

## Community Measurement of Carbon Stock Changes for REDD

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Tanzania

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## Introduction

- ▶ Kyoto: Think Global, Act Local (K:TGAL) is:
  - a research and capacity building program,
  - investigates possibilities and potential for CFM of existing natural forest to be included as an eligible carbon mitigation activity.
- ▶ Research teams in four regions:
  - East Africa (Tanzania),
  - West Africa (Senegal, Mali and Guinea Bissau),
  - PNG and,
  - the Himalayas (Nepal and India).
- ▶ Measuring :
  - sequestration in existing forests and reduced emissions of carbon by avoiding degradation

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## TZ Forest extent

- ▶ Tanzania: 94.5 million ha
- ▶ Forestland of 35 million ha:
  - 16 million are reserved forests,
  - 2 million hectares are forests in national parks and
  - 17 million hectares (49% of all forestland) are unprotected forests in general lands.
- ▶ Deforestation & Degradation: 412,000 ha per yr in the general land forests.



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## CFM in Tanzania

- ▶ Started in 1990's
- ▶ Low speed: To date 17 million ha unprotected
- ▶ This is where most deforestation & degradation happen
- ▶ CFM retard deforestation in unreserved forestland.
- ▶ They transform unsustainable management of existing natural forests, to sustainable management
- ▶ However, only 11% of the country's forests are under CFM due to lack of funds and capacity.
- ▶ Accessing carbon finances could potentially provide incentives for more CFM establishment.
- ▶ Challenge: Limited forest inventory data due to lack of human & financial resources

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## Components of REDD

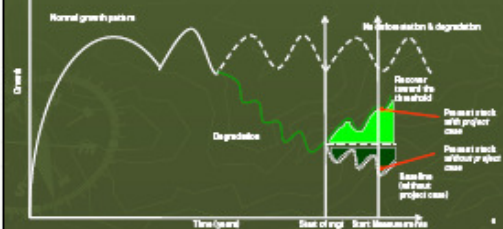
- ▶ REDD credit = Country improvements Vs baseline scenario
- ▶ Deforestation baselines
  - loss of forest area, that is, complete land use change: use historical trends of forest area changes, RS
- ▶ Degradation baselines
  - loss of biomass stock within a forest: No historical data available
- ▶ Enhancement baselines
  - incremental change in biomass stock within a forest: No historical data available

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## Individual projects e.g. CFM

Should determine and monitor carbon stocks

- With project case: to determine the rate of recovery
- Without project case: to determine the rate of degradation



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## Material & methods

### Carbon Assessment & Monitoring

- Stock changes in managed CFM and unmanaged forests in proximity
- Done by local communities themselves after training
- Use IPCC GPG 2003



## The equipment

Consists of:

- A handheld computer with ArcPad™ 6.0 software and connected to GPS
- It is easy to use
- Is used to locate:
  - forestry boundaries
  - sample plots and
  - recording measurement data
- With a step-by-step guide to the procedures, local communities were trained in a short time and were able to use the system effectively



## Steps in Carbon Assessment

- Forest mapping/stratification
- Pilot survey to estimate variance and number of sample plots
- Locate the sample plots on the ground
- Measure the dbh of all trees
- Set out the sub-plots for the grasses, herb and litter data
- Take soil samples randomly within the plot

## Data analysis

The following trees stand parameters were computed:


- Density i.e. the number of stems per ha (N)
  - Basal area per hectare (Dominance)(G)
  - Volume per ha (V) and
  - Dry biomass / carbon (tones per ha)
- Trees volume and biomass were computed using tested local existing allometric functions for the areas.
- Computation were fitted on Ms Access database

## Results

With Project Case					
Vegetation type	Location	Average annual increment (t/ha/yr)	CO <sub>2</sub> sequestration (tCO <sub>2</sub> /ha/yr)	Forest Area (ha)	Total sequestration (tCO <sub>2</sub> /ha/yr)
Woodlands	Kilungulungo	2.8	5.3	800	4,240
	Ayazanda	1.7	3.2	550	1,760
Lowland	Ludewa	4.4	8.3	28.5	237
Montane	Mgaribo	5.2	9.8	158	1,780
Without Project case					
Vegetation type	Location	Average biomass loss (t/ha/yr)	Average CO <sub>2</sub> Emissions (t/ha/yr)	Forest Area (ha)	Total CO <sub>2</sub> Emissions (tCO <sub>2</sub> /ha/yr)
Woodland	Kilungulungo	1	1.8	800	1440
Montane	Mgaribo	3.5	6.5	158	1040

## Conclusions & Recommendations

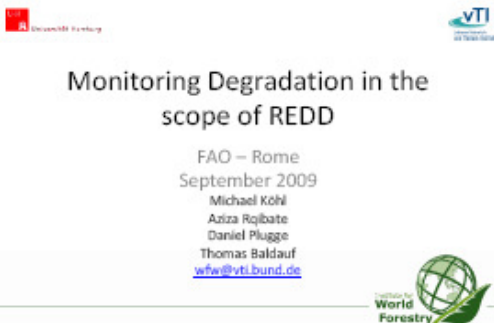
- Since forests under CFM are efficient in carbon storage and sequestration:
  - governments are argued to consider CFM as part of their approach under climate mitigation policy
- Since there are no data on carbon stocks
  - Studies on forest inventories using methodologies such as that developed in this study are recommended



**Monitoring Degradation in the scope of REDD**

FAO – Rome  
September 2009

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**Case Study: REDD-FORECA Project in Madagascar**

- Duration: Phase 1, 2007 - 2009 (2 years)
- Starting year: July 2007
- Donors: BMZ, BMELV, SDC
- Partners: MEFT, GTZ/PGM-E, Intercooperation, ESSA Forêts, vti
- Pilot sites:
  - JC Group: Miarivavio, Arabatofiaandriana, Manerapasa
  - GTZ/PGME: Tsiajavio, Teinonampasoa, Hosa Ramona, Mararano
- Mission and objectives:
  - To support Madagascar Government in the elaboration of a mechanism reducing the emissions of GHG from deforestation and degradation of forests in Madagascar
  - To participate to the conception of an international system of exchange of quotas emissions to REDD
- Expected results:
  - Development of a REDD methodology for Madagascar (national)
  - Implementation of the concept of committed forest at local level
  - Diffusion of results of REDD FORECA





**Case Study in Madagascar: Workpackages**

Biomass survey → carbon budget  
Socio-economic study → causes of deforestation  
Economic study → economic aspects of timber use

Baseline & Incentives





**Case Study in Madagascar: Causes of deforestation**

Methodology development → Causes of deforestation and degradation → Input for the baseline → Output

- Conceptual framework
- Photo collection
- Data analysis




Causes of deforestation and degradation

- Factors of deforestation and degradation
- Explanatory variables, factors

Input for the baseline

- Requirements for incentive system implementation

Output








**Case Study in Madagascar: Causes of deforestation**


Input: Data collection: Indirect procedure, Data collection: Direct procedure

Needs and Uses Analysis

Output: Causes of deforestation and degradation, Explanatory variables, Input for the baseline and requirements for the development of adapted incentives

**Case Study in Madagascar: causes of deforestation**



1. Households with high incomes benefit more than poor household from the deforestation
2. Households with low incomes are more dependant on deforestation and degradation

⇒ Measures to combat deforestation / degradation will affect the poorest households the most

⇒ Respect the Millennium Development Goals

