



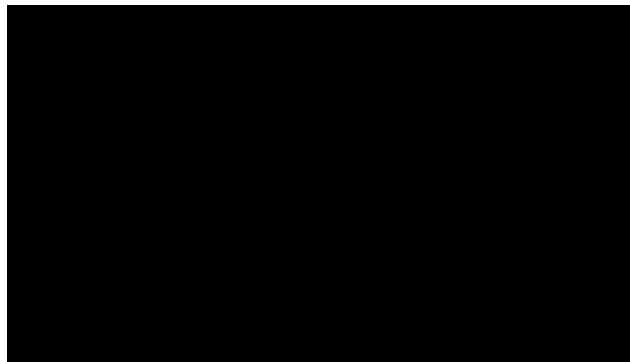
Kenya Agricultural Carbon Project

Climate Change and Sustainable
Agricultural Land Use Management
March 9, 2011, Tokyo, Japan



Solid Scientific base

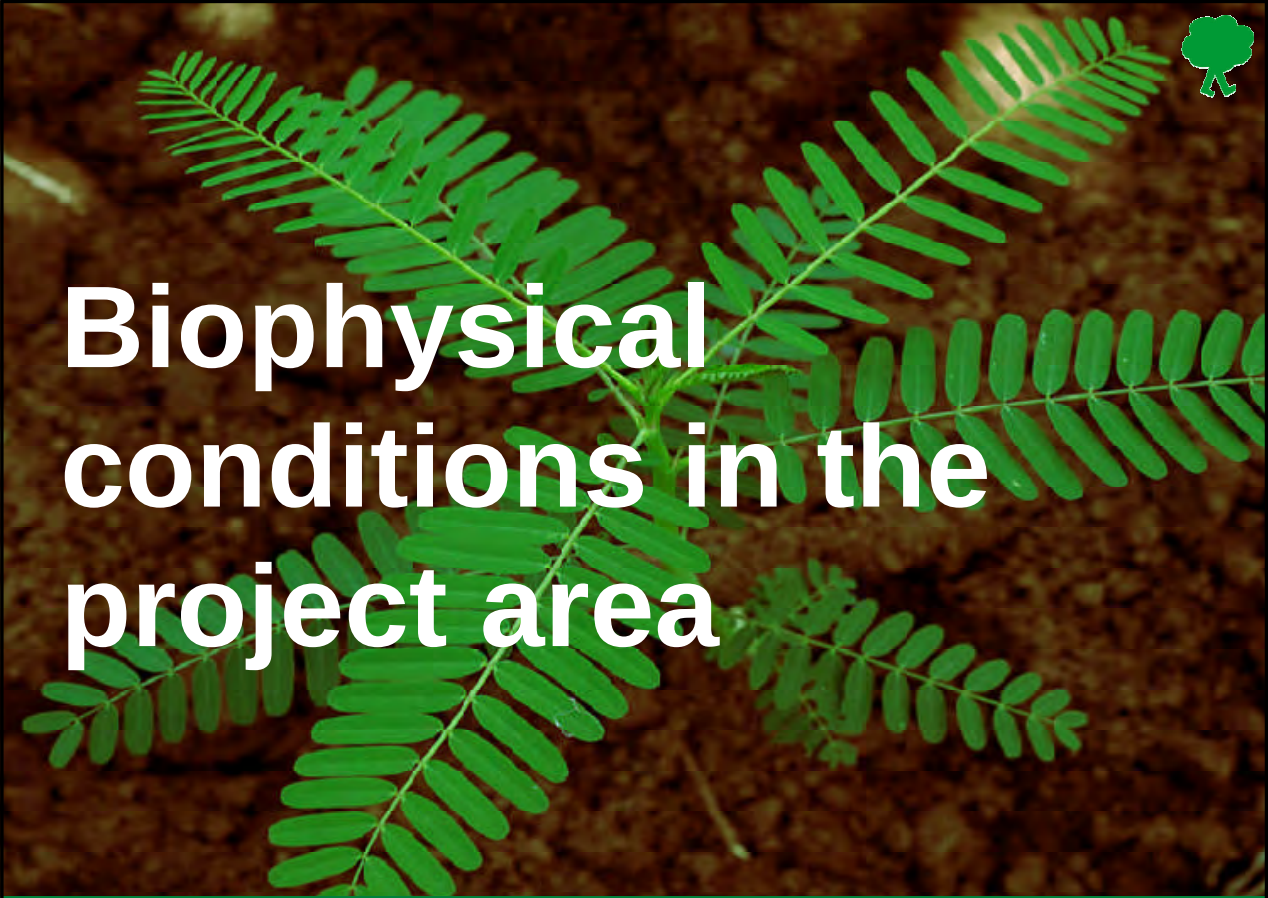
- Utilise the momentum of agricultural carbon finance projects
- Solid scientific backing from Pete Smith, Professor of Soils & Global Change and Lead Author for Agriculture and Forestry Chapter of Intergovernmental Panel on Climate Change (IPCC)





