

BioCF

Agricultural land management carbon projects

Soil carbon brainstorming workshop,
March 2nd, 2009

Project Team:
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Joanneum Research & University of Aberdeen

presented by Timm Tennigkeit and Johannes Woelcke

Content

- Momentum for agricultural land management mitigation activities
- Agricultural carbon pilot projects in Kenya
- Methodology development
- Benefits of agricultural carbon assets for smallholder farmers & investors

Momentum for agricultural land management mitigation

- Within UNFCCC process:
 - UNFCCC AWG-LCA published report on agricultural mitigation options (Nov. 2008) – requested by > 40 countries
 - draws on IPCC AR4-WG3 Report "Mitigation of Climate Change" (May 2007)
 - CDM approved small-scale methodology using activity-based default values for soil carbon (Dec 2008)
 - Submissions on agricultural/soil carbon for 5th Session of UNFCCC AWG-LCA in March/April by:
 - 11 African Governments
 - FAO
 - UNCCD
 - COMESA Draft

Momentum for agricultural land management mitigation

- Within UNFCCC Process (contd.):
 - 5th Session of AWG-LCA in Bonn (March 29 to April 8), with an in-session workshop on agriculture
 - Contributions by FAO, World Bank (BioCF, AFTAR), Ireland, Belarus, New Zealand
 - Submission for 6th Session of AWG-LCA (Bonn, June 1-12) by April 24
- US climate policy debate:
 - Soil carbon considered in all leading US climate change bills (unclear if soil carbon credits, like REDD, can be imported from developing countries into the future US compliance market)
- Danish Government: Policy dialogues on climate change adaptation for land and water management (envisaged as input to Copenhagen Conference)

Kenya Agricultural Carbon Finance Projects

Western Kenya Smallholder Agricultural Carbon Project

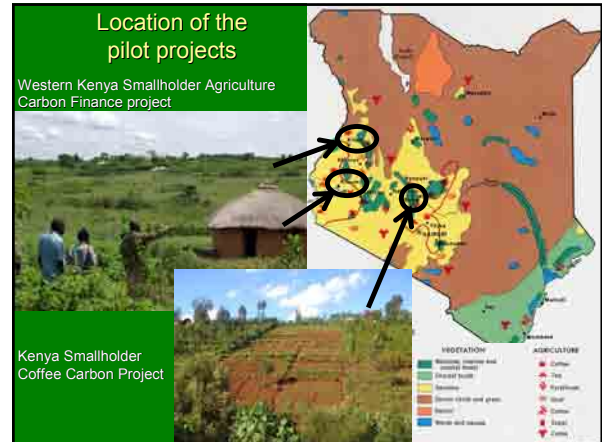
Kenya Smallholder Coffee Carbon Project

Project Identification Process

- Pre-feasibility study to identify cropping systems with a high economic mitigation potential in Kenya (April 2007)
- Public tender for project ideas (April 2007)
- Capacity building workshop for potential project developers (June 2007)
- Coaching support provided to short-listed project developers to prepare quality Project Idea Notes (June-Sept. 2007)
- Supporting two pilot projects to develop Project Design Document and a modular Methodology meeting the requirements of the Voluntary Carbon Standard (VCS)
 - Kick off workshop with project developers (May 2008)
 - First presentation of pilot projects & methodology key concepts at COP-14 side event in Poznań (December 2008) together with Government of Kenya, World Bank, VCS

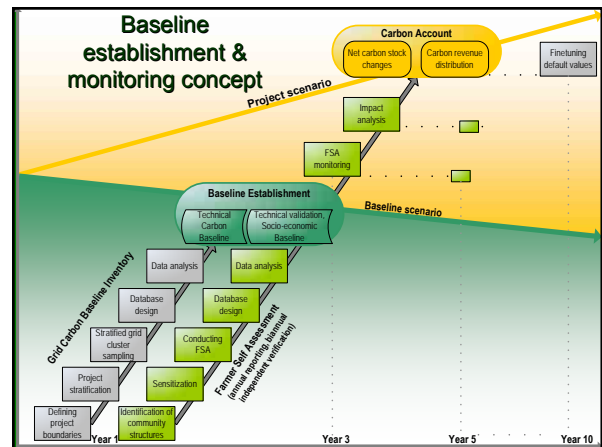
Agricultural mitigation potential screening in Kenya: Focus on smallholder mixed cropping systems & best coffee practices

Commodity	Smallholder Mixed cropping systems	Maize	Bio-fuels	Coffee	Tea	Sugar
Area available in ha (million)	3	1.6	Semi-arid: 0.9	0.15	0.15	0.14
GHG mitigation activities	SALM: Agronomy Nutrient mgmt Water mgmt Agroforestry Set aside land	Residue mgmt.	Jatropha/ Croton 1) Fuel-switch 2) AR	1) Shade trees, multiple cropping 2) Mulching systems 3) Fertilizer use efficiency	Inter-cropping no option in Kenya	1) No/ burning of residues 2) Mulching systems 3) Fertilizer related emissions
Existing extension service	-	-	-	+	++	+
Tech. GHG mitigation potential in t CO ₂ e/ha/y.	2 - 5	0.5	1) 1-12 2) 2.5-5.0 High bandwidth	3 - 8	-----	7.8 in 6 years
Economic mitigation potential	++	?	?	++	0	+



