p4ges can paying 4 global ecosystem services reduce poverty?

les paiements pour les services écosystèmiques globaux peuvent-ils réduire la pauvreté?

CARBON STOCK SURVEY IN THE FRAMEWORK OF POVERTY ALLEVIATION IN MADAGASCAR: CHALLENGES AND RESULTS

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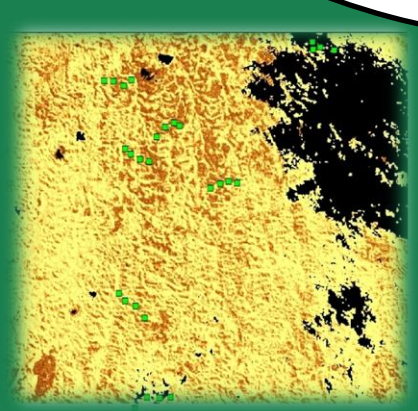
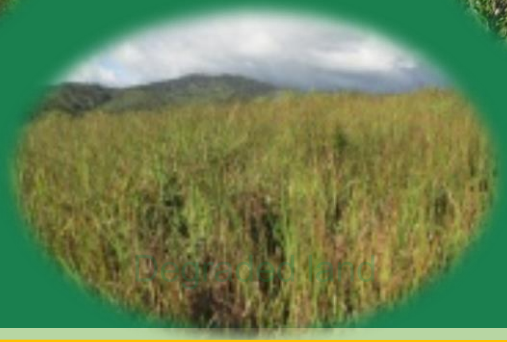
Département des Eaux et Forêts de l'ESSA

OBJECTIVES

1) five (5) pools



3) Develop carbon stock maps



2) Understand carbon evolution / dynamics according to land uses

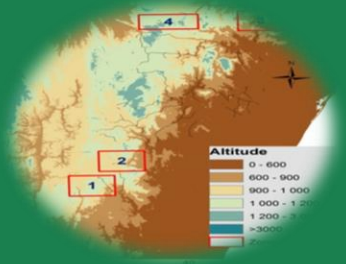
ACTIVITIES

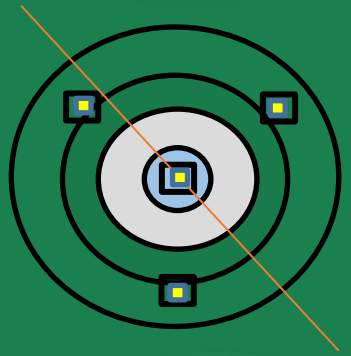
Information session

Local Authorities	Local population

Data collection

Determination of zones with other workpackage	Methodological test Develop design sampling





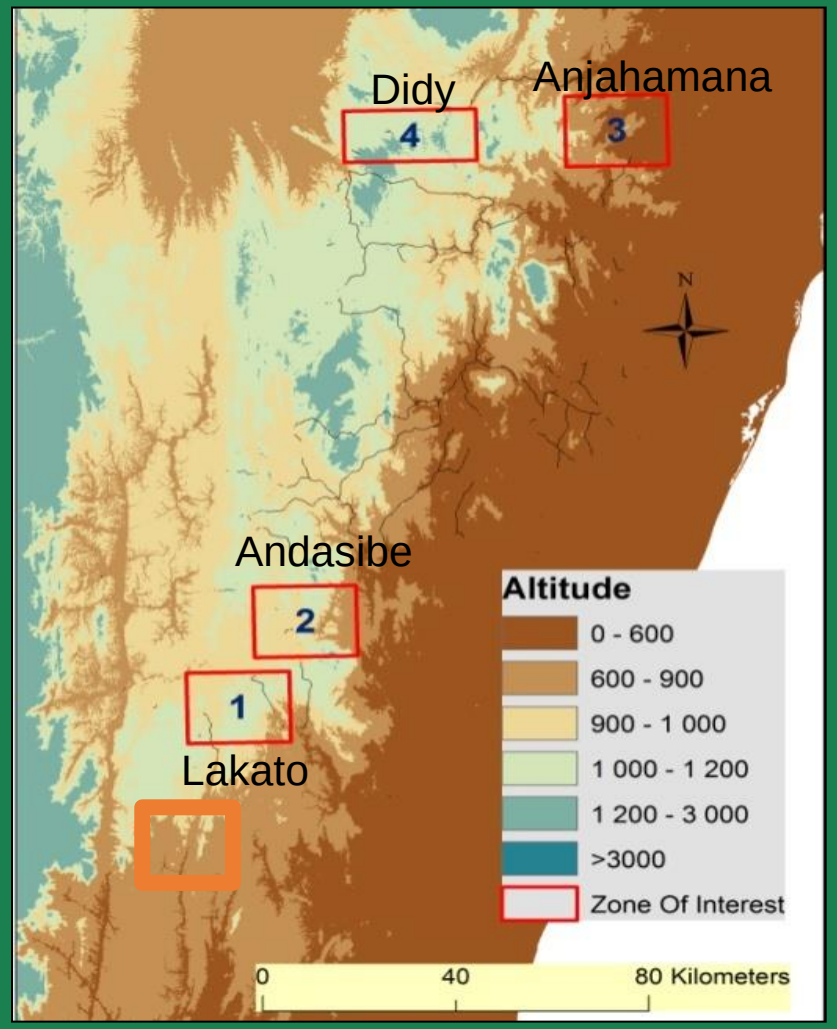
Determination of sites/target trees	Field data collection

Analysis

In Laboratory	Data processing/writing

RESULTS

Determination of Zones of interest



Map1: Corridor Ankeniheny-Zahamena (CAZ) with 4 Zones of interest

Corridor ANKENIHENY ZAHAMENA
4 zones of interest (ZOI)

ZOI1: Lakato (only Carbon WP surveyed)

