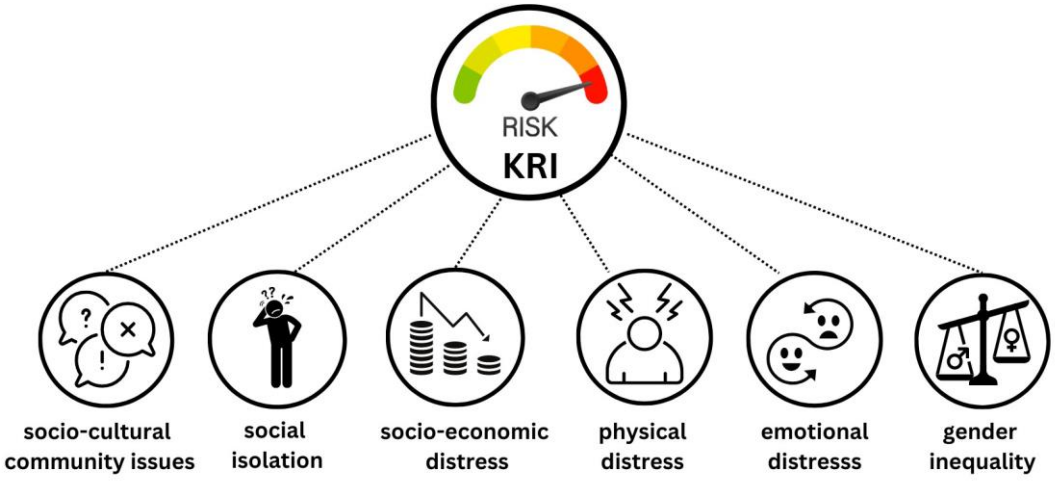


Figure 13. KRI's for solar for the development of energy infrastructure on Maroon land in the North-East of Suriname.

Social Key Risk Indicator	Abaadu Konde	Akale Konde	Benhatimofo
Socio-cultural community issues			
1. Indecision about community ownership models.			
2. Temporary displacement due to project building activities.			
Social isolation			
3. Unequal distribution of water, energy or telecom services.			
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems			
5. Lack of trust due to past false promises.			
Socio-economic distress			
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.			
7. Inability to buy freezers, electronic devices or other electrical tools.			
Physical distress			
8. Physical injury while supporting project objectives.			
9. Noise disturbance at critical locations.			

10. Distance for fetching water too far, especially for the elderly.			
11. Dust production during building activities.			
Emotional distress			
12. Worries and stress about generating the finances for the projects.			
13. Temporary distress due to project building activities.			
Gender inequality			
14. Gender inequality in the ability to pay for and maintain services.			
15. Socio-cultural community issues			

Table 88. Risk analysis rating: an overview.

Legend	
	High risk.
	Substantial risk.
	Moderate risk.
	Low risk.
	No information.

Table 89. Risk analysis color legend.

7.3.2. Recommended safeguard policies and social best practices

For all risks assessed the recommended risk mitigation strategy is to absorb or transfer the risk by reducing it to ALARP by following the recommended safeguard policies and social best practices outlined in table 91.

Potential risk analysis.

The scope that was assessed is whether the KPI's damage the social group, as verbally stated during krutu sessions and by socio-cultural assessment of the location in question.		
Social KRI	**Risk analysis: an overview.**	**Recommended safeguard policies and social best practices.**
Socio-cultural community issues		
1.Indecision about community ownership models.	There is a substantial risk for indecision; The men in communities express a desire to pay for maintenance themselves, while women prefer external financing. This can lead to a lack of clear accountability, which can result in systems not being managed properly after installation. They currently use a model that everyone who uses it should pay for it and that usage are measured per household, just like in the city.	Krutus are needed on a village level to discuss financial ownership models that fit their village. Consent forms that state that they are aware that the operation and maintenance costs are their responsibility, use audio recording if possible.
2.Temporary displacement due to project building activities.	Is unlikely to occur. People will not have to move from their current location due to the construction work of the project.	
Social isolation		
3.Unequal distribution of water, energy or telecom services.	Improved access to services would benefit the communities, and make their opportunities equal as the rest of the country.	Inclusion of every household, sex and age would be a recommended good practice as a social safeguard. Water connection at the household level would be ideal.
4.Lack of local capacity and expertise to sustain maintenance or operation of the systems.	In general, there is no local technical expertise present.	No training is required for the maintenance and operation of that system. This is because EBS will operate the system itself.
5.Lack of trust due to past false promises.	They have complete trust in the project.	Within the informed consent process, considerable effort needs to be taken to inform the inhabitants of the project phases and what they can expect to happen next.
Socio-economic distress		

6.Lack of paid jobs or employed villagers to upkeep ongoing costs.	In the villages, people are already part of the cash economy. Their main income is selling acai and clearing land. The men say they can cover the costs with their income. However, the women indicated that they cannot always cover these costs and that they want to pay them with external funding. This leads to challenges in covering essential expenses, such as maintaining infrastructure (such as electricity and water systems).	Stimulating the local economy and creating new livelihoods with improved energy, water and telecommunications access will ensure the long term sustainability of the project building objectives.
7.Inability to buy freezers, electronic devices or other electrical tools.	Despite having access to electricity, many villagers have appliances that they do not use or that are broken due to the sub-optimal electricity supply. Due to the lack of income, they cannot afford new appliances or appliances to replace the broken ones.	
Physical distress		
8.Physical injury while supporting project objectives.	Physical injury during building work is not applicable right now, but could occur.	Within the FPIC mechanism, what they could expect to include with physical manual labor during project building objectives is recommended.
9.Noise disturbance at critical locations.	The villages would not be okay with noise disturbance close to the school.	Grievance mechanisms are expressed via krutus. The noise disturbance limits are recommended to be taken into account during project building work.
10.Distance for fetching water too far, especially for the elderly.	Not answered.	
11.Dust production during building activities.	The villages would not be okay with dust production close to their school.	Grievance mechanisms are expressed via krutus. The possible dust production location and limits are recommended to be taken into account.
Emotional distress		
12.Worries and stress about generating the	Considering the hustle work of the villagers, there can be a sense of uncertainty about how to secure funding for the maintenance. If they do not have enough funds, they will not be able to maintain the services or upkeep the maintenance.	In the FPIC process, worries of villagers and their leaders should be addressed. It is recommended to give an estimate of the potential maintenance and operational costs.
13.Temporary distress due to project building activities.	Villagers said they would be okay with some distress to reach project goals such as dust or noise production.	The pleminary FPIC process has shown that they would be okay with some temporary distress due to project building objectives.
Gender inequality		
14.Gender inequality in the ability to pay for and maintain services.	Men as well as women have job and can help to pay for maintenance or operation costs of energy, water or telecom services.	Gender equality and women empowerment is recommended to be built-in in all project phases.

	Gender equality is an ongoing process and is something to be taken into account for all villages.	
15.gender inequality in potential job creation.	Only men want to help with project building objectives, the women do not. Indirectly though, with improved energy, telecom and water access there could be potential job creation for women in the field of tourism and sale of traditional medicines.	Creating jobs and compensating women during the project work is recommended. Stimulating women's livelihoods that can be potentiated with improved energy, water and telecommunications access is recommended.

Table 90. Potential risk analysis: an overview.

7.3.3. Cluster 2

KRI's (figure 7) were used to assess the potential risks that could damage the social groups or cultural functions. Table 92 and 93 shows an overview of the risk rating and analysis.

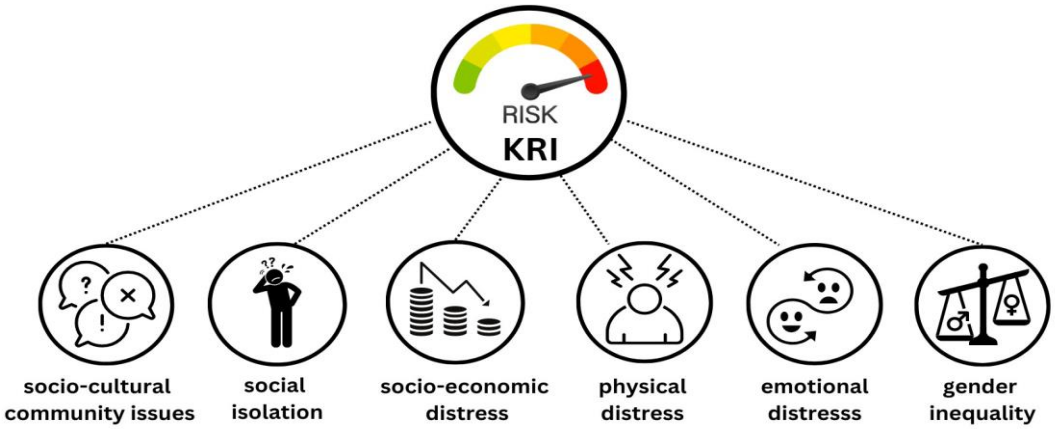


Figure 14. KRI's for solar for the development of water, solar energy- and telecommunications infrastructure on Indigenous land in the South of Suriname.

Social Key Risk Indicator	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti
Socio-cultural community issues								
1. Indecision about community ownership models.								
2. Temporary displacement due to project building activities.								
Social isolation								
3. Unequal distribution of water, energy or telecom services.								
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems								
5. Lack of trust due to past false promises.								
Socio-economic distress								
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.								
7. Inability to buy freezers, electronic								

devices or other electrical tools.	
Physical distress	
8. Physical injury while supporting project objectives.	
9. Noise disturbance at critical locations.	
10. Distance for fetching water too far, especially for the elderly.	
11. Dust production during building activities.	
Emotional distress	
12. Worries and stress about generating the finances for the projects.	
13. Temporary distress due to project building activities.	
Gender inequality	
14. Gender inequality in the ability to pay for and maintain services.	
15. Socio-cultural community issues	

Table 91. Risk analysis rating: an overview.

Legend	
	High risk.
	Substantial risk.
	Moderate risk.
	Low risk.
	Not Applicable.
	No information.

Table 92. Risk analysis color legend.

7.3.4. Recommended safeguard policies and social best practices

For all risks assessed the recommended risk mitigation strategy is to absorb or transfer the risk by reducing it to ALARP by following the recommended safeguard policies and social best practices outlined in table 94.

Potential risk analysis.

The scope that was assessed is whether the KPI's damage the social group, as verbally stated during krutu sessions and by socio-cultural assessment of the location in question.		
Social KRI	**Risk analysis: an overview.**	**Recommended safeguard policies and social best practices.**
Socio-cultural community issues		
1.Indecision about community ownership models.	In Amaloko kondre, Langa Uku 1 and 2, Tamarin and Wanhatti they decided that their payment model would be that everyone who uses it would pay for it and that the usage would be metered per household, just like in the city. In Lantiwee the villagers decided to pay the operational and maintenance costs collectively as a community. No information for Pikin Santi ans Pinatjarimi	Krutu's are needed on a village level to discuss financial ownership models that fit their village. Consent forms that state that they are aware that the operation and maintenance costs are their responsibility, use audio recording if possible.
2.Temporary displacement due to project building activities.	Is unlikely to occur. People will not have to move from their current location due to the construction work of the project.	
Social isolation		
3.Unequal distribution of water, energy or telecom services.	N.A.	
4.Lack of local capacity and expertise to sustain maintenance or operation of the systems.	In general, there is no local technical expertise present. In Langa Uku 1 and 2 There is only some expertise there, as they have been trained twice by the Ministry of Natural Resources about working on their generator, but this is minor. They are willing to be trained for maintenance or operation of the systems.	No training is required for the maintenance and operation of that system. This is because EBS will operate the system itself.
5.Lack of trust due to past false promises.	The political parties have promised a lot of services, but have not completed those projects. However most villages have trust in this project. There is no info on this in Pikin SantiKumakapan.	Within the informed consent process, considerable effort needs to be taken to inform the inhabitants of the project phases and what they can expect to happen next.

	In Tamarin the political parties also have promised many services but have not completed those projects. Because of this, they do not have fully trust in this project will be good for their village.	
Socio-economic distress		
6.Lack of paid jobs or employed villagers to upkeep ongoing costs.	In most villages, men said they have no objection to paying for electricity each month from their own income, including small agricultural costs and the sale of hunting products (Hustle). Also Podisiri and people working in Moengo. They want to pay individually for their use. No information for Pikin Santi and Pinatjarimi. In Tamarin and Wanhatti there is income in the village.	Stimulating the local economy and creating new livelihoods with improved energy, water and telecommunications access will ensure the long term sustainability of the project building objectives.
7.Inability to buy freezers, electronic devices or other eletrical tools.	Some villages do not have a complete answer to this yet, but it may be possible due to a lack of income. They may already have power tools. No information for Pikin Santi and Pinatjarimi.	
Physical distress		
8.Physical injury while supporting project objectives.	N.A.	Within the FPIC mechanism, what they could expect to include with physical manual labor during project building objectives is recommended.
9.Noise disturbance at critical locations.	Almost all villages are okay with it. In Tamarin they would not be okay with noise disturbance close to the school.	Grievance mechanisms are expressed via krutus. The noise disturbance limits are recommended to be taken into account during project building work.
10.Distance for fetching water too far, especially for the elderly.	Not Answered.	
11.Dust production during building activities.	Almost all villages are okay with it. In Tamarin they would not be okay with dust production close to the school.	Grievance mechanisms are expressed via krutus. The possible dust production location and limits are recommended to be taken into account.
Emotional distress		
12.Worries and stress about generating the	In Amaloko kondre There is a neutral response to financial concerns suggesting that there is no strong concern but also no complete certainty about the financing of the project. If they do not have enough money, they will not be able to maintain the services or keep up the maintenance.	In the FPIC process, worries of villagers and their leaders should be addressed. It is recommended to

	In Langa Uku 1 and 2, the villagers are stressed about this. Lantiwee, Pikin Santi, Pinatjarimi, Tamarin and Wanhatti No. The villagers are not worried.	
13.Temporary distress due to project building activities.	The villages are okay with temporary distress as long as builders take the school and church into account in the case of any nuisances.	The pleminary FPIC process has shown that they would be okay with some temporary distress due to project building objectives.
Gender inequality		
14.Gender inequality in the ability to pay for and maintain services.	In Amaloko kondre, Langa Uku 1 and 2 Both men and women have jobs and can contribute to the maintenance or operating costs of energy, water or telecom services. Although there are more men than women working in the village and the men have no objection to paying for the services. No info for Lantiwee, Pikin Santi, Pinatjarimi, Tamarin and Wanhatti.	Gender equality and women empowerment is recommended to be built-in in all project phases.
15.gender inequality in potential job creation.	Indirectly though, with improved energy, telecom and water access there could be potential job creation in the field of tourism for women. Additionally, most women spend a lot of time fetching water (not in Sipaliwini) the men tend to have more job opportunities. Improved water acces would give women more opportunities to earn money.	Creating jobs and compensating women during the project work is recommended. Stimulating women's livelihoods that can be potentiated with improved energy, water and telecommunications access is recommended.

Table 93. Potential risk analysis: an overview.

7.3.5. Cluster 3

KRI's (figure 6) were used to assess the potential risks that could damage the social groups or cultural functions. Table 95 and 96 shows an overview of the risk rating and analysis.

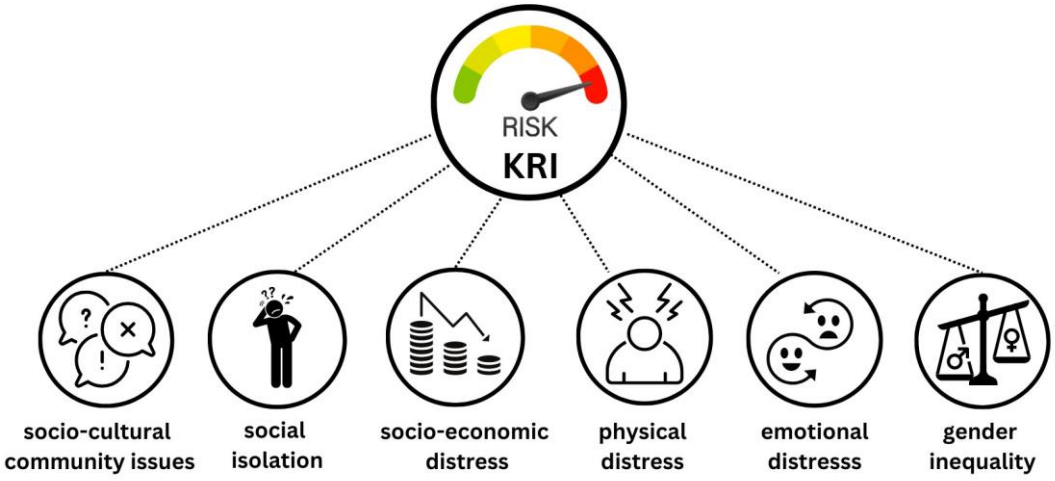


Figure 15. KRI's for solar for the development of energy infrastructure on Maroon land in the North-East of Suriname.