Features of the two early action agricultural mitigation projects in Kenya

Features	Western Kenya Smallholder Agriculture Carbon Project	Kenya Smallholder Coffee Carbon Project
Project region	Western Kenya (116,000ha, adoption area: 86,000ha)	Central Kenya (phase I: 7,200ha, 50% coffee, 50% subsistence agriculture), phase II 10,000 ha
Project developer/ extension provider	VI-Swedish Cooperative Centre (SCC)	ECOM Agroindustrial Corp
Aggregator	Registered farmer associations covering an area with about 80,000 farms	Komothai smallholder farmers cooperation, 9000 members
Agricultural objectives	Restoring agricultural production, adopting farm enterprise approach, Reducing climate change vulnerability	Restoring coffee production & producing certified specialty coffee using best coffee practices Reducing climate change vulnerability
Expected VERs (IPCC 20 y. default period)	516,000 tCO ₂ e/y. (full role out) (1.5tCO ₂ e soil C & 4.5tCO ₂ e biomass C/ha/y)	~30,000 tCO ₂ e/year, phase I (2.4tCO ₂ e soil C & 1.6tCO ₂ e biomass C/ha/y)



Agricultural land management modular methodology, Key Concepts:

- Activity based methodology
- Monitor activity
 - Agricultural practice
 - Production
 - Reduced tillage
 - Cover crops
 - Residuals
 - Manure
 - Fertilizer use
 - Biomass burning
 - Fossil fuel use
- Model long-term Δ soil organic carbon (RothC or CENTURY), modified IPCC Tier 2 approach
- Convert the long-term to transitional Δ soil organic carbon using 20 year moving average
- Measure Δ biomass in woody perennials

11

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
 - Improved agricultural management

12

Project Boundary and Applicability Conditions

- Project boundary
 - Includes all terrestrial carbon pools
 - Applicability conditions
 - Cropland or grassland
 - Constant or increasing agricultural pressure
 - 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
 - No increase in livestock
- Baseline** {
- No lagoon type manure storage systems
 - No biomass or manure from outside the project boundary
- Emissions** {
- No increase in fossil fuels for agricultural management
- Leakage** {
- No increase in fossil fuels for cooking and heating

13

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 Applications by the User

14

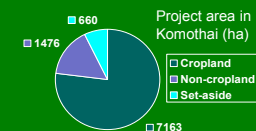
Conclusion about the methodology key concepts

- Looks like a complex methodology **BUT**
 - Mostly existing tools and modules
- Activity based
 - Model long-term Δ soil organic carbon
 - Transition based on moving-average
 - Approach is already CDM approved see AR-AMS0004 methodology
- **Draft was submitted to VCS early 2009**

15

ECOM coffee project

Crop areas in hectares in Komothai → from Carbon Baseline Survey	
Coffee	3,527
Banana	4,626
Maize	2,508
Sweet potatoes	1,360
Potatoes	1,113
Beans	1,091
Napier grass	1,032
Tea	883
Avocado	830
Kales (root crop)	714
Loquat (fruit bush)	629
Cassava	598
Yams	431
Mango	463
...	...



From Baseline Survey and FSA:

- Mainly grown in two different cropping systems (coffee & maize dominated) with different shares
- Crop production quantities; considered low for the default table (<0.56 t/ha for maize, <0.05 t/ha for beans, <0.67 t/ha for potatoes)
- SALM baseline and expected with project scenario, weighted by adopted area

↓
Look-up table

Carbon look up table example: ECOM coffee project residue mgmt in Maize, beans, potatoes intercropped

ICV ha/yr for low crop production	Residues removed from the field	Residues left in the field	Residues removed & 1 t/ha year of manure distributed	Residues removed & 2 t/ha year of manure distributed	Residues left & 1 t/ha year of manure distributed	Residues left & 2 t/ha year of manure distributed	Residues left & 4 t/ha year of manure distributed
Residues removed from the field	0.08	0.11	0.47	0.87	0.19	0.52	0.96
Residues left in the field		0.03	0.35	0.79	0.11	0.44	0.87
Residues removed & 1 t/ha year of manure distributed				0.76	0.08		0.85
Residues removed & 2 t/ha year of manure distributed							

- Maize, Beans Potatoes: intercropped on 4,488 ha
- 2.41 tCO₂e/ha/year (with project scenario considering baseline scenario)
- 2018 (10 years): 108,245 tCO₂e
- 2028 (20 years): 216,490 tCO₂e
- conservative assumption: no repercussions with increasing agri. production (no change in default values) assumed, but increase in production over time expected.

Benefits for smallholder farmers

- Carbon market access & up-scaling potential (sectoral/programmatic approaches)
- Cost efficient and transparent project monitoring, i.e. Farmer Self Assessment, apart from extension workers no experts required to maintain the system
- Increased productivity & food security: Soil carbon sequestration contributes to restore agricultural production and fertilizer absorption capacity
- Bridging the cash-flow gap between the adoption of sustainable agricultural management practices & improved crop production
- Adapting agricultural production to climate change e.g. enhanced soil carbon stocks are reducing the vulnerability to extreme weather events