DPSIR Framework

Handbook

GUYANA

Driver-Pressure-State-Impact-Response (DPSIR) Framework for Guyana

OVERVIEW

This handbook summarizes the Driver-Pressure-State-Impact-Response (DPSIR) Framework conducted for Guyana, under the CSIDS-SOILCARE Phase 1 Project. It provides an overview of the methodology, assessments, and description of the three (3) intervention sites selected for Guyana. Importantly, the DPSIR results of each intervention site were highlighted along with the recommended interventions to address the land degradation issues. Through the various interventions, the project aims to restore 29,000 hectares of land and 26,000 hectares of landscapes under improved practices. Consequently, the project will target approximately 4000 hectares of land in Guyana.

The recommended interventions will be further discussed with stakeholders to determine the most effective interventions for each selected site. Additional information on the DPSIR Framework for Guyana and the other participating countries can be found in the detailed DPSIR report and the country-specific reports.

INTRODUCTION

The Partnership Initiative for Sustainable Land Management (PISLM) is implementing ***the Caribbean Small Island Developing States (SIDS) Multicountry Soil Management Initiative for Integrated Landscape Restoration and Sustainable Food Systems: Phase 1, referred to as the PISLM CSIDS-SOILCARE Phase 1 Project.*** *This project is being implemented in eight (8) participating countries, Antigua and Barbuda, Barbados, Belize, Grenada, Guyana, Haiti, Jamaica, and St. Lucia. The project's primary objective is to "strengthen Caribbean SIDS with the necessary tools for adopting policies, measures, and reforming legal and institutional frameworks to achieve Land Degradation Neutrality (LDN) and Climate Resilience".*

In this regard, five (5) components were established under the project to address and reverse land degradation in CSIDS. Furthermore, the Driver-Pressure-State-Impact-Response (DPSIR) Framework is one such intervention. This was coupled with the National Soil Surveys, Climate Risk Assessment, and Land Suitability Analysis conducted in participating countries. This handbook, however, will focus on the results of the DPSIR framework for Guyana intervention sites as highlighted by the DPSIR report.

The DPSIR framework is considered valuable for assessing soil degradation in CSIDS given its cause-effect approach which can determine appropriate management responses (Francis, 2023).

Under the CSIDS- SOILCARE Phase 1 Project, three components will be addressed in Guyana as follows:

Component 2: *Addressing the drivers of land degradation through the rehabilitation of land and soil degraded areas; the promotion of integrated landscape management and restoration and the identification and implementation of livelihood alternatives for communities.* **This component would be executed in Arakaka, Region 1.**

Component 3: *Resilience Building to Land Degradation, Natural Disasters and Climate Change through Climate Smart Agriculture and Drought Risk Management.* **This component would be executed in Little Biabu, Region 5.**

Component 4: *Enhancement of Food Systems and Alternative Livelihoods through the promotion of innovations in agriculture and livestock production systems and mobilization of the Private Sector in Support of LDN Special Climate Change Fund (SCCF).* **This component would be executed in Kimbia, Region 10.**

METHODOLOGY

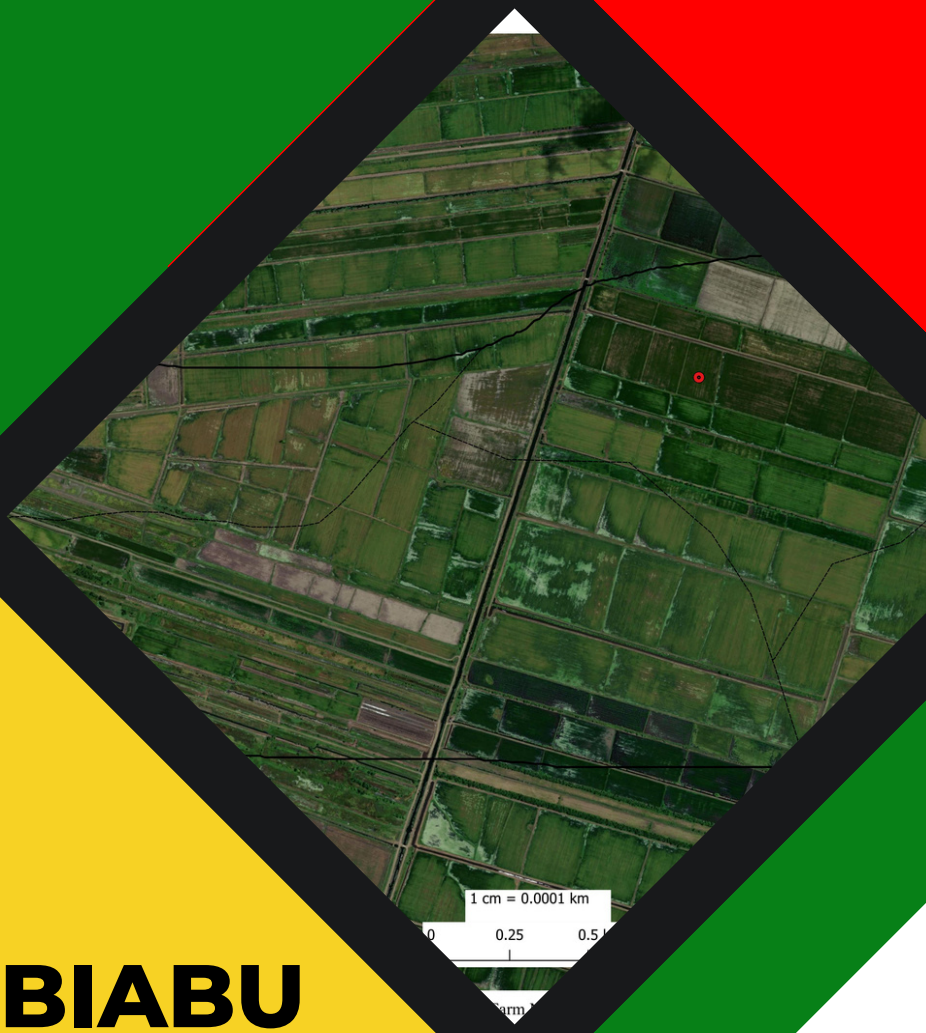
The research was conducted in four (4) stages as follows:

1. Comprehensive review of the Land Degradation Neutrality-Target Setting Process for Guyana.
2. Identification of hot spots affected by land degradation.
3. Participatory qualitative analysis was conducted within the locations identified as Intervention Sites.
4. Evaluation of the drivers, pressures, state, impacts, and possible responses (DPSIR) to land degradation of the Intervention sites.

NB, A land capability survey and a visual soil analysis were conducted based on the Protocol for the Assessment of Sustainable Soil Management. However, the findings are captured briefly in this handbook but details can be found in the DPSIR report.

A GIS analysis was conducted for each location to ascertain the nature of the land use and vegetation health through the Normalized Difference Vegetation Index (NDVI).

SOILCARE INTERVENTION SITES



NO. 1: LITTLE BIABU

Little Biabu is one of the intervention sites selected for Guyana. It is characterized by a dispersed settlement pattern with approximately 500 residents. The area's main livelihood activity is rice farming and cash crop cultivation.

Grazing of the lands and dry-season water sources are the primary natural resources used by the community for production. The main challenges with land degradation are soil erosion and biodiversity decline. Moreover, monoculture agricultural farming systems, excessive use of chemicals, and inorganic fertilizers to support monocropping and large-scale farming are the main contributors to land degradation in the intervention site.

LITTLE BIABU
DPSIR FRAMEWORK

Table 1: Driver-Pressure-State-Impact-Response (DPSIR) Framework

Framework	Indicator
Driving Forces	Human Population Growth
	Climate Change
Pressures	Intensification of droughts and flooding, sea level rise.
	Increase demand for agriculture products and livestock.
	Poor farming practices and overgrazing