Content

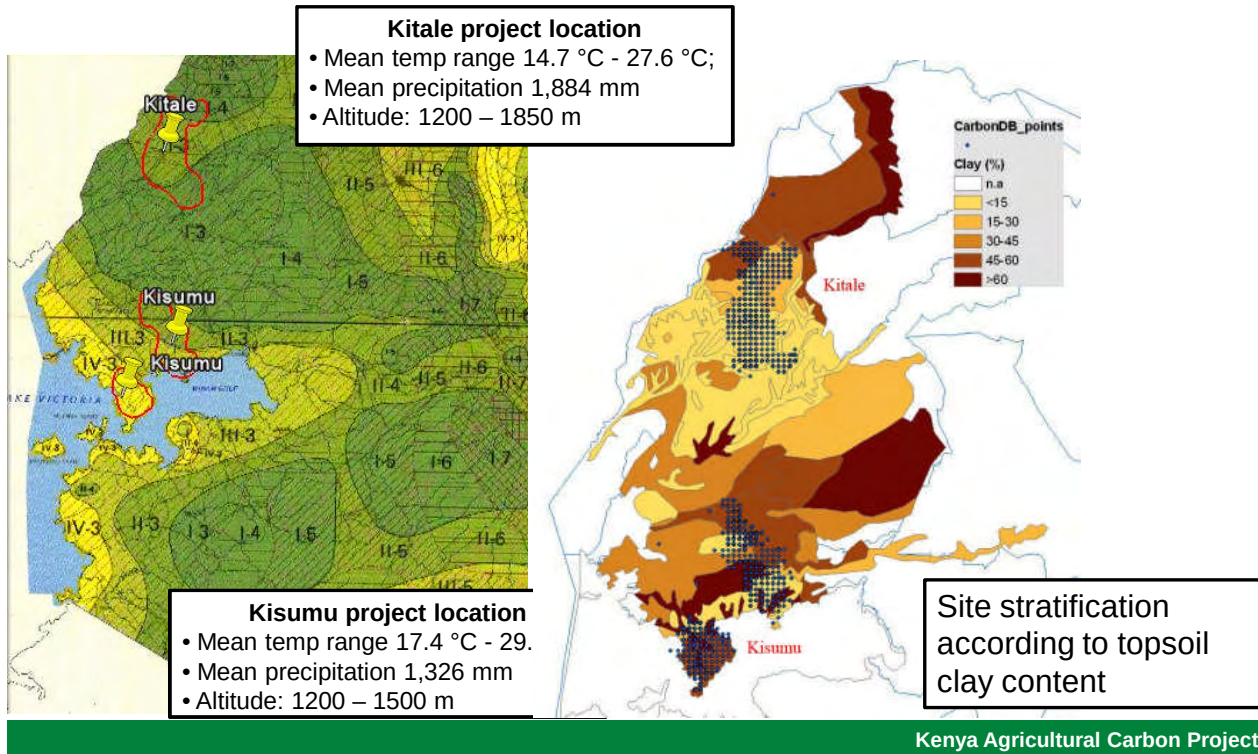
- Biophysical conditions in the project area
- Institutional set-up and project approach
- Sustainable Agricultural Land use Management (SALM) practices
- Implementation status
- Methodology development (MRV)
 - ✓ Requirements for scaling-up
 - ✓ Economic considerations
- Conclusions/Challenges