Social Key Risk Indicator	Moengo	Albina – Alfons dorp	Albina – Marijke dorp	Albina- Pierre Kondre
Socio-cultural community issues				
1. Indecision about community ownership models.				
2. Temporary displacement due to project building activities.				
Social isolation				
3. Unequal distribution of water, energy or telecom services.				
4. Lack of local capacity and expertise to sustain maintenance or operation of the systems				
5. Lack of trust due to past false promises.				
Socio-economic distress				
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.				
7. Inability to buy freezers, electronic devices or other electrical tools.				
Physical distress				

8. Physical injury while supporting project objectives.				
9. Noise disturbance at critical locations.				
10. Distance for fetching water too far, especially for the elderly.				
11. Dust production during building activities.				
Emotional distress				
12. Worries and stress about generating the finances for the projects.				
13. Temporary distress due to project building activities.				
Gender inequality				
14. Gender inequality in the ability to pay for and maintain services.				
15. Socio-cultural community issues				

Table 94. Risk analysis rating: an overview.

Legend	
	High risk.
	Substantial risk.
	Moderate risk.
	Low risk.
	No information.

Table 95. Risk analysis color legend.

7.3.6. Recommended safeguard policies and social best practices

For all risks assessed the recommended risk mitigation strategy is to absorb or transfer the risk by reducing it to ALARP by following the recommended safeguard policies and social best practices outlined in table 97.

Potential risk analysis.

The scope that was assessed is whether the KPI's damage the social group, as verbally stated during krutu sessions and by socio-cultural assessment of the location in question.		
Social KRI	**Risk analysis: an overview.**	**Recommended safeguard policies and social best practices.**
Socio-cultural community issues		
1.Indecision about community ownership models.	Across Moengo and Albina villages, there is interest in participating in ownership and governance of the systems, but decision-making is inconsistent. In Moengo, decision authority exists through the village board and DC/BIC channels, yet multiple neighborhoods complicate alignment. In Alfonsdorp and Marijkedorp, residents express willingness but remain uncertain about financial obligations, governance roles, and environmental impacts. In Pierrekondre, proactive attitudes toward ownership exist, but without formalization, disputes may arise later. These differences leave space for governance hesitation and potential conflict over tariffs and responsibilities.	Conduct structured krutus at both neighborhood and umbrella levels to codify ownership models. Require signed informed consent agreements that outline roles, responsibilities, and financial obligations. Use audio-recorded FPIC processes for transparency. Reduce residual indecision risk to ALARP by formalizing decision-making and preventing governance disputes.
2.Temporary displacement due to project building activities.	Communities generally do not expect relocation, but anticipate temporary access restrictions during construction phases. In Alfonsdorp and Marijkedorp, poles and lines pass near homes and residential roads, which could cause safety concerns or short-term restrictions. In Pierrekondre, residents explicitly refuse relocation for poles on their land, highlighting potential conflicts if siting does not respect private property.	Apply FPIC-based micro-siting protocols. Avoid private property where possible; if unavoidable, negotiate compensation or alternative routes. Establish safety perimeters around work zones. Absorb unavoidable impacts by minimizing duration and transferring liability to contractors.
Social isolation		
3.Unequal distribution of water, energy or telecom services.	Moengo currently experiences uneven electricity reliability across neighborhoods, with regular outages affecting some more severely than others. In Marijkedorp, many households still depend on candles and batteries, creating inequities in access to reliable 24/7 service. Such disparities can reinforce social divisions, erode trust in the project, and undermine its development goals.	Adopt transparent service rollout criteria and monitor distribution quality. Establish grievance redress systems to resolve inequity complaints. Define minimum service benchmarks across all neighborhoods. Residual inequity risk reduced to ALARP by ensuring fair allocation of services.

4.Lack of local capacity and expertise to sustain maintenance or operation of the systems.	Moengo retains a cadre of about 40–45 employees after industrial downsizing, but attrition of skilled staff is a challenge. In Albina villages, residents show strong interest in training but currently lack familiarity with solar technology and structured O&M systems. Without structured training and retention mechanisms, long-term sustainability and technical reliability remain at risk.	Implement structured local training and certification programs, in partnership with EBS and vocational institutions. Provide retention incentives for trained technicians. Transfer highly specialized O&M tasks to external operators where necessary, while absorbing routine maintenance locally.
5.Lack of trust due to past false promises.	In Moengo and Albina villages, political promises and unfinished projects have left a legacy of mistrust. While many residents remain optimistic about the current initiative, confidence depends on advance disclosure, safety assurances, and visible delivery. Communities repeatedly stressed that consistent, transparent communication is essential for trust	Establish transparent information channels (community notice boards, radio, WhatsApp groups). Provide advance timelines, safety protocols, and status updates. Use informed consent forms and regular krutu feedback loops. Absorb mistrust by over-communicating and transferring accountability to independent monitors.
Socio-economic distress		
6.Lack of paid jobs or employed villagers to upkeep ongoing costs.	In Moengo, high diesel consumption (9,500–10,500 liters for 40 hours/day supply) signals a costly system. Coupled with weak municipal services, affordability remains fragile. In Alfonsdorp, unemployment and youth unrest create economic vulnerability, while in Marijkedorp and Pierrekondre, willingness to pay exists but income sources are unstable. Without new livelihoods, tariff compliance and O&M funding are at risk.	Link project roll-out to local job creation in construction, maintenance, and productive energy use (ICT, tourism, retail, agro-processing). Establish flexible payment schemes and community saving groups. Transfer affordability risk through subsidies for the most vulnerable. Residual risk managed to ALARP by ensuring livelihoods accompany service provision.
7.Inability to buy freezers, electronic devices or other eletrical tools.	In Moengo and Marijkedorp, many households lack financial resources to purchase appliances like freezers, restricting their ability to benefit from electricity for income-generating activities. Reliance on candles and batteries persists, reducing the development impact of electrification. Without support, inequality of benefit uptake will remain.	Facilitate microcredit and cooperative financing schemes. Partner with NGOs/microfinance institutions to expand appliance ownership. Absorb residual risk by supporting shared-use models (e.g., community cold storage). Reduce inequity to ALARP by enabling access to productive appliances.
Physical distress		
8.Physical injury while supporting project objectives.	Construction and line installation near community spaces raise safety concerns. In Moengo and Albina villages, residents specifically requested marked safety zones and protective measures. Risks include electrical hazards, falling poles, and traffic accidents during works.	Enforce occupational health and safety standards. Mark safety perimeters, conduct community safety briefings, and provide insurance for contractors. Transfer residual risk through liability clauses in contracts. Reduce risks to ALARP by enforcing compliance.
9.Noise disturbance at critical locations.	Concerns are raised in Alfonsdorp and Marijkedorp about noise near schools, sacred sites, and wildlife areas. Moengo residents expect noise controls during road and line works. Without mitigation, noise can disrupt education, cultural practices, and well-being.	Set construction schedules outside school hours. Limit high-noise works near sensitive areas. Route grievances through established krutu mechanisms. Residual nuisance reduced to ALARP by proactive noise management.
10.Distance for fetching water too far, especially for the elderly.	Albina villages rely on SWM for water. Evening outages and billing problems sometimes require travel to Paramaribo, creating disproportionate burdens for elderly and vulnerable groups. In	Improve reliability of SWM services and introduce community storage tanks (durotanks). Provide special support to elderly households during outages. Absorb

	Marijkedorp, outages may require longer walks for water storage.	residual risk via social safety nets. Reduce burdens to ALARP through redundancy in supply.
11.Dust production during building activities.	Communities in Alfonsdorp and Marijkedorp anticipate dust from pole setting, road access, and construction. Sensitive sites such as schools and houses near roads are particularly vulnerable. Without mitigation, dust can cause nuisance and minor health impacts.	Apply Environmental and Social Management Plan (ESMP) controls: watering roads, covering trucks, scheduling to avoid school hours. Establish grievance channels. Absorb residual nuisance as temporary, reducing to ALARP through ESMP compliance.
Emotional distress		
12.Worries and stress about generating the	Anxiety over tariffs, affordability, and payment accessibility is widespread. In Marijkedorp and Pierrekondre, financial stress is reported as substantial, with concerns that tariffs and travel to payment points may reduce compliance and generate opposition.	Provide early and transparent tariff disclosure. Establish local/mobile payment points. Introduce targeted subsidies or social tariffs. Residual affordability stress absorbed through ongoing monitoring and mitigation, reducing opposition to ALARP.
13.Temporary distress due to project building activities.	Communities anticipate psychosocial stress due to noise, dust, outages, and traffic disruption during project construction. Residents strongly emphasized the need for advance information to reduce frustration.	Deliver early notifications, schedule works around community events, and compensate where disruptions are prolonged. Absorb temporary inconvenience as acceptable, provided advance consultation. Residual psychosocial stress reduced to ALARP.
Gender inequality		
14.Gender inequality in the ability to pay for and maintain services.	While not dominant, gender inequalities in income control and mobility may create uneven access to payment systems, particularly for women caregivers. Travel requirements for fee collection risk placing extra burdens on women.	Ensure payment systems are accessible via mobile/digital solutions. Promote women's participation in financial decision-making during krutu sessions. Absorb residual inequities by embedding gender-sensitive consultation in FPIC. Reduce to ALARP by ensuring inclusivity in service access.
15.gender inequality in potential job creation.	Construction and technical roles typically skew male. Without specific measures, women risk exclusion from early job and training opportunities. This may reinforce existing gender gaps in employment and access to benefits from electrification.	Integrate gender quotas and targeted training for women. Develop alternative livelihoods linked to energy access (tourism, ICT, retail, food services). Transfer residual bias through affirmative action in recruitment. Reduce exclusion risk to ALARP by ensuring gender mainstreaming.

Table 96. Potential risk analysis: an overview.

7.4. Social Safeguards: A Three Phase Model

From the SIA and SRA, a three-phase social safeguards model has been designed to ensure the long-term sustainability of the solar, water and telecommunications infrastructure projects. Within this model the relevant safeguards take action plans, ownership models and social best practice considerations into account.

The social safeguard model includes the following phases:

Phase 1. Free Prior and Informed Consent (FPIC) safeguards.

- *Early FPIC responses.*
- *False promises and informed consent forms.*
- *Dust production and noise disturbance.*
- *Safeguarded territories.*
- *Grievance mechanism.*
- *Potential physical injury.*

Phase 2. Community Capacity Building (CBB) safeguards: technical capacity.

- *Capacity gap analysis.*
- *Technical capacity training programmes.*
- *Gender equality: women empowerment.*

Phase 3 . CBB safeguards: socio-economic capacities and ownership models

- Socio-economic factors to consider: willingness to pay potential, current potential to pay and future opportunities that can be potentiated with improved energy, water and telecommunications access.
- Financial ownership models to sustain operation and maintenance costs.

7.4.1. Phase 1. Free Prior and Informed Consent (FPIC) safeguards. – Cluster I

Early FPIC responses.

The principle of Free, Prior and Informed Consent (FPIC) refers to the right of Maroon peoples to give or withhold consent for any action that would affect their lands, territories or rights. Legally speaking there is no official recognition in Suriname's land law that states that native or tribal groups own the land they live on. However, a constitutional amendment and a draft Law on Collective Rights of Indigenous people and Tribal groups is composed by a land rights management team consisting of representatives of the government and traditional communities of Indigenous people and Maroons which addresses their right to self-determination, cultural integrity, FPIC and the composition of traditional authorities.[8]

By starting the FPIC process early in the engagement process, community ownership and responsibility is encouraged and built-in early on. In this report, early FPIC analysis has been analyzed via the positive impact analyses report with an overview of 23 KPI's in table 54. In general, all inhabitants showed significant willingness to participate in IDB's solar, energy and telecommunications projects, are excited about the opportunity and think that the projects would have a significant beneficial effect on their social group. Table 64 shows a quick overview of the preliminary FPIC considerations per village as stated during initial krutu sessions.

Preliminary FPIC	
Village	**FPIC**
Abaadu Konde, Akale Konde and Benhattimofo	**The villagers are very excited about the project goal. They strongly agree that the project will be good for their village although some of them are worried about the costs.**

Table 97. Preliminary FPIC per location.

False promises and informed consent forms.

Social Key Risk Indicator	**Abadoe Konde**	**Akale Konde**	**Benhatimofo**
5. Lack of trust due to past false promises.			

From KRI number 5 it is clear that all the villages have trust in this project. To minimize social conflict, it is recommended to clearly explain the project phases and objectives to the inhabitants and their leaders and to explain the project's conditions. The consent form in table 67 is a model to be used during krutu FPIC discussions before starting project building.

The traditional leaders make the final decisions and would need to decide if the local government board supervisors should be included in the FPIC process. In addition, it is recommended to actively inform villagers in a krutu setting or, at minimum, to interview a sample percentage of villagers to test their informed consent about their head captains' final decision.

8

Krutu/interview date:		
I hereby declare that: o **I have been informed about the nature, methods and purpose of the IDB projects.** o **that the inhabitants of [*location name*] have been informed about the nature, methods and purpose of the IDB projects.** **(Optional)** **Krutu date:** **Location:** o **I hereby give [*organization name/ person's name*] consent to install solar panels, telecommunication networks and/or water infrastructure in [*location name*]** o **I will allow project workers to enter the village for the discussed time frame to perform building work.** o **I understand that operational and maintenance costs are not covered by IDB/ project investors and their working partners [*organizations name/ person's name*].**		
Location:		
Name(s) of translator(s):		
Signature of translator(s):		
Name.	**Traditional leader role: Granman/ Captain/ Bassia.**	**Signature.**
Name.	**Governmental bodies: Board supervisor/ assistant board supervisor.**	**Signature.**
Name of inhabitant. **"I hereby declare to have been informed on IDB's project goals".**		**Signature.**

Notes of discussions	

Table 98. Model consent form.

Dust production and noise disturbance.

Social Key Risk Indicator	Abaadu Konde	Akale Konde	Benhatimofo
9. Noise disturbance at critical locations. **11. Dust production during building activities.**			

KRI numbers 9 and 11 have shown the following instructions from inhabitants in relation to possible dust and noise production: The villages would not be okay with dust production or noise disturbance close to their school.

Safeguarded territories.

The villages have not designated areas where people are not allowed to enter or where work is not allowed.

Grievance mechanism.

In all village the traditional engagement method is the krutu format. In the occasion of grievances during site visits, the inhabitants stated that they would notify project workers via their traditional leaders (captain/basjas). Table 66 shows the stated preferred grievance mechanism per village.

Grievance mechanism	
village	Grievance mechanism
Abaadu Konde, Akale Konde and Benhattimofo	The villagers will let the captain or basja know if grievances should occur.

Table 99.Grievance mechanism per village as stated during krutu sessions.

Potential physical injury.

Social Key Risk Indicator	Abaadu Konde	Akale Konde	Benhatimofo
8. Physical injury while supporting project objectives.			

KRI number 8 shows that the inhabitants of all locations are willing to help with project building objectives.

7.4.2. Phase 1. Free Prior and Informed Consent (FPIC) safeguards. – Cluster 2

Early FPIC responses.

The principle of Free, Prior and Informed Consent (FPIC) refers to the right of tribal Maroons and Indigenous peoples to give or withhold consent for any action that would affect their lands, territories or rights. Legally speaking there is no official recognition in Suriname's land law that states that native groups own the land they live on. However, a constitutional amendment and a draft Law on Collective Rights of Indigenous people and Tribal groups is composed by a land rights management team consisting of representatives of the government and traditional communities of Indigenous people and Maroons which addresses their right to self-determination, cultural integrity, FPIC and the composition of traditional authorities.[5]

By starting the FPIC process early in the engagement process, community ownership and responsibility is encouraged and built-in early on. In this report, early FPIC analysis has been analyzed via the positive impact analyses report with an overview of 23 KPI's in table 59. In general, all inhabitants showed significant willingness to participate in IDB's solar, energy and telecommunications projects, are excited about the opportunity and think that the projects would have a significant beneficial effect on their social group. Table 69 shows a quick overview of the preliminary FPIC considerations per village as stated during initial krutu sessions.

Preliminary FPIC	
village	**FPIC**
Amaloko Konde	**The villagers are excited about the project goals. They strongly agree that the 24/7 energy, will be good for them and their village. However, they noted that they do not want people to come to their village and make false promises anymore.**
Langa-oekoe 1	**They say they prefer around the clock electricity. They strongly agree that the project will be good for their villages.**
Langa-oekoe 2	**They agree that the project would be good for their village.**
Lantiwee	**They strongly agree that the project would be good for their village.**
Pikin Santi	**The villagers are very excited about potential project outcomes and would feel very supported. They strongly agree that these project would be good for their village.**
Pinatjarimi	**The villagers want and need electricity .**
Tamarin	**They agree that the projects will be good for their village. They want and need access to and around the clock electricity.**
Wanhatti	**They agree that the project could improve their lives and will be good for their village.**

Table 100. Preliminary FPIC per location.

False promises and informed consent forms.

Social Key Risk Indicator	**Amaloko kondre**	**Langa-oekoe 1**	**Langa-oekoe 2**	**Lanti-wee**	**Pikin Santi**	**Pina-tjarimi**	**Tamarin**	**Wanhatti**
5. Lack of trust due to past false promises.								

From KRI number 5 it is evident that in all villages the residents are marked by previous false promises of political parties and government agencies. Although the trust in this project. But in the village of Tamarin there is a lack of trust in this project due to the false promises made by parties earlier. In order

to minimize social conflicts, it is recommended to clearly explain the project phases and objectives to the residents and their leaders and to explain the conditions of the project. The consent form in table 70 is a model that can be used during krutu FPIC discussions before the construction of the project begins.
The traditional leaders make the final decisions and would need to decide if the local government board supervisors should be included in the FPIC process. In addition, it is recommended to actively inform villagers in a krutu setting or, at minimum, to interview a sample percentage of villagers to test their informed consent about their head captains' final decision.