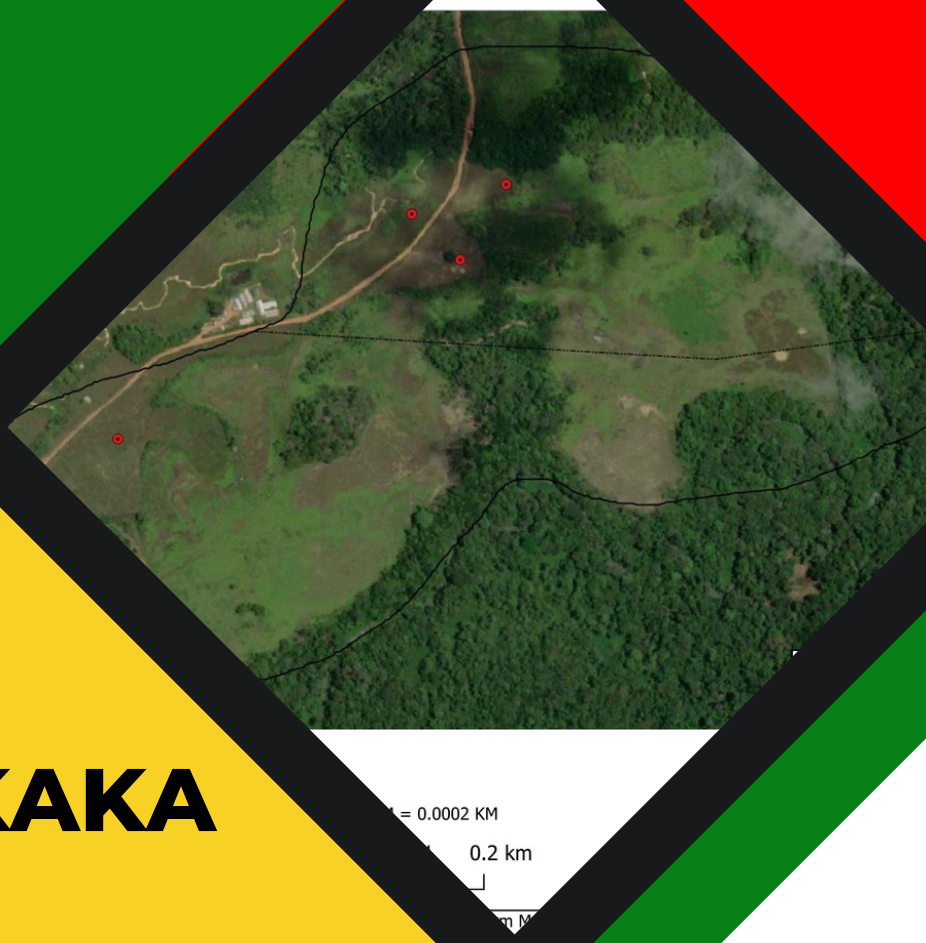
LITTLE BIABU
DPSIR FRAMEWORK

Framework	Indicator
State	Decline in agriculture output, loss of livestock and reduced rice productivity.
	Increase soil salinity.
Impacts	Disruption in ecosystem services due to saltwater intrusion
	Household economic decline and poverty
	Increase demand on food imports

RECOMMENDED INTERVENTIONS FOR LITTLE BIABU

Table 2: Recommended interventions for Little Biabu

Vegetative measures	Mangrove rehabilitation in coastal areas.
Structural measures	Improve water management for drainage and saltwater intrusion
Other measures	Agriculture Smart Farm establishment



NO. 2: ARAKAKA

The Arakaka is a small dispersed community comprising approximately 1200 residents. The area's main land use types are farming and logging. Furthermore, mining and farming are the primary livelihood activity. The community also utilizes the land for grazing land and extraction of timber.

Arakaka's land degradation issues are water availability, soil and water contamination, soil erosion, and reduction in vegetation. The land degradation issues can be attributed to mining, overgrazing, and deforestation. This results in soil erosion, water contamination, and soil loss.

ARAKAKA
DPSIR FRAMEWORK

Table 3: Driver-Pressure-State-Impact-Response (DPSIR) Framework

Framework	Indicator
Driving Forces	Human Population Growth
	Gold mineral extraction
	Vegetation over-exploitation
Pressures	Increased clearing of forest
	Harvesting of manicole palm and for other craft production
	Clear felling for cattle farming in riverain area