ZOI2 : Andasibe

ZOI3: Anjahamana

ZOI4: Didy

Deforestation in Lakato

In total: 132 surveyed sites by Carbon WP

Pool 1: Aboveground biomass

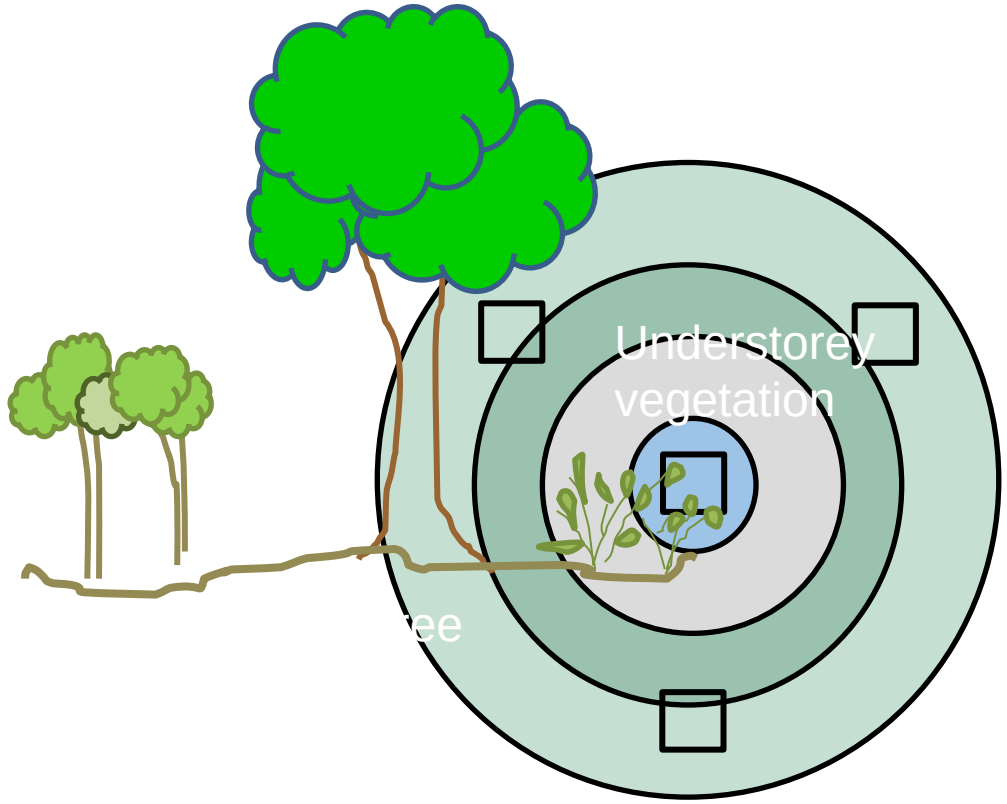

Forest inventory


Percentage of cover


Biomasse sampling


Biomasse weighting


Understorey sampling



Radius 20 m: trees DBH ≥20cm

Radius10 m: trees 10≤DBH<20cm

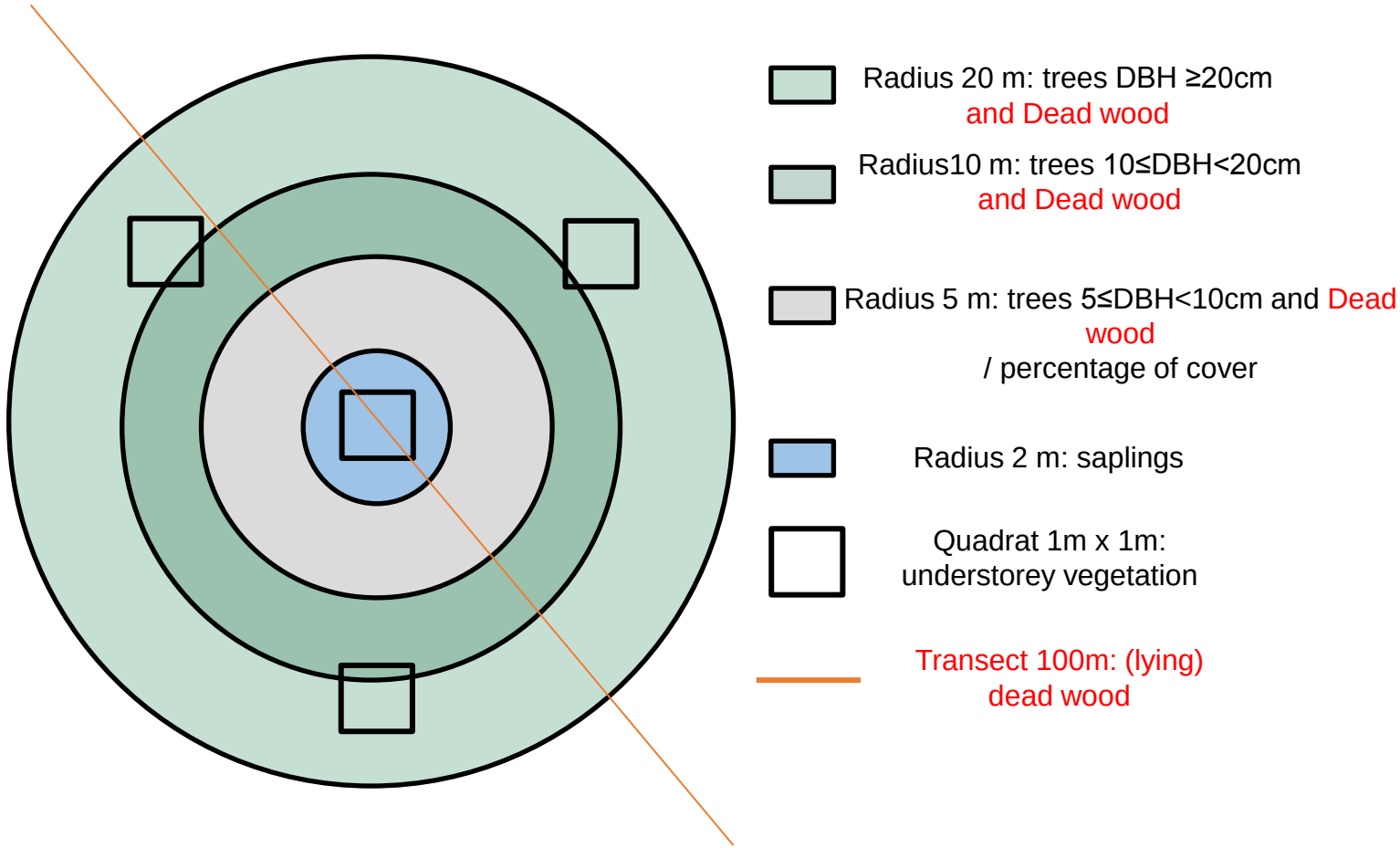
Radius 5 m: trees 5≤DBH<10cm/ percentage of cover