Krutu/interview date:		
I hereby declare that: o **I have been informed about the nature, methods and purpose of the IDB project.** o **that the inhabitants of [*location name*] have been informed about the nature, methods and purpose of the IDB project.** **(Optional)** **Krutu date: Location:** o **I will allow project workers to enter the village for the discussed time frame to perform building work.** o **I understand that operational and maintenance costs are not covered by IDB/ project investors and their working partners [*organizations name/ person's name*].**		
Location:		
Name(s) of translator(s):		
Signature of translator(s):		
Name.	**Traditional leader role: Granman/ Captain/ Bassia.**	**Signature.**
Name.	**Governmental bodies: Board supervisor/ assistant board supervisor.**	**Signature.**

Name of inhabitant. **"I hereby declare to have been informed on IDB's project goals".**		**Signature.**
Notes of discussions		

Table 101. Model consent form.

Dust production and noise disturbance.

Social Key Risk Indicator	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti
9. Noise disturbance at critical locations. 11. Dust production during building activities.								

KRI number 9 and 11 have shown the following instructions from inhabitants in relation to possible dust and noise production: In Tamarin they would not be okay with dust production or noise disturbance close to their school. The inhabitants of the rest of the locations are okay with some dust production or noise disturbance.

Safeguarded territories.

In Langa Oekoe 1 en Langa Oekoe 2 strangers, outsiders "should not come to the Fraga Tiki". they would like those territories not to be entered or that the artifacts should not be touched. For the villages with their traditional belief the 'Fraga Tiki' is a place of worship for the spirits.

Grievance mechanism.

In all village the traditional engagement method is the krutu format. In the occasion of grievances during site visits, the inhabitants stated that they would notify project workers via their traditional leaders. Table 103 shows the stated preferred grievance mechanism per village.

Grievance mechanism	
village	Grievance mechanism
Amaloko Konde	The villagers will let the captain or basja know if grievances should occur, the traditional authorities.
Langa-oekoe 1	The villagers would let the head captain know and then the remaining captains or basjas.
Langa-oekoe 2	They would notify the traditional leaders, first the captain, then the basjas.
Lantiwee	They would let the captain know.

Pikin Santi	They would let the captain or the head captain know.
Pinatjarimi	They would let the captain and the traditional leaders know.
Tamarin	They would let the captain know, then the village management.
Wanhatti	They would let the basja and the captain know.

Table 102. Grievance mechanism per village as stated during krutu sessions.

Potential physical injury.

Social Key Risk Indicator	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti
8. Physical injury while supporting project objectives.								

KRI number 8 shows that the inhabitants of all locations are willing to help with project building objectives.

7.4.3. Phase 1. Free Prior and Informed Consent (FPIC) safeguards. – Cluster 3

Early FPIC responses.
The principle of Free, Prior and Informed Consent (FPIC) ensures that Indigenous and Tribal peoples retain the right to give or withhold consent for any project that may affect their territories, resources, or cultural rights. While Suriname's current land law does not formally recognize customary land tenure, a constitutional amendment and a draft Law on the Collective Rights of Indigenous and Tribal Peoples have been prepared by a land rights management team composed of government representatives and traditional authorities. This draft legal framework explicitly addresses the rights to self-determination, cultural integrity, FPIC, and the recognition of traditional governance structures.
In Cluster 3 (Moengo, Alfonsdorp, Marijkedorp, and Pierre Kondre), the FPIC process was initiated through a series of preliminary krutu (community meetings) where residents were introduced to the proposed solar, water, and telecommunications interventions. By engaging early, these sessions not only fostered awareness but also encouraged community ownership and responsibility in shaping the future service models.

The early FPIC analysis for these villages was informed by the positive impact assessment and the detailed household survey data. Findings indicate that most inhabitants across the four communities expressed a clear willingness to participate in IDB-supported projects and generally perceived the interventions as opportunities for improved quality of life, access to reliable services, and strengthened social cohesion. Nevertheless, village-specific concerns were also raised:

- Moengo residents emphasized issues of trust, reliability of energy supply, and affordability, particularly in light of prior experiences with frequent outages and uncertainty around cost-sharing models.
- Alfonsdorp residents expressed broad enthusiasm but highlighted concerns about the affordability of appliances and the limited availability of local jobs to sustain household contributions.
- Marijkedorp participants focused on the importance of equitable distribution of benefits, with particular attention to ensuring that water access points are close enough for the elderly and that women are not disadvantaged in payment schemes.
- Pierre Kondre residents showed strong interest in the project's potential but expressed apprehension about the impact of dust, noise, and physical disturbances during construction, as well as the need for culturally respectful consultation practices.

In general, the communities demonstrated that, despite different livelihood bases and varying exposure to infrastructure services, they are eager to participate, view the projects as beneficial, and expect to be treated as active decision-makers in both planning and implementation. Early FPIC engagement in these four villages has therefore laid the groundwork for deeper dialogue and co-design, ensuring that subsequent phases of the FPIC process can be built upon a foundation of mutual trust and responsiveness.

A consolidated overview of the preliminary FPIC considerations raised during initial krutu sessions for Cluster 3 is provided in Table 104

Preliminary FPIC	
village	**FPIC**
Moengo	**• Broad willingness to participate in IDB-supported projects. • Concerns about unequal electricity reliability (frequent blackouts in some neighborhoods). • Debate over community vs. individual ownership/payment models; preference for individual billing but awareness of risks of exclusion. • Emphasis on affordability and trust due to mixed experiences with utilities. • Requests to safeguard schools and sacred sites from dust and noise during construction.**
Albina - Alfonsdorp	**• Overall positive perception of project benefits; households value improved energy, water, and telecom. • Enthusiasm tempered by limited household income and concern over the affordability of appliances (freezers, refrigerators). • Expressed interest in local training and employment opportunities linked to service provision. • Recognition of existing EBS connection, but need to ensure equitable benefits across all households.**
Albina – Marijke dorp	**Strong desire for equitable distribution of benefits, especially water access points to reduce burdens on women and the elderly. • Households highlighted the need to address gender inequality in affordability, with women-headed households being particularly vulnerable. • Residents welcomed the project but stressed importance of inclusive governance structures and transparent tariff-setting.**
Albina – Pierre kondre	**• Community expressed high interest in participation, recognizing potential improvements in quality of life. • Concerns raised about dust, noise, and temporary disruption during construction phases. • Emphasis on culturally respectful consultation practices, ensuring that traditional authorities and ceremonies are respected. • Households highlighted need for clarity on payment responsibilities and support for vulnerable families.**

Table 103. Preliminary FPIC per location.

False promises and informed consent forms.

Social Key Risk Indicator	Moengo	Albina – Alfons dorp	Albina – Marijke dorp	Albina- Pierre Kondre
5. Lack of trust due to past false promises.				

From KRI number 5 it becomes clear that in the villages of Moengo, Alfonsdorp, Marijkedorp and Pierre Kondre, residents express a lack of trust due to previous false promises made by political parties and government institutions. **As indicated by the moderate classification in the Cluster 3 risk assessment table,** this issue does not present an immediate barrier to project acceptance but may significantly affect community cooperation and long-term support if not addressed carefully.

To reduce the likelihood of misunderstandings or resistance, it is essential that project representatives provide **clear, consistent, and repeated communication** about the project's phases, timelines, and objectives. In line with FPIC principles, the consent form (see table 104) should be presented and discussed in krutu meetings before project implementation begins. These forms must outline not only the benefits but also the conditions, responsibilities, and potential limitations of the project.

Given that this is a **moderate risk**, the safeguards should focus on **proactive transparency** and **verification of consent**. Traditional leaders will ultimately make the final decision, but it is strongly recommended to also test the broader community's understanding through open krutu discussions or by interviewing a representative sample of households. This will help ensure that informed consent reflects the community's collective awareness and not solely the authority of local leadership.

Krutu/interview date:		
I hereby declare that: o **I have been informed about the nature, methods and purpose of the IDB project.** o **that the inhabitants of [*location name*] have been informed about the nature, methods and purpose of the IDB project.** **(Optional)** **Krutu date: Location:** o **I will allow project workers to enter the village for the discussed time frame to perform building work.** o **I understand that operational and maintenance costs are not covered by IDB/ project investors and their working partners [*organizations name/ person's name*].**		
Location:		
Name(s) of translator(s):		
Signature of translator(s):		
Name.	**Traditional leader role: Granman/ Captain/ Bassia.**	**Signature.**
Name.	**Governmental bodies: Board supervisor/ assistant board supervisor.**	**Signature.**

Name of inhabitant. "I hereby declare to have been informed on IDB's project goals".	Signature.
Notes of discussions	

Table 104: Model consent form

Dust production and noise disturbance.

Social Key Risk Indicator	Moengo	Albina – Alfons dorp	Albina – Marijke dorp	Albina- Pierre Kondre
9. Noise disturbance at critical locations.				
11. Dust production during building activities.				

KRI numbers 9 and 11 highlight the risks of noise disturbance and dust production during project building activities. **As indicated in the Cluster 3 risk assessment table, these risks are considered substantial in Moengo and Alfonsdorp, moderate in Marijkedorp, and range from low (noise) to moderate (dust) in Pierre Kondre.**

This distribution shows that while some villages may tolerate a certain level of disturbance, in others the risks are significant and must be carefully managed to avoid conflict and social disruption. In Moengo and Alfonsdorp, where the risks are substantial, special safeguards are necessary such as scheduling construction activities outside of school hours, implementing dust suppression measures, and setting up noise barriers near critical locations. In Marijkedorp and Pierre Kondre, where the risk is moderate to low, preventive communication and visible mitigation measures may be sufficient to maintain trust.

In line with FPIC principles, the potential impacts of dust and noise should be clearly discussed with community leaders and villagers during *krutu* meetings before construction begins. This dialogue allows communities to raise specific concerns about sensitive areas (e.g., schools, places of worship, or gathering grounds) where disturbances should be minimized.

As with other risks, the **preferred grievance mechanism** remains the *krutu* format: residents communicate complaints through their traditional leaders, who then pass them on to project staff. It is recommended to formalize this grievance mechanism (see table 105) and ensure timely responses to avoid escalation.

Village	Preferred Grievance Mechanism(s)	Details / Notes (Noise & Dust Risk Context)

Moengo	**Krutu via village leadership, with escalation to DC/BIC**	Noise and dust risks are **substantial** here. Residents expect formal announcements and government authority involvement (DC/BIC). Grievances should be raised first in **krutu**, then passed through leadership channels. Special safeguards (dust suppression, noise barriers, scheduling around schools) are required.
Alfonsdorp	**Krutu meetings led by community captain**	Noise and dust risks are **substantial**. The community prefers complaints to be voiced collectively in krutu. Trust relies on transparency and the captain's mediation. Strong mitigation actions (noise/time restrictions, dust control) must be explained and monitored with community participation.
Marijkedorp	**Krutu format with village leaders as mediators**	Noise and dust risks are **moderate**. Preventive communication, timely updates, and visible dust/noise mitigation are sufficient. The krutu remains the forum for grievances; villagers expect leaders to relay complaints to project staff.
Pierre Kondre	**Krutu meetings with captain and direct villager involvement**	Noise risk is **low**; dust risk is **moderate**. Community emphasizes consent and transparency in land use. Preventive communication before works, and reassurance through krutu, will help maintain trust. Complaints are routed through traditional leadership.

Table 105: Grievance mechanism per village as stated during krutu sessions

Potential physical injury

Social Key Risk Indicator	Moengo	Albina – Alfons dorp	Albina – Marijke dorp	Albina- Pierre Kondre
8. Physical injury while supporting project objectives.				

KRI number 8 addresses the risk of physical injury while supporting project building activities. **As indicated in the Cluster 3 risk assessment table, this risk is considered substantial in Moengo and Alfonsdorp, and moderate in Marijkedorp and Pierre Kondre.**

The table shows that, despite these risks, community members in all four villages are generally willing to contribute labor to the project. However, the substantial and moderate risk classifications indicate that without safeguards, accidents could occur and undermine community support.

To mitigate these risks, it is recommended that clear safety guidelines are communicated during *krutu* meetings, and that protective equipment (such as gloves, masks, or helmets where relevant) is provided to all participants. In villages with substantial risk (Moengo and Alfonsdorp), additional measures should include the presence of trained supervisors during construction and basic first aid provisions on-site. For moderate risk villages (Marijkedorp and Pierre Kondre), reinforcing safety awareness and monitoring compliance with safety protocols may be sufficient.

In line with FPIC, these safety measures and expectations should be explained before construction begins, so that villagers can give informed consent with full knowledge of both the opportunities and the risks associated with their participation.

7.4.4. Phase 2. CBB safeguards: socio-economic capacities and ownership models; Cluster I

Socio-economic factors to consider.

Social Key Risk Indicator	Abaadu Konde	Akale Konde	Benhatimofo
Socio-economic distress			
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.			
7. Inability to buy freezers, electronic devices or other electrical tools.			
Emotional distress			
12. Worries and stress about generating the finances for the projects.			

The KRI number 6, 7 and 12 show that there are socio-economic factors that need to be addressed in order to sustain the project long-term. From the preliminary krutu sessions, the following socio-economic factors were gathered: the willingness to pay, their current potential to pay and the potential future economic activities that can be potentiated.

Socio-economic factors.			
Village	**Willingness to pay**	**Current potential to pay: Main economic activities to cover operational costs.**	**Potential future economic activities and use of new tools with improved energy, water and telecom access.**
Abaadu Konde, Akale Konde and Benhattimofo	They still need to figure out how they could pay for it. The men are ready to pay the cost with their income, while the women **prefer funding from outside to pay.**	Both men and women are part of the money economy and do economic activities as: clearing land and Acai sale.	○ Tourism ○ Selling traditional medicine ○ Elevation of existing business ○ Game hunt sale

Table 106. Socio-economic factors.

Financial ownership models to sustain operation and maintenance costs.

Social Key Risk Indicator	Abaadu Konde	Akale Konde	Benhatimofo
Socio-cultural community issues			
1. Indecision about community ownership models.			

From KRI number 1 it appears that the villages need some more time to discuss the practical application of their ownership models. They currently use a model where everyone who uses it has to pay for it and the usage is metered per household, just like in the city. To reduce the risks they can continue with this payment model.

7.4.5. Phase 2. CBB safeguards: socio-economic capacities and ownership models; Cluster 2

Socio-economic factors to consider.

Social Key Risk Indicator	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti
Socio-economic distress								
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.								
7. Inability to buy freezers, electronic devices or other electrical tools.								
Emotional distress								
12. Worries and stress about generating the finances for the projects.								

The KRI number 6, 7 and 12 show that there are socio-economic factors that need to be addressed in order to sustain the projects long-term. From the pleminary krutu sessions, the following socio-economic factors were gathered: the willingness to pay, their current potential to pay and the potential future economic activities that can be potentiated.

Socio-economic factors.			
Village	**Willingness to pay**	**Current potential to pay: Main economic activities to cover operational costs.**	**Potential future economic activities and use of new tools with improved energy, water and telecom access.**
Amaloko kondre, Langaoekoe 1 and Langa-oekoe 2	The men are ready to pay the cost with their income, each month. They decided that their payment model would be that everyone who uses it should pay for it and that usage should be measured per household, just like in the city.	Both men and women are part of the money economy and do economic activities as: small farming, selling hunting products, Podisiri sale, boat services and people working in Moengo.	○ Tourism ○ Elevation of existing business
Lantiwee	The villagers decided to pay the operational and maintenance costs collectively as a community.	Both men and women are part of the money economy and do economic activities as: **Agriculture and bush products ("boesibita").**	○ Tourism ○ Elevation of existing business
Pikin Santi	Not specified	Not specified	○ Tourism

Pinatjarimi	Not specified	Not specified	○ Tourism There is an opportunity to develop tourism with the right support. They would want to further develop in tourism by selling souvenirs to tourists or give tours. The women would like to sell and cook food for tourists.
Tamarin	People have no objection to paying for electricity monthly with their own income. They decided that their payment model would be that everyone who uses it should pay for it and that usage should be measured per household, just like in the city.	Both men and women are part of the money economy and do economic activities as: gardener work, watchman duties, and farm plot yields.	○ Tourism There in an opportunity to develop tourism with the right support. The fort Boekoe location is in this area and already tourists from Afrika and other countries came to visit. So the villagers need ngo's and other business organizations to help develop the tourist sector. ○ Elevation of existing business
Wanhatti	People have no objection to paying for electricity monthly with their own income. They decided that their payment model would be that everyone who uses it should pay for it and that usage should be measured per household, just like in the city.	Both men and women are part of the money economy and do economic activities as: sale of traditional medicine, hunting, agriculture.	○ Tourism ○ Elevation of existing business: selling more medicinal products if there is tourism.

Table 107. Socio-economic factors.

Financial ownership models to sustain operation and maintenance costs.

Social Key Risk Indicator	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti
Socio-cultural community issues								
1. Indecision about community ownership models.								

