# 1. Activity Reporting.

## Activity 481-2014

Case studies and framework for scaling up women's innovations in low-emissions agriculture

| | | | |
|---|---|---|---|
| Status | Complete | Milestone | 3.1.2 2014 |
| Start date | 2012 Jun | End date | 2014 Nov |

Description: This activity seeks to understand women's role as drivers of innovation for climate change adaptation and mitigation and to identify opportunities to link farmer innovation, especially innovation by women, to lowering greenhouse gas emissions associated with agriculture whilst promoting more just gender relations.

Status: Complete. PROLINNOVA, an international network on promoting local innovation, completed the second phase of three small-scale action research pilots and analyses to demonstrate the enabling and supporting of women's local low emission agricultural innovation, by providing more visibility to these innovations and encouraging wider learning from both individual innovations. The results of these projects generated initial lessons on how women could be supported to innovate in ways that lead to better household food security and more equitable gender relations whilst capturing carbon. The projects were:
(a) Improving soil condition and mitigating carbon emissions through a combination of bioslurry and biochar in Cambodia
(b) Enabling women's innovation capacity in social forestry through video-mediated learning in Bangladesh
(c) Participatory agroforestry and eco-stoves for reducing household labour, mitigating carbon emissions and improving health in Honduras

Gender Component: This research explicitly seeks to understand how gender influences agricultural innovation, and in turn how agricultural interventions can positively impact gender relations. For example in one of the pilot projects in Bangladesh, the Department of Agricultural Extension Education (DAEE) of Bangladesh Agricultural University (BAU) is working with several small groups of women on social forestry and vegetable growing as a means of regenerating degraded land. The work started with learning sessions using videos made by other women farmers and included low-emission agricultural practices such as vermicomposting, botanical pesticides and organic vegetable growing. After these learning sessions, the women tried out several of these practices to find the best options in their conditions. In addition, and with the support of DAEE, the women secured access to small plots of degraded public land on which they began planting seedlings and organic vegetable growing. DAEE has also been helping the farmers to determine soil carbon increases as a means of tracking carbon sequestration. DAEE has been recording the role that gender plays in shaping these

experiments – who can participate, what experiments are favoured, how outcomes are interpreted – and how the project activities in turn affect local gender relations.

Objectives:

1. To expand Theme 3 research on gender and develop a framework that can be applied at CCAFS sites to understand women's innovation and actions supporting climate smart agriculture.
2. Identify innovations that facilitate climate change mitigation and have positive impacts on women
3. Produce a guide with framework and methods to capture such innovations
   Apply framework and methods within selected partner organisations.

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| 1 academic journal article analyzing cases and 9 small-scale pilot projects strengthening current activities and/or developing new project focus areas in:<br>i. gender analysis and women's empowerment<br>ii. Low emission agriculture and food security<br>iii. innovation within the agricultural system | Peer-reviewed journal articles | 2015 | Incomplete | |
| A women's innovation framework to guide action research and 1 academic article analyzing the framework and its relationship to innovation systems approaches | Peer-reviewed journal articles | 2014 | Extended | Has been submitted to the journal "Agriculture and Human Values" |
| 7 short cases to be disseminated through CCAFS, WEDO, PROLINNOVA and potentially GGCA describing local women's innovations and enabling conditions | Peer-reviewed journal articles | 2014 | Extended | Final draft in progress |
| 1 academic article on the workshop as social learning | Peer-reviewed journal articles | 2014 | Cancelled | Decide to focus the article on the gender framework |
| 3 in-depth action research projects, building off first mini-grants for activities including: building networks within the innovation systems, establishing a learning model, initiating experimental/innovative activities that address low emission agriculture, food security and gender justice | Other | 2014 | Complete | |

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| At least one funding proposal | Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.) | 2014 | Extended | The funding proposal is still in draft phase. |
| Presentation at the International Conference on Agriculture and Forestry Colombo, Sri Lanka June 10-11, 2014 by Dr. M. Asaduzzaman Sarker | Articles for media or news (radio, TV, newspapers, newsletters,etc.) | 2014 | Complete | |

Partners:

1- Promoting local innovation (PROLINNOVA):
Chesa Wettasinha <c.wettasinha@etcnl.nl>

2- University of Virginia (UVA):
David Edmunds <david.s.edmunds@gmail.com>

3- Foundation for Participatory Research with Honduran Farmers (FIPAH):
Sally Humphries <shumphri@uoguelph.ca>

4- Department of Agricultural Extension Education of Bangladesh Agricultural University (DAEE):
Ataharul Chowdhury <atahar77@yahoo.com>

5- Cambodian Centre for Study and Development in Agriculture (CEDAC):
Sam Vitou <samvitou@cedac.org.kh>

Location(s):

**Countries:** Bangladesh, Cambodia, Honduras,

## Activity 724-2014

Refinement of SHAMBA methodology for approval by Plan Vivo for smallholders

| | | | |
|---|---|---|---|
| Status | Cancelled | Milestone | 3.3.2 2014 |
| Start date | 2013 Oct | End date | 2014 Apr |

Description: The Small-Holder Agriculture Mitigation Benefits Assessment (SHAMBA) methodology is currently being reviewed by the Plan Vivo foundation for acceptance as a methodology that could be applied by projects throughout sub-Saharan Africa. If approved, this will for the first time allow Plan Vivo projects to derive carbon credits from increases in soil carbon stocks as well as above-ground biomass, increasing the volume of carbon credits for which they are eligible. It will also mean that projects activities where the main mitigation benefits come from improvements to the soil - such as reduced tillage and conservation agriculture, will be able to access mitigation finance.