Radius 2 m: saplings

Quadrat 1m x 1m: understorey vegetation

Design sampling

Pool 2: Dead wood



Design sampling

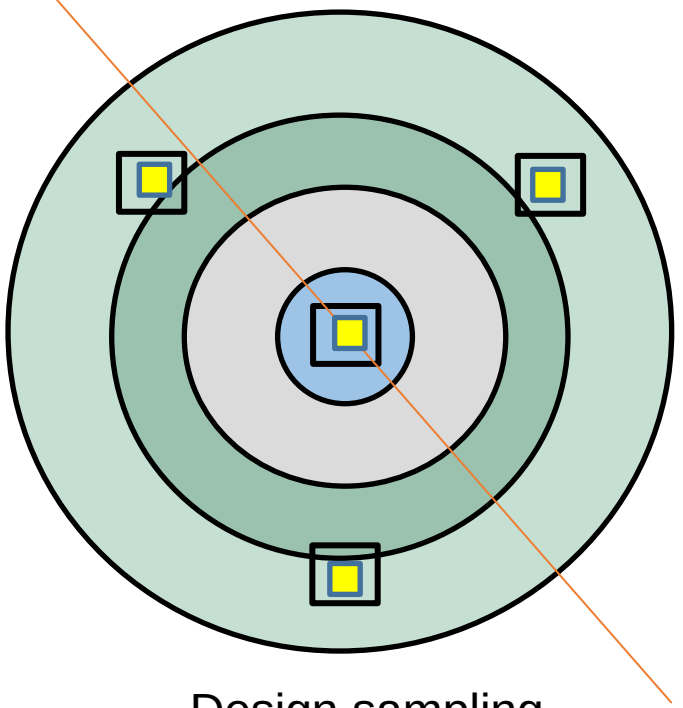
Pool 3: Litter


Collection of litter


Mat root


Dead leaves and

Litter sampling


Design sampling

Radius 20 m: trees DBH ≥20cm and Dead wood

Radius10 m: trees 10≤DBH<20cm and Dead wood

Radius 5 m: trees 5≤DBH<10cm and Dead wood / percentage of cover

Radius 2 m: saplings

Quadrat 1m x 1m: understorey vegetation

Transect 100m: (lying) dead wood

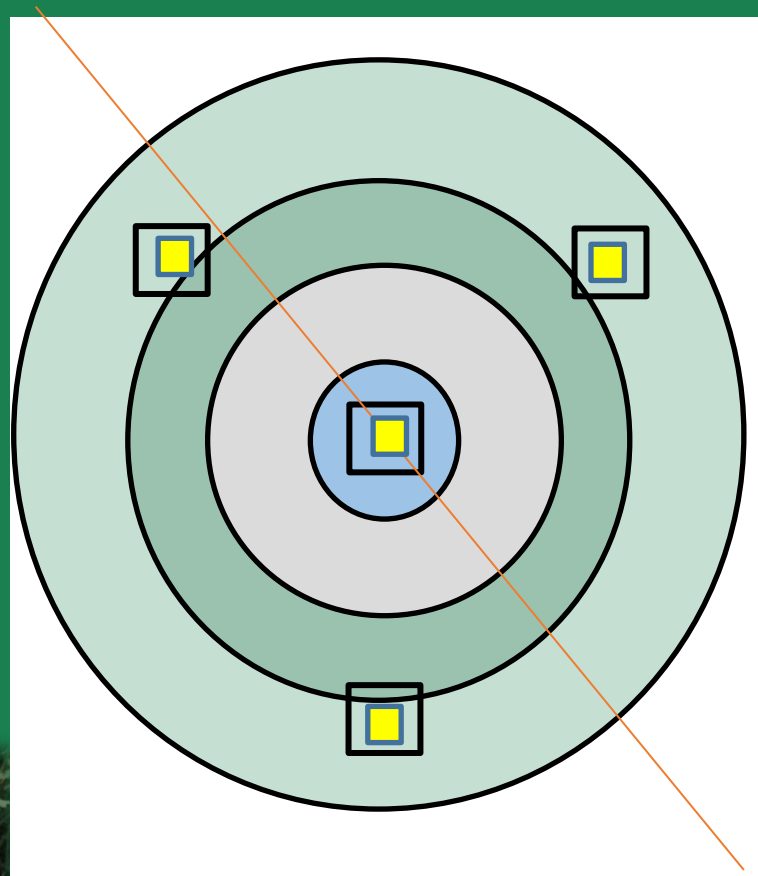
Quadrat 25 cm x 25 cm: Litter

Pool 4: Soil (30 cm and 100 cm depth)

Soil sampling by auger

Soil sampling by cylinder

Soil profil description



Radius 20 m: trees DBH ≥20cm and Dead wood

Radius10 m: trees 10≤DBH<20cm and Dead wood

Radius 5 m: trees 5≤DBH<10cm and Dead wood / percentage of cover

Radius 2 m: saplings

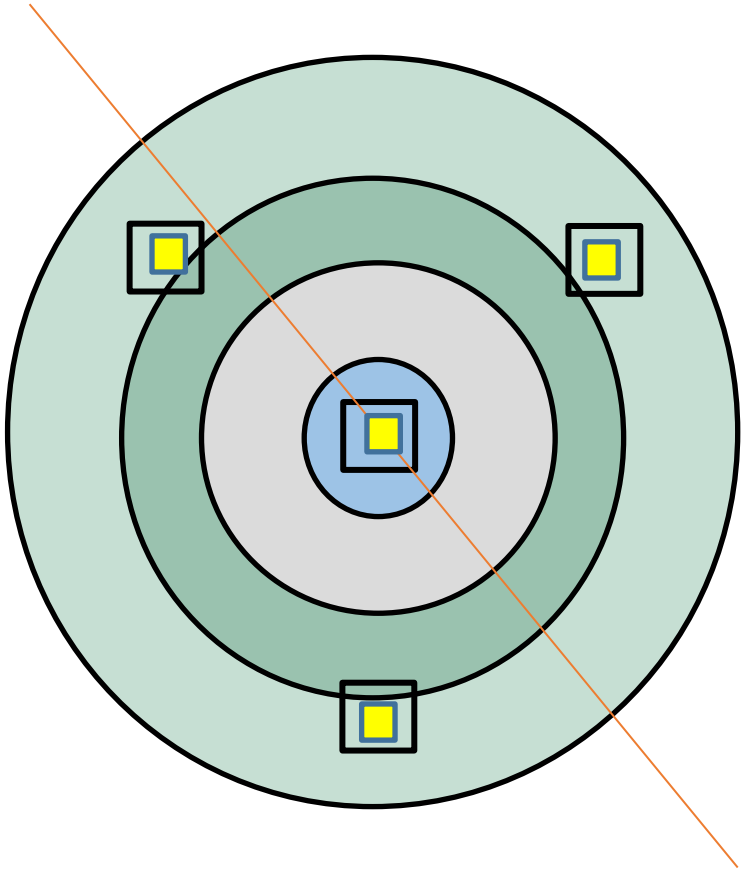
Quadrat 1m x 1m: understorey vegetation/ soil sampling