Biophysical conditions in the project area

Kenya Agricultural Carbon Project

Biophysical conditions



Key Features

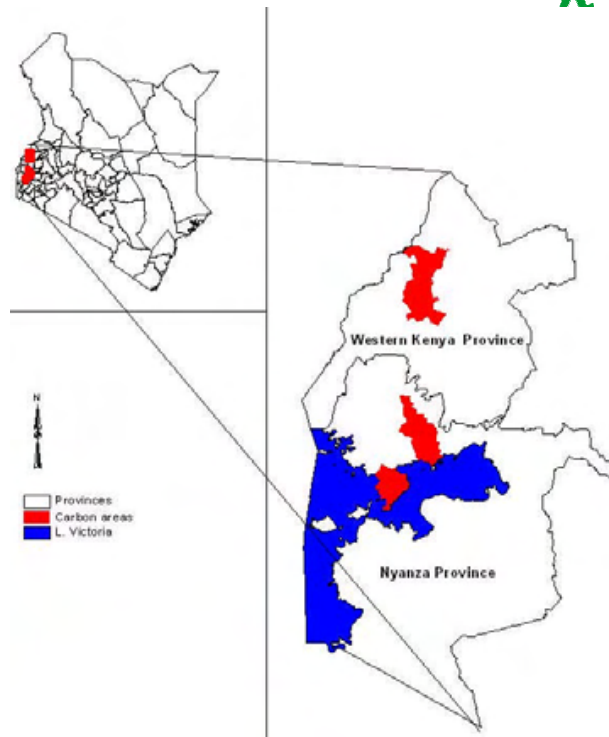


Features	Kenya Agricultural Carbon Project
Project objectives	• Restoring agricultural production and increasing productivity (farm enterprise approach) • Reducing climate change vulnerability • Selling emission reduction
Farming systems	• small-scale, subsistence agriculture • average farm size: less than 1 ha • mixed-cropping systems
Project developer	VI Agroforestry (also advisory agent)
Aggregator	Registered farmer associations covering an area with about 60,000 farms
Expected ERs	• 1.2 m t CO₂e over 20 years • Average 60,000 tCO₂e per year • Average ex-ante estimated SOC sequestration 1.4 tCO₂e per ha per year • 4 USD/tCO₂e projected revenue

Key features, cont.



- 6 divisions in Kitale and Kisumu
- 45,000 ha targeted
- 60,000 households in 3,000 farmer groups
- Project roll out plan: 9 years, started 2009
- At the moment 15,000 farmers in 800 farmer groups involved and adopting SALM
- 60% permanence buffer





Stakeholders in Research/Finance/ Agricultural extension

- Farmer groups in western Kenya
- Vi Agroforestry, Kenya
- Joanneum research, Austria
- Unique Forestry, Germany
- World Bank, Washington
- BioCarbon Fund, Washington
- Voluntary Carbon Standard
- Swedish International Development Cooperation Agency (Sida)



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The World Bank
Carbon Finance Unit
www.carbonfinance.org





World Bank Carbon Funds & Facilities

Total funds pledged = US\$ 2.1 billion (16 governments, 67 firms)



■ **Prototype Carbon Fund**. \$180 million (closed). Multi-shareholder. Multi-purpose.



■ **Netherlands Clean Development Mechanism Facility**. (closed). Netherlands Ministry of Environment. CDM energy, infrastructure and industry projects.



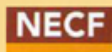
■ **Community Development Carbon Fund**. \$128.6 million (closed). Multi-shareholder. Small-scale CDM energy projects.



■ **BioCarbon Fund**. \$91.9 million (Tranche 1 and 2 closed). Multi-shareholder. Mainly CDM LULUCF projects; some REDD and soil carbon.



■ **Italian Carbon Fund**. \$155.6 million (closed). Multi-shareholder (from Italy only). Multipurpose.



■ **Netherlands European Carbon Facility**. (closed). Netherlands Ministry of Economic affairs. JI projects.



■ **Spanish Carbon Fund**. \$282.4 million (closed). Multi-shareholder (from Spain only). Multipurpose.



■ **Danish Carbon Fund**. \$69.4 million (closed). Multi-shareholder (from Denmark only). Multipurpose.

