DPSIR Framework

Handbook

ST LUCIA

Driver-Pressure-State-Impact-Response (DPSIR) Framework for St. Lucia

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 St. Lucia. 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, for St. Lucia, the project will target approximately 3000 hectares of land in St Lucia under Component 3 and 1500 hectares under Component 4.

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 St. Lucia 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 St. Lucia 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 St. Lucia 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 Darban.**

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 Arthur Lewis College.**

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 Roseau.**

METHODOLOGY

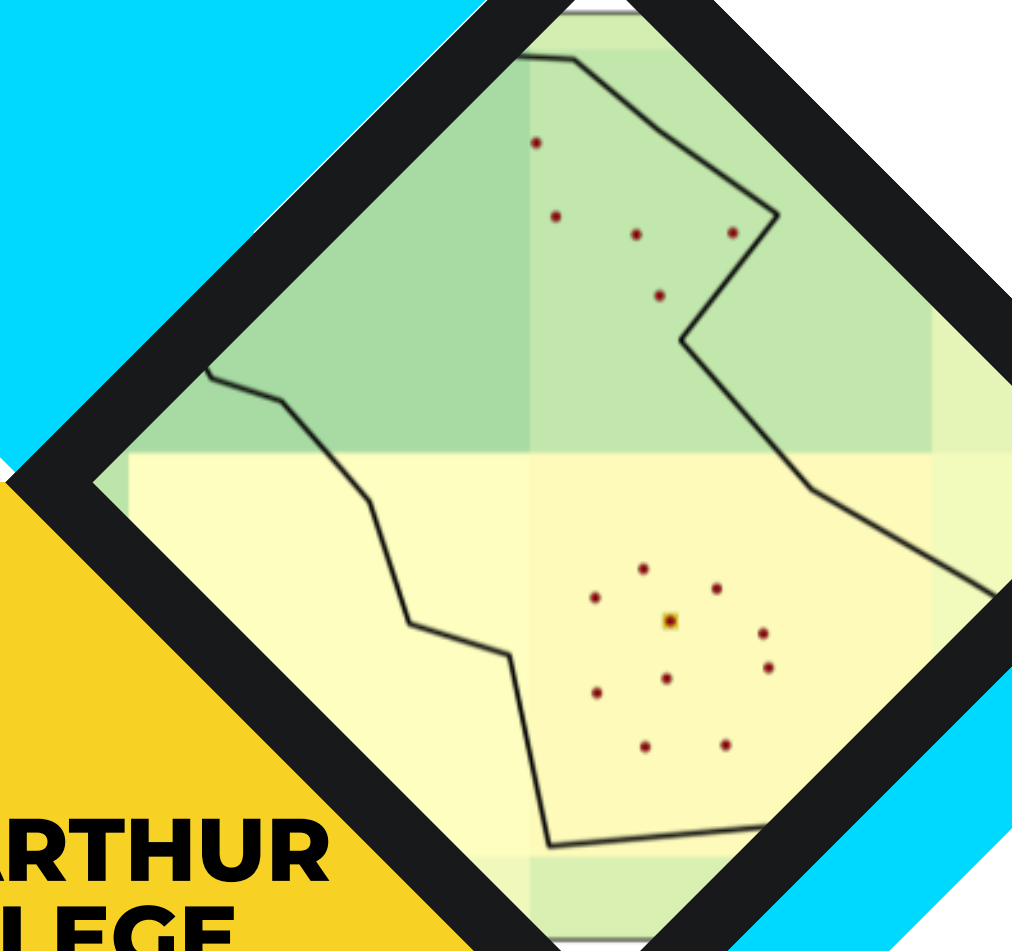
The research was conducted in four (4) stages as follows:

1. Comprehensive review of the Land Degradation Neutrality-Target Setting Process for St. Lucia.
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: SIR ARTHUR LEWIS COLLEGE

Historically a banana plantation, Sir Arthur Lewis College is the first intervention site focused on training, research, and development. It spans twenty (20) acres of land with a surrounding dispersed community with approximately 2000 residents. The main activities in this area are commercial farming systems, including rotational grazing of small ruminants, and tethering of cattle on the northern slopes. Additionally, the greenhouse production of leafy greens complemented the year-round cultivation of vegetables and bananas. The area also has an established stand of coconut and mango on the slopes.