Transect 100m: (lying) dead wood

Quadrat 25 cm x 25 cm: Litter

Design sampling

Pool 5: Root



- Radius 20 m: trees DBH ≥20cm and Dead wood
- Radius10 m: trees 10≤DBH<20cm and Dead wood
- Radius 5 m: trees 5≤DBH<10cm and Dead wood / percentage of cover
- Radius 2 m: saplings
- Quadrat 1m x 1m: understorey vegetation/ soil sampling/ in center root sampling
- Transect 100m: (lying) dead wood
- Quadrat 25 cm x 25 cm: Litter

Design sampling

Pool 5: Root ➔ Challenging for humid tropical forest

DIRET MEASUREMENT IN FOREST

Design sampling of voronoi method

Excavation of root

Sorting root

Washing root

coarse roots (CR) with diameter ≥10 mm, medium roots (MR) 2 mm ≤diameter<10 mm and fine roots (FR) diameter < 2mm

Data collection for root biomass

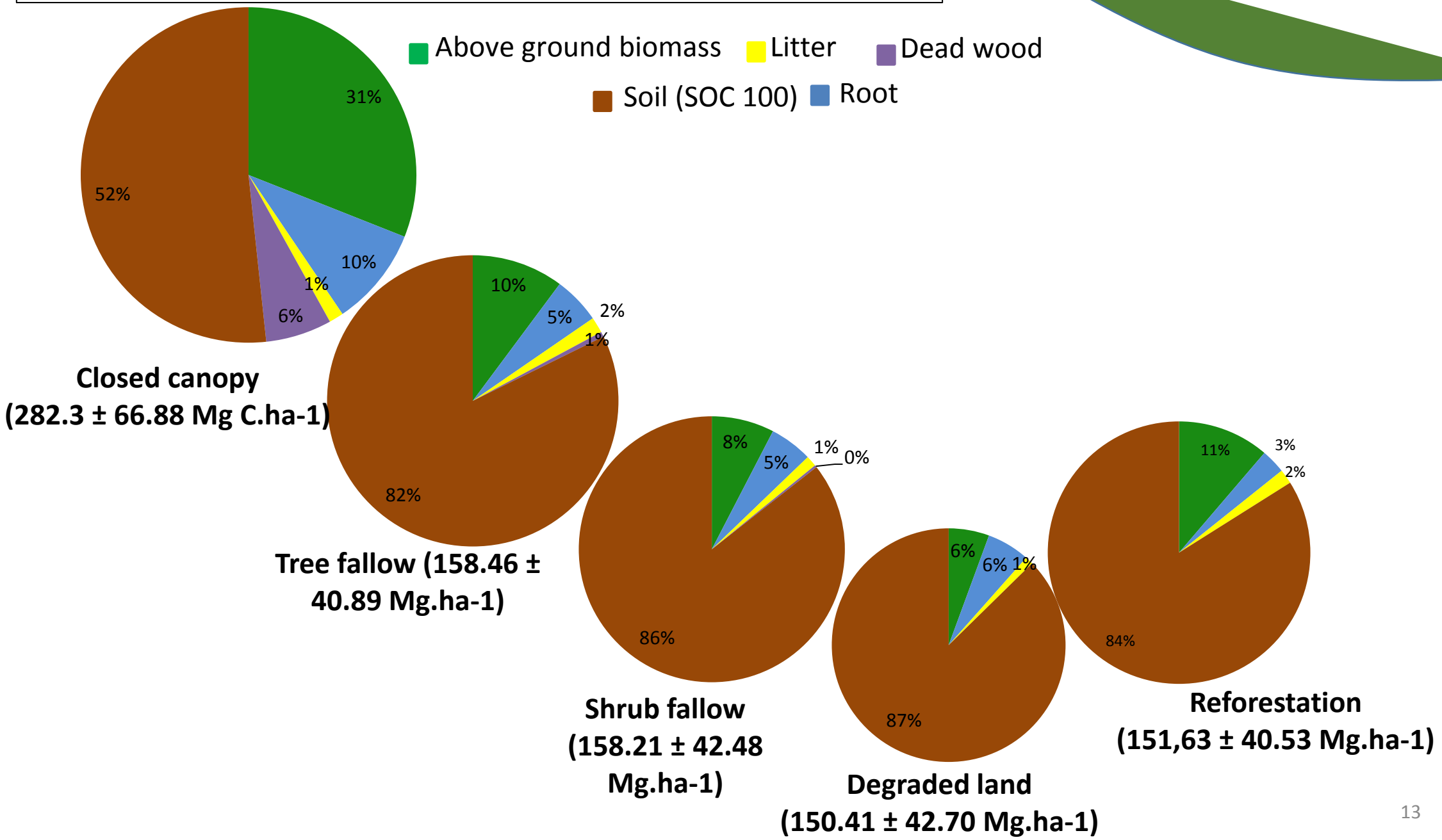
Tracking roots

Root ready to be measured

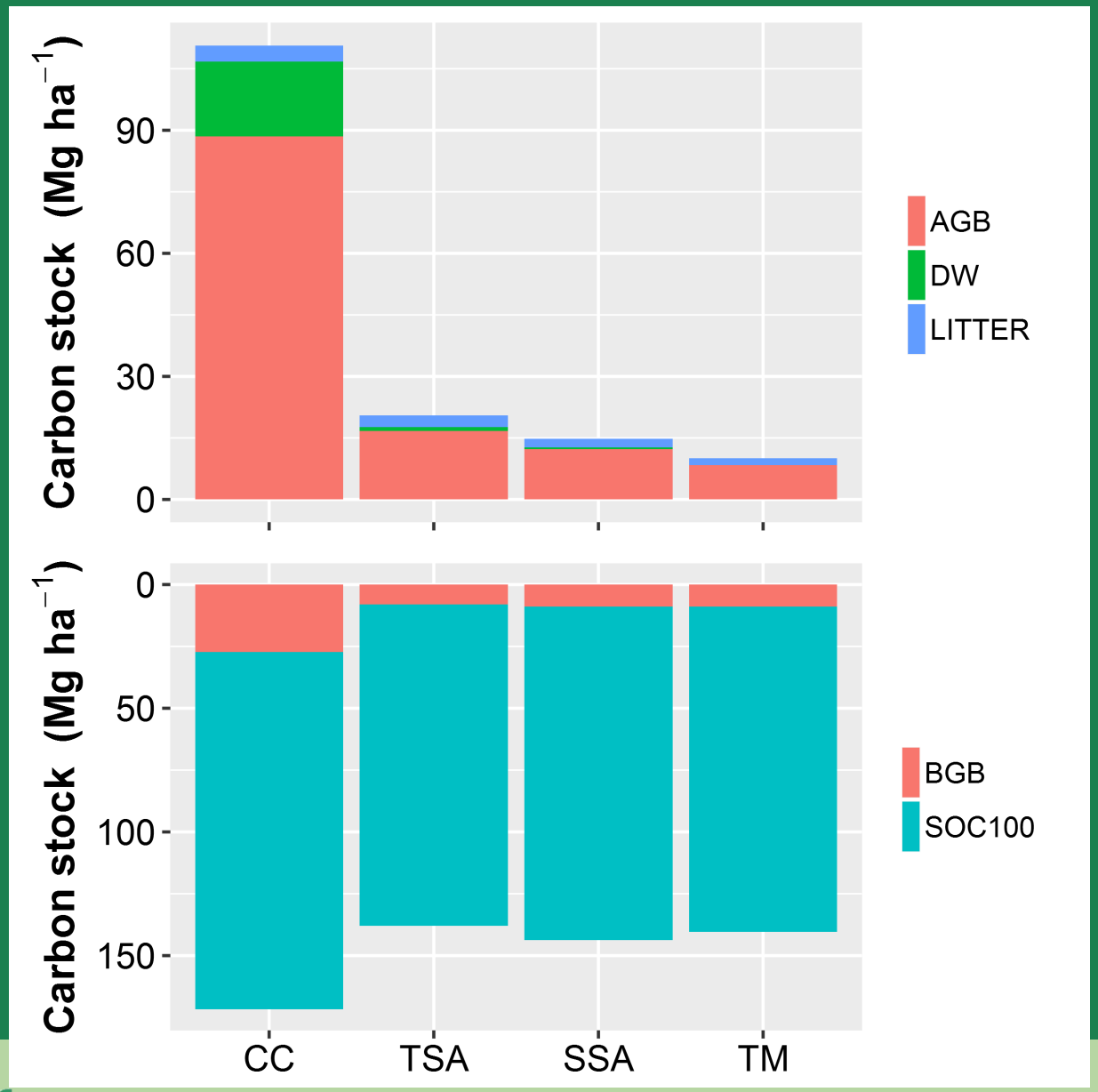
Measuring roots

CHALLENGES

Contribution of each pool in terms of carbon stock



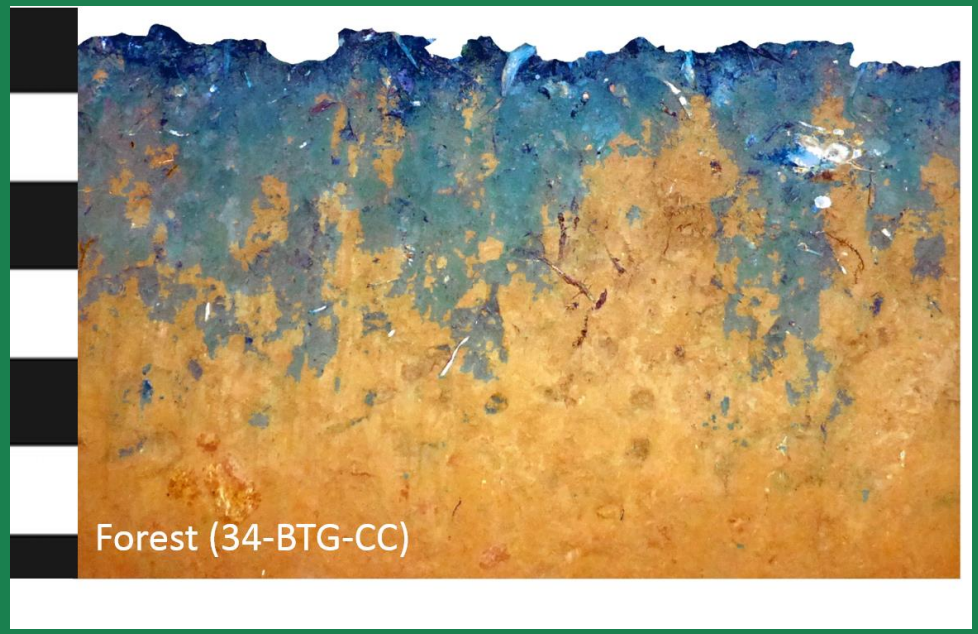
Carbon stock dynamics according to land use change