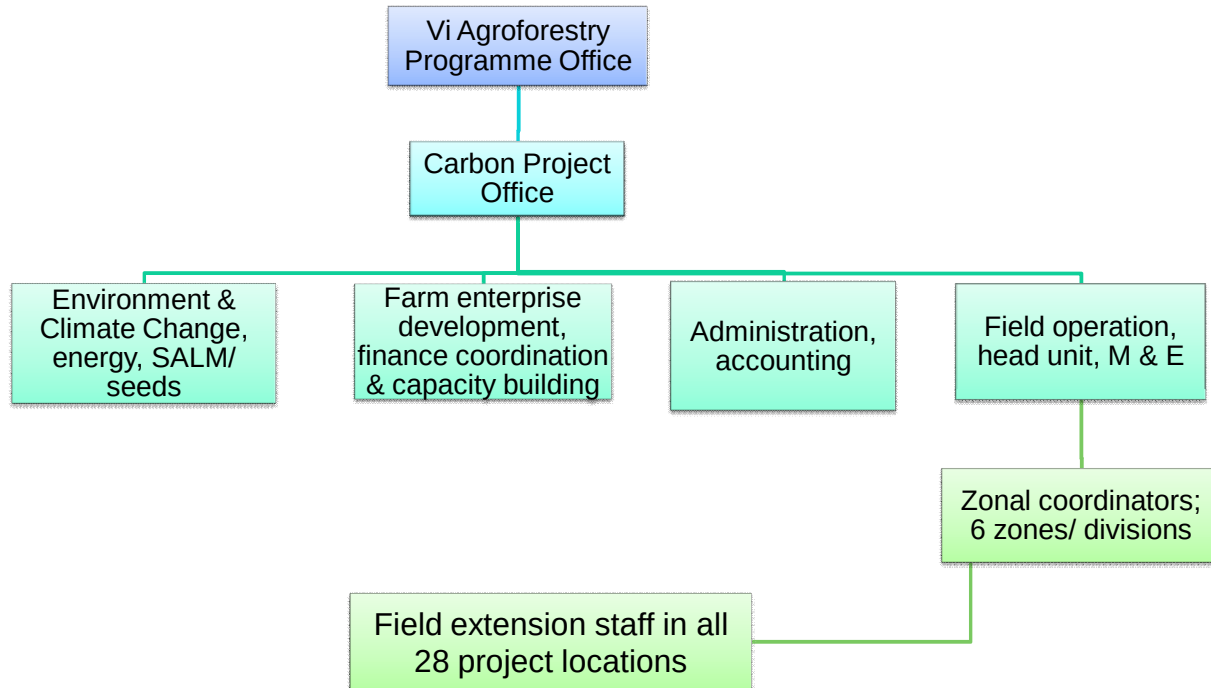


■ **Umbrella Carbon Facility**. \$737.6 million (Tranche 1 closed – 2 HFC-23 destruction projects in China).



■ **Carbon Fund for Europe**. \$65 million. Multi-shareholder. Multi-purpose. Managed with EIB.

Extension and institutional setting





Farm enterprise approach

- Financial attractiveness and market linkages key for promotion and adoption of improved technologies and practices
- Enterprise selection: appraisal of potential enterprises and decision making
- Enterprise groups: constituted as and when an enterprise is selected or a request for facilitation services is made.
- Business planning: strategies, marketing, production, resources, expenditure and income projections

A photograph showing several farmers working on a hillside. In the foreground, a man in a red shirt is using a long wooden pole or tool to work the soil. To his left, another man in a patterned shirt looks towards the camera. In the background, other farmers are visible, and the hillside is covered with green vegetation and small trees. A green tree icon is located in the top right corner of the image.

Sustainable Agricultural Land use Management (SALM) practices

Kenya Agricultural Carbon Project

SALM



AGRONOMIC PRACTICES



NUTRIENT MANAGEMENT



WATER MANAGEMENT



TILLAGE AND RESIDUE MANAGEMENT



AGROFORESTRY



RESTORATION AND REHABILITATION



LIVESTOCK MANAGEMENT



EFFICIENT ENERGY PRODUCTION



Agronomic practices



- Improved crop variety
- Crop rotation
- Cover crops and green manure
- Multiple cropping
- Intercropping,
- Alley cropping,
- Relay cropping,
- Contour strip cropping,
- Earthing/ridging
- Integrated Pest Management (IPM)



Nutrient Management



- Mulching
- Improved fallows
- Manures
- Composting
- Careful use of fertilizers
- Weed management



Water management



- River bank protection
- Broad beds and furrows
- Planting basins and pits
- Contour bunds and catchment strips
- Road Catchments
- Half moon micro-catchments
- Small scale-Irrigation



Tillage and Residue Management



- Reduced tillage
- Zero tillage
- Residue Management
- Trash lines



Agroforestry



- Trees in Agriculture systems
- Boundary/hedges tree planting
- Contour planting
- Wind breaks
- Woodlots
- Home or tree gardens
- Trees and perennial crops
- Trees and pastures
- Fodder banks



Restoration & rehabilitation of Degraded Land



- Natural Regeneration
- The Use of Agroforestry
- Soil and Water Conservation Techniques



Livestock Management



- Improved feeding practices
- Fodder banks
- Pest and disease control
- Poultry enterprises
- Animal breeding or upgrading
- Bee keeping
- Fish farming



Efficient energy production



- Firewood
- Efficient Charcoal production enterprises
- Biogas
- Solar
- Bio diesel



Implementation status

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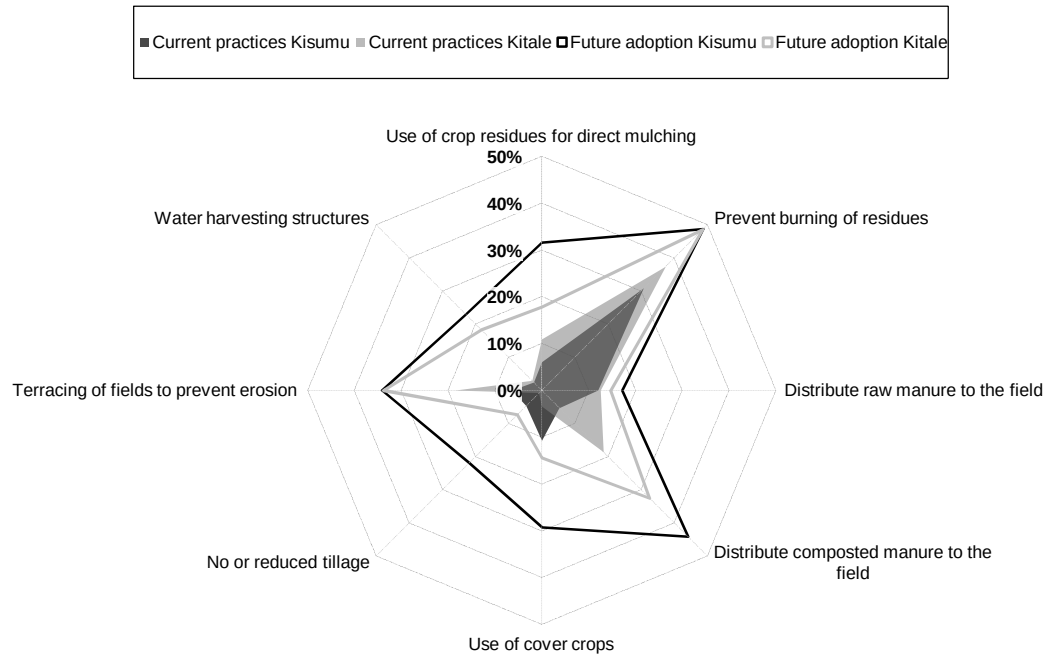