From KRI number 1 it appears that the villages already know about the practical application of their ownership models. They decided that their payment model would be that everyone who uses it would pay for it and that the usage would be metered per household, just like in the city. In Lantiwee the villagers decided to pay the operational and maintenance costs collectively as a community. Pikin Santi and Pinatjarimi did not provide information about this.

Whether these community funds are managed through bank accounts or through cash can be decided by the villagers and their traditional leaders. With cash there would be a need for local administrative capacity and possibly training.

7.4.6. Phase 2. CBB safeguards: socio-economic capacities and ownership models; Cluster 3

Socio-economic factors to consider.

Social Key Risk Indicator	Moengo	Albina – Alfons dorp	Albina – Marijke dorp	Albina- Pierre Kondre
6. Lack of paid jobs or employed villagers to upkeep ongoing costs.				
7. Inability to buy freezers, electronic devices or other electrical tools.				
12. Worries and stress about generating the finances for the projects.				

The Cluster 3 risk assessment highlights that socio-economic conditions present a challenge to the long-term sustainability of the project. **KRI 6 (lack of paid jobs), KRI 7 (inability to buy equipment), and KRI 12 (financial worries and stress) have been classified as ranging from moderate to substantial risks across the four villages.**

In particular, Alfonsdorp, Marijkedorp, and Pierre Kondre face substantial risks related to limited employment opportunities and high financial stress, while Moengo experiences moderate risks in terms of job scarcity and affordability but substantial concerns regarding financial pressures. These findings underline that socio-economic vulnerabilities directly affect the willingness and ability of households to maintain project-related costs.

From the preliminary *krutu* sessions, the following socio-economic factors must be considered in the FPIC safeguards:

- **Willingness to pay**: Community members express varying levels of readiness to contribute financially, depending on their household income stability.

- **Current potential to pay**: Many households, particularly in Alfonsdorp and Marijkedorp, lack disposable income to invest in equipment or recurring service fees.

- **Future economic activities**: Opportunities for livelihood enhancement, such as small-scale commerce, agriculture, or fisheries, could strengthen the ability of households to sustain project benefits in the long term.

Given the prevalence of substantial risks, the safeguards should focus on **developing fair ownership models** that reduce household burdens and exploring **subsidy or support mechanisms** during the initial years of operation. In addition, project representatives should actively facilitate discussions in *krutu* settings on how socio-economic differences within and between villages can be balanced, ensuring equitable access and long-term sustainability.

Socio-economic factors.			
Village	**Willingness to pay**	**Current potential to pay: Main economic activities to cover operational costs.**	**Potential future economic activities and use of new tools with improved energy, water and telecom access.**
Moengo	Moderate willingness to pay; households show readiness if services are reliable, but emphasize need for transparency in tariffs and safety.	Small trade (retail shops), employment in services and government sector (post-Suralco era), some fishing, small agriculture; remittances and pensions also supplement incomes. Financial pressures remain substantial.	Improved refrigeration can expand retail and food trade; small-scale agro-processing (cassava, fruits); ICT-based services (internet cafés, digital training); increased tourism-related businesses given proximity to Albina.
Alfonsdorp	Expressed willingness but constrained by limited disposable income. Willing to contribute if payment systems are transparent and affordable.	Agriculture (cassava, bananas), hunting, fishing, sewing/tailoring, small-scale retail, GODO-linked fee collection for energy. Unemployment and youth social unrest remain challenges.	Expansion of agriculture with cold storage; women-led microenterprises (tailoring, retail, catering); ICT and computer training for youth; ecotourism and cultural tourism opportunities with better telecom access.
Marijkedorp	Willing but with high financial stress. Some households struggle to sustain recurring costs. Strong preference for fairness and equity in payment models.	Subsistence agriculture, hunting, fishing; small retail activities; reliance on seasonal or informal labor. Disposable income is very limited, making equipment purchases difficult.	○ With energy/water access, small-scale agro-processing, women-led retail, digital commerce; potential growth in handicrafts, cultural heritage tourism, and local service delivery with ICT tools.
Pierre Kondre	Willingness exists but is fragile, due to high poverty levels and lack of steady jobs. Households expect external support or subsidies, especially in the early years.	Limited agriculture (small plots), fishing, subsistence-based livelihoods; very low household incomes; lack of market access; high dependency on remittances or external aid.	Future potential through improved agriculture productivity, cold storage for fisheries, women-led microbusinesses, improved handicrafts, and gradual introduction of ICT-enabled services. Visible mitigation of dust/noise and FPIC engagement will be crucial for community trust.

Table 108. Socio-economic factors.

Financial ownership models to sustain operation and maintenance costs.

Social Key Risk Indicator	Moengo	Albina – Alfons dorp	Albina – Marijke dorp	Albina- Pierre Kondre
1. Indecision about community ownership models.				

KRI number 1 highlights that there is uncertainty about the most appropriate ownership and payment models in the villages of Cluster 3. **As indicated in the risk assessment table, this indecision is classified as low in Moengo, moderate in Alfonsdorp and Pierre Kondre, and substantial in Marijkedorp.** This variation shows that while some communities already have a clear view on how financial responsibilities should be shared, others are still uncertain or divided on how to sustain operation and maintenance costs in the long term.

Preliminary *krutu* sessions revealed that villagers in some communities lean towards an individual payment model, where usage is metered per household, similar to practices in the city. Others have expressed interest in collective payment models, where the community as a whole contributes to cover operational expenses. The substantial risk classification in Marijkedorp indicates that without further guidance, disagreements over ownership and payment models could slow down or undermine project sustainability.

To mitigate these risks, FPIC safeguards should include structured discussions on **financial ownership models** before project implementation begins. Whether funds are managed through bank accounts or in cash is a decision to be taken by the community and their traditional leaders, but in cases where cash is preferred, it is recommended to strengthen local administrative capacity through basic financial training. In villages with substantial or moderate risks, external facilitation may be needed to support consensus-building and to prevent social conflict over unequal contributions or benefits.

By embedding these financial discussions within the FPIC process, communities will not only be able to decide on an ownership model that fits their socio-economic reality but also give informed consent to the long-term commitments associated with the project.

7.5. Environmental Risk Rating and Culturally Appropriate Mitigation Measures/Action Plan

Table 109: Potential positive impact rating

Potential positive Impactrating	Description	Proceed with:
High potential positiveimpact.	Certain to benefit the environment and/orsolve big (socio-) environmental issues.	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated.
Medium potential positiveimpact.	May benefit the environment and/or mayminor (socio-) environmental issues.	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated.
Low potential positiveimpact.	Could benefit the environment but may notsolve (socio-) environmental issues.	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated.

A risk analysis was carried for these KRI's by:

- Rating the potential negative impact (table 75).
- Rating the likelihood of this negative impact; likelihood is the level of probability that a risk willoccur (table 76).
- Evaluating the risk with a risk matrix (risk= potential negative impact x likelihood) (table 77). Thepotential risks are defined by 4 categories: low risk, moderate risk, substantial risk and high risk. The risk per category is described in table 78, with subsequent plan of actions.

Table 110: Potential negative impact rating description

Potential negative Impact rating	Description	Proceed with:
Very high potential negative impact	Irreparable damage to the environment and/orsocio-environmental indicators.	Risk analysis
High potential negative impact	Significant damage to the environment and/orsocio-environmental indicators.	Risk analysis.
Medium potential negative impact	Considerable damage to the environment and/orsocio-environmental indicators.	Risk analysis.
Low potential negative impact	No or insignificant damage to the environment and/or socio-environmental indicators.	Risk analysis.

Table 111: Likelihood rating description

Likelihood	Description
Very likely	Certain to occur.
Likely	Can occur.
Possible	May occur.
Unlikely	Almost never occurs.

Table 112: Risk matrix description

Likelihood- very likely	**Moderate**	**Substantial**	**High**	**High**
likely	**Low**	**Moderate**	**Substantial**	**High**
possible	**Low**	**Moderate**	**Moderate**	**Substantial**
unlikely	**Low**	**Low**	**Low**	**Moderate**
Negative impact	**Low**	**Medium**	**High**	**Very high**

Table 113: Environmental risk rating and mitigation measures / actions description

Risk rating	Description	Mitigating measures /Actions
High	Solar energy, water or telecommunications infrastructure activities may cause irreparable direct or indirect damage to Indigenous peoples'land, air and water. The environment causes significant damage toproject building objectives. The socio-environmental factors 'lack of environmental awareness' or 'gender inequality' impede with the delivery of mitigation measures.	Risk mitigation: The risk can be avoided, reduced to as low as reasonably practicable (ALARP), or transferred. The risk is not acceptable. Safeguards should be formulated.
Substantial	Solar energy, water or telecommunications infrastructure activities may cause significant direct or indirect damage to Indigenous peoples'land, air and water. The environment may cause significant damageto project building objectives The socio-environmental factors 'lack of environmental awareness' or 'gender inequality'can impede with the delivery of mitigation measures.	Risk mitigation: The risk can be avoided, reduced to as low as reasonably practicable (ALARP), transferred or retained. The risk may be acceptable. Safeguards should be formulated.
Moderate	Solar energy, water or telecommunications infrastructure activities may cause considerable direct or indirect damage to Indigenous peoples'land, air and water. The environment may cause considerable damage to project building objectives. The socio-environmental factors 'lack of environmental awareness' or 'gender inequality'may impede with the delivery of mitigation measures.	Risk mitigation: The risk can be avoidedor reduced to as low as reasonably practicable (ALARP), transferred or retained. The risk may be acceptable. Safeguards should be formulated.
Low	Solar energy, water or telecommunications infrastructure activities cause no or insignificantdamage to Indigenous peoples' land, air and water. The environment causes no or insignificant damage to project building objectives. The socio-environmental factors 'lack of environmental awareness' or 'gender inequality'do not impede the delivery of mitigation measures.	Further risk-reducing measures may notbe needed. Guidelines could be formulated.

7.6. Discussion Of Rated Environmental Kpi's Per Village

In this paragraph the environmental KPIs and KRIs will be discussed and an overview for potential positive environmental impact and risks will be given for all locations analyzed to formulate relevant safeguards and guidelines.

The following best practice environmental KPI's were relevant for the purposes of this project:

1. Forest and biodiversity protection.
2. Clean water.
3. Clean energy.
4. Waste management systems.
5. Use of natural resources.
6. Environmental awareness.
7. Gender equality.

The potential positive impact of solar energy, water and telecommunications infrastructure was assessed to see where there were opportunities for improvement. In the general scope of the analysisthe following is considered:

- The level of potential positive impact to the Indigenous peoples' environment, namely their land, airand water.
- The level of potential positive impact of socio-environmental factors, namely environmentalawareness and gender equality on project building objectives.
- Formulation of guidelines to enhance positive impacts.

Table 114: Potential positive environmental impact rating

Potential positive Impactrating	**Description**	**Proceed with:**
High potential positiveimpact.	Certain to benefit the environment and/orsolves big (socio-) environmental issues.	Guidelines to enhance or optimize thispotential positive impact or opportunity should be formulated.
Medium potential positive impact.	May benefit the environment and/or mayminor (socio-) environmental issues.	Guidelines to enhance or optimize thispotential positive impact or opportunity should be formulated.

For the assessment of the potential positive environmental impact, the following legend applies:

Table 115: Positive impact colour legend

Legend	
	High positive potential impact.
	Medium positive potential impact.
	Low positive potential impact.
	Not Applicable.
	No information.

Table 116: KPI Forest and biodiversity protection

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
1. Forest and biodiversity protection													

Scope

This KPI assesses the extent to which local communities are willing and able to engage in **forest protection and biodiversity conservation**. It includes participation in activities such as reforestation, biodiversity monitoring, sustainable energy transitions that reduce reliance on fuelwood, and conservation of sacred or culturally important areas. The scope also considers how communities balance their traditional use of natural resources with emerging conservation needs, and whether there is capacity to adopt **sustainable forest management practices**.

-

Potential Positive Environmental Impact Analysis

The assessment indicates that most villages across Clusters 1, 2, and 3 demonstrate a **medium to high positive potential** for forest and biodiversity protection:

- **High positive potential**: **Akalekondre, Benhattimof, Langa-oekoe 1, Langa-oekoe 2, Pina-tjarimi, Tamarin, Wanhatti, Moengo, Albina-Marijkedorp, Albina-Pierrekondre.**
  These communities show strong interest in reforestation, biodiversity monitoring, and forest protection. In Moengo and Marijkedorp, there is willingness to explore sustainable alternatives to deforestation-driving practices. Tamarin and Wanhatti demonstrate readiness to integrate biodiversity protection with ongoing development projects.

- **Medium positive potential**: **Abadoekondre, Amalokokondre, Lanti-wee, Pikin Santi, Albina-Alfonsdorp.**
  These villages recognize the importance of forests and biodiversity but require additional **awareness-building, technical guidance, and structured support** to strengthen conservation practices. For example, Pikin Santi could improve forest management through reforestation programs, while Alfonsdorp may benefit from biodiversity awareness campaigns and partnerships with NGOs.

No villages are rated with low potential, which underlines a broad regional opportunity for conservation initiatives.

Opportunities to Enhance the Positive Impact

To maximize forest and biodiversity protection across all clusters, the following actions are recommended:

- **For High potential villages**:
  - Expand **community-led reforestation projects**, biodiversity monitoring, and designation of protected zones (e.g., sacred forests or buffer areas).
  - Partner with **research institutions** and **environmental NGOs** to provide tools and training for forest and biodiversity data collection.
  - Integrate forest management into **livelihood diversification strategies**, linking conservation to economic opportunities such as **eco-tourism**, **sustainable harvesting of non-timber products**, or **payment for ecosystem services schemes**.

- **For Medium potential villages**:
    - Strengthen **awareness campaigns** that highlight the environmental and cultural value of forest ecosystems.
    - Start with **small pilot initiatives** (nurseries, wildlife monitoring, erosion control) to build confidence and demonstrate quick wins.
    - Provide **capacity building** for village leaders and youth groups to support long-term forest stewardship.
- **Cross-cutting measures**:
    - Integrate biodiversity and forest protection commitments into **FPIC discussions**, ensuring community-wide ownership.
    - Establish **community monitoring systems** to track deforestation and biodiversity status, empowering villagers to lead conservation.
    - Address linkages with **clean energy adoption (KPI 3)**, reducing fuelwood reliance as a key driver of deforestation.

Table 117: KPI 2 Clean water

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
2. Clean water													

Scope

The scope of this assessment focuses on the **accessibility, reliability, and sustainability** of clean water sources across all villages in Clusters 1, 2 and 3. It examines whether current sources meet community needs and evaluates the added benefits of improved access, including **public health**, **agricultural productivity**, and how **energy availability** (for pumping and filtration) shapes water treatment and sanitation systems. The assessment also considers the potential of **sustainable water management practices**—such as rainwater harvesting, protected wells, and point-of-use filtration—to reduce pressure on rivers and wetlands while strengthening long-term environmental resilience.

Potential Positive Environmental Impact Analysis

Based on the color-coded matrix, the positive impact potential differs by village/group:

- **High positive potential**: **luster I (Abadoekondre, Akalekondre, Benhattimof)**, **Langa-oekoe 2**, **Lanti-wee**, **Pikin Santi**, **Tamarin**, **Moengo**, **Albina-Alfonsdorp**, **Albina-Marijkedorp**, **Albina-Pierrekondre**.
  In these locations, communities show strong openness to adopting or upgrading clean water systems. Interventions are likely to yield rapid gains in **reduced waterborne disease**, **improved sanitation**, and **ecosystem protection** (e.g., less contamination of surface waters). The high rating signals readiness for implementation and good prospects for sustained operation when paired with basic management support.
- **Medium positive potential**: **Amalokokondre**, **Langa-oekoe 1**, **Pina-tjarimi**, **Wanhatti**. Here, the environmental and health benefits are clear, but success is more **contingent on enabling factors**—notably steady energy for pumping/filtration, local O&M capacity, and community governance for equitable distribution. With these supports in place, these villages can move from medium to high performance over time.

Overall, the distribution indicates **broad opportunity** across all clusters, with most villages already positioned for high impact once appropriate systems and capacities are in place.

Opportunities to Enhance the Positive Impact

Targeted interventions aligned to potential level:

- **For High potential villages (Cluster I; Langa-oekoe 2; Lanti-wee; Pikin Santi; Tamarin; Moengo; Albina-Alfonsdorp; Albina-Marijkedorp; Albina-Pierrekondre):**
  - **Deploy infrastructure**: prioritize **solar-powered pumping**, **gravity-fed distribution**, **rainwater harvesting**, and **multi-barrier filtration** (household and communal).
  - **Protect sources**: establish **buffer zones** and riparian protection to limit erosion and runoff; link water works with **forest/watershed conservation**.
  - **O&M readiness**: constitute/strengthen **village water committees** with clear roles for fee collection, minor repairs, and spare-parts logistics.
- **For Medium potential villages (Amalokokondre; Langa-oekoe 1; Pina-tjarimi; Wanhatti):**
  - **Pair water with energy**: co-design water upgrades alongside **reliable energy solutions** (e.g., PV + battery for pumps and UV).
  - **Capacity & governance**: deliver **hands-on training** for caretakers; use simple **O&M playbooks** and **spare-parts kits**; agree on transparent **cost-recovery** methods through FPIC.
  - **Phased pilots**: start with **pilot points** (school/clinic) to demonstrate benefits, then scale to household or community networks once routines are established.