This activity will define the SHAMBA methodology for acceptance by Plan Vivo and develop an accessible tool for project developers to document technical specifications in order to receive credits.

Status: Cancelled. University of Edinburgh completed the SHAMBA tool (version 1), along with the accompanying tool description, user guide and methodology. The tool contains its own help. All of these documents and the tool are publically available on the SHAMBA website. A review of SHAMBA has been undertaken by Plan Vivo and the tool has been approved (subject to minor revision) for use by Plan Vivo projects.
In addition, the team conducted a sensitivity analysis of the tool, which will be developed into a publication entitled: “What and how much needs to be measured to ‘know’ the climate benefits of climate smart agriculture?” Finally the web interface of the tool is up and running. The remaining work consists of running the tool for each farm on three different PV projects (Scole Te, Mexico; TFGB, Uganda; and Nhambita, Mozambique). This will allow us to assess the between farm variability and thus make recommendations about sampling intensities for monitoring.

Gender Component: Not defined

Objectives:

1. The aim of the proposed project is to enable projects working with smallholders in sub-Saharan Africa to assess and monitor the mitigation benefits of their activities, and access mitigation finance through the sale of Plan Vivo credits, without the need to rely on technical experts or consultants.

## Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| An activity-based indicator framework: The framework will describe what should be recorded by projects and approaches that can be used for monitoring and setting appropriate performance thresholds. | Platforms - Data Portals for dissemination | 2014 | Complete | |
| Technical specification and monitoring reporting templates for use by project developers to meet Plan Vivo specifications with the SHAMBA methodology. | Platforms - Data Portals for dissemination | 2014 | Complete | |
| A tool for project developers to produce technical specifications and monitoring reports | Platforms - Data Portals for dissemination | 2014 | Complete | |
| A report on the areas of applicability and sensitivity of monitoring with at least one project case study | Peer-reviewed journal articles | 2014 | Extended | The project team conducted a sensitivity analysis of the tool, which has been submitted to CCAFS, and will be developed into a publication after some further work. This will be entitled: “What and how much needs to be measured to ‘know’ the climate benefits of climate smart agriculture?” |
| A web-based tool for displaying and querying mitigation benefits | Platforms - Data Portals for dissemination | 2014 | Complete | |

## Partners:

1- Plan Vivo Foundation:

Casey Ryan <casey.ryan@ed.ac.uk>

2- University of Edinburgh:
Casey Ryan <casey.ryan@ed.ac.uk>

Location(s):

**Regions:** East Africa (EA),

## Activity 479-2014

Analysis of the impacts of smallholder mitigation on climate targets, mitigation priorities

| | | | |
|---|---|---|---|
| Status | On going | Milestone | 3.1.1 2014 |
| Start date | 2012 Dec | End date | 2015 Dec |

Description: In a partnership with IIASA, regional stakeholders, and several CGIAR centers, CCAFS is generating climate mitigation scenarios consistent with the Shared Socioeconomic Pathways of the ongoing IPCC AR5 scenario process. These scenarios will be used to test to what extent mitigation by developing countries or smallholders is necessary to stay within desired climate change thresholds. IIASA will use the scenarios to identify mitigation priorities spatially, producing a global map of mitigation hotspots stratified by most effective mitigation options. IIASA will also use scenarios to create a decision support tool for national policy makers to identify priority investments in low emissions agriculture.

Status: On going. IIASA, as part of a multi-year project to determine global mitigation priorities, used the GLOBIOM model to estimate baseline emissions and analyze the extent of mitigation necessary in developing countries. Drivers for scenarios of climate change mitigation were generated with the MESSAGE energy system model and implemented in GLOBIOM. A set of policy scenarios, including scenarios of global collaboration in climate policies and exemptions for selected groups of developing countries, have been implemented and simulated. Results have been presented in the form of one master thesis, two contributions at international conferences. For 2015, IIASA will conclude in the global analysis of amount of mitigation to meet future climate target thresholds with a journal article and two international conference presentations, and will address the spatial analysis of mitigation priorities and improvement of modeling to identify LED pathways.

Gender Component: Not defined

Objectives:

1. Analyze the extent of agricultural mitigation necessary in developing countries and the effect of selected emissions floors on meeting future climate target thresholds (30%)

2. Conduct a spatial analysis of mitigation priorities globally for selected policy pathways (25%)
3. Improve modeling to identify low emissions development pathways to support national decision making and investment in agricultural development in 3-4 CCAFS regions, with an initial focus in a selected region to be determined (45%).

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Scientific article and at least one international meeting presentation on 'need for agricultural mitigation – when and where' | Workshop | 2014 | On going | The paper will be submitted in 2015. |
| Report analyzing priorities for mitigation activities (March 2015) | Peer-reviewed journal articles | 2015 | Incomplete | |
| Draft tool for identifying low emissions development pathways (September 2015) | Platforms - Data Portals for dissemination | 2015 | Incomplete | |
| Train national researchers in CCAFS region on use of the tool and get feedback | Capacity | 2015 | Incomplete | |
| Final tool ready for web-publishing (2016) | Platforms - Data Portals for dissemination | 2015 | Incomplete | |
| Scientific article on analysis and at least one international meeting presentation on 'Need for agricultural mitigation' | Peer-reviewed journal articles | 2015 | Incomplete | |