Implementation Status

- BioCF ERPA signed in November 2010 (3-way legal agreement)
- Project region and adoption of SALM practices:

Total project region in 6 administrative divisions	116,000 ha
Targeted area (agricultural land) for potential SALM adoption	45,000 ha
Area where carbon sequestration from increased tree biomass is considered	45,000 ha
Area considered for soil carbon offset generation (→ mixed-maize farming systems)	20,025 ha
Total area adopting SALM by 2010	7,000 ha
Total estimated No of households adopting SALM	60,000 hh

Adoption of SALM practices in 2010



Seebauer et al. 2011 upcoming Earthscan publication

Kenya Agricultural Carbon Project



Next step

Validation:

The project developer determines a third party certifier (accredited by a specific carbon standard) who will review the Carbon Project Document. It is important for the project to be validated to ensure the transparency of the project design.

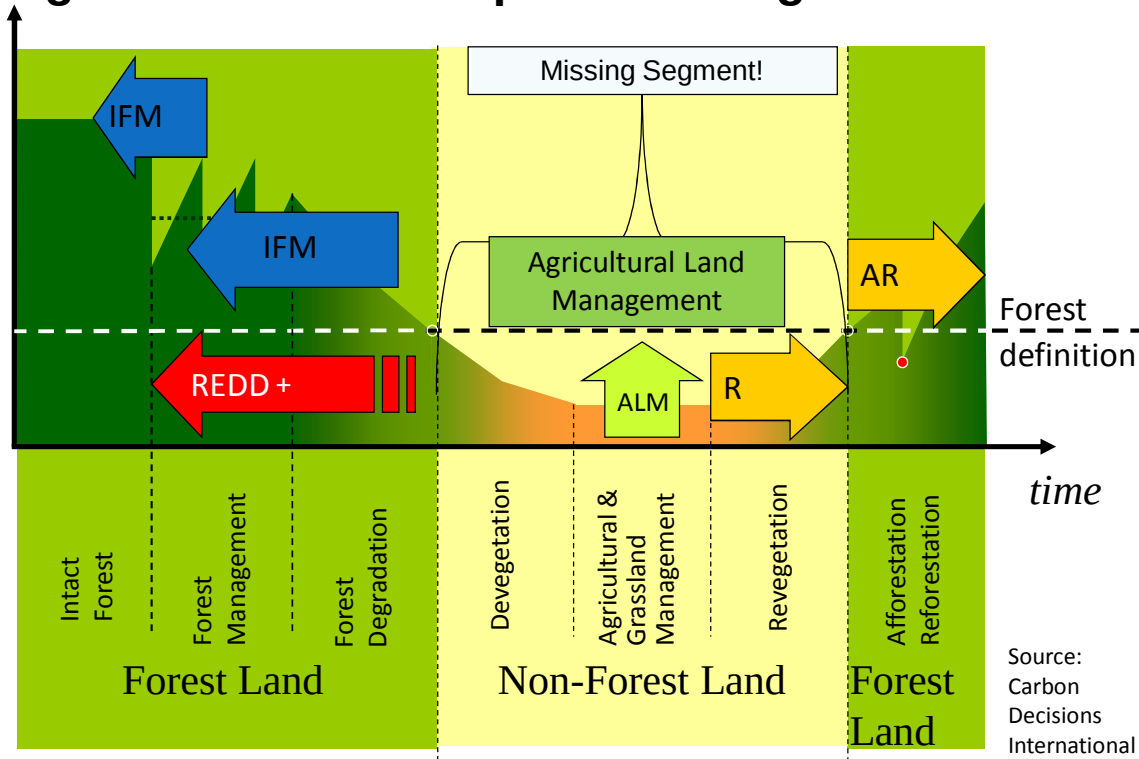
Verification:

CERs are verified at an interval of 3 or 5 years.
Starting year 2012.

