

Terms of Reference

WORKING GROUP MEETING 5 ANALYSING AND MODELING DEFORESTATION

REDD+ for the Guiana Shield

Regional Technical Collaboration Project



GENERAL CONTEXT

REDD+ for the Guiana Shield – a technical regional platform for REDD+ development in the Guiana Shield – is a regional project funded at the level of € 2.7 million by the European Regional Development Fund (FEDER), the French Global Environment Facility (FFEM) and the local government of French Guiana (Région Guyane). It targets Guyana, Suriname, Brazilian State of Amapá and French Guiana.

Cooperation and capacity building are key and strategic components of the project and **Regional Working-Group Meetings** are one of the channels used to reinforce capacities and cooperation within the REDD+ for the Guiana Shield project framework. Aims of those Working Group Meetings are to promote REDD+ methodologies under development or implementation within or outside the region. Each meeting provides opportunities to discuss specific technical topics in order to enhance a common understanding and identify opportunities for training and technology transfer on REDD+.

Specific objectives include:

- Initiating regional dialogue to identifying gaps (data and methodologies) at national and regional level (i.e. in the perspective of a common view of REDD+ MRV);
- Build capacity (through lessons learnt and sharing of good practices);
- Discuss the development of a Regional cooperation platform;
- Prepare technical inputs and feed into Steering Committee decision making.

Four Regional Working Group Meetings have already been organized (see <http://reddguianashield.com/working-groups/>) and two additional ones will be organized in the coming year. Modeling Deforestation was among topics of interest expressed by Steering Committee members. These ToRs are detailed what could be discussed during such a WGM. Other ToRs will follow on other subjects.

SPECIFIC CONTEXT

Modeling deforestation is one of the project technical components. Several activities are or will be performed within the project framework on this topic:

- Study on Methods and Tools to Analyze Historical Deforestation – Characterization of landscape patterns of deforestation in the Guiana Shield (on-going study performed by Maxence Rageade (ONFI), see dedicated ToRs)
- Study on Regional Dynamic Interactions of Deforestation between the Guiana Shield countries (study to be performed by Maxence Rageade, see ToRs)
- Modeling future deforestation and forest degradation in the Guiana Shield in function of different political and socio-economic scenario (support from the project to the on-going PhD of Camille Dezécache (CIRAD/UAG))

All those activities aim at studying and building capacities on regional future deforestation, based on empirical observations of past deforestation dynamics.

As part of the previous ToRs on modeling deforestation (see September 29th email from Nicolas Karr – ONF), a Training session was announced, to be organized in the framework of a dedicated Working Group Meeting.

Purposes of those ToRs are to provide more details on this Working Group Meeting.

OBJECTIVES AND ACTIVITIES

Objectives

Objectives of having a Working Group Meeting dedicated to *Analyzing and Modeling Deforestation* are to:

- Provide a global overview of undergoing activities on analyzing and modeling deforestation under the project framework;
- Build capacities on some specific tools and methods to analyze, as well as to model deforestation;
- Facilitate appropriation and understanding of the PhD methodology of modeling deforestation;
- Initiate collaborative work on historical analysis of deforestation in the Guiana shield.

It is expected that, after this WGM, participants will have a better knowledge of some tools that are used to analyze and characterize historical deforestation and will be capable to produce a simple model to predict future deforestation localization. It is also expected that thanks to this WGM, project partners will be able to better understand – and therefore better participate to - ongoing project activities on modeling.

Activities

For all project activities on modeling (two studies and a regional model), tools, methodologies and first results will be presented and discussed. After that, time will be dedicated to technical training, including through a learning-by-doing process. These technical training sessions will be conducted in order to facilitate appropriation of both results and methods used in the project activities framework, but also – thanks to a learning-by-doing approach – in order to build capacities on deforestation analyzing and modeling. Participants will be invited to produce their own analysis and model according to method and tools that will have been presented during the Working Group Meeting. They will be

invited to work on their own data, focusing on an area of interest (see below a description of the study site to be selected). Objective of working on an area well-known by participants (including in terms of deforestation dynamic) is to facilitate interpretations of results and to initiate discussion.

As it has been presented and announced several time to Steering Committee members, the under development regional model (see SCM3 and SCM4 presentations from Camille Dezécache) will be developed using R software, a free and open source software widely used for statistical and modeling purposes. As it might help participants to better understand and analyze outputs from Camille Dezécache, but also because R is more and more holding researchers' and experts' attention as a polyvalent tool for all statistical works. As such, it might be a valuable input to methodologies developed by the project partners.

During the WGM5, participants will be initiated into R, with an emphasis made on tools to characterize the deforestation dynamics and to produce models of deforestation.