Cross-cutting recommendations for all villages:

- Integrate clean water actions into **krutu/FPIC** so access rules, tariffs (if any), and responsibilities are **understood and accepted**.
- Couple water improvements with **hygiene promotion** (safe storage, handwashing) to maximize health/environmental returns.
- Track **water quality and uptime** (simple logs and periodic tests) to maintain performance and community trust.

Table 118: KPI 3 Cleaner Energy

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
3. Cleaner energy													

Scope

The scope assessed under this KPI focuses on the transition of village energy systems toward cleaner and more sustainable alternatives. Many of the assessed communities continue to rely on fossil fuels (diesel generators) and traditional biomass sources (fuelwood and charcoal) for their daily energy needs. This reliance creates multiple challenges: deforestation, indoor air pollution, high greenhouse gas emissions, and economic vulnerability due to dependence on costly and logistically difficult fuel transport.

The assessment therefore examines both the willingness of communities to adopt renewable energy systems (solar, wind, hybrid solutions) and the feasibility of such transitions in terms of technical, financial, and social readiness. Cleaner energy access not only reduces environmental pressures but also provides a foundation for health improvements, education, productive livelihoods, and long-term sustainability.

Potential Positive Environmental Impact Analysis

The classification across villages shows clear differences in potential:

- **High positive potential**: Cluster I (Abadoekondre, Akalekondre, Benhattimof), Amalokokondre, Langa Oekoe 2, Lanti-wee, Pikin Santi, Tamarin, Wanhatti, Moengo, Albina-Alfonsdorp, Albina-Marijkedorp, Albina-Pierrekondre.

  These villages demonstrate strong interest in shifting to solar power and other renewable solutions. For example, Tamarin and Pikin Santi already express willingness to reduce dependence on wood-based fuels, while Moengo and the Albina villages see renewable energy as a path toward modernized community infrastructure. Replacing diesel generators and firewood with renewable systems will significantly lower emissions, reduce indoor smoke exposure, and protect surrounding forests from further degradation.

- **Medium positive potential**: Langa Oekoe 1, Pina-tjarimi.

  These villages acknowledge the benefits of renewable energy but face constraints such as affordability, limited technical capacity, and dependency on external support for installation and maintenance. Without targeted training and financing, adoption here may progress more slowly. Nevertheless, even in medium potential areas, introducing renewable pilot projects can yield important environmental and social benefits.

No villages are rated as low potential, which underscores the broad regional opportunity for clean energy transition across all clusters.

Opportunities to Enhance the Positive Impact

To accelerate the shift toward cleaner energy, the following strategies are recommended:

- For **High potential villages:**
  - Infrastructure investment: Prioritize solar mini-grids, decentralized PV kits, and hybrid renewable systems, particularly for schools, clinics, and water systems.
  - Clean cooking solutions: Introduce efficient stoves and biogas systems to reduce reliance on charcoal and firewood, directly linking energy to forest protection.
  - Health co-benefits: Communicate the advantages of reduced household air pollution, especially for vulnerable groups such as women and children.
  - Community engagement: Establish village energy committees to manage tariffs, repairs, and equitable access.
- For **Medium potential villages (Langa Oekoe 1, Pina-tjarimi):**
  - Capacity-building and training: Provide technical skills for system maintenance and troubleshooting.
  - Pilot programs: Begin with small-scale solar installations in public spaces to demonstrate reliability and build trust.
  - Financial mechanisms: Explore subsidies, micro-finance, or cooperative ownership schemes to reduce upfront costs.
- **Cross-cluster opportunities**:
  - Encourage knowledge-sharing between high potential villages (e.g., Pikin Santi, Tamarin, Albina villages) and medium potential ones, fostering peer learning.
  - Partner with renewable energy organizations and financing institutions to ensure durable, high-efficiency technologies and long-term maintenance support.
  - Embed energy transition into FPIC processes, ensuring that communities fully understand both the benefits and the responsibilities of maintaining systems.

By aligning technical support, financial accessibility, and community ownership, the transition to renewable energy can create lasting environmental improvements while reinforcing the social and economic resilience of all assessed villages.

Table 119: KPI 4 Waste management systems

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
4. Waste management systemes													

Scope

The assessment under this KPI focuses on current waste disposal practices, community interest in structured waste management, and the environmental and health benefits of introducing formalized systems. At present, none of the assessed villages across Clusters 1, 2, and 3 have established waste collection, recycling, or composting infrastructure. Instead, disposal tends to be informal and unregulated: burning of household refuse, dumping in rivers or open areas, and burial of hazardous materials such as used batteries. These practices contribute to soil and water contamination, greenhouse gas emissions from open burning, and local health hazards.

The scope also considers how access to energy infrastructure, community engagement, and environmental education could facilitate improved waste handling. Structured waste management systems—ranging from waste separation and composting to recycling and safe hazardous waste disposal—offer a pathway toward both environmental protection and healthier living conditions.

Potential Positive Environmental Impact Analysis

The analysis indicates a medium overall potential for positive impact across the villages, with variations by local conditions:

- High positive potential: Cluster I (Abadoekondre, Akalekondre, Benhattimof), Langa Oekoe 1, Langa Oekoe 2, Moengo, Albina-Marijkedorp, Albina-Pierrekondre.

  These communities would benefit substantially from the introduction of structured waste management systems. In Abadoekondre and Langa Oekoe 1, unmanaged waste contributes directly to pollution risks, while in Moengo and the Albina towns, larger populations generate greater waste volumes, heightening the urgency for collection and recycling solutions.

- Medium positive potential: Amalokokondre, Lanti-wee, Pikin Santi, Pina-tjarimi, Tamarin, Wanhatti, Albina-Alfonsdorp.

  These locations show openness to improved waste practices but require significant awareness raising, infrastructure investment, and governance mechanisms to ensure proper implementation. For example, Amalokokondre and Pina-tjarimi would need stable energy supply to enable advanced solutions such as composting or controlled processing, while Pikin Santi and Tamarin would benefit most from community-driven education and participatory waste initiatives.

Overall, structured waste management presents an important opportunity to reduce environmental pollution, prevent the spread of diseases, and protect water and forest ecosystems across all assessed clusters.

Opportunities to Enhance the Positive Impact

To maximize positive outcomes, several strategic actions are recommended:

- For High potential villages:
  - Establish pilot waste collection systems with emphasis on household waste separation (organic, recyclable, hazardous).
  - Introduce community-based recycling projects, particularly in Moengo and Albina, where larger populations make scaling feasible.
  - Explore waste-to-value initiatives (compost for agriculture, plastics recycling, biogas generation) to align environmental goals with local livelihoods.

- For Medium potential villages:
  - Community education campaigns to raise awareness of health risks from burning and improper disposal.
  - Encourage youth and women's groups to lead local clean-up and recycling activities, building ownership.
  - Provide basic infrastructure (collection bins, controlled pits, transport arrangements) before moving to more advanced systems.

- Cross-cutting recommendations:
  - Integrate waste management planning into FPIC discussions so that rules for collection, cost-sharing, and safe disposal are accepted by all households.
  - Partner with environmental NGOs and municipalities to introduce sustainable recycling chains and hazardous waste management.
  - Include training and local governance support, ensuring waste committees are able to manage operations long-term.

By combining infrastructure, community engagement, and external partnerships, villages across Clusters 1–3 can significantly reduce pollution and improve both environmental and human health conditions through effective waste management systems.

Table 120: KPI 5 Use of natural resources

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
5. Use of natural resources													

Scope

This KPI evaluates how communities' current use of natural resources—particularly wood for cooking and heating, diesel for power generation, and waste burning—affects air quality, and how shifts to sustainable alternatives could improve environmental and health outcomes. The assessment looks at the feasibility and willingness of communities to transition to renewable energy systems, electric cooking appliances, and waste management solutions that reduce indoor and outdoor air pollution.

Air quality is closely linked to household practices: indoor smoke from firewood and charcoal use is a major health hazard, particularly for women and children, while open burning of waste releases pollutants harmful to both people and ecosystems. Clean air improvements depend heavily on electrification (KPI 3), clean water availability (KPI 2), and forest conservation (KPI 1), making this KPI a cross-cutting issue.

Potential Positive Environmental Impact Analysis

The assessment indicates a generally medium-to-high potential for clean air improvements across the villages:

- High positive potential:
  Cluster I (Abadoekondre, Akalekondre, Benhattimof), Amalokokondre, Langa Oekoe 2, Lanti-wee, Wanhatti, Moengo, Albina-Marijkedorp, Albina-Pierrekondre.
  These communities show clear opportunities to replace firewood and diesel with renewable systems. For example, Abadoekondre and Amalokokondre could substantially reduce wood smoke exposure by adopting electric cooking and solar energy. Moengo and the Albina towns, with larger populations, would benefit strongly from cleaner cooking solutions and structured waste management, reducing both indoor air pollution and urban smog-like effects from waste burning.
- Medium positive potential:
  Langa Oekoe 1, Pikin Santi, Pina-tjarimi, Tamarin, Albina-Alfonsdorp.
  These villages are willing to engage in sustainable practices but may face adoption challenges due to financial constraints, dependency on traditional cooking, or lack of awareness. For example, Pikin Santi and Tamarin remain highly dependent on wood burning, creating both deforestation pressure and indoor air pollution. Langa Oekoe 1 and Pina-tjarimi have signaled interest in cleaner options but need targeted awareness campaigns and support to adopt new technologies.

Overall, reducing reliance on biomass fuels and open burning practices represents one of the most direct pathways to improving community health and environmental quality across all clusters.

Opportunities to Enhance the Positive Impact

To maximize air quality improvements, the following actions are recommended:

- For High potential villages:
  - Introduce electric cooking appliances (solar-powered stoves, induction cookers) to reduce wood smoke exposure.
  - Deploy clean energy mini-grids and solar kits (linked to KPI 3) that enable reliable household electricity for cooking, lighting, and refrigeration.
  - Integrate waste management interventions (KPI 4) to prevent open burning and toxic emissions.
  - Promote community health campaigns highlighting the risks of smoke exposure and benefits of clean air.
- For Medium potential villages:
  - Focus on behavior change and awareness through krutu sessions on the dangers of wood smoke and waste burning.
  - Pilot fuel-efficient stoves or shared cooking systems as a gradual transition before full electrification.
  - Provide financial incentives or micro-credit schemes for households to invest in clean cooking solutions.
- Cross-cutting recommendations:
  - Integrate clean air goals into FPIC and CBB discussions, ensuring communities connect energy, waste, and health.
  - Collaborate with NGOs and public health agencies to measure indoor/outdoor air quality improvements and monitor adoption.
  - Ensure that women—who are most exposed to indoor smoke—are central to planning, training, and decision-making.

By advancing electrification, clean cooking, and waste management in tandem, the villages across Clusters 1–3 can achieve significant reductions in air pollution. These improvements will lead to better health outcomes, reduced deforestation, and stronger environmental resilience.

Table 121: KPI 6. Environmental awareness

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
6. Environmental awareness													

Scope

This KPI examines the level of environmental awareness and resilience-building practices across all villages in Clusters 1, 2, and 3, focusing on how education, infrastructure, and technology can strengthen community preparedness for climate change impacts. The analysis considers:

- Openness to scientific research and willingness to participate in biodiversity or climate monitoring initiatives.
- Traditional knowledge sharing and its integration with modern conservation strategies.
- Access to electrification and digital education, which can support awareness campaigns and climate adaptation strategies.
- Community readiness to adopt sustainable technologies, including clean energy, water management, and waste reduction systems, which directly contribute to climate resilience.

Overall, climate resilience depends on the balance between traditional practices and modern adaptation strategies, as well as the capacity of villages to organize themselves around long-term environmental protection.

Potential Positive Environmental Impact Analysis

The assessment reveals differences across villages, grouped by their potential to build resilience and awareness for climate change mitigation:

- High positive potential:
  Langa Oekoe 1, Tamarin, Moengo, Albina-Marijkedorp, Albina-Pierrekondre.
  These communities show strong environmental awareness and interest in combining conservation with modernization. Langa Oekoe 1 demonstrates an existing culture of sustainability, while Tamarin balances modernization efforts with traditional values. Moengo and the Albina towns have greater access to education and infrastructure, which provides fertile ground for structured climate awareness programs and community-led sustainability initiatives.
- Medium positive potential:
  Cluster I (Abadoekondre, Akalekondre, Benhattimof), Amalokokondre, Langa Oekoe 2, Lanti-wee, Pikin Santi, Wanhatti, Albina-Alfonsdorp.
  These villages demonstrate openness to environmental education and sustainable technologies but require structured interventions to strengthen awareness and translate it into action. Abadoekondre and Lanti-wee, for instance, are willing to engage in research and discussions, but long-term resilience will require consistent training and integration of sustainable infrastructure. Wanhatti and Amalokokondre can leverage electrification to access digital education, while Pikin Santi needs targeted awareness programs to sustain engagement.
- Lower-medium potential:
  Pina-tjarimi.
  While interest in sustainability exists, limited infrastructure and low exposure to digital education hinder the village's ability to engage fully in climate awareness. Structured support and demonstration projects will be essential to raise its resilience capacity.
- Opportunities to Enhance the Positive Impact

To strengthen environmental awareness and resilience across Clusters 1–3, a multi-layered strategy is recommended:

1. Leverage high-potential villages as role models
    - Langa Oekoe 1 and Tamarin can lead in community-driven conservation, serving as training and demonstration sites for other villages.
    - Moengo and Albina towns can pilot integrated urban climate strategies, combining waste reduction, renewable energy, and eco-education initiatives.
2. Expand environmental education and digital access
    - Wanhatti and Amalokokondre can use electrification to enhance access to digital platforms for environmental learning.
    - Partner with NGOs and government agencies to provide workshops, school curricula, and multimedia campaigns on climate adaptation and biodiversity protection.
3. Integrate sustainable infrastructure into awareness-building
    - In Langa Oekoe 2 and Lanti-wee, pilot projects on renewable energy, water management, and eco-friendly construction can showcase practical benefits.
    - Promote community recycling and reforestation projects that combine traditional practices with modern environmental management.
4. Promote eco-tourism and sustainable economic activities
    - Abadoekondre and Tamarin have the cultural and natural foundations to link traditional knowledge with eco-tourism and conservation-based livelihoods.
    - Establish local sustainability committees in each village to oversee awareness initiatives, monitor environmental impact, and ensure long-term community ownership.

By combining education, infrastructure, and community-led initiatives, all assessed villages can improve their capacity to adapt to climate change, mitigate environmental risks, and strengthen resilience. The cross-cluster approach ensures that villages with higher awareness support those with emerging potential, reinforcing a collective path toward sustainability.

Table 122: KPI 7 Gender Equality

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
7. Gender Equality.													

Scope

This KPI examines how improved infrastructure—clean water, renewable energy, waste management, and telecommunications—affects gender equality across the villages of Clusters 1, 2, and 3. Traditionally, women in these communities bear the primary responsibility for household chores, such as collecting water, preparing food, gathering firewood, and managing childcare, which limits their opportunities for education, income generation, and leadership roles.

The assessment considers how infrastructure development and sustainable practices can reduce these burdens, allowing women to engage in education, entrepreneurship, digital opportunities, and decision-making processes. It also explores how changing gender roles in resource management and increased involvement in community governance can contribute to long-term empowerment. While some villages already show progress in integrating women into environmental and socio-economic

activities, others require structured interventions and cultural shifts to ensure inclusivity in project benefits.

Potential Positive Impact Analysis

The classification of gender equality potential differs across the villages:

- High potential impact: Pikin Santi, Tamarin, Moengo, Albina-Marijkedorp. These villages are well-positioned to experience significant shifts in gender roles with the introduction of clean water, renewable energy, and digital access. In Pikin Santi and Tamarin, reducing women's time spent on household burdens through electrification and water access can translate directly into greater participation in education, small business, and community leadership. Moengo and Albina-Marijkedorp, with larger populations and existing social infrastructure, offer strong opportunities for women's entrepreneurship and professional engagement.
- Medium potential impact: Abadoekondre, Akalekondre, Benhattimof (Cluster I), Amalokokondre, Lanti-wee, Langa Oekoe 2, Pina-tjarimi, Wanhatti, Albina-Alfonsdorp, Albina-Pierrekondre. These communities will also benefit from infrastructure improvements, particularly in clean water and renewable energy, which can reduce women's workload and free time for productive activities. For instance, Amalokokondre and Pina-tjarimi could see progress through vocational training and entrepreneurship initiatives, while Lanti-wee and Langa Oekoe 2 can enhance women's roles in sustainability committees and resource management. In Wanhatti, access to telecommunications and digital services could create opportunities for remote work and digital empowerment, provided education and training accompany these shifts.
- Low potential impact: Langa Oekoe 1. Gender equality benefits here are more indirect and gradual, with women's participation likely to improve mainly through involvement in environmental decision-making committees rather than immediate economic empowerment. Cultural norms and traditional governance structures may slow down shifts in household roles, requiring long-term engagement strategies.