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Kleinwechter, U. et al. (2014), "Agriculture and Forest Sector Long Term Outlook from GLOBIOM". Presentation held at Strategic Foresight Conference, International Food Policy Institute (IFPRI), Washington D.C., 07 November 2014. Available at http://globalfutures.cgiar.org/2014/11/03/global-futures-strategic-foresight-conference/ | Articles for media or news (radio, TV, newspapers, newsletters,etc.) | 2014 | Complete | |
| Havlík, P., N. Forsell, Y. W. Zhang, U. Kleinwechter, O. Fricko, K. Riahi, and M. Obersteiner (2014), "Regional Development versus Global Mitigation: Insights from GLOBIOM". Presentation held at the 7th Annual IAMC Annual Meeting, Maryland, 17 November 2014. | Presentations | 2014 | Complete | |
| Levesque, A. (2014), "Climate regime, AFOLU mitigation and carbon-food efficiency". M.Sc. Thesis, Université Paris Ouest Nanterre La Défense, Master Economie du Développement Durable, de l'Energie et de l'Environnement, 2013-1024 | Workshop | 2014 | Complete | |

Partners:

1- International Institute for Applied Systems Analysis (IIASA):
Michael Obersteiner <oberstei@iiasa.ac.at>

Location(s):

Global

## Activity 812-2014

Decision support tool for geographic optimization of mitigation options

| | | | |
|---|---|---|---|
| Status | Complete | Milestone | 3.1.2 2014 |
| Start date | 2013 Aug | End date | 2014 Dec |

Description: The publication of Hillier et al. 2012 (Global Change Biology, 18(6)) integrated several data sets and models to demonstrate that a number of commonly proposed mitigation options for agriculture have different relative effectiveness based on their location. This is primarily due to the fact that carbon fluxes and nitrous oxide emissions are functions of climate and soil in addition to management. The structure and limited data requirements of this approach make it a good candidate to develop into an easy to use, scalable decision support tool for identification of effective mitigation options at site level.
This activity will build on and address several limitations (namely the inclusion of only non-degraded, non-paddy croplands) of the analysis from Hillier et al. (2012) to develop a simple tool for comparison of GHG mitigation options for field crops.

Status: Complete. The CCAFS Mitigation Options Tool (MOT) has been presented in its alpha version in multiple workshops. Unlike other agricultural calculators, the CCAFS – MOT ranks the most effective options according to their mitigation potential, also in relation to current management practices, climate and soil characteristics of each region. The tool has low input data requirements, is provided in Excel and will be freely downloadable from the CCAFS website. There was strong support for further development of the CCAFS-MOT. Many practitioners and policy advisors revealed they intend to use the tool in their work. The feedback provided is the work basis for the next phases of development, including incorporation of agroforesty, yield response to management, grassland, and livestock systems into the beta version.

Gender Component: Not defined

Objectives:

1. To develop an easy-to-use, scalable decision-support tool for spatially-linked identification of effective mitigation options for sites and regions.

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Implementation of the basic tool<br>Inputs would concern certain soil characteristics (e.g. texture, SOC, drainage, pH,) and climate (temperate/tropical, wet/dry), and annual nitrogen inputs. The outputs would be the potential reduction in emissions associated with 5 practices; reduced N rate, nitrification inhibitors, BAT fertilisers, reduced tillage, increased inputs (e.g. cover cropping). | Platforms - Data Portals for dissemination | 2014 | Complete | |
| Tool extension review to address limitations of basic tool approach in an extended version of the tool. Five review components will be conducted:<br>Addition of a yield response to management<br>Impact of degraded lands on productivity and capacity to model it<br>Methods to add agroforestry and legume intercropping mitigation options<br>Methods for paddy rice management<br>Applicability of the cropland mitigation factors for grasslands | Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.) | 2014 | Complete | |

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Demo version of extended tool. The list of modelled mitigation options will be extended to the following complete list; reduced N rate, nitrification inhibitors, BAT fertilisers, reduced tillage, increased inputs (e.g. cover cropping), agroforestry, and legume intercropping | Platforms - Data Portals for dissemination | 2014 | Complete | |
| Review and refinement of tool with stakeholders | Workshop | 2014 | Complete | |
| Beta geo-referenced Excel tool to auto-generate mitigation potentials based on a very limited set of input data such as latitude, longitude, crop, yield and N application rate. | Platforms - Data Portals for dissemination | 2014 | Cancelled | The beta version will be part of a separate contract beginning in 2015. |
| Analysis of the outputs and publication in scientific journal. | Peer-reviewed journal articles | 2014 | Extended | The methods used in the CCAFS-MOT are described in a manuscript to be shortly submitted to the international scientific journal Environmental Modelling and Software. We divided the methodology section into models to estimate GHG emissions and models to estimate GHG emissions mitigation. In this manuscript we also show the calculations obtained with the tool (GHG emissions and ranked mitigation options) for a rice producing system in Indonesia (South East Asia). We then reflect on the objectives of the tool, the target users, the barriers to implementation of mitigation options, and the potential longer-term improvements to be developed in the tool (e.g. linking mitigation and adaptation). |

Partners:

1- University of Aberdeen:
Jon Hillier <j.hillier@abdn.ac.uk>

Location(s):

Global

## Activity 813-2014

Food, Fuel, Fiber and Forests Field-Dialogue: Multistakeholder event on agriculture and deforestation in Indonesia:

| | | | |
|---|---|---|---|
| Status | Complete | Milestone | 3.2.1 2014 (2) |
| Start date | 2014 Jan | End date | 2014 Sep |

Description: In partnership with and hosted by CIFOR, TFD will convene a multi-stakeholder field Dialogue of
about 20 international and 30 Indonesian experts to inform discussion. Dialogue participants will then participate in a two-day,facilitated multi-stakeholder dialogue utilizing both plenary and small working group formats to develop consensus on the challenges and opportunities for 4Fs in Indonesia and internationally.

