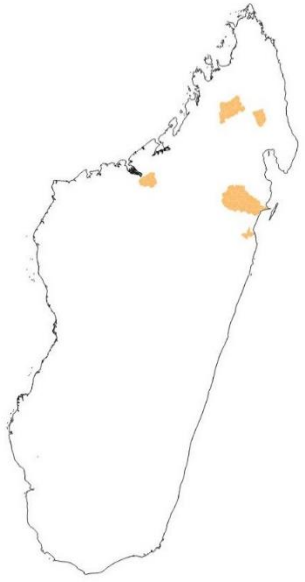
Overview of methodologies and data analysis for sustainable landscape management plan



Madagascar

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General introduction on the objective of the Sustainable Landscape Management Project

Projet Agriculture Durable par une Approche Paysage
PADAP

Program goals

Reduce the degradation of natural resources
Increase the value of output from productive sectors

PDO

To increase access to improved irrigation services and agricultural inputs
Strengthen the integrated management of natural resources by the local actors

The project contributes to higher level objectives :

→ Two of the five strategic axes of Madagascar's 2015 -2019 National Development Plan

- (i) inclusive growth and territorial anchoring of development (axis 3);
- (ii) conserving natural capital and strengthening resilience to risks and catastrophes (axis 5).

PADAP Project's component

Component 1 → Information and Planning

Component 2 → Investments and capacity building

Component 3 → Management, coordination, M&E

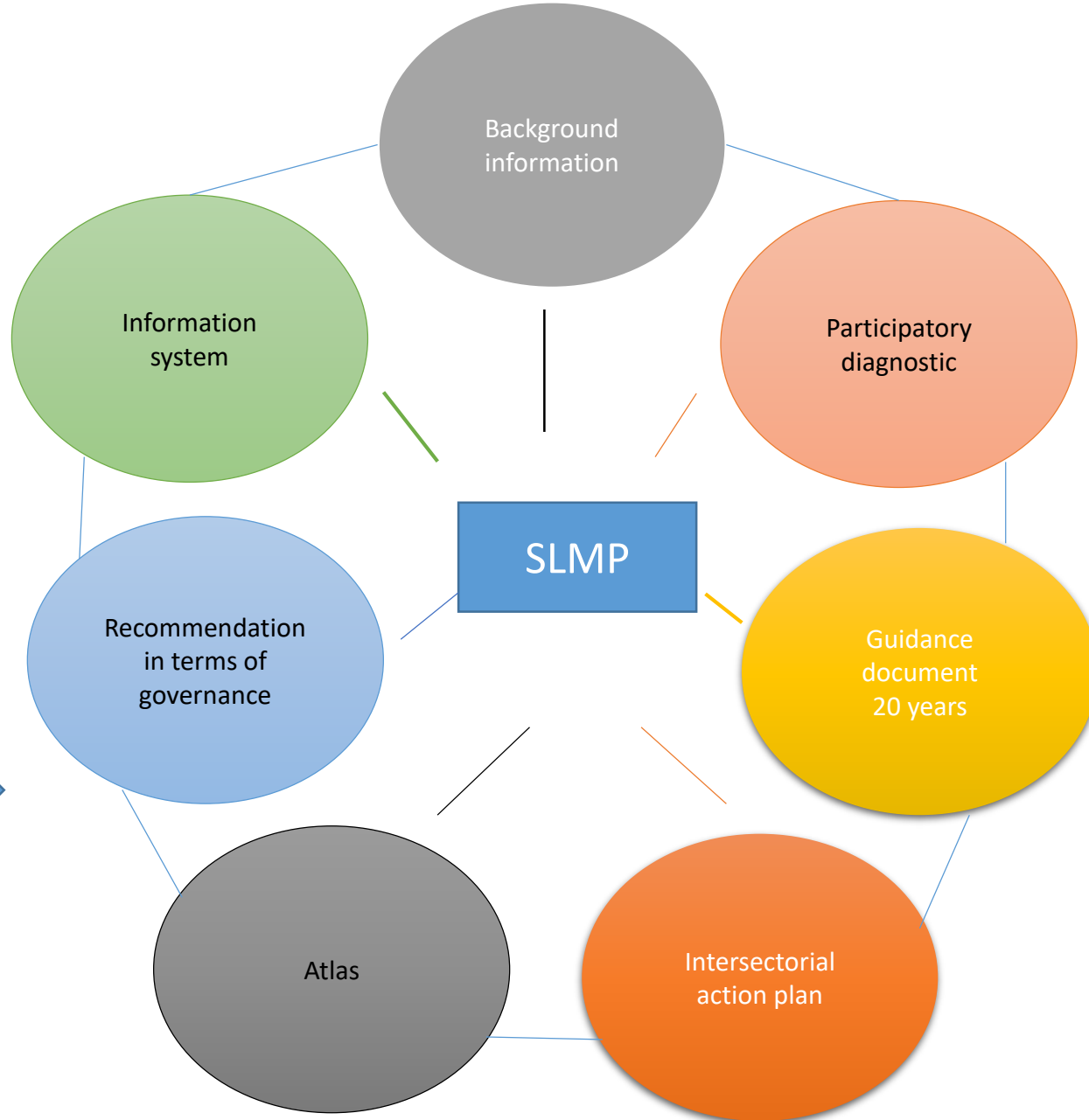
Component 4 → Contingency Emergency Response

The Sustainable Landscape Management Plan (SLMP)

Complexity of the approach : physical relationship between landscape element

Need a management tool that allows the implementation of landscape approach = SLMP

Landuse and resources management to guarantee needs of local people and sustainability of ecosystem

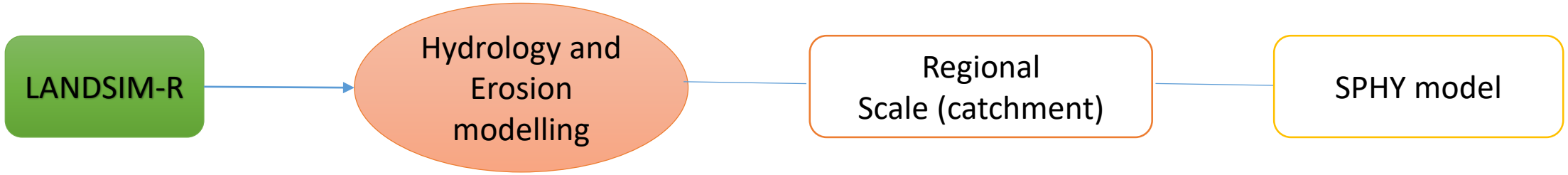


LAUREL : Land Use Planning for Enhanced Resilience of Landscapes

A tool to support integrated decision making for landscape management

→To assess the effects of changes in land use and management, and ensuing land degradation or restoration, on downstream water availability and sedimentation.

- River discharge / water availability (m^3/s)
- Sediment concentration ($tons/m^3$)
- Soil erosion rate (tons/ha)



LAUREL : Land Use Planning for Enhanced Resilience of Landscapes

Overview of input data

→Monthly data from the GeoSFM for the period 2001-2013 (WAVES national water accounting report, 2016)

- water balance components (rainfall, evapotranspiration, runoff)
- monthly runoff from GeoSFM
- daily temperature
- precipitation

→slope

→landcover

→measurements ->ground truth

LAUREL : Land Use Planning for Enhanced Resilience of Landscapes

Data analysis : Use of hydrological modeling tool

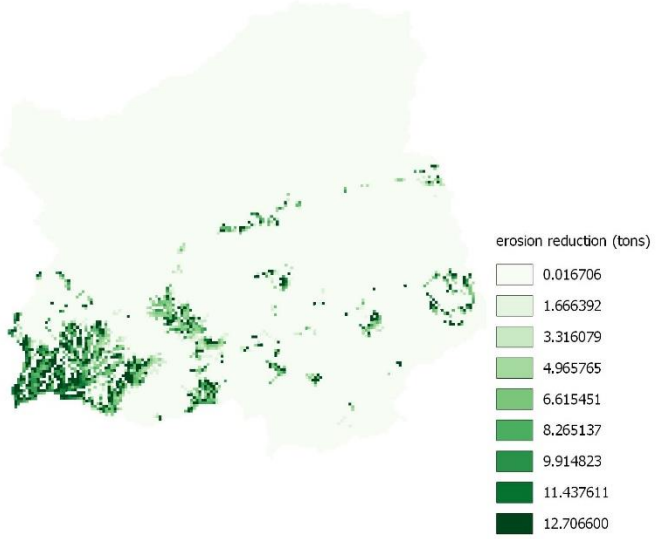
→SPHY: The Spatial Processes in Hydrology (SPHY) model is a hydrological modeling tool suitable for a wide range of water resource management applications.

1. Identification of erosion hotspot: simulation of erosion

Total erosion in catchment (values in ton/cell)

2. Exploring on-site impact of an SLM measure : SLM interventions

- Terracing
- Reforestation and forest restoration
- Agroforestry
- Reduced tillage

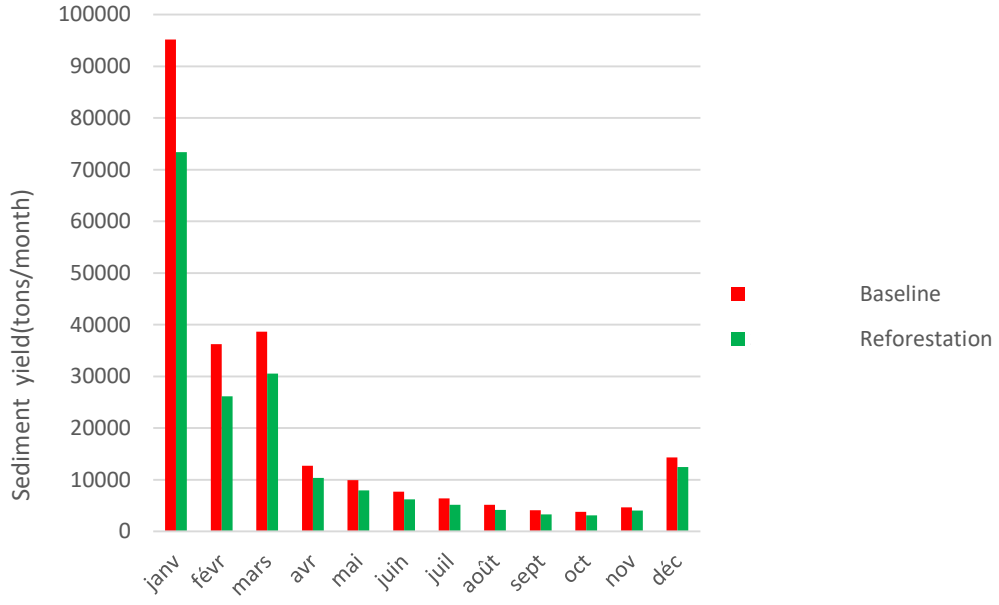


LAUREL : Land Use Planning for Enhanced Resilience of Landscapes

3. Impact of an upstream SLM intervention on downstream sediment flux

Time series of sediment flux in tons are saved for each station location

The model will present different result with or without SLM intervention



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3. Impact of an upstream SLM intervention on downstream sediment flux

Time series of sediment flux in tons are saved for each station location

The model will present different result with or without SLM intervention

LAUREL : Land Use Planning for Enhanced Resilience of Landscapes

4. Impact of an upstream SLM intervention on downstream water availability

To assess the effect on hydrology and downstream water availability