Opportunities to Enhance the Positive Impact

To strengthen gender equality outcomes, the following actions are recommended across all clusters:

1. Education and Entrepreneurship Programs
    - In high-potential villages such as Pikin Santi, Tamarin, Moengo, and Albina-Marijkedorp, integrate vocational training, financial literacy, and entrepreneurship programs tailored to women.
    - Support digital literacy initiatives in Wanhatti and Albina villages to enable women to benefit from remote work, online services, and e-commerce.
2. Community Engagement and Policy Advocacy
    - In Abadoekondre, Amalokokondre, and Lanti-wee, organize community dialogues to promote inclusive governance and encourage men to share household responsibilities.
    - Strengthen policy advocacy at village and district levels to ensure women are represented in energy, water, and environmental committees.
3. Gender-Inclusive Infrastructure Development
    - In Langa Oekoe 1, Langa Oekoe 2, and Pina-tjarimi, ensure women are systematically included in resource management and environmental planning bodies, giving them a stronger voice in sustainability decisions.

- Provide training in eco-friendly livelihoods (e.g., waste recycling, reforestation work, eco-tourism), which can combine environmental and gender equality goals.

4. Leveraging Technology for Empowerment
    - Expand access to telecommunications, mobile banking, and online education for women in Wanhatti, Moengo, and Albina communities, helping bridge gender gaps in economic opportunities.
    - Pilot women-led digital cooperatives that can link sustainable resource management with income generation.

By reducing household burdens, creating space for education and entrepreneurship, and ensuring women's representation in decision-making, infrastructure development and sustainability initiatives across Clusters 1–3 can significantly contribute to advancing gender equality and building more inclusive communities.

Overview of Environmental KPI rating

Table 123: Overview Environmental KPI rating

Key Performance Indicator	cluster I: Abadoekondre, Akalekondre and	Amalokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina-Pierrekondre
1. Forest and biodiversity protection													
2. Clean water													
3. Cleaner energy													
4. Waste management systemes													
5. Use of natural resources													
6. Environmental awareness													
7. Gender Equality.													

Table 124: positive impact colour legend

Legend	
	High positive potential impact.
	Medium positive potential impact.
	Low positive potential impact.
	Not Applicable.
	No information.

7.7. Overview Of Scope, Potential Positive Environmental Impact Analysis And Opportunities To Enhance Positive Impact Analysis

Key Performance Indicator	Scope	Positive impact analysis: anoverview.	Opportunities to enhance this positive impact.
1. Forest and biodiversity protection.	The KPI assesses the engagement of local communities in forest and biodiversity protection through scientific research, sustainable energy, and conservation initiatives. Some villages show strong interest in sustainable practices, while others need further encouragement and structured support. Key themes include electrification, sustainable forest management, and biodiversity monitoring.	Villages such as Amalokokondre, Langa-oekoe 1, Langa-oekoe 2, and Pina-tjarimi show high potential for biodiversity conservation through their willingness to adopt sustainable energy solutions, thereby reducing deforestation. Abadoekondre (Cluster I) and Lanti-wee contribute through scientific research, while Pikin Santi and Tamarin can strengthen forest protection through reforestation and limiting large-scale agricultural projects. Wanhatti has moderate potential and requires additional education and capacity-building to transition successfully to sustainable practices. Urban sites such as Moengo and Albina towns also demonstrate opportunities to integrate conservation with municipal planning.	Targeted actions can enhance the impact: collaboration with environmental organizations for biodiversity monitoring (Abadoekondre, Lanti-wee); expansion of electrification and clean energy sources (Amalokokondre, Pina-tjarimi, Langa-oekoe 1); reforestation and sustainable forest management (Langa-oekoe 2, Pikin Santi); awareness of solar energy and sustainable alternatives (Tamarin); and education and capacity-building (Wanhatti). In urban sites (Moengo, Albina towns), integration of conservation efforts with infrastructure upgrades can strengthen resilience.
Key Performance Indicator	**Scope**	**Positive impact analysis: anoverview.**	**Opportunities to enhance this positive impact.**
2. Clean water.	This KPI examines the accessibility and reliability of clean water sources within the thirteen villages. The assessment considers whether current water supplies meet the needs of the communities and evaluates the potential health, livelihood, and environmental benefits of improved clean water access.	Villages such as Abadoekondre, Langa-oekoe 2, Lanti-wee, Pikin Santi, and Tamarin show a high potential for positive impact from water improvements, with benefits including reduced waterborne diseases, improved sanitation, and increased agricultural productivity. Amalokokondre, Langa-oekoe 1, Pina-tjarimi, and Wanhatti demonstrate medium potential, where improvements are possible but dependent on energy infrastructure. Urban sites	Solar-powered purification and rainwater collection projects should be prioritized in Abadoekondre, Lanti-wee, and Tamarin. Electrification improvements would strengthen water treatment in Amalokokondre and Wanhatti. Community-led water committees would ensure inclusive governance. In urban sites such as Moengo and Albina, integrating modern filtration

		such as Moengo, Albina-Alfonsdorp, Albina-Marijkedorp, and Albina-Pierrekondre show medium-to-high potential if linked with municipal water projects.	technologies with municipal infrastructure could secure long-term sustainability.
Key Performance Indicator	**Scope**	**Positive impact analysis: anoverview.**	**Opportunities to enhance this positive impact.**
3. Cleaner energy.	The KPI focuses on transitioning communities from heavy reliance on wood and diesel to renewable energy sources such as solar and wind. The scope emphasizes environmental and health benefits, such as reduced emissions, improved air quality, and sustainable energy independence.	Villages including Abadoekondre, Amalokokondre, Langa-oekoe 1, Lanti-wee, Pina-tjarimi, Pikin Santi, Tamarin, and Wanhatti demonstrate high potential for renewable energy transition due to strong community interest. Langa-oekoe 2 shows medium potential, reflecting slower implementation readiness. Urban sites such as Moengo and Albina towns display moderate potential, where interest exists but requires structural and financial support.	Pilot solar mini-grids and home systems could be prioritized in Abadoekondre, Amalokokondre, and Pina-tjarimi. Training on operation and maintenance should be implemented in villages with high adoption potential. Partnerships with renewable energy providers can strengthen technical support and financing in urban contexts such as Moengo and Albina.
Key Performance Indicator	**Scope**	**Positive impact analysis: anoverview.**	**Opportunities to enhance this positive impact.**
4. Waste management systems.	This KPI examines how villages currently handle waste and the opportunities for structured waste collection, recycling, and responsible disposal. Many communities still use informal practices such as burning or burying waste, which creates health and environmental risks.	The introduction of structured waste management systems has a medium potential positive impact across the villages. Abadoekondre and Langa-oekoe 1 could significantly reduce local pollution through improved waste handling. Amalokokondre and Pina-tjarimi could use electricity to enable better processing and composting. Tamarin and Pikin Santi require strong community involvement for success. Wanhatti and Lanti-wee need further education and infrastructure development. Urban sites like Moengo and Albina towns show opportunities for integration into municipal waste programs.	Opportunities include piloting waste-to-energy or composting systems in villages with electricity (Amalokokondre, Pina-tjarimi), implementing education campaigns for recycling (Langa-oekoe 2, Pikin Santi), and introducing waste separation and collection systems in Abadoekondre and Langa-oekoe 1. Urban sites should align with municipal waste strategies, supported by technical and financial assistance.
Key Performance Indicator	**Scope**	**Positive impact analysis: an overview.**	**Opportunities to enhance this positive impact.**

5. Use of natural resources.	This KPI assesses how communities use resources such as firewood, water, and land, and how shifts to electrification and efficient technologies can reduce pressure on the environment.	All villages demonstrate a strong dependence on wood as a fuel source, leading to deforestation and biodiversity loss. Abadoekondre, Amalokokondre, and Wanhatti could reduce wood use by adopting electric cooking. Langa-oekoe 1, Pikin Santi, and Tamarin would benefit from improved water management systems. Langa-oekoe 2 shows strong comprehensive focus on sustainable land and water use. Lanti-wee demonstrates interest in solar technologies. Urban communities such as Moengo and Albina towns provide opportunities for structured management of resources through municipal systems.	Opportunities include electrification projects with electric cooking appliances (Abadoekondre, Amalokokondre, Wanhatti), water storage and conservation systems (Langa-oekoe 1, 2, Pikin Santi, Tamarin), and promoting sustainable hunting and fishing practices (Pikin Santi, Tamarin). In urban areas, coordination with municipal planning for sustainable water and energy use is essential.
Key Performance Indicator	**Scope**	**Positive impact analysis: an overview.**	**Opportunities to enhance this positive impact.**
6. Environmental awareness.	This KPI evaluates the level of environmental awareness in villages, considering education, traditional knowledge, and the influence of electrification and technology in raising awareness.	Villages such as Langa-oekoe 1 and Tamarin show high awareness and readiness to adopt conservation practices. Abadoekondre, Amalokokondre, Langa-oekoe 2, and Lanti-wee demonstrate medium potential, where awareness exists but needs more education and practical integration. Pina-tjarimi and Wanhatti could leverage electricity and digital resources to enhance environmental education. Pikin Santi shows lower levels, requiring consistent engagement. Urban sites (Moengo and Albina towns) show potential through schools and	Opportunities include community-led conservation projects in high-awareness villages (Langa-oekoe 1, Tamarin), structured workshops in medium-level villages (Amalokokondre, Lanti-wee, Langa-oekoe 2), digital education programs in Pina-tjarimi and Wanhatti, and integrating awareness campaigns into schools and municipal structures in Moengo and Albina towns.

		outreach programs.	
Key Performance Indicator	**Scope**	**Positive impact analysis: anoverview.**	**Opportunities to enhance this positive impact.**
7. Gender equality	This KPI assesses how improved infrastructure (clean water, energy, telecommunications) impacts gender equality. Women traditionally carry the burden of water collection, fuel gathering, and household tasks, limiting their ability to engage in education, income generation, and leadership.	Villages such as Pikin Santi show high impact potential, where infrastructure improvements would significantly shift gender dynamics. Abadoekondre, Amalokokondre, Lanti-wee, Pina-tjarimi, and Wanhatti show medium potential, as improved services will free women's time for education and economic activities. Langa-oekoe 1, Langa-oekoe 2, and Tamarin show lower impact levels, where changes may occur more gradually. Urban sites such as Moengo and Albina towns present opportunities for gender-inclusive programs in education, digital access, and community leadership.	Opportunities include entrepreneurship and vocational programs for women (Pikin Santi, Wanhatti, Pina-tjarimi), inclusive decision-making in resource management (Abadoekondre, Amalokokondre, Lanti-wee), and ensuring women's participation in sustainability committees (Langa-oekoe 1, 2, Tamarin). Urban contexts can leverage technology and education programs (Moengo, Albina towns) to expand women's empowerment and participation.

Table 125: Scope, Positive Environmental Impact & Opportunities to Enhance

7.8. Results Environmental assessment: risk analysis

An environmental risk analysis was done from the information of the Krutu sessions in each village. Risk indicators were extrapolated from the relevant best practice KPI analysis. Key Risk Indicators were used to measure potential risks for setting up solar, water and telecom infrastructure in the villages.

The following KRI's were identified:

1. Climate: heavy rainfall/flood risk.
2. Deforestation and biodiversity loss.
3. Noise disturbance.
4. Air pollution: dust production.
5. Water pollution: gold extraction.
6. Lack of waste management.
7. Lack of environmental awareness.
8. Gender inequality.

In the general scope of the analysis the following is considered

- The level of damage to Indigenous peoples' land, air and water, environmental fact
- The level of damage the environment can cause to project building objectives.
- If the socio-environmental factors 'lack of environmental awareness' and 'gender inequality' could impede the delivery of risk mitigation measures. (see table 87 for complete risk rating).

Table 126: Risk analysis colour legend

Legend	
	High risk.
	Substantial risk.
	Moderate risk.
	Low risk.
	Not Applicable.
	No information.

Table 127: KRI 1. Climate – heavy rainfall

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
1. Climate heavy rainfall													

Scope

This KRI assesses the risk of **flooding, soil erosion, drainage failure, and damage to solar/water/telecom infrastructure** linked to heavy rainfall. It considers:

- **Damage to Indigenous land, air, and water** (e.g., erosion of riverbanks, siltation, crop loss).
- **Damage the environment can cause to project objectives** (e.g., substation/solar array inundation, access road washouts, tower foundation instability).
- Whether **socio-environmental factors** — notably **lack of environmental awareness** and **gender inequality** — could **impede risk-mitigation** planning, training, and upkeep (e.g., exclusion of women from early-warning committees or O&M roles, or low community engagement in drainage upkeep).

Risk Analysis

Cluster 1 shows **Substantial** rainfall/flooding risk across all three villages (Abadoekondre, Akalekondre, Benhattimof). Anticipated issues include frequent road passability problems, erosion of cleared plots, and higher O&M costs if drainage is not installed and maintained.

Cluster 2 is **mixed**: Langa-oekoe 1 and Tamarin are **Substantial**, while most others are **Moderate**, and Wanhatti is **Low**. Moderate-risk sites still face material transport delays, periodic culvert overtopping, and localized embankment failure during peak storms; Substantial-risk sites are more prone to platform inundation and slope instability unless designs elevate and harden assets. **Low** at Wanhatti suggests current siting/drainage/natural elevation reduce exposure, though climate variability could increase intensity over time.

Cluster 3 has **High** risk at **Moengo** and **Albina-Marijkedorp**, **Substantial** at **Alfonsdorp**, and **Moderate** at **Pierrekondre** — indicating urban/peri-urban drainage constraints, riverine overflow potential, and greater vulnerability of telecom towers and distribution lines to foundation scour and access disruption.

Safeguards

Safeguards against flooding and heavy rainfall should be woven into both the design of infrastructure and the way communities prepare for the future. In high-risk villages like Moengo and Albina-Marijkedorp, it is not enough to build quickly; construction must be guided by careful siting so that roads, solar fields, and telecom towers stand above flood-prone areas. This requires raising platforms, improving drainage systems, and reinforcing embankments so that stormwater can flow without washing away roads or destabilizing structures.

At the same time, resilience cannot be built on engineering alone. Communities need to understand how climate change will shape rainfall patterns and what that means for their homes and livelihoods. Regular awareness programs can transform knowledge into preparedness, helping residents recognize flood warning signs and maintain small-scale protective measures, such as clearing blocked drains before the rainy season. Ensuring that women, men, and youth all participate in these initiatives makes the response more inclusive and effective.

Nature itself should be treated as an ally in flood protection. Restoring forest cover, protecting riverbanks, and maintaining wetlands strengthens the landscape's ability to absorb water and reduce

erosion. When combined with community-driven monitoring and institutional support, these efforts ensure that safeguards are not one-off interventions but a continuous process that protects both infrastructure and the people who depend on it.

Table 128: KRI 2. Deforestation and biodiversity loss

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
2. Deforestation and biodiversity loss													

Scope

This KRI assesses risks of **forest loss, biodiversity decline, and ecosystem disruption** in and around the project villages. Deforestation may arise from construction activities (land clearing for solar fields, telecom towers, or access roads), as well as indirect impacts (increased logging, mining, or settlement expansion once infrastructure access is improved). Biodiversity loss affects not only flora and fauna but also local livelihoods that depend on forest products, hunting, fishing, and traditional medicine.

The analysis considers:

- **Damage to Indigenous land, forest resources, and biodiversity** — such as loss of sacred groves, medicinal plants, and wildlife habitats.
- **Damage to project objectives from environmental degradation** — erosion, landslides, and ecosystem instability that compromise infrastructure.
- **Socio-environmental barriers** — such as **lack of environmental awareness** or **gender inequality** — which can weaken reforestation, monitoring, and protection initiatives.

Potential Environmental Risk Analysis

Cluster 1 villages (Abadoekondre, Akalekondre, Benhattimof) face **High risk** due to high reliance on forests and proximity to ongoing land-use change. Clearing for infrastructure could accelerate biodiversity loss and degrade natural protective barriers (e.g., against erosion).

Cluster 2 is mixed:

- **High risk** in Langa-oekoe 1, Lanti-wee, and Tamarin, where deforestation pressures are already strong and forest fragmentation threatens habitats.
- **Substantial risk** in Amalokokondre, Langa-oekoe 2, Pikin Santi, and Pina-tjarimi, where deforestation is less advanced but awareness and monitoring are weak.
- **Moderate risk** in Wanhatti, where forest cover remains relatively intact but infrastructure development could trigger indirect impacts.

Cluster 3 shows **High risk** in Moengo — a hub where mining and urban expansion accelerate forest loss. Villages such as Albina-Alfonsdorp, Marijkedorp, and Pierrekondre face **Substantial risk** due to peri-urban expansion, illegal logging, and habitat disturbance in nearby forest patches.

Safeguards

Safeguards for deforestation and biodiversity loss must be grounded in respect for the land and the people who depend on it. Infrastructure should be planned with an eye for the surrounding ecosystem, avoiding unnecessary clearing and ensuring that sacred sites, wildlife corridors, and river buffers are left intact. Where land must be disturbed, restoration with native species and careful management of topsoil can help ecosystems recover more quickly.