Status: Complete. The Forest Dialog, "4 Fs" CCAFS provided a modest contribution for a multistakeholder field event in Central Kalimantan to discuss options for reconciling oil palm production and forest benefits in March 2014. http://theforestsdialogue.org/dialogue/field-dialogue-4fs-indonesia

Gender Component: Not defined

Objectives:

1. Build a strong stakeholder network that can support national policy initiatives on the 4Fs (food, fuel, fiber, and forests) issue
2. Lay the foundations for an ongoing national platform to continue and deepen exploration of 4Fs issues in Indonesia.

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Background paper with a baseline understanding of key issues and present ideas to stimulate discussion | Policy briefs - Briefing paper | 2014 | Complete | |
| Workshop with key actors focusing on the main challenges to balance different land-use demands as well as possible ways to overcome the identified challenges in Indonesia. | Workshop | 2014 | Complete | |
| Official summary report will summarize dialogue discussions, written by the Indonesian Dialogue Co-Chairs. The Summary report will be distributed widely and the key findings presented to key stakeholders in Indonesia. | Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.) | 2014 | Complete | |

Partners:

1- Center for International Forestry Research (CIFOR):
Pablo Pacheco <p.pacheco@cgiar.org>

2- The Forests Dialogue at Yale University:
Gary Dunning <gary.dunning@yale.edu>

Location(s):

**Countries:** Indonesia,

## Activity 482-2014

Institutional Analysis and Capacity-Building of Agricultural Carbon Projects in Africa, Phase 2

| | | | |
|---|---|---|---|
| Status | On going | Milestone | 3.2.1 2014 (2) |
| Start date | 2011 May | End date | 2015 Jan |

Description: Participatory action research (PAR) with several carbon market projects to improve the institutional design of agricultural carbon market projects to better support local sustainable development priorities.
This final phase of the research will synthesize the lessons learned from the PAR process and disseminate the findings to policy makers.

Status: On going. EcoAgriculture, together with Vi Agroforestry and EcoTrust, completed their multiyear project with training manuals for low emissions agriculture and successfully trained several thousand farmers in Uganda and Western Kenya.

Gender Component: Inclusion of and focus on women as focus-group in PAR. Research has, for example, examined the differing preferences of and impacts on men and women participating in carbon projects.

Objectives:

1. To enable national planners, developers and managers of agriculture carbon projects in Africa to develop cost effective agriculture PES projects and programs that support local sustainable development priorities.

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| One scientific publication on the Participatory Action Research | Peer-reviewed journal articles | 2014 | Extended | To be completed in February 2015 |
| Presentation of at least one paper at appropriate scientific meeting | Workshop | 2014 | Extended | Poster to be presented at CSA Conference in March 2015 |
| Discussion paper describing the results of project cases, and synthesis of lessons learned | Peer-reviewed journal articles | 2014 | Extended | Not yet completed. |
| 3 policy briefs summarizing policy-relevant lessons learnt from the project, produced by EcoAgriculture, CCAFS and other partners | Peer-reviewed journal articles | 2014 | Extended | All policy briefs are to be completed in February 2015. Two of the policy briefs are directed at local government (Bungoma county in Kenya and Mbale, Manafwa and Bududa districts in Uganda). |
| Discussion with at least 5 national policy makers about findings and their implications | Other | 2014 | Extended | To be completed my March 2015 |
| Assistance to two field projects in organising internal seminars to discuss findings of Participatory Action Research | Workshop | 2014 | Complete | |
| Co-organization with local partners of one knowledge-sharing workshop among projects (with co-financing), or sessions or side events on the Participatory Action Research findings in at least two workshops or meetings. | Workshop | 2014 | Complete | |

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Paper on collective action topic (e.g. determinants for collective/community investment by Vi groups following the first carbon payment) | Peer-reviewed journal articles | 2014 | Cancelled | It was decided that the paper no longer held a strong research reason or movement of the project toward outcomes. |
| The Smallholder Agricultural Carbon Projects in Eastern Africa Trainers Manual was developed to help build the capacities of farmers, farmers groups, extension staff and project managers who are implementing agricultural carbon projects in Eastern Africa. The manual describes the steps for implementing an afforestation/reforestation voluntary carbon project based on the Plan Vivo Standard. | Reference material (booklets and training manuals for extension agents, etc.) | 2014 | Complete | |
| Recha J, Kapukha M, Wekesa A, Shames S, and Heiner K. 2014. Sustainable Agriculture Land Management Practices for Climate Change Mitigation: A training guide for smallholder farmers. Washington, DC. EcoAgriculture Partners. | Data | 2014 | Complete | |

Partners:

1- EcoAgriculture Partners:

Seth Shames <sshames@ecoagriculture.org>

2- Ecotrust:

Lillian Kiguli <lkiguli@ecotrust.or.og>

3- Vi Agroforestry:

Wangu Mutua <wangu.mutua@viafp.org>

Location(s):

**Countries:** Ethiopia, Kenya, Uganda,

**Benchmark Site:** Nyando (Katuk Odeyo),

## Activity 815-2014

Agricultural NAMA development in Kenya

| | | | |
|---|---|---|---|
| Status | On going | Milestone | 3.2.1 2014 (2) |
| Start date | 2013 Aug | End date | 2014 Apr |

Description: The Government of Kenya in the framework of the National Climate Change Action Plan is interested to develop Nationally Appropriate Mitigation Actions (NAMA) in the agricultural sector, yet the mechanism is new and the basis for agricultural-based mitigation as a secondary benefit of food security enhancing approaches is still being tested. The overall purpose of this work is to strengthen frameworks and guidance for NAMAs through the implementation of a jurisdictional approach at the subnational level and delivering mitigation, food security and livelihood benefits to the rural poor of Kenya. The NAMA would focus on devel-opment of county, farmers (associations) and agribusiness capacities to implement and monitor transformational, low emissions agricultural development.