Registration:

The VERs of the validated project are kept in a Registry on behalf of the owner until they are bought.

Agricultural land management is the “missing segment” for landscape level mitigation



Kenya Agricultural Carbon Project



Harvesting agricultural and soil carbon (WIN – WIN – WIN)

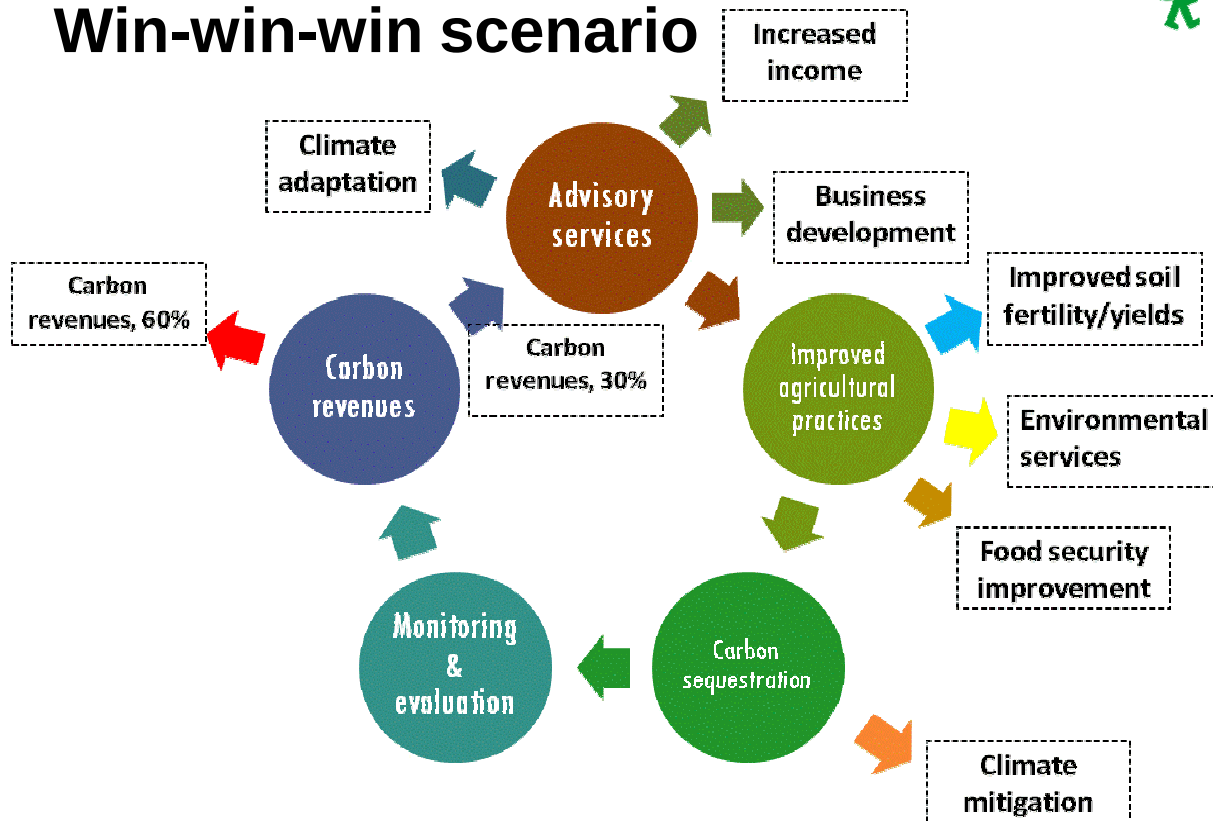
Sustainable agricultural land
management