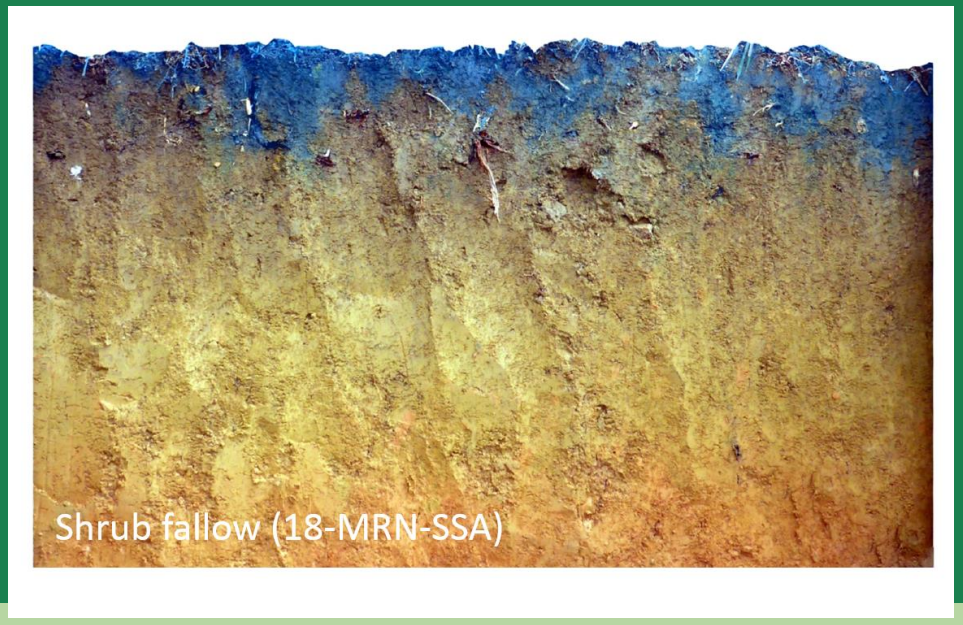
Visible carbon pools

Hidden carbon pools

Forest: infiltration (eg along roots) is high so overland flow is low

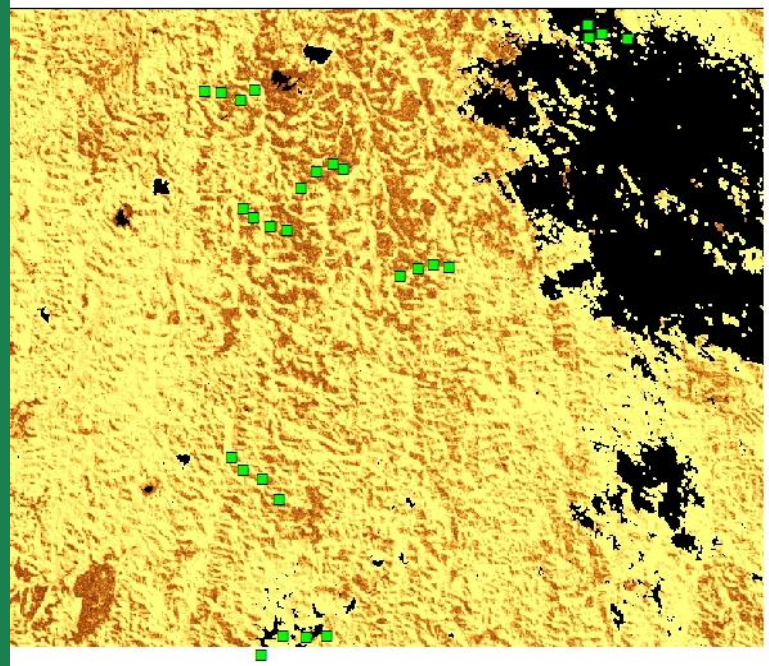


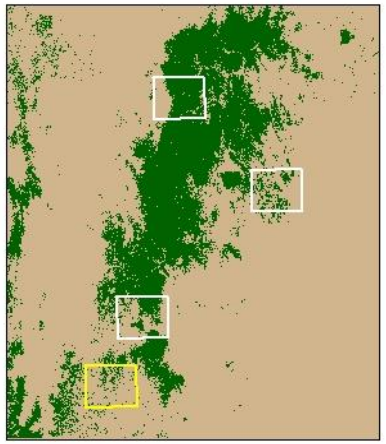
Shrub fallow: infiltration is low so overland flow is high

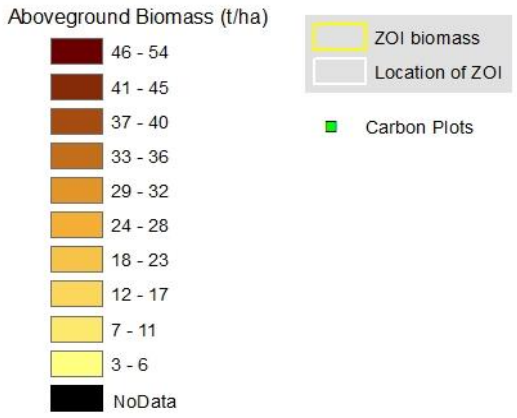


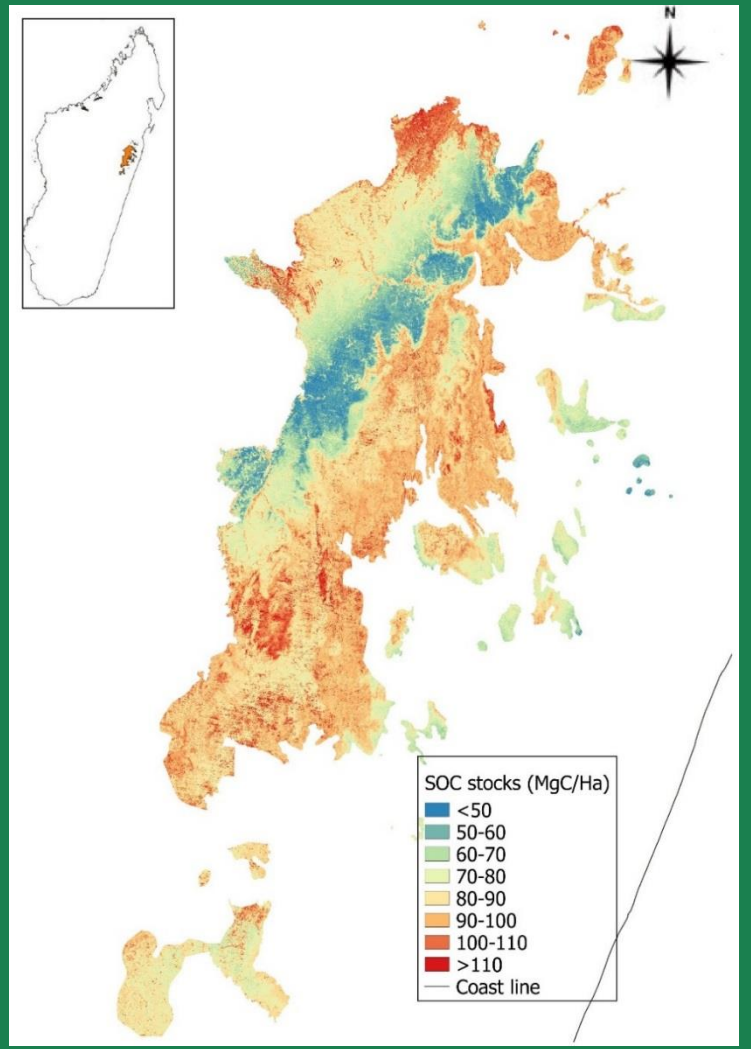
Zwartendijk et al (in press), Ghimire et al (2016)

Mapping: Above-ground biomass carbon stock









Mapping: Soil organic carbon stock

- **Participation in conferences**

National

Malagasy Academy — Presentation: Soil and climate change (IFM)