Status: On going. UNIQUE Forestry and Land Use completed a (i) feasibility study, (ii) design of a tentative NAMA proposal and (iii) detailed NAMA design including consultation of development partners. A pilot county has been selected in collaboration with ministries, farmers, and private sector partners.

Gender Component: Not defined

Objectives:

1. The objective of this study is to conduct a feasibility study and to define the design features of a NAMA (phase 1) and to develop NAMA arrangements in three counties(phase 2) including the institutional, MRV and investment framework, together with national planning processes in Kenya

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Desk study and preparation stakeholder consultation in the form of an informal workshop (field visit approximately 6 days) to tentatively determine stake-holders, their role and to identify counties and commodity/value chains of interest | Workshop | 2014 | Complete | |
| Feasibility assessment including selection of pilot county and value chain | Workshop | 2014 | Complete | |
| Outline of NAMA design activities including institutional, MRV and investment framework | Working Paper | 2014 | On going | Final draft being reviewed. Should be published in late February 2015. |
| Trial MRV guidelines for 3 counties and report on stakeholder views on institutional arrangements. | Peer-reviewed journal articles | 2014 | Cancelled | This deliverable is being incorporated into another project for 2015-2018. |
| Working paper on Climate-smart livestock sector development: the state of play in NAMA development | Working Paper | 2014 | On going | Will be working paper 105 - publication due in late February 2015 |

Partners:

1- Unique Forestry and Land Use (UNIQUE):

Timm Tennikgeit <timm.tennigkeit@unique-landuse.de>

Location(s):

**Countries:** Kenya,

## Activity 818-2014

Workshop: Reducing data costs for GHG estimate in agriculture to inform low emissions development

| | | | |
|---|---|---|---|
| Status | Complete | Milestone | 3.3.2 2014 |
| Start date | 2014 Jan | End date | 2014 Dec |

Description: Workshop to bring together experts from CCAFS and partner institutions to improve methods for greenhouse gas estimation that are both low cost and rigorous for their purpose

Status: Complete. Country representatives and leading scientists met at the Food and Agriculture Organization of the United Nations (FAO) in November 2014 to identify how to reduce the cost of estimating greenhouse gas emissions from agriculture. Collecting data on farm activities, making measurements to establish emission factors, and establishing national systems for compiling and analyzing data are expensive, and uncertainties in current data remain high. In response, country representatives identified several key challenges to agricultural greenhouse gas accounting in developing countries and action points for reducing the cost of greenhouse gas emission estimates in different agriculture sectors.

Gender Component: Not defined

Objectives:

1. Increase awareness of promising tools and approaches available for reduced data needs through exchange and synthesis of material
2. Bring together scientists and practitioners to balance usability and rigor of methods, and identify research needs

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Workshop report | Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.) | 2014 | Complete | Final draft is now in progress. |
| Synthesis paper | Peer-reviewed journal articles | 2014 | Extended | A synthesis paper should be published in 2015. |
| Web resource page | Articles for media or news (radio, TV, newspapers, newsletters,etc.) | 2014 | Complete | |
| Blog: Lower cost greenhouse gas emission estimates for agriculture with links to all presentations on Slide Share. | Social media outputs (including web sites, blogs, wikis, linkedin group, facebook, yammer, etc.) | 2014 | Complete | |

Partners:

1- Food and Agriculture Organization of the United Nations (FAO):
Kaisa Karttunen <kaisa.karttunen@fao.org>

Location(s):

Global

## Activity 819-2014

Capacity building in quantification of GHG emissions from farms and landscapes, in support of SAMPLES research

| | | | |
|---|---|---|---|
| Status | Extended | Milestone | 3.3.3 2014 |
| Start date | 2014 Jan | End date | 2014 Dec |

Description: Capacity building of PhD students and regional and national partners in GHG quantification methods being developed by SAMPLES

Status: Extended. CLIFF funded 9 students for research stays at CGIAR centers in 2014 and distributed grants to 8 students to undertake research stays in 2015. CLIFF students published 8 journal articles in 2014.

Gender Component: 3 of the 9 CLIFF students were women in the 2013/2014 cycle. 6 of the 8 students newly awarded grants for research stays in 2015 were women.

Objectives:

1. Build institutional and human capacity to carry out integrated assessment of greenhouse gas emissions, food production, and livelihoods in developing countries.