(SALM) has the potential to

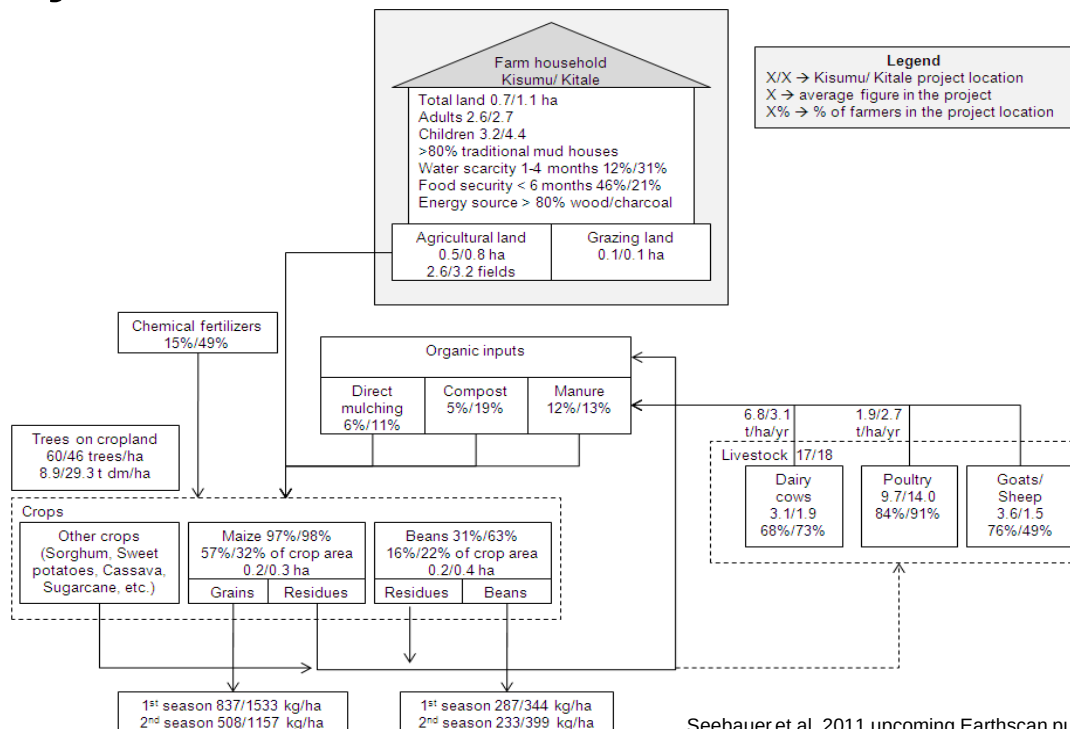
- 1) increase agricultural productivity,
- 2) sequester carbon and
- 3) decrease vulnerability to climate change



Win-win-win scenario



Diversity of smallholder farming systems in Kisumu/Kitale



Seebauer et al. 2011 upcoming Earthscan publication

Economics of agricultural mitigation in SSA



	Package 1: No External Inputs	Package 2: Medium External Inputs (seeds only)	Package 3: High External Inputs (seeds and fertilizer)	Package 4: Agroforestry
C-sequestration	0.5 tCO ₂ /ha-yr	1 tCO ₂ /ha-yr	1.5 tCO ₂ /ha-yr	4 tCO ₂ /ha-yr
Crop response	225 kg/ha-yr	1,500 kg/ha-yr	3,000 kg/ha-yr	1,500 kg/ha-yr
Annual carbon payments	\$1.15	\$4.90	\$8.65	\$27.40
Annual revenues yield improvements	\$34	\$225	\$450	\$225
Total additional revenues	\$35	\$230	\$459	\$252
Net revenues	-\$10	\$162	\$309	\$177

Source: Tennigkeit, T.; Kahr, F.; Wölcke, J.; Newcombe, K. 2009. Agricultural Carbon Sequestration in Sub-Saharan Africa: Economics and Institutions. Washington DC: World Bank.



Methodology development (MRV)

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Applicability of methodology

- Applicable to projects that introduce SALM into an agricultural landscape subject to conditions such that the soil organic carbon would remain constant or decrease in the absence of the project



Methodology and monitoring

- The methodology is based on Adoption of sustainable agricultural land management (SALM) while monitoring based on SALM activity and activity-based monitoring modeling estimates and no direct soil organic carbon measurement www.v-c-s.org/methodology_salm.html
- The methodology shows Carbon Accounting methodology
- We have selected Rothamsted C soil decomposition model (RothC) www.rothamsted.bbsrc.ac.uk/aen/carbon/rothc.htm to predict soil carbon stock changes.



Methodology development

- Key methodology features:
 - Activity-based monitoring approach using model based default values for soil carbon (e.g. production, residual use, livestock, fertilizer, manure, perennials, cover crops)
 - Long-term research in Kenya confirms model applicability
 - Non-soil modules (using approved CDM AR methodologies for tree carbon)
 - Non-prescriptive in promoting individual activities, encouraging the adoption of a package of SALM practices for better livelihoods, considering risk mitigation
-
- Methodology submitted to Voluntary Carbon Standard (VCS): www.v-c-s.org/methodology_salm.html (passed 1st validation, 2nd ongoing)



Data collection

- There are two type of data collection:
 - Activity Baseline Monitoring Survey (ABMS)
 - Social monitoring
- ABMS accounts for current and future:
 - Fields management practices
 - Crop production and residues
 - Improving the management of manure
 - Improving tillage practices
 - Agroforestry practices