National Library

International

2015 International Year of Soils

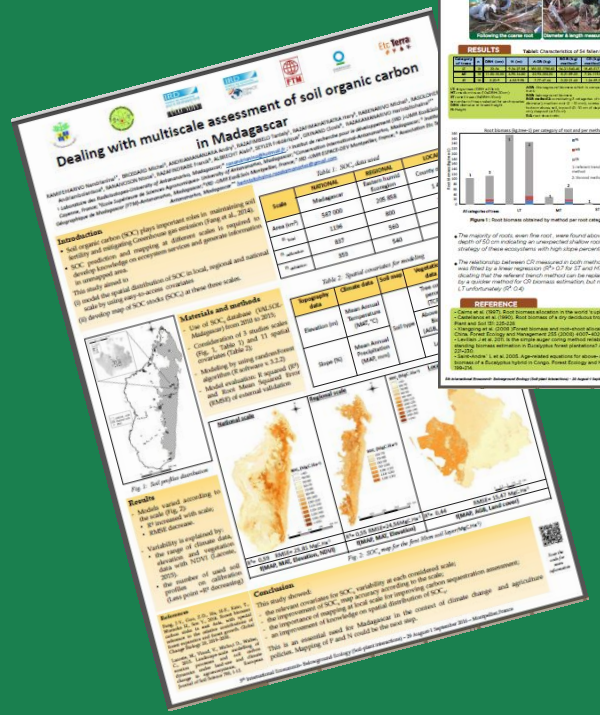
PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21·CMP11

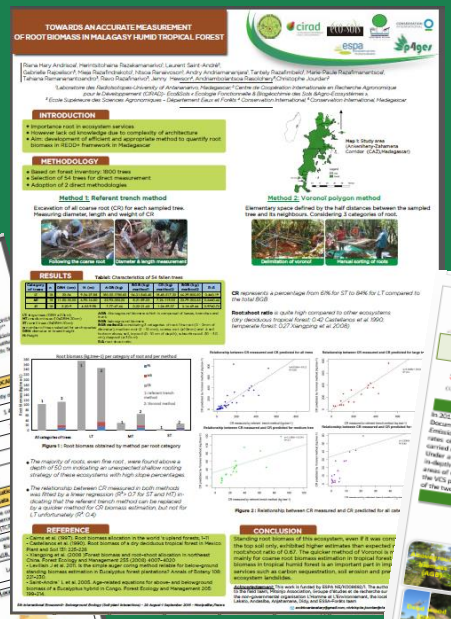
2016 African ESP Conference
Ecosystem Services for SDGs in Africa
21-25 November 2016, Nairobi, Kenya

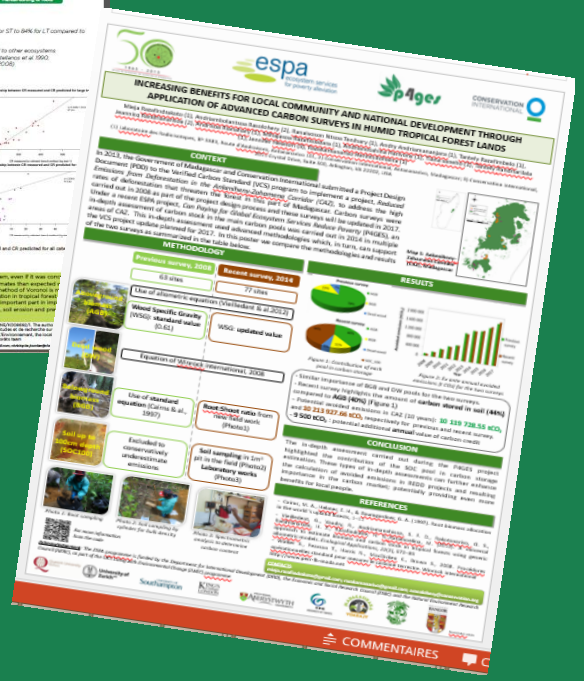
espa ecosystem services for poverty alleviation

BROADCAST OF SCIENTIFIC FINDINGS

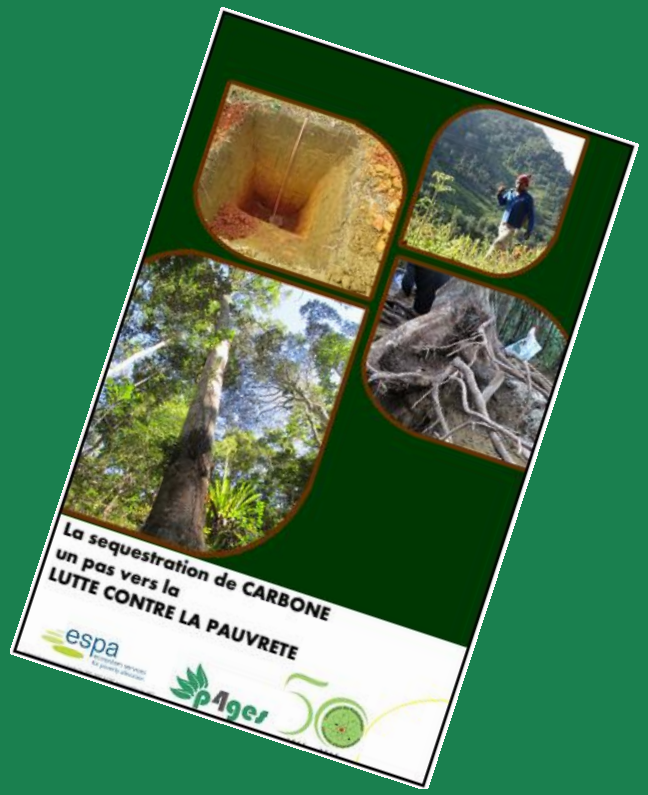
Posters







Scientific card dispatched during CoP 21



▪Scientific papers in international journals

XIV WORLD FORESTRY CONGRESS, Durban, South Africa, 7-11 September 2015

Assessing aboveground and soil carbon storage under preserved forested area in Madagascar to address climate change: case of Ankeniheny-Zahamena Corridor (CAZ)

Nantenaina Ramboatiana[1,2], Andry Andriamananjara[1,2], Andrisoa Riana Hary[1], Tiana Saneho[1,6], Tantely Razafimbelo[1,2], Marie Paule Razafimanatsoa[1,2], Andriambolantsoa Rasolohery[3], Jenny Hewson[4], Nandrianina Ramifehiarivo[2], Nantenaina Rabetokotany[2], Tahiana Ramananantoandro[5], Andriambelo R. Razafimahatratra[5], Gabrielle Rajoelison[1], Lilia Rabeharisoa[2], Eustache Miasa[6], Herintsitohaina Razakamanarivo[1,2].