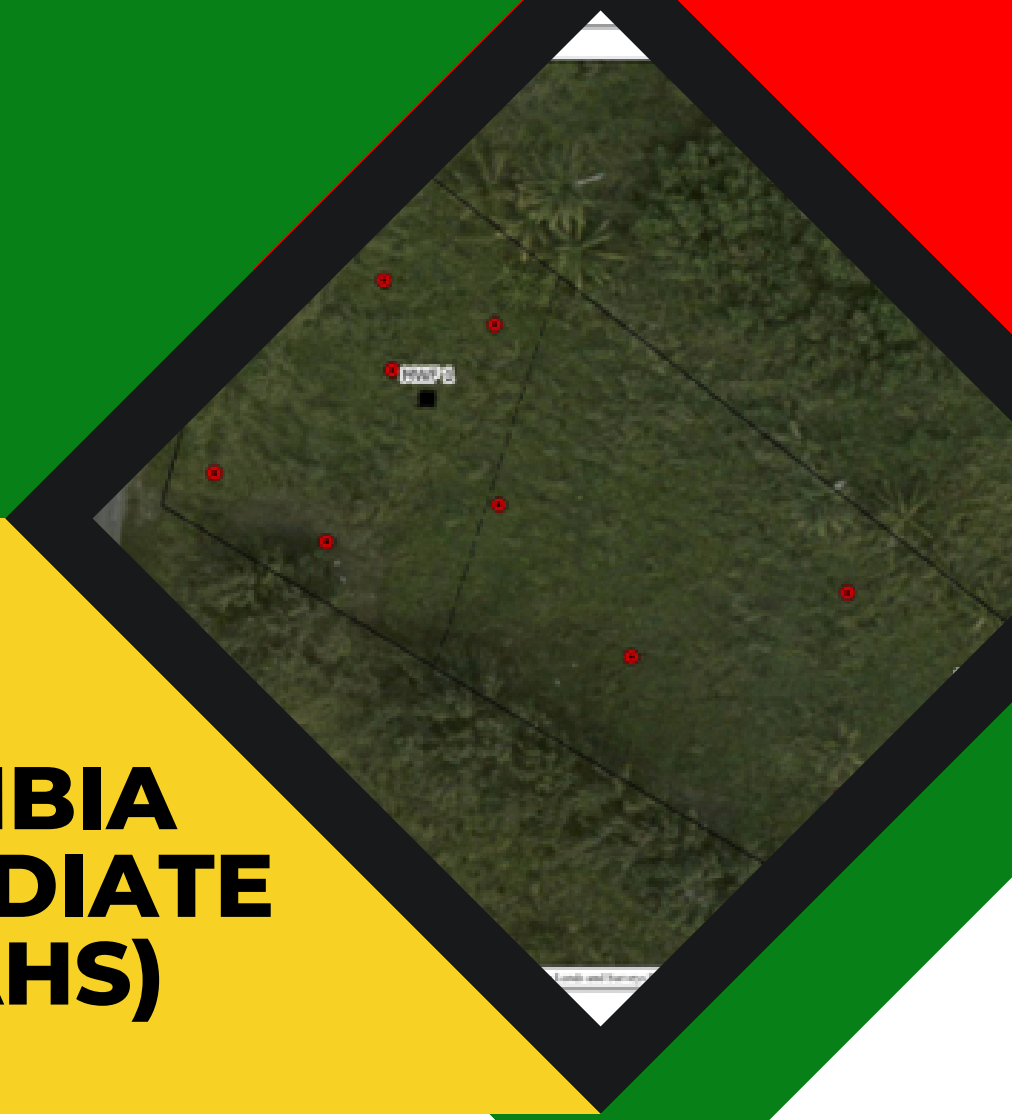
ARAKAKA
DPSIR FRAMEWORK

Framework	Indicator
State	Extensive soil erosion, reduced native species due to habitat loss
	Leaching of chemical waste from mining activities
	Contamination of water supply with unregulated use of mercury
	Decline in land productivity.
Impacts	Disruption in ecosystem services.
	Household economic decline and loss of income.
	Increase demand on food imports resulting in food insecurities.
	Increase risk of hunger, exploitation of indigenous community for cheap labour.

RECOMMENDED INTERVENTIONS FOR ARAKAKA

Table 4: Recommended interventions for Arakaka

Agronomic measures	Introducing soil reclamation practices.
Vegetative measures	Introduction of land use policy and agroforestry practices.



NO. 3: KIMBIA (INTERMEDIATE SAVANNAHS)

Kimbia is a small community with a nucleated settlement pattern of approximately 170 residents. Farming and logging are the main land use types. The area's primary livelihood activities are subsistence and cash crop farming of mainly beans, and peanuts and livestock farming, specifically rearing of cattle and small ruminants.

Grazing of the land, medicinal plants, and extraction of water sources during the dry season are the community's main natural resources for production. Kimbia's issues with land degradation are soil contamination, soil erosion, vegetation reduction, and a decline in soil fertility. This has resulted in reduced yields, higher fertilizer inputs, the spread of pests and diseases, a reduction in arable lands, and a decline in crop diversity.

KIMBIA
DPSIR FRAMEWORK

Table 5: Driver-Pressure-State-Impact-Response (DPSIR) Framework

Framework	Indicator
Driving Forces	Agriculture
	Climate Change
Pressures	Farming practices which include clear felling and overgrazing of pastures
	Increased drought and storm intensity
State	Soil erosion and loss of land productivity
	Water contamination
	Soil biodiversity decline and habitat loss

KIMBIA
DPSIR FRAMEWORK

Framework	Indicator
Impacts	Disruption in ecosystem services
	Household economic decline and poverty

RECOMMENDED INTERVENTIONS FOR KIMBIA

Table 6: Recommended interventions for Kimbia

Agronomic measures	Introduction of land use policy and improving agriculture practices, organic mulching
Vegetative Measures	Reforestation measures
Structural measures	Improve water management for drainage, crop, and livestock production.
	Increased water harvesting and construction of well for irrigation.
Management measures	Compositing to improve fertility, setting up of compositing units.

REFERENCE

Francis, R. (2024). DPSIR Framework Analysis

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PISLM (2021). Caribbean Small Island Developing States (SIDS) Multicounty Soil Management Initiative for Integrated Landscape Restoration and Climate-Resilient Food Systems- Phase 1.