

A Baseline and Monitoring Methodology for Agricultural Land Management Activities

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Emissions and Removals in Agricultural Land Management

Emissions

- CO₂
 - Biomass removal
 - Land clearing
 - Tree cutting
 - Soils
 - Fossil fuel use
- CH₄
 - Manure
 - Biomass burning
 - Fossil fuel use

N₂O

Manure Fertilizer use N-fixing species Biomass burning Fossil fuel use





Removals

- C Sequestration
 - Trees
 - Improved soil management



Key Concepts

Activity based methodology

- Monitor activity
 - Agricultural practice
 - Production
 - Cover crops
 - Residuals
 - Manure
 - Fertilizer use
 - Biomass burning
 - Fossil fuel use
- Convert the long- term to transitional Δ soil organic carbon
- Measure
 biomass in woody perennials



Project Boundary and Applicability Conditions

Project boundary Includes all sources of biomass and manure Applicability conditions Cropland or grassland Constant or increasing agricultural pressure **Baseline** Constant or decreasing use of agricultural inputs Forest land in the area is constant or decreasing No cutting of perennials in the first two years **Emissions** No increase in livestock No lagoon type manure storage systems No biomass or manure from outside the project boundary No increase in fossil fuels for agricultural management Leakag No increase in fossil fuels for cooking and heating



Methodological Components

• Δ Biomass in woody perennials CDM AR Tool for perennials in the baseline CDM AR SSC methodology Synthetic fertilizers CDM AR Tool for fertilizers N-fixing species **IPCC** Tier 1 methodology **Biomass burning IPCC** Tier 2 methodology



Soil Organic Carbon Component

- Modified IPCC Tier 2
- Group activities
- Model long-term ∆ soil organic carbon for each Group using RothC¹ (or CENTURY²)
 - Clay content, weather
 - plant residues, manure, soil cover
- Convert long-term to transitional ∆ soil organic carbon using 20 year moving average

¹ <u>http://www.rothamsted.bbsrc.ac.uk/aen/carbon/rothc.htm</u> ² <u>http://www.nrel.colostate.edu/projects/century5/reference/html/Century/overview.htm</u>



Soil Organic Carbon Component Preliminary Baseline Clustering

Corn system Residue removal, no cover crops, trees Bananas and napier grass Maize, beans, bananas and napier grass High fertilizer use Low fertilizer use Coffee system Residue removal, potato intercrop, trees Cover crops High fertilizer use Low fertilizer use



Soil Organic Carbon Component Preliminary Project Clustering





Soil Organic Carbon Component Long-term versus transition





Leakage

- 1. Displacement of biomass from outside the project boundary
- 2. Displacement of manure from outside the project boundary
- 3. Increase in the use of fossil fuel for cooking and heating
- 4. Increase in the use of fossil fuel by vehicles to ship agricultural produce shipped to market.
- 5. Increase in the use of fuel wood from non-renewable sources for cooking and heating purposes. AMS-I.E. Switch from Non-Renewable Biomass for Thermal
 - AMS-I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User



Conclusion

Looks like a complicated methodology BUT Mostly existing tools and modules Activity based Model long-term Δ soil organic carbon Transition based on moving-average Will be submitted to VCS in early 2009



In Memoriam

Bernhard Schlamadinger

March 7, 1967 – Aug. 28, 2008