Yet the technical side is only part of the solution. Lasting safeguards come from strengthening community ownership of forests. By engaging women, who often hold unique knowledge of medicinal plants, and involving youth in conservation activities, projects can nurture a shared sense of responsibility. Awareness campaigns that connect biodiversity protection with daily life — from clean water to fertile soils — help communities see conservation not as an external demand but as a source of wellbeing.
In areas already under severe threat, like Moengo or villages near intensive logging, safeguards also require stronger partnerships with authorities and civil society. Local monitoring groups can be trained to identify illegal logging and report it, creating accountability. At the same time, alternative livelihoods such as agroforestry or community reforestation initiatives give people tangible incentives to protect rather than exploit the forest.
In this way, safeguards against deforestation are not limited to fences or rules; they become part of the social fabric of the villages, ensuring that development and biodiversity protection move forward together rather than at each other's expense.

Table 129: KRI 3. Noise disturbance

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amaloko kondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
3. Noise disturbance													

Scope
This KRI evaluates the risks linked to **noise pollution from construction and operational activities**. Sources of disturbance include machinery, vehicles transporting materials, generators for backup power, and pile-driving or drilling associated with telecom towers. Noise can affect community well-being by disturbing rest, disrupting schools and cultural activities, and creating stress or conflict in villages where the environment is otherwise quiet. It also considers whether awareness levels and participation across genders influence the ability of communities to voice concerns or participate in mitigation.

Risk Analysis
In **Cluster 1**, the three villages (Abadoekondre, Akalekondre, and Benhattimof) face a **Moderate risk**. While construction will likely bring noticeable disturbances, the relative distance between project sites and household areas reduces the likelihood of severe long-term disruption.
Cluster 2 shows similar results, with most villages at **Moderate risk**, apart from **Lanti-wee**, which is **Low risk** due to its location and limited population density near proposed construction areas. Noise levels are expected to rise temporarily during building phases but may decline once installations are completed. However, in villages like Tamarin and Langa-oekoe 1, sustained use of heavy vehicles may continue to generate concern.
In **Cluster 3**, noise disturbance is more critical. **Moengo** and **Albina-Pierrekondre** are at **Substantial risk**, reflecting their larger populations, higher baseline activity, and the increased likelihood of conflicts when construction machinery operates close to homes, schools, and community centers. **Albina-Alfonsdorp** and **Albina-Marijkedorp**, though only **Moderate risk**, still face challenges due to proximity to urban areas and frequent traffic flows that amplify overall exposure.

Safeguards
To mitigate noise disturbance effectively, safeguards should go beyond technical fixes and instead embed themselves in **planning, community dialogue, and operational discipline**. In high-exposure areas such as Moengo and Albina-Pierrekondre, work schedules should be carefully managed so that

heavy construction activities occur during daylight hours when communities are less sensitive to disruption. Contractors must be made aware that machinery maintenance and the use of noise-reducing equipment are not optional extras but essential measures to prevent avoidable harm.
At the same time, communities need to be fully informed of upcoming construction phases. Transparent communication, for instance through village meetings and public notices, can greatly reduce frustration. Importantly, these meetings must actively include women and vulnerable groups, ensuring that those traditionally excluded from decision-making also have a chance to express concerns about disturbance in daily activities such as childcare, food preparation, or teaching.
Finally, once construction is complete, ongoing noise from backup generators or vehicular movement must be minimized through thoughtful design. Locating generators away from residential areas, creating vegetative buffers, and limiting unnecessary transport runs can all contribute to long-term noise control. In this way, noise management is not treated as a one-time technical measure but as an ongoing commitment to safeguarding community health, well-being, and cohesion.

Table 130: KRI 4. Air pollution : dust production

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
4. Airpollution dust production													

Scope
This KRI assesses the risks related to **dust emissions** from construction and transport activities, as well as ongoing impacts from maintenance traffic and site clearing. Dust can degrade air quality, cause respiratory health problems, reduce crop productivity, and disturb daily life in villages situated close to access roads or work sites. It also considers whether social factors — such as lack of awareness about dust health impacts, or limited inclusion of women in consultations — could limit the effectiveness of dust-control measures.

Potential Environmental Risk Analysis
Cluster 1 villages (Abadoekondre, Akalekondre, Benhattimof) are at **Moderate risk**, reflecting exposure to temporary dust plumes during construction, particularly if roads remain unpaved and traffic is heavy. While not extreme, these risks can affect vulnerable groups such as children and elders.
Cluster 2 shows a range of vulnerabilities. **Langa-oekoe 1** is rated **High risk**, reflecting its sensitivity to both construction-related dust and cumulative impacts from nearby land-clearing. **Tamarin**, with **Substantial risk**, faces similar concerns due to its location near project access routes. The majority of other Cluster 2 villages fall under **Moderate risk**, meaning that dust exposure is likely to be disruptive but manageable with proactive measures. **Wanhatti**, although only **Moderate**, could still see significant seasonal impacts during the dry season if preventive steps are not taken.
Cluster 3 highlights **Substantial risk** in **Moengo**, where construction dust is compounded by urban traffic and ongoing industrial activities. The other Albina villages are **Moderate risk**, suggesting that dust is a concern but not expected to escalate beyond tolerable levels if safeguards are enforced.

Safeguards
To manage dust-related risks, safeguards should be integrated as a continuous process rather than one-time interventions. Communities need to be engaged from the beginning, so that villagers understand the health risks of dust exposure and are empowered to voice concerns if impacts worsen. Construction companies should demonstrate visible commitment by adopting measures such as regular road wetting during the driest months, covering soil and material stockpiles, and minimizing unnecessary vehicle movement.

Where villages like Langa-oekoe 1 and Tamarin face particularly high exposure, the approach must be more intensive. Work schedules can be adjusted to reduce dust generation during times of peak village activity, such as school hours or market days. Planting vegetative barriers and maintaining buffer zones between infrastructure sites and households can also help capture dust before it spreads into living spaces.
In urban and peri-urban settings such as Moengo, technical controls must be paired with strong regulatory oversight. Contractors should be held accountable for dust suppression and subject to regular monitoring, ensuring that protective actions are not only promised but consistently applied. By weaving together community awareness, technical prevention, and institutional enforcement, dust risks can be significantly reduced, safeguarding both human health and the broader environment.

Table 131. KRI 5. Water pollution

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
5. Waterpollution													

Scope

This KRI examines the risks of **water contamination due to gold extraction and related activities**, including mercury and sediment runoff into rivers and creeks. Mining can cause severe degradation of water quality, impacting human health, fisheries, agriculture, and biodiversity. The analysis considers both **direct environmental damage to land and water** and **risks to project objectives**, such as the reliability of water-based infrastructure and community support. It also reflects on whether a **lack of environmental awareness or gender inequality** weakens efforts to introduce safe practices, since women are often the first to feel the burden of polluted water in household and community health.

Risk Analysis

In **Cluster 1**, all three villages — Abadoekondre, Akalekondre, and Benhattimof — are at **High risk**. These communities are particularly exposed to contamination from artisanal and small-scale gold mining, which increases turbidity and mercury levels in rivers. The dependency of villagers on river water for drinking, cooking, and washing heightens the severity of the threat.
Cluster 2 shows mixed results: Lanti-wee faces a **High risk**, reflecting active mining pressures in the surrounding environment. Most other villages (Amalokokondre, Langa-oekoe 1 and 2, Pikin Santi, Pina-tjarimi, and Tamarin) are **Substantial risk**, suggesting frequent water contamination incidents with moderate to severe consequences. **Wanhatti** is at **Moderate risk**, indicating that while mining activities exist, they are less intense or further removed from the community's immediate water sources.
In **Cluster 3**, **Moengo** and **Albina-Pierrekondre** are at **Moderate risk**, reflecting moderate but ongoing exposure to water pollution. **Albina-Alfonsdorp** and **Albina-Marijkedorp**, both **Substantial risk**, are more exposed to industrial runoff and higher levels of human activity along riverbanks.

Safeguards

Mitigating water pollution requires a blend of community empowerment, regulatory control, and technical solutions. For villages at **High risk**, such as those in Cluster 1 and Lanti-wee, urgent measures must be taken to reduce exposure to contaminated water. This includes providing safe alternatives such as treated water points, rainwater harvesting systems, or protected wells. Equally important is raising awareness within the communities about the dangers of mercury and sediment in water, with women — who are often responsible for water collection and child care — fully included in training and decision-making.

In areas at **Substantial risk**, efforts should focus on community monitoring and advocacy. Local residents can be trained to detect signs of water contamination and to document and report illegal mining practices. Partnerships with government agencies and NGOs are critical to enforce restrictions on mercury use and to establish remediation programs for polluted sites. Ensuring gender balance in monitoring groups not only builds inclusivity but also strengthens vigilance, since women frequently observe water changes earlier through daily household use.
For **Moderate risk** villages such as Wanhatti, Moengo, and Pierrekondre, proactive planning is needed to prevent escalation. Even if current exposure is lower, infrastructure projects must avoid actions that worsen sedimentation or encourage further mining activity. Creating protective buffer zones along rivers and restricting construction waste dumping are essential measures.
Ultimately, long-term safeguards depend on integrating water safety into both community practices and project management. By promoting environmentally sustainable alternatives, supporting strong community institutions, and holding mining actors accountable, the cycle of water degradation can be slowed and reversed.

Table 132. KRI 6. Lack of Waste management

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
6. Lack of Waste management													

Scope
This KRI evaluates the risk posed by **inadequate waste management systems**, which can lead to pollution of land and waterways, health hazards from uncollected waste, and increased conflict around dumping practices. Both construction-generated waste (metal scraps, packaging, oils, batteries) and domestic waste from the villages must be considered. The analysis also asks whether **low environmental awareness** and **gender inequality** reduce the effectiveness of solutions, since managing waste is often seen as women's work but requires broader community commitment and institutional support.

Risk Analysis
In **Cluster 1**, all three villages face **Substantial risk**, reflecting limited or non-existent waste collection systems. Waste is often disposed of through open burning or dumping near rivers, creating direct risks to water quality and local health.
Cluster 2 is more varied. Villages such as Lanti-wee, Tamarin, and Wanhatti face **High risk**, reflecting serious waste challenges, including insufficient space for proper disposal and high dependency on river dumping. The other villages (Amalokokondre, Langa-oekoe 1 and 2, Pikin Santi, and Pina-tjarimi) face **Substantial risk**, showing persistent problems but with potential to improve through awareness and small-scale interventions.
Cluster 3 is especially critical. **Moengo** and **Albina-Marijkedorp** are at **High risk**, reflecting urban pressures, higher population density, and greater waste production. Although Albina-Alfonsdorp and Pierrekondre are only **Substantial risk**, they still lack reliable collection, creating localized pollution issues.

Safeguards
Waste management safeguards need to be framed as a **community service and shared responsibility**, rather than an afterthought of construction. Villages facing **High risk** require urgent introduction of safe disposal practices. This may begin with simple but effective steps, such as creating designated

waste collection points away from rivers and sensitive areas, and introducing periodic waste removal or safe burning under controlled conditions. In these villages, it is critical to establish clear roles and responsibilities for upkeep, ensuring that men as well as women take part, so that waste control does not become an invisible and unsupported burden on women.

In **Substantial risk** areas, waste awareness campaigns can play a transformative role. When communities understand the health and environmental impacts of poor waste disposal, they are more likely to commit to practices such as separating organic from non-organic waste, composting, or reducing plastic use. School programs and women's groups can act as key multipliers, helping to embed new habits into community life.

Urban and peri-urban settings like **Moengo** and **Albina** require a more structured approach. Here, coordination with municipal authorities and contractors is crucial, not only to manage project-related waste but also to build stronger long-term systems, such as small-scale collection and transport services. By making waste management part of the infrastructure development plan — rather than an external issue — projects can model sustainable practices and leave behind stronger local capacity.

In summary, by blending awareness, shared responsibility, and institutional support, waste risks can be reduced while also strengthening local resilience and pride in clean and healthy environments.

Table 133. KRI 7. Lack of environmental awareness

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
7. Lack of environmental awareness													

Scope

This KRI assesses the **level of knowledge and awareness in communities regarding environmental impacts and sustainability**. A lack of awareness may hinder the adoption of safeguards related to waste management, deforestation, water protection, and climate resilience. It also increases the risk that harmful practices — such as river dumping, overuse of forest resources, or disregard for drainage maintenance — persist unchecked. Furthermore, if awareness campaigns are not inclusive, gender inequality can amplify the challenge by leaving out the voices of women, youth, and vulnerable groups who are directly affected by environmental issues.

Risk Analysis

Cluster 1 villages are at a **Moderate risk**, meaning that while communities may be receptive to environmental messaging, they currently lack structured awareness programs or ongoing education to reinforce sustainable practices.

Cluster 2 presents a more diverse picture. Villages such as **Langa-oekoe 1** and **Pikin Santi** are at **Substantial risk**, suggesting entrenched gaps in understanding the long-term consequences of environmental degradation. Without targeted interventions, these villages may face greater resistance to adopting risk mitigation strategies. The remaining villages in Cluster 2 are **Moderate risk**, indicating that although environmental issues are recognized, they are not yet seen as urgent priorities in daily decision-making.

Cluster 3 reveals a similar pattern. **Moengo**, with its larger and more urbanized population, faces **Substantial risk**, where environmental pressures from industrial activity and urban growth are not matched by community awareness or education campaigns. The Albina villages are at **Moderate risk**, which still represents a barrier to effective implementation of safeguards unless proactive measures are taken.

Safeguards

Building environmental awareness cannot be reduced to one-off workshops; it requires **long-term investment in education, communication, and cultural integration**. Villages at **Substantial risk** will benefit most from tailored programs that link environmental sustainability to daily life, such as safe water use, sustainable farming, and the importance of forests in protecting against erosion and climate impacts. Awareness-raising should be **participatory and inclusive**, engaging both men and women, elders and youth, so that environmental stewardship becomes a shared value rather than a top-down directive.

In villages at **Moderate risk**, simple yet consistent interventions — for example, regular school-based activities, storytelling that connects traditional knowledge to modern sustainability practices, and visible demonstrations of good waste or water management — can shift perceptions and build habits over time. In **urban contexts like Moengo**, where competing priorities often overshadow environmental concerns, sustained campaigns led by trusted local institutions, churches, and women's associations can create the visibility and trust needed to shift behavior.

By embedding environmental awareness into education systems, cultural practices, and community governance, safeguards can become self-reinforcing. Once awareness grows, communities are far more likely to support and sustain other environmental safeguards, from drainage upkeep to forest protection, creating a positive cycle of resilience.

Table 134. KRI 8:nGender Inequality

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
8. Gender inegquality													

Scope

This KRI evaluates how **gender inequalities within communities** may impede or weaken environmental and social safeguards. If women are excluded from decision-making, training, or community committees, their knowledge and perspectives on water, waste, and resource use may be lost, reducing the effectiveness of mitigation. Gender inequality also risks reinforcing existing burdens, for instance, when women are expected to manage household waste or water collection without being given a say in project design or maintenance planning.

Risk Analysis

All villages across **Clusters 1, 2, and 3** are at **Moderate risk**, meaning that gender inequality is a persistent issue but not uniformly severe. This suggests women often face limited participation in decision-making forums, with traditional leadership and committees dominated by men. In practical terms, this can weaken community adoption of safeguards, since women — who manage water collection, food preparation, and caregiving — are often the ones most affected by environmental risks.

In **Cluster 1**, the risk reflects traditional structures where women are not equally represented in village councils. In **Cluster 2**, women play important roles in farming and water use but remain underrepresented in formal decision spaces, which creates a gap between household-level practices and collective safeguards. In **Cluster 3**, urban and peri-urban villages like Moengo and Albina face similar dynamics: while women's groups exist, their voices are often sidelined in large infrastructure discussions.

Safeguards

Addressing gender inequality requires embedding **inclusive participation and equal voice** into every stage of project planning and implementation. Safeguards cannot be reduced to simply "inviting women to meetings"; they must ensure that women's contributions are genuinely valued and incorporated into decisions. This means scheduling consultations at times that accommodate household responsibilities, providing safe spaces where women feel comfortable speaking, and recognizing their expertise in managing water, food systems, and community health.

For **Moderate risk villages**, capacity-building should focus on empowering women's associations and ensuring that they are given formal roles in environmental monitoring and maintenance. For instance, women can lead community awareness sessions on waste and water, or manage early-warning systems for floods. By promoting gender-balanced committees, projects ensure that safeguards are not undermined by unequal social structures.

Over time, the safeguard is not only about mitigating risk but also about building **social resilience**: when women and men share responsibility and authority in managing the environment, the community as a whole becomes stronger and more adaptive. Embedding gender equality as a cross-cutting safeguard guarantees that all other risk mitigation measures — from drainage to forest protection — stand a better chance of long-term success.

Overview Environmental KRI Rating all villages

Table 135. The following table provides an overview of the risk analysis results per village

Key Risk Indicators	cluster I: Abadoekondre, Akalekondre and Benhattimof	Amalokokondre	Langa-oekoe 1	Langa-oekoe 2	Lanti-wee	Pikin Santi	Pina-tjarimi	Tamarin	Wanhatti	Moengo	Albina-Alfonsdorp	Albina-Marijkedorp	Albina - Pierrekondre
1. Climate heavy rainfall													
2. Deforestation and biodiversity loss													
3. Noise disturbance													
4. Airpollution dust production													
5. Waterpollution													
6. Lack of Waste management													
7. Lack of environmental awareness													
8. Gender inegquality													

Table 136. Risk analysis colour legend

Legend	
	High risk.
	Substantial risk.
	Moderate risk.
	Low risk.
	Not Applicable.
	No information.