Deliverables:

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| At least 25 PhD students, NARS partners, and university partners trained across SAMPLES sites. | Capacity | 2014 | Complete | |
| Nyamadzawo G, Wuta M, Nyamangara J, Smith JL, Rees, RM. 2014. Nitrous oxide and methane emissions from cultivated seasonal wetland (dambo) soils with inorganic, organic and integrated nutrient management. Nutrient Cycling in Agroecosystems. Published online 24 Aug 2014 | Peer-reviewed journal articles | 2014 | Complete | |
| Nyamadzawo G, Shi Y, Chirinda N, Oleson J, Mapanda F, Wuta M, Wu W, Meng F, Oelofse M, de Neergaard A, Smith J. 2014. Combining organic and inorganic nitrogen fertilisation reduces N2O emissions from cereal crops: a comparative analysis of China and Zimbabwe. Mitigation and Adaptation Strategies for Global Change. DOI 10.1007/s11027-014-9560-9 | Peer-reviewed journal articles | 2014 | Complete | |
| Mujuru L, Gotora T, Velthorst E J, Nyamangara J, Hoosbeek M.R. (2014). Soil carbon and nitrogen sequestration over an age sequence of Pinus patula plantations in Zimbabwean Eastern Highlands. Forest Ecology and Management 313: 254–265. doi:10.1016/j.foreco.2013.11.024 | Peer-reviewed journal articles | 2014 | Complete | |

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Mujuru L, Mureva A, Velthorst E.J, Hoosbeek MR. (2013). Land use and management effects on soil organic matter fractions in Rhodic Ferralsols and Haplic Arenosols in Bindura and Shamva districts of Zimbabwe. Geoderma 209-210: 262–272. | Peer-reviewed journal articles | 2014 | Complete | |
| Nyamadzawo G, Wuta M, Nyamangara J,Rees R, Smith J. 2014. The effects of catena positions on greenhouse gas emissions along a seasonal wetland (dambo) transect in tropical Zimbabwe. Archives of Agronomy and Soil Science. | Peer-reviewed journal articles | 2014 | Complete | |
| Kansiime KM, Shisanya AC, Wambugu KS. 2014. Effectiveness of technological options for minimising production risks under variable climateic conditions in eastern Uganda. African Crop Science Journal 2: Issue supplement s4, 859-974. | Peer-reviewed journal articles | 2014 | Complete | |
| Vu QD, Neergaard A, Tran TD, Hoang HTT, Vu VTK, Jensen LS. 2014. Greenhouse gas emissions from passive composting of manure and digestate with crop residuesbiochar on small-scale livestock farms in Vietnam, Environmental Technology, DOI: 10.1080/09593330.2014.960475 | Peer-reviewed journal articles | 2014 | Complete | |

| Description | Type | Year | Status | Justification |
|---|---|---|---|---|
| Nyamadzawo G, Wuta M, Nyamangara J, Nyamugafata P, Chirinda N. 2014. Optimizing dambo (seasonal wetland) cultivation for climate change adaptation and sustainable crop production in the smallholder farming areas of Zimbabwe. International Journal of Agricultural Sustainability, DOI: 10.1080/14735903.2013.863450 | Peer-reviewed journal articles | 2014 | Complete | |

Partners:

1- International Livestock Research Institute (ILRI):
Klaus Butterbach-Bahl <k.butterbach-bahl@cgiar.org>

2- Centro Internacional de agricultura Tropical (CIAT):
Ngoni Chirinda <n.chirinda@cgiar.org>

3- World Agroforestry Centre (ICRAF):
Todd Rosenstock <t.rosenstock@cgiar.org>

4- Center for International Forestry Research (CIFOR):
Mariana Rufino <m.rufino@cgiar.org>

5- International Maize and Wheat Improvement Center (CIMMYT):
Clare Stirling <c.stirling@cgiar.org>

6- International Rice Research Institute (IRRI):
Ole Sander <b.sander@irri.org>

7- Aarhus University (AARHUS):
Tanka Kandel <tanka.kandel@agro.au.dk>

Location(s):

Global

# 2. Succinct summary of activities and deliverables by Output level.

## Output: 3.1.1

Summary: 1. IIASA, as part of a multi-year project to determine global mitigation priorities, used the GLOBIOM model to estimate baseline emissions and analyze the extent of mitigation necessary in developing countries. Drivers for scenarios of climate change mitigation were generated with the MESSAGE energy system model and implemented in GLOBIOM. A set of policy scenarios, including scenarios of global collaboration in climate policies and exemptions for selected groups of developing countries, have been implemented and simulated. Results have been presented in the form of one master thesis, two contributions at international conferences:

- M.Sc. Thesis by Antoine Levesque, Université Paris Ouest Nanterre La Défense, France, titled "Climate regime, AFOLU mitigation and carbon-food efficiency" provides a sectorial analysis of baseline emissions, AFOLU mitigation and discusses efficiency aspects of climate change mitigation under different policy regimes. The thesis has been submitted to the university and is currently under review by the supervisors.
- Havlík, P., N. Forsell, Y. W. Zhang, U. Kleinwechter, O. Fricko, K. Riahi, and M. Obersteiner (2014), "Regional Development versus Global Mitigation: Insights from GLOBIOM". Presentation held at the 7th Annual IAMC Annual Meeting, Maryland, 17 November 2014.

- Kleinwechter, U. et al. (2014), "Agriculture and Forest Sector Long Term Outlook from GLOBIOM". Presentation held at Strategic Foresight Conference, International Food Policy Institute (IFPRI), Washington D.C., 07 November 2014. Available at http://globalfutures.cgiar.org/2014/11/03/global-futures- strategic-foresight-conference/

Kleinwechter presented results on market and production effects of climate change mitigation in the agricultural and land use sector. In particular the aspects related to mitigation attracted substantial interest among the conference participants (mainly from CGIAR and related communities) and it was recognized that this work addresses a gap in agricultural foresight modelling.

