

Methodology use for Assessing baseline standing carbon stock for reforestation systems in tropical zones in the Scolel Té project, Mexico

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Background: The Scolel Té project

Objective: to estimate the baseline standing carbon stock for forestry systems used within the Scolel Té project

The following systems were considered:

- Taungya with cedro – Plantation of *Cedrela odorata* established through intercropping with maize. This system is usually planted on abandoned agricultural fields.
- Tropical improved fallow – Plantation of *Cedrela odorata* established in fallow vegetation.
- Timber trees in coffee plantations – Planting of timber trees within shade grown coffee plantations to increase the value and diversity of products. Although existing shade trees are not cleared prior to planting they are included in the baseline in line with the principle of conservative estimation.
- Tropical live fences – planting of *Cedrela odorata* around field margins

Methods

The work was carried out between in 2002. A total of 142 fields were surveyed representing approximately 25% of the area of land registered with the project. In each field two sample plots were measured of 500m² each, equivalent to 10% of the area of most field.

The carbon stock in trees >10 cm dbh was calculated by recording the number of trees in 5 different size classes and applying the following conversion factor for the amount of carbon per tree:

| DBH (cm) | tC/tree |
|----------|---------|
| 10-20 | 0.05 |
| 20-30 | 0.17 |
| 30-40 | 0.35 |
| 40-50 | 0.59 |
| >50 | 0.91 |

The carbon per tree was calculated using the following biomass coefficient from Brown (1989) where D = dbh:

$$\text{kgC} = 0.5 \times (13.2579 - 4.8943D + 0.6713D^2)$$

The carbon stock in vegetation of less than 10cm DBH was calculated by estimating the abundance of the vegetation in three strata and applying a conversion factor based on an assumed maximum carbon stock in each strata (de Jong *pers com*):

| Strata | Maximum carbon stock (tC/ha) |
|---------------|-------------------------------------|
| Herbs | 2 |
| Shrubs | 4 |
| Small trees | 12 |

| Abundance | Cover | Conversion factor |
|------------------|--------------|--------------------------|
| Abundant | >50% | 1 |
| Moderate | 25-50% | 0.6 |
| Few | <25% | 0.2 |
| None | 0 | 0 |

Results

The following table shows the mean per ha carbon stock based on the results of the analysis:

| System | n | mean | St dev |
|---------------|----------|-------------|---------------|
| Taungya | 36 | 14.79 | 0.73 |
| Fallow | 82 | 18.43 | 0.95 |
| Coffee | 24 | 28.43 | 0.65 |
| Agriculture | 4 | 11.43 | 0.02 |