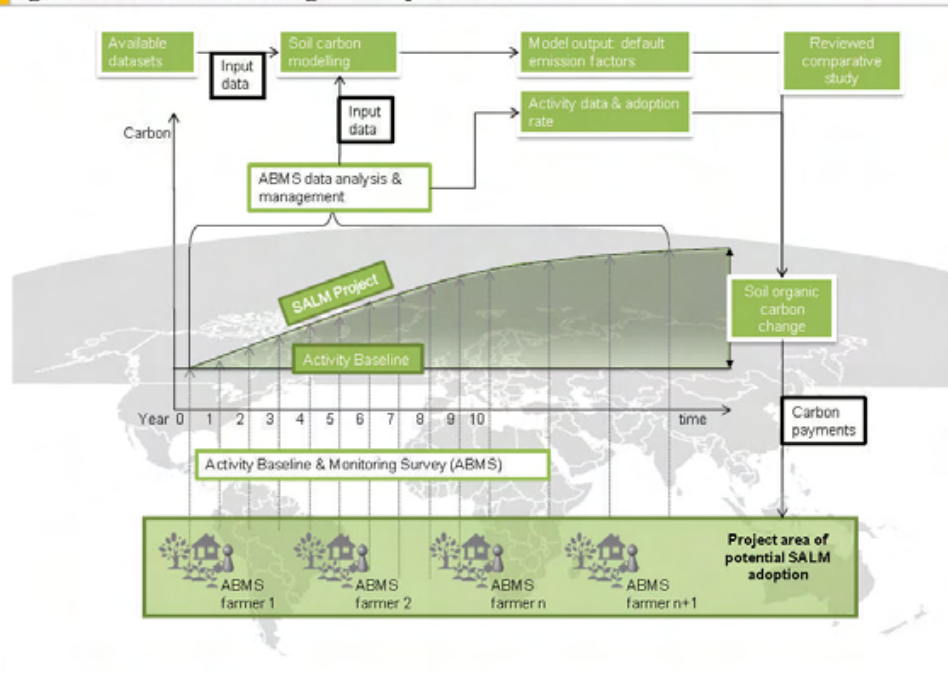
ABMS sampling design

- A two stage sampling design is used within the project region in the participatory extension system
 - Households are stratified based on AEZ , Socio-economic and institutional structures
 - From each strata a farmer is picked randomly
- Sample size
 - Considered after carrying out a number of sample surveys
 - The sample should show the chance of SOC accurately within the range of 15 % (mean error $\pm 15\%$) and 95% confidential level

Activity/Carbon Monitoring approach



Figure 1: Concept of the activity-based modeling approach for Sustainable Agricultural Land Management practices





Costs for carbon monitoring

	Direct measurement		Crop production & activity monitoring	
	Total cost (\$)	% of carbon revenues	Total cost (\$)	% of carbon revenues
	316,819	13%	316,819	13%
Carbon monitoring	872,740	35%	260,726	11%
	1,293,600	52%	1,293,600	52%
Total costs	2,483,159	100%	1,871,145	76%



Carbon monitoring requirements for up-scaling

- Cost-effective MRV must adapt to existing farming systems:
 - Small-scale agriculture (farm size),
 - Diversity of farming systems
- MRV must assist small-scale farmers to reach their objectives:
 - Productivity, Food security, Climate resilience
- MRV must minimize transaction costs:
 - Minimize transaction costs along (carbon) value chain
 - Facilitate/acknowledge value-addition



Carbon monitoring requirements for up-scaling (contd)

- MRV must align with agricultural development concept:
 - Coherent with activity-based/production-based advisory systems
 - Effective advisory services
 - Limited resources and capacity constraints
- Acknowledge realities of national research systems
 - Data availability
 - Limited research funding and capacity constraints

Conclusions/ Challenges



Kenya Agricultural Carbon Project



Conclusions

- Concept of carbon payments can be well integrated into tested approaches for promoting sustainable agricultural development
- Low cost, but rigorous MRV systems are essential
- Synergies with objectives of increased productivity and climate resilience must be maximized
- Strong and demand-driven extension systems prerequisite for successful implementation
- Training and capacity building for project entities is essential
- Additional flexibility for carbon payments need to be explored

...agricultural carbon concept is attractive and need to be scaled-up!

Challenges



- 1 Lack of credible methodologies slows the development of terrestrial carbon projects to be developed.
- 2 High permanence buffer is delaying payment to farmers in the early stages of project.
- 3 Knowledge barrier among small scale farmers and scarce regional technical expertise.
- 4 Market has been biased toward industrial emissions in industrial and energy sectors and buyer's short-term compliance needs rather than long-term mitigation potential.
- 5 Difficulties coordinating large numbers of smallholder farmers
- 6 The modest sequestration rates per farmer measuring and monitoring of emission reductions makes the financial model weak.
- 7 The lack of secure up-front finance for initial cost is a hurdle for project developers.
- 8 Lack of holistic livelihood approach in carbon finance
- 9 No functional African carbon facility
- 10 High transaction cost
- 11 Discriminating women in Carbon finance
- 12 There are a risk in carbon finance of attracting unserious actors as project developers
- 13 Life time of land base programmes are generally short



Thank you!