[1]Carbon WorkPackage-p4ges project, Laboratoire des Radioisotopes, Antananarivo, Madagascar.
[2]Laboratoire des Radioisotopes, BP 3383, Route d'Andraisoro, Antananarivo 101, Madagascar.
[3]Conservation International, Madagascar
[4]Conservation International, 2011 Crystal Drive, Arlington, VA 22202, USA
[5]Ecole Supérieure des Sciences Agronomiques, Département Eaux et Forêts, BP 175, Antananarivo Madagascar
[6]Institut Supérieur des Sciences, Environnement et Développement Durable – Université de Toamasina, Madagascar.

Abstract

The importance of carbon (C) as a global ecosystem service is increasingly ... example, the development of results-based payment initiatives to incentivize ... was assessed in a study focusing on poverty alleviation in the forest of Anker... (CAZ) in eastern Madagascar. This study aimed to: i) estimate total C stock ... ground biomass (AGB) and soil organic carbon (SOC), for four existing l... canopy closed forest (CC), tree fallow (TF), shrub fallow (SF) and *tany*... and analyse the variability of C stock per pool and LU type through... defined zones of interests (ZOI) . Forest inventory, vegetation and so... deep soil 30-100 cm) were performed in 56 sites, distributed through... and Anjahamana (ZOI3). These 56 sites included the four existing... TM). Soil C content and bulk density were measured and AGB qu...

Agriculture, Ecosystems and Environment 233 (2016) 1–15

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/agee

Land cover impacts on aboveground and soil carbon stocks in Malagasy rainforest

Andry Andriamananjara[a,*], Jennifer Hewson[b], Herintsitohaina Razakamanarivo[a], Riana Hary Andrisoa[a], Ntsoa Ranaivoson[a], Nantenaina Ramboatiana[a], Mieja Razafindrakoto[a], Nandrianina Ramifehiarivo[a], Marie-Paule Razafimanantsoa[a], Lilia Rabeharisoa[a], Tahiana Ramananantoandro[c], Andriambolantsoa Rasolohery[d], Nantenaina Rabetokotany[d], Tantely Razafimbelo[a]

ARTICLE INFO

ABSTRACT

Deforestation and forest degradation can impact carbon dynamics and, subsequently, ecosystem functioning and climate change. In this study, we surveyed the influence of such land cover changes on four land cover/uses including closed canopy forest, tree fallow, shrub fallow and degraded land among 120 study sites. We assessed these changes on total carbon stocks including both aboveground biomass (AGB) and soil organic carbon (SOC) in the topsoil (0–30 cm), and deep soil, 30–100 cm. The four land cover/uses were located within four regions (Analanjirofo, Diégo, Anjahamana, and Lakato) in the Eastern humid tropical forest of Madagascar. Our results show that total carbon stocks, AGB and soil average 166 ± 57 Mg Cha^{-1} in which 82% is stored in the topsoil and 27% in deep soil) suggesting the importance of 0–100 cm of soil surface horizon (500 stored in the carbon. The total carbon stocks were significantly higher in closed canopy compared to the other land covers. In lower altitude regions, the total carbon stock was lower ranging from 141.5 $Mg Cha^{-1}$ to 163.7 $Mg Cha^{-1}$ relative to higher altitude areas where total C stock ranged from 170.5 $Mg Cha^{-1}$ to 186.1 $Mg Cha^{-1}$. The relative importance of AGB and SOC were reversed in these study sites, with AGB/SOC ratios of 0.37 for Anjahamana and 0.17 for Ambatovy, and 0.17 for Analanjirofo, high SOC was combined with soil properties could explain the SOC variation across the study regions. High SOC was related to lower precipitation, high clay content and high root development. These results provide an accurate assessment of carbon storage distribution in a tropical region and support the importance of forest conservation and effective land cover management in maintaining carbon storage in ecosystems as tools in climate change mitigation in tropical forests.

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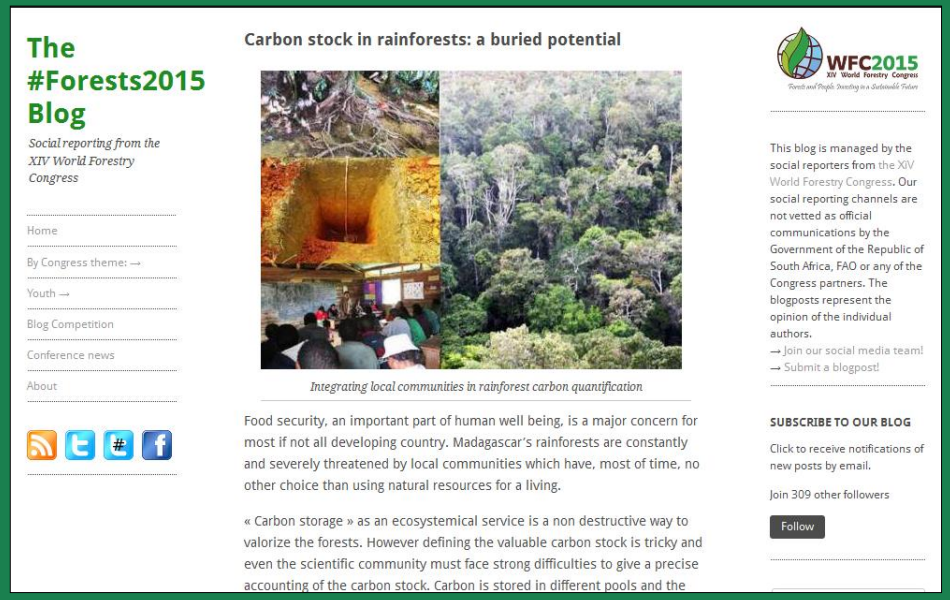
▪Blogs

Site P4GES: p4ges.org

Awarded Blog during the World Congress Forest 2015, Durban, https://forests2015.wordpress.com/2015/08/02/carbon-stock-in-rainforests-a-buried-potential/



The #Forests2015 Blog

Social reporting from the XIV World Forestry Congress

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Carbon stock in rainforests: a buried potential

Integrating local communities in rainforest carbon quantification

Food security, an important part of human well being, is a major concern for most if not all developing country. Madagascar's rainforests are constantly and severely threatened by local communities which have, most of time, no other choice than using natural resources for a living.

« Carbon storage » as an ecosystemical service is a non destructive way to valorize the forests. However defining the valuable carbon stock is tricky and even the scientific community must face strong difficulties to give a precise accounting of the carbon stock. Carbon is stored in different pools and the

WFC2015 XIV World Forestry Congress

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