There are no residential properties situated within the intervention site, however, farmhouses and faculty buildings are on the grounds. The institute also has breeding programs for pigs and sheep. The main land degradation challenges are biodiversity decline, reduction in land cover, and declining water availability.

SIR ARTHUR LEWIS COLLEGE
DPSIR FRAMEWORK

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

Framework	Indicator
Driving Forces	Population growth
	Climate change
	Trade policy changes
Pressures	Monocropping of banana
	Increased rainfall variability and flooding during hurricane events
	Land use change to cultivation on slopes

SIR ARTHUR LEWIS COLLEGE
DPSIR FRAMEWORK

Framework	Indicator
State	Soil erosion
	Decline in agriculture output and land productivity
	Decline in water quality.
Impacts	Household economic decline, poverty
	Increase demand on food imports resulting in food insecurities.

RECOMMENDED INTERVENTIONS FOR SIR ARTHUR LEWIS COLLEGE

Table 2: Recommended interventions for Sir Arthur Lewis College

Agronomic measures	Residue management: specification required for burning, organic mulching
Management measures	Conversion of banana farms to alternative cropping systems, introducing cocoa, flowers and mushrooms cropping as an alternative livelihood.
	Compositing to improve fertility, setting up of compositing units.
Structural measures	Graded ditches, channels, waterways to drain and convey water.
Other measures	Improve monitoring and enforcement strength of Development and Control Authority, improve land use and physical planning act.

NO. 2: ROSEAU

The second intervention site selected for St. Lucia is the community of Roseau. It comprises approximately 231 inhabitants in a dispersed settlement pattern. Agriculture and fishing are the main livelihood activities. The main land degradation challenges include a decline in water quality and soil erosion. Furthermore, these are caused by deforestation, overgrazing, and improper agricultural practices. The decline in water quality results from eutrophication, sedimentation, and toxic chemicals leaching from farms.

The resulting impacts are reduced income, influencing low yield and land productivity, and contributing to biodiversity loss. There has also been evidence of a reduction in land cover and decreased resilience of forest resources over the years.

ROSEAU
DPSIR FRAMEWORK

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

Framework	Indicator
Driving Forces	Climate change
	Small farm sizes 0.5 -2 ha
	Lack of technical expertise in irrigation technology
	Lack of land tenure
Pressures	Agriculture intensification
	Increase demand on irrigation water supply for crop growth
	Lack of an efficient water collection and storage system
	Transfer of agrichemical pollutants to air, water, and land due to leaching and volatilization