## Output: 3.1.2

Summary: 1. University of Aberdeen completed the first phase of work on a mitigation optimization tool (MOT). This included

development of alpha mitigation screening tool (alpha CCAFS-MOT). The CCAFS- MOT is a demo tool which aims at improving policy makers' understanding of crop and livestock management practices available to reduce greenhouse gas emissions (GHG) and of their mitigation potential in different regions in the world. The tool joins together several empirical models (e.g. Stehfest and Bowman 2006; Yan et al. 2005; Herrero et al., 2013) to estimate GHG emissions from different land uses and livestock systems and consider mitigation practices which are compatible with food production. The mitigation potentials of these practices are taken from several studies (e.g. Brentrup & Palliere 2010, Kessel et al. 2013; Akiyama et al. 2010; Smith et al., 1997 etc.). Unlike other agricultural calculators (e.g. CFT, C-Plan, EX-ACT) the CCAFS – MOT ranks the most effective options according

to their mitigation potential, and also in relation to current management practices, climate and soil characteristics of each region. Another important characteristic of the tool is the low input data requirements which mean that only 10 min are needed to obtain the estimates. The fact that the tool is provided in Excel and that will be freely downloadable from the CCAFS website.

The project also conducted analyses for agroforestry, grassland, livestock systems and soil carbon. For agroforestry, a meta-analysis that included data collection from 41 studies on above ground and soil carbon sequestration for different agroforestry systems, climates and regions in the world was undertaken. The aim of the study was to integrate results of field measurements to evaluate quantitatively the effect of carbon sequestration from agroforestry, using meta-analysis, and linear mixed effect modelling. Factors derived can be used to determine “Climate Smart” carbon sequestration options in that they are responsive to key environmental and practice variables. The study helps to identify regionally optimal agroforestry related policy interventions. The meta-analysis was submitted to Global Change Biology and not accepted. The revised manuscript will be resubmitted to Agriculture, Ecosystems and Environment, by July 2015. In addition a review on yield responses to agroforestry practices was undertaken. We also collected literature covering yield response to no-tillage practices, fertiliser application, biochar, nitrification inhibitors and other management practices in general. A database has been built to accommodate the values extracted from literature reviewed (see Appendix 1, Deliverable 3). We will explore the possibility of implementing yield response to management in the CCAFS-MOT in the following development Phases (I and II).

To improve data on mitigation practices for grassland, a literature review was undertaken to assess suitable mitigation practices for grassland and mitigation potentials. A key component for sustaining production in grassland ecosystems is the maintenance of soil organic matter (SOM), which can be strongly influenced by management. Many management techniques intended to increase forage production may potentially increase SOM, thus sequestering atmospheric carbon (C). Several mitigation practices in grassland were analysed and a summary of the results were described. Some examples of improved management for grassland include: grazing intensity, fertilisation, nutrient management, fire management, introduction of forage grasses and legumes. We will explore to possibility to implement specific grassland mitigation options (and associated potentials) in the CCAFS-MOT in the following development Phases (I and II).

A demo option to estimate GHG emissions from livestock systems (dairy cattle, Latin America & Caribbean for Temperate climate) was implemented in the alpha CCAFS-MOT. The remained data (livestock types, livestock systems, climates), was provided by Mario Herrero (CSIRO) during a meeting with a member of the team (Sylvia Vetter) in London, in December 2014. Mitigation options for livestock systems have been assessed, as well as barriers to implementation (see Deliverable 5). We are now collecting more information (e.g. Gerber et al., 2013) on livestock specific mitigation options. The improved livestock function (GHG emissions and mitigation) is a priority for development in the next phase of development (Phase I).

A review analysing the impact of enhanced soil carbon in Africa summarised the impacts of SOC/SOM on soil properties in more detail and characterise the positive impacts of SOC. It also discussed possible negative impacts and effects which may get compensated or reduced by other environmental factors. The impacts of SOC on soil properties are highly variable, depending on soil type, climatic region and initial conditions of the soil. The review has proved intractable to obtain quantitative estimates of the impact of soil carbon on system performance in Africa. We propose to discuss next steps with the possibility of formatting the review for a special issue paper.

Feedback on the alpha CCAFS-MOT was collected at workshops in FAO (Rome) and the 2014 COP (Lima). Three workshops, one in Rome, Italy (12.11.2014) and two Lima, Peru (03.11.214), were held to present the alpha CCAFS-MOT to different stakeholders, including researchers, practitioners and policy makers/advisers. Workshop participants provided feedback on the several methods included in the tool, functionalities and appearance, as well as missing information. The feedback provided by the workshop participants, which was collected through workshop notes, recording system and in writing, was analysed and organised. In general there was strong support for further development of the CCAFS-MOT, especially at Lima learning sessions. Many practitioners and policy advisors revealed they intend to use the tool in their work. The feedback provided is the work basis for the next Phases of development (Phase I and II).

The methods used in the CCAFS-MOT are described in a manuscript to be shortly submitted to the international scientific journal Environmental Modelling and Software. We divided the methodology section into models to estimate GHG emissions and models to estimate GHG emissions mitigation. In this manuscript we also show the calculations obtained with the tool (GHG emissions and ranked mitigation options) for a rice producing system in Indonesia (South East Asia). We then reflect on the objectives of the tool, the target users, the barriers to implementation of mitigation options, and the potential longer-term improvements to be developed in the tool (e.g. linking mitigation and adaptation). This manuscript will be subsequently revised in parallel with CCAFS-MOT refinement Phase.

The project will be extended to July 2015 (6 months) to incorporate key changes from stakeholder feedback. There is the possibility of a Phase II period of activities to further improve the data, user interface and use a spatially explicit format.

2. Together with authors from 18 institutions, CCAFS produced a technical paper for FAO and the Alliance for Climate Smart Agriculture reporting on a preliminary target for mitigation in the agricultural sector in 2030. The Alliance declined to use the targets produced for mitigation, as well as adaptation at this early stage of its formation, but the material is being submitted as a policy piece for publication in Science.

