

Carbon Assessment and Monitoring by Local Communities: The Methodology

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Introduction

- To reduce the transaction costs of measuring carbon, local communities were trained and tasked to conduct the measurements
- Techniques were developed to measure and monitor carbon stock.
- They are:
 - User friendly to the users - i.e. to the communities
 - reliable and
 - presented in a format acceptable to the scientific community

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

Assessment procedure based on MacDicken (1997), Weyerhaeuser (2000) and the Intergovernmental Panel on Climate Change (IPCC), (2003) *Good Practice Guidance for Land Use, Land-Use Changes and Forestry*.

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

Pilot survey to calculate variance

- 15 randomly laid out samples plots to cover all possible variation were established in each forest/strata.
- All trees \geq minimum dbh were measured in a plot of at least 5.6m radius
- Data was entered to the computer and a paper record backup made
- Existing tree species checklists for the areas were used to get botanical names of species identified by local communities

Then the number of sampling units (n):
$$n = \frac{CV^2 t^2}{E^2}$$

Where:

CV = Coefficient of variation = standard deviation/mean

E = Sampling Error (10%)

t = a value of t obtained from the students' t distribution table.

A pre-designed database in MS Access program was used to compute n, needed for each forest/strata

Permanent plots layout and data collection

- ▶ Permanent plots were laid out systematically with a random start in each forest/strata
- ▶ A position of the plot was marked and its details recorded directly to the computer in the field
- ▶ Measurement:
 - Dbh of all trees above minimum agreed dbh (1 cm)
 - Height of some trees in a plot
 - Make a record of disturbances in a 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. Where there were no existing allometric functions new ones were developed.
- Computation were fitted on Ms Access database (Other already existing databases such as PROGEDE in Senegal were used).