7.9. Overview of environmental scope, risk rating, safeguard policies, and recommendations

Key Risk Indicator.	Scope.	Risk analysis: an overview.	Safeguard policies and recommendations
1. Climate: heavy rainfall. *flood risk	This assessment evaluates risks of flooding, soil erosion, and damage to infrastructure resulting from heavy rainfall. With climate change, variability and intensity of rainfall are expected to increase, making vulnerable villages more exposed. Poor drainage, unstable siting of infrastructure, and lack of preparedness amplify risks.	Villages across clusters face varying levels of risk. Some experience frequent flooding and erosion events, while others lack reliable data or awareness to assess exposure. Cluster 3 villages such as Moengo and Albina-Marijkedorp face high risks due to population density and infrastructure vulnerability. Cluster 1 and 2 villages show substantial to moderate risks, with localized drainage and soil erosion concerns. Future rainfall variability may worsen impacts on housing, agriculture, and road access.	Safeguards emphasize siting infrastructure on higher ground and constructing adequate drainage. Flood mapping and proactive planning should guide investments. Communities need awareness on flood preparedness and maintenance of small-scale drainage. Nature-based solutions such as reforestation and wetland protection strengthen resilience. Reinforcing roads, bridges, and buildings against intense rainfall will reduce long-term damage and protect livelihoods.
2. Deforestation and biodiversity loss.	This assessment evaluates risks linked to forest clearance, habitat destruction, and biodiversity loss caused by infrastructure, mining, or unsustainable resource use. Protecting forests is crucial for Indigenous livelihoods, water quality, and long-term ecological stability.	Cluster 1 villages face high risk as they are directly dependent on intact forest ecosystems. Cluster 2 presents both high and substantial risks, especially near mining zones or where community land use places pressure on ecosystems. Cluster 3 shows high risk in Moengo due to urban expansion and substantial risk in Albina villages. Without safeguards, further degradation may undermine food security, water protection, and cultural heritage.	Safeguards must limit land clearance and avoid disrupting sensitive habitats. Where disturbance occurs, restoration with native species and soil protection is essential. Communities, including women with knowledge of forest resources, should be engaged in conservation programs. Local monitoring groups can report illegal logging and enforce protection. Promoting sustainable livelihoods such as agroforestry and small-scale reforestation provides incentives to protect rather than exploit forests.
3. Noise disturbance.	This assessment considers risks from noise pollution due to construction, vehicle movement, generators, and tower installation. Noise can affect well-being, daily routines, and cultural practices.	Most Cluster 1 and 2 villages are moderate risk, facing temporary disturbances during construction. Urban villages such as Moengo and Pierrekondre are at substantial risk given their population density and continuous background noise pressures. Persistent noise could affect health, learning environments, and social cohesion.	Safeguards include scheduling noisy activities at appropriate times, maintaining machinery to minimize sound, and informing communities before high-noise operations. In high-risk villages, natural buffers like vegetation and careful placement of equipment can reduce impacts. Transparent communication and inclusion of vulnerable groups in planning are critical to build trust and minimize disruption.
4. Air pollution: dust production.	This assessment evaluates the risks of dust emissions from construction activities, road traffic, and land clearing. Dust exposure can affect respiratory health, reduce agricultural productivity, and lower quality of life.	Cluster 1 villages are generally moderate risk. In Cluster 2, Langa-oekoe 1 is high risk and Tamarin substantial, while others are moderate. In Cluster 3, Moengo faces substantial risks due to urban-industrial overlap, and Albina villages are moderate. The main vulnerabilities include	Safeguards emphasize controlling dust through water spraying, vegetation buffers, and covering transported materials. Awareness on health impacts should be provided, especially for children and vulnerable groups. In higher-risk areas, stricter contractor oversight, adaptive work schedules, and protective

		respiratory illness, contaminated water supplies, and crop damage.	equipment are necessary to minimize exposure.
5. Water pollution:	This assessment considers contamination of rivers and groundwater due to gold mining, especially through mercury and sediment. Water pollution directly affects health, aquatic ecosystems, and access to clean water.	Cluster 1 villages are at high risk given proximity to contaminated rivers. Cluster 2 ranges from substantial to high risk, with Wanhatti at moderate risk. Cluster 3 shows substantial risks in Albina villages and moderate risks in Moengo and Pierrekondre. Ongoing gold extraction without safeguards endangers both human and ecological health.	Safeguards require provision of safe water alternatives such as filtration or community wells. Awareness campaigns on mercury's health effects should be prioritized. Community-based monitoring and partnerships with local authorities are needed to track contamination. Enforcement of controls on gold mining and buffer zones along rivers are critical to protect water resources.
6. Lack of waste management.	This assessment evaluates risks from absent or weak waste collection and disposal systems. Improper waste handling leads to water and soil pollution, health problems, and environmental degradation.	Cluster 1 villages face substantial risks due to lack of formal collection. In Cluster 2, villages like Lanti-wee, Tamarin, and Wanhatti face high risks with significant waste challenges. Others are substantial. Cluster 3 includes Moengo and Albina-Marijkedorp at high risk, with Alfonsdorp and Pierrekondre at substantial risk. Population density and absence of municipal systems worsen the problem.	Safeguards emphasize community-level collection points and proper disposal areas away from rivers. Waste awareness programs should include all community members, ensuring that responsibility is shared by men and women. In rural areas, education on safe burning or composting can help. Urban centers require stronger collaboration with municipal authorities to establish long-term collection and recycling systems.
7. Lack of environmental awareness.	This assessment addresses gaps in community knowledge and awareness of environmental risks. Without awareness, harmful practices such as river dumping or unsustainable land use persist and weaken safeguards.	Most villages are moderate risk, while Langa-oekoe 1, Pikin Santi, and Moengo face substantial risks where awareness gaps are significant. Low awareness reduces community cooperation and increases barriers to implementing safeguards across sectors.	Safeguards require inclusive awareness campaigns that connect sustainability with daily life, such as food security, water health, and forest protection. Schools and local associations should integrate environmental education. Women's associations and youth groups are key actors in spreading knowledge. Strengthening traditional cultural values around stewardship will improve long-term adoption of sustainable practices.

8. Gender inequality.	This assessment considers the exclusion of women from decision-making and planning processes. Gender inequality weakens safeguard effectiveness by ignoring the perspectives of those most affected by water, waste, and food-related risks.	All villages are at moderate risk, reflecting persistent but not extreme gender imbalances. Women often carry the burden of household water, food, and waste management yet are underrepresented in governance. This gap weakens safeguard implementation and long-term success.	Safeguards focus on ensuring equal participation in planning committees and monitoring activities. Creating safe spaces for women's voices and valuing their knowledge in natural resource management strengthens governance. Empowering women's groups and formalizing their role in community decision-making ensures safeguards are more effective and sustainable.

Table 137. Scope, Environmental risk analysis and safegaurds

8. Conclusions and Recommendations

8.1. Conclusions

The Environmental and Social Assessment (ESA) confirms that the proposed electrification project—linking Peperpot, Moengo, Albina, Wanhatti, and the surrounding Maroon and Indigenous villages—represents a technically and socially viable investment with transformative potential for north-eastern Suriname. By extending the national grid, upgrading substations, and introducing a solar PV component in Moengo, the project will substantially reduce reliance on expensive and polluting diesel generators, thereby improving the reliability of electricity supply and enabling more sustainable economic growth.

Environmental Conclusions

From an environmental perspective, the project inevitably involves disturbances associated with construction and infrastructure development. Clearing vegetation for transmission lines and substations will lead to localized deforestation and could disrupt habitats that are important for biodiversity, particularly in ecologically sensitive areas such as wetlands and secondary forests along the Cottica River and in the Albina hinterland. Certain cultural landscapes, notably the Fraga Tiki site in Langa Uku, also warrant protection.

Risks of soil erosion, water contamination, dust, and noise will be most pronounced during the construction phase, with schools in villages such as Tamarin and Abaadu Konde especially vulnerable. In addition, the project area is exposed to climate risks: Moengo and Albina in particular face high levels of rainfall and flooding, while Alfonsdorp and Pierrekondre face substantial to moderate flood risks. These hazards require resilient design standards and adaptive management.

On the positive side, the shift from diesel-based generation to grid electricity and solar power will help reduce greenhouse gas emissions, lower the risk of oil spills, and open opportunities for improved waste and water management, environmental monitoring, and biodiversity conservation.

Social Conclusions

From a social perspective, the project is expected to bring clear benefits to households and communities by improving access to reliable electricity. This will enhance education and health services, enable new livelihood opportunities, and contribute to local economic development in both rural villages and urban centers such as Moengo and Albina.

However, challenges remain. The financial sustainability of electricity provision is uncertain, as many households and communities may struggle to cover the costs of operation and maintenance, particularly in Wanhatti and surrounding villages. Differences in income and economic capacity risk excluding poorer households from full participation unless inclusive tariff and ownership models are adopted. Community trust also presents a critical issue: past experiences of unfulfilled political promises in places such as Wanhatti and Tamarin have generated skepticism that must be addressed through transparent engagement and Free, Prior and Informed Consent (FPIC).

The assessment further highlights the need to address the rights and vulnerabilities of Indigenous and Tribal Peoples (ITPs), whose collective land rights are not formally recognized in Suriname, and who therefore require special protection and meaningful involvement in project decision-making. Gender inequality persists as well: women remain underrepresented in leadership and employment opportunities, and gender-based violence and harassment are recognized risks in connection with construction activities and the influx of workers. Vulnerable groups—including female-headed households, youth, the elderly, persons with disabilities, and sexual and gender minorities—require targeted strategies to ensure they benefit equitably from electrification.

In sum, the ESA concludes that the project offers substantial and wide-ranging benefits but alsoentails risks that, if left unaddressed, could undermine both environmental integrity and social cohesion. To secure long-term sustainability, it is essential that environmental safeguards, financial and governance arrangements, and inclusive social measures be integrated from the outset. If implemented with these

protections, the project has the potential to not only deliver reliable electricity but also to strengthen trust, equity, and resilience in Maroon and Indigenous communities across north-eastern Suriname.

8.2. Recommendations for the Environmental and Social Management Plan (ESMP)

The ESMP will be the primary instrument for translating the ESA's findings into practical actions. It serves as the operational framework that integrates environmental safeguards, social protection measures, and institutional responsibilities into a single, coherent system. The recommendations below outline how the ESMP should be structured and implemented to ensure that risks are effectively managed and that communities share equitably in the project's benefits.

The Environmental and Social Management Plan (ESMP) must serve as the central operational tool to translate the findings of the ESA into actionable safeguards. Rather than functioning as a stand-alone checklist, the ESMP should be structured as an integrated system that combines technical, environmental, and social measures, with clear institutional responsibilities and transparent monitoring arrangements.

The ESMP should first establish a project-specific **Environmental and Social Management System (ESMS)**, aligned with IDB's Environmental and Social Performance Standards (ESPS). This system must integrate **site-specific action plans** for each area—Wanhatti and its surrounding villages, Moengo, and Albina—recognizing that risks and community contexts differ. For example, cultural heritage considerations at Langa Uku require different safeguards than flood resilience measures in Albina-Marijkedorp.

The ESMP should also include a **comprehensive monitoring framework** with measurable indicators covering both environmental aspects (e.g., biodiversity, water quality, emissions, climate resilience) and social dimensions (e.g., gender inclusion, affordability, and participation of vulnerable groups). These indicators should be developed in consultation with communities to strengthen local ownership.

To ensure effective implementation, the ESMP must define **roles and responsibilities** for all stakeholders, including NV EBS, contractors, relevant ministries (NH, ROS, GBB), village leadership, and NGOs. Mechanisms for coordination between these actors should be built into the plan.

Finally, the ESMP should institutionalize **grievance redress mechanisms (GRM)** that are culturally appropriate and accessible to all community members, with special provisions for women, youth, and vulnerable groups. Regular **public disclosure of monitoring reports** and the establishment of **community oversight committees** will be critical to maintaining trust and ensuring accountability.

8.3. Environmental Risk Management Recommendations

The project area presents a diverse range of environmental challenges, from localized deforestation and biodiversity loss to climate-related risks such as flooding and soil erosion. While these impacts are manageable, they require proactive and carefully targeted measures. The recommendations in this section focus on how to prevent, minimize, and mitigate environmental harm, while at the same time enhancing the positive environmental outcomes associated with renewable energy integration and reduced reliance on diesel generation.

Biodiversity and Habitat Protection
The project area contains valuable ecological and cultural sites, including wetlands, secondary forests, and the sacred Fraga Tiki site at Langa Uku. Protecting these areas requires a Critical Habitat Assessment (CHA) prior to construction and the establishment of buffer zones and wildlife corridors where feasible. Where vegetation clearing is unavoidable, compensatory measures such as reforestation with native species should be implemented. Local communities can play a key role by acting as biodiversity monitors or "community rangers," thereby creating co-benefits for livelihoods and conservation.

Pollution Control and Waste Management
Construction and operation activities carry risks of water pollution, hazardous material spills, and soil erosion. These must be addressed through strict protocols for hazardous waste handling, sediment control barriers, and spill-prevention systems. Strengthening waste collection and disposal is particularly important in Moengo and Albina, where existing facilities are limited or non-functional. The ESMP should also consider longer-term waste management systems that serve communities beyond the project's construction phase.

Noise, Dust, and Community Disturbance
Dust and noise are anticipated impacts during construction, especially near sensitive locations such as schools in Tamarin and Abaadu Konde. These impacts can be reduced by restricting work near schools to off-peak hours, applying dust suppression methods, and using acoustic barriers where possible. Community-based traffic management plans should also be introduced to reduce risks from increased vehicle movements.

Climate Adaptation and Disaster Preparedness
Climate change presents a significant challenge for infrastructure in north-eastern Suriname. Substations and towers in Moengo and Albina must be designed to withstand flooding, heavy rainfall, and soil erosion. Elevated platforms, resilient foundations, and drainage systems will be essential. Beyond engineering solutions, a Disaster Risk Management Plan (DRMP) and an Emergency Preparedness, Prevention, and Response Plan (EPPRP) should be developed to ensure that both contractors and communities are prepared to respond effectively to extreme weather events.

8.4. Social Risk Management Recommendations

The social dimension of the project is as critical as the technical and environmental components. Electricity access has the potential to transform livelihoods, improve health and education, and reduce poverty, but it can also create new risks, particularly for vulnerable groups and communities with fragile trust in institutions. This section sets out recommendations for addressing these risks and ensuring that the project is implemented in a socially inclusive, equitable, and sustainable manner.

Financial Sustainability and Ownership
A long-term risk to the project is the financial sustainability of electricity services. While access will expand significantly, communities in Wanhatti and nearby villages may struggle to afford operation and maintenance costs. Village-level krutu consultations should therefore be used to discuss ownership models and tariff structures. Options such as pre-paid meters, lifeline tariffs, or targeted subsidies for vulnerable households could help prevent inequitable access.

Community Engagement and FPIC

Sustained engagement is vital to overcoming the trust deficit identified in several communities. Free, Prior, and Informed Consent (FPIC) must be applied systematically, using village-specific protocols. In Albina, this includes structured dialogue with captains of Alfonsdorp and Marijkedorp, as well as KLIM, which represents the wider Marowijne communities. Engagement should emphasize transparency around project costs, timelines, and responsibilities, helping to rebuild confidence in public commitments.

Gender Equality and Inclusion
The project presents an opportunity to address gender gaps by proactively recruiting and training women in technical and management roles related to electricity distribution. Women's entrepreneurship can also be strengthened through access to electricity for small businesses. The ESMP should integrate a Gender Action Plan, with clear targets for participation, equal opportunity policies, and zero-tolerance provisions for gender-based violence (GBV) and harassment. Special attention should also be given to youth, elderly, persons with disabilities, and LGBTQI+ individuals, ensuring their voices are included in decision-making.

Community Health and Safety
Construction activities will bring new risks, including traffic accidents, dust exposure, and increased interaction between workers and community members. To address these, the ESMP should enforce personal protective equipment (PPE) requirements, develop road safety campaigns, and implement supervised community labor arrangements. A confidential referral system for survivors of sexual exploitation and abuse (SEA) and GBV should also be established, ensuring rapid response and protection of vulnerable groups.

Capacity Building and Livelihood Development
Beyond risk management, the project should actively foster positive social impacts. Training programs for local workers in the operation and maintenance of substations, solar PV systems, and metering will build long-term capacity. Electricity access should also be leveraged to stimulate small enterprises in agro-processing, cold storage, ICT, and tourism, with a focus on youth and women entrepreneurs. In this way, the project can contribute not only to energy security but also to diversified and inclusive local economies.

8.5. Final Remarks

This ESA confirms that the project is viable and has transformative potential for Maroon and Indigenous communities in north-eastern Suriname. However, this potential will only be realized if:
- Environmental safeguards are rigorously applied,
- Social inclusion is mainstreamed in every project phase, and
- Adaptive management and monitoring remain ongoing.

By aligning the ESMP with the above recommendations, and by cross-referencing complementary documents (e.g., baseline studies, FPIC protocols, DRMP, Biodiversity Action Plan, Labor Management Procedures, Gender Action Plan, and the IDB Safeguards Policy Framework), the project can serve as a model of sustainable and equitable electrification in Latin America and the Caribbean.

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