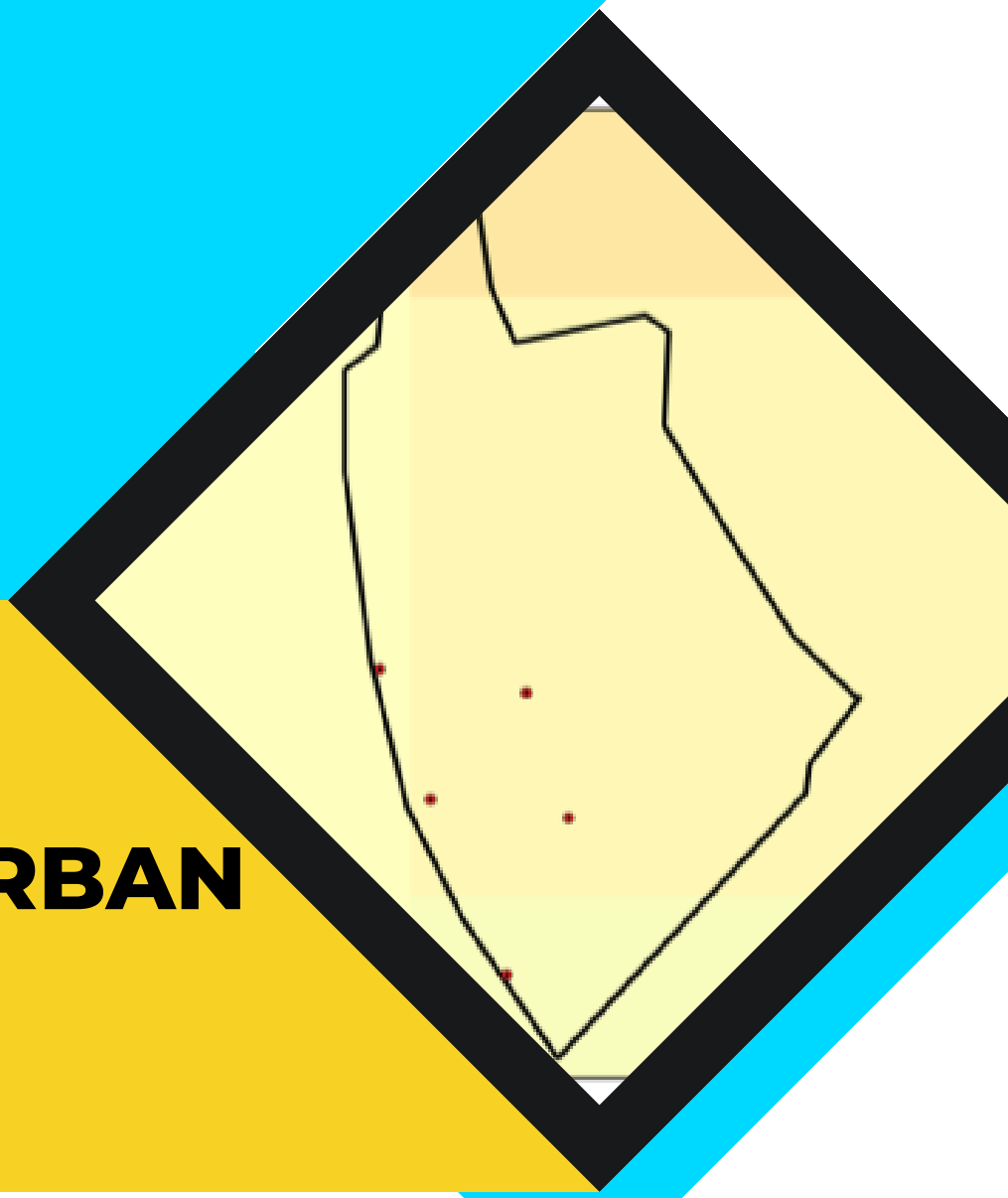
ROSEAU
DPSIR FRAMEWORK

Framework	Indicator
State	Soil erosion
	Decline in agricultural output and loss of land productivity.
	Decline in water quality.
Impacts	Increase demand on food imports resulting in food insecurities
	Poverty and reduced household income

RECOMMENDED INTERVENTIONS FOR ROSEAU

Table 4: Recommended interventions for Roseau

Agronomic measures	Introducing soil reclamation practices; organic mulching, grass strips and bio-pores, bamboo gully to check erosion
Structural measures	Installation of drip irrigation lines, rehabilitation of water storage tank with 60, 000-gallon capacity.
Management measures	Waste management; compositing to improve fertility, setting up of composting units, plant nursery development, training in seedling preparation
Others measures	Capacity building in irrigation techniques and management.



NO. 3: DARBAN

The Darban intervention site which spans five (5) acres of land is a dispersed community predominantly involved in agriculture as the primary livelihood activity. The intervention site's main land degradation challenges include biological deterioration, primarily from deforestation driven by charcoal production, and soil erosion, resulting from shifting cultivation and poor agricultural practices. The main impacts of these land degradation issues include income loss, low yields, reduced productivity, and biodiversity loss.

Over the years there has been a notable reduction in land cover and the loss of crucial ecosystem services. There is also an increase of invasive species in the area.

DARBAN
DPSIR FRAMEWORK

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

Framework	Indicator
Driving Forces	Climate change
	Demand for timber
	Small farm size 0.5 -2 ha
	Lack of land tenure
Pressures	Agriculture intensification
	Intensification of drought and tropical storms
	Illegal logging for wood products

DARBAN
DPSIR FRAMEWORK

Framework	Indicator
State	Soil erosion
	Reduced vegetation composition
	Decline in water quality.
Impacts	Loss of habitat for animals and destruction of ecosystem services
	Reduction in wildlife population which negatively affects the ecotourism secto

RECOMMENDED INTERVENTIONS FOR DARBAN

Table 6: Recommended interventions for Darban

Agronomic measures	Climate Smart Agriculture; establishment of agroforestry practice.
Management measures	Improved management of timber harvesting

REFERENCE

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