3. CCAFS initiated a series of mitigation Practice Briefs, in collaboration with FAO. Two have been produced, one on alternate wetting and drying in rice and one on conservation agriculture. A brief on nutrient management more are in the pipeline.

4. PROLINNOVA, an international network on promoting local innovation, completed the second phase of three small-scale action research pilots and analyses to demonstrate the enabling and supporting of women's local low emission agricultural innovation, by providing more visibility to these innovations and encouraging wider learning from both individual innovations. The results of these projects generated initial lessons on how women could be supported to innovate in ways that lead to better household food security and more equitable gender relations whilst capturing carbon. The projects were:
(a) Improving soil condition and mitigating carbon emissions through a combination of bioslurry and biochar in Cambodia: In Cambodia, CEDAC (Cambodian Centre for Study and Development in Agriculture), the lead NGO of PROLINNOVA–Cambodia, chose to support farmers in Kampong Chhnang Province, mainly women, who were interested in experimenting with mixes of bioslurry and biochar for soil conditioning as well as to adapt the fuels and the form of the prototype cook stove to find a good fit with local fuels, cooking styles and biochar needs. In Cambodia, the second phase expanded the number of farmers directly supported by the project from 20 to 40 (27 women), all of whom continued to generate innovations related to the production of biochar from eco-stoves. In total, 20 trainings were offered in the second phase, focusing on Participatory Innovation Development (PID) as a process, leadership and organization, the use of eco-stoves, home gardening techniques, System of Rice Intensification, and gender and climate change. Women and men experimented with different mixes of biochar from the stoves, bioslurry and conventional compost and found different mixes appropriate for different vegetables and soil types. Most of them noted that these mixes helped vegetables grow faster and better cope in drought conditions. They also noted higher yields. The experimenting farmers also came up with various innovations to increase the quantity of biochar produced. Farmers recorded wood savings of 25 to 50% from the stoves, and time savings of about 10 to 20%, mostly for the women.

CEDAC produced a local version of the stove which is adaptable to different sizes of cooking pots, produces biochar more efficiently (lower weight of rice husks for producing 1 kg of biochar and less time needed for this operation) and emits less smoke. These stoves are now being manufactured and sold locally for around USD 30 – a price that farmers are willing to pay. The pilot project had impacts beyond the 40 experimenters and their families. Trainings for an additional 56 farmers were organized through CEDAC's network of farmer organizations. A similar number of farmers participated in farmer-to-farmer site visits to see how the experiments were evolving and to learn from their peers. Near the end of the second phase, 60 participants (45 women) - including representatives of the Farmer and Nature Net (FNN), local authorities, government staff - were all invited to discuss the project's results. Ten experimental farmers shared their experiences at this event. The Dutch NGO, SNV is now interested in promoting biochar and bioslurry mixes as soil amendments in connection with their bio-digester programme. CEDAC
has now assigned one, full-time staff member to promote biochar/bioslurry soil conditioning projects in support of organic vegetable production.

The project also built support for continuing the farmer-led joint experimentation (PID) process. The

Provincial Department of Agriculture noticed the strong farmer associations where the experiments have taken place, and is looking to support the associations for continued experimentation in biochar and other new farming technologies.
CEDAC has begun thinking about the long-term sustainability of these climate change-related experiments through the market. There is now demand for organic vegetables produced in experimenting villages not just at CEDAC-supported shops in Phnom Penh, but in other urban markets. An earlier carbon credit from Nexus helped CEDAC purchase three gasifiers at a cost of USD 150,000. CEDAC will continue to work with NEXUS to add the biochar and stove projects to the mix of activities for which they receive the carbon credits. CEDAC will share these experiences with FIPAH in Honduras.

(b) Enabling women's innovation capacity in social forestry through video-mediated learning in Bangladesh: The Department of Agricultural Extension Education (DAEE) of Bangladesh Agricultural University (BAU) supported farmer- and community-led experimentation with several small groups of women in the Madhupur Sal Forest area and stimulated them to engage in social forestry and vegetable growing as a means of regenerating degraded land. The work included low-emission agricultural practices such as vermicomposting, botanical pesticides and organic vegetable growing.

During the second phase, the project continued to work with the 15 experimenting farmers from four groups and brought in 15 additional farmers from two new groups. The majority were women. Workshops were held with the 15 new innovators, local political leaders and university staff to talk about what innovations might address climate change, as soil carbon had been introduced as an issue in the first phase of the project. Ideas for mitigation included fuel efficient stoves, natural fertilizers and pesticides. The pilot took a stove model used by another organization and made modifications to it that made the stove cheaper and easier to use. Six women were heavily involved in the redesign of the stove. Now, 140 stoves are in use within the project area by 100 women and 40 men. The vast majority of them report savings in firewood and less time spent on travel to the forest for wood collection. The project team is working with participating women to see how they might measure these reductions in carbon emissions. An additional 20 households undertook experiments in vermi-composting. A full 100 group members using vermi-compost reported generally favourable results. Nearly all who use the compost report better crop yields. Botanical pesticides were also discussed, and women were quicker to pick up on the benefits than men. Many are interested, but the take up of the strategy is slow. For both vermi-composting and botanical pesticides, women have not made many adjustments to formulas introduced by university staff.

Farmers and the project team attracted the interest of two local NGOs, who have now purchased 600 kg of vermi-compost from the women, and 350 liters of botanical pesticide. The women and men of the project have asked for assistance in marketing these products to other NGOs and directly to farmers. The Bangladesh team used video and social media to help farmers communicate what they needed from