Area of interest - Data to be prepared before the WGM

To ensure efficiency of training sessions, practical exercises will be performed on data set to be prepared beforehand by participants.

Each country should select an area of interest on which analyses and modeling will be performed. Those areas should:

- Be less than 50km² (for technical reasons)
- Be still forested but with observable past deforestation
- Be well known by countries, i.e. participants should be aware of what is on the field, both in terms of coverage (forest or non-forest) and should know at least one of the deforestation drivers

For each of them, participants should send – at least 1 month before the event:

- A shapefile of the area,
- A note quickly describing the zone and the deforestation dynamic.

Based on this information, the training team will collect information and create a dataset that will be used during the Working Group Meeting (forest/non-forest maps, three time points deforestation maps, GIS data on deforestation drivers). This data set will be shared with participants before the training in order for them to complete the dataset and provided they have better ones and that it can be combine with the other data (including in terms of geographical coordinates and projections), to replace some of the data (e.g. replace Hansen deforestation maps with maps produced locally with higher resolution).

WGM ORGANIZATION

Date and location

Proposed dates for this 3.5 days Working Group Meeting are Tuesday May 4th, to Friday May 8th, inclusive. It will be held in Cayenne.

Expected participants

Up to 4 participants per country will be welcomed to the WGM.

Each participant should have good knowledge of GIS software (QGIS, ArcGIS or others) that they should use on a daily basis. Ideally, they should also be familiar with statistics. It is recommended to name participants among people who are dealing or will deal with analysis and/or modeling of deforestation.

Software used

This WGM will focus on free and open source software. *QGIS* will be used for GIS data manipulation and visualization. *R software* will be used for data processing, modeling and as a statistical tool.

These software and modules have to be installed prior to the working group and participants must ensure their operability.

- R can be downloaded on <http://cran.rstudio.com>

NB: R Studio requires R 2.11.1 (or higher).

- R studio is freely downloadable on <http://www.rstudio.com/products/rstudio/download/>
- Qgis software is freely available on: <http://www2.qgis.org/fr/site/forusers/download.html>

Equipment required

Ideally, each participant should bring his / her own computer including at minimum:

- 2Gb RAM minimum (4Gb recommended for Windows XP and Ubuntu) / 4Gb minimum for Windows 7 and 8;
- Hard disk with a minimum of 20 Gb free space;
- Spreadsheet software (Excel, Libre Office or other);
- Latest versions of R studio installed;
- Qgis;
- Pdf software.

If not possible, a minimum of 1 computer for 2 participants is required.

Speakers/Training team

The training team will be composed of two experts:

- Maxence Rageade, an Environmental Economist from ONF International staff, in charge of the two studies on modeling deforestation in the Guiana Shield;



- Camille Dezécache, PhD student on the REDD+ Guiana Shield project.

DRAFT AGENDA

Day 1: Introduction

- Introductory session on analyzing and modeling deforestation:
 - Issues in the context of REDD+ Guiana Shield project.
 - Overall presentations on analyzing and modeling deforestation: Process and Methods
- Training session:
 - R software initiation (presentation of the software and the main functions which are useful for managing GIS data)

Day 2: Analyzing and characterizing the pattern of historical deforestation

- Introduction
- Presentations of the Study on Methods and Tools to Analyze Historical Deforestation – Characterization of landscape patterns of deforestation in the Guiana Shield
- Tools and methods:
 - Characterizing deforestation through landscape metrics
 - Characterizing spatial et temporal changes
- Training session:
 - Characterizing deforestation pattern from remote sensing data
 - Analyzing and understanding temporal and spatial trends of deforestation

Day 3: Modeling deforestation

- Introduction on modeling deforestation:
 - Presentation on modeling future deforestation and forest degradation in the Guiana Shield in function of different political and socio-economic scenario
 - Linear modeling: theory and application:
- Introduction to logistic regression for modeling the probability of deforestation;
- Introduction to random forest classifier: an alternative tool to compute the probability of deforestation using decision trees.
- Training session:
 - Producing a model for predicting the localization of deforestation;

Day 4: Final session

- Presentation of results by each country and discussions
- Closing discussion

BUDGET

Total estimated budget for this WGM is **35,160€**, including expertise and travel fees for Maxence Rageade, as well as all logistics for a 4 participants per country meeting (hotel, transportation, translation, etc.)

This budget will be covered by the following budget lines:

Item	Total cost	Budget line
Expertise and travel fees	10,160€	2.a
Logistics	25,000€	2.b

NB: expertise and travel fees for Maxence Rageade are not additional to the budget already announced in ToRs on modeling sent by Nicolas Karr on September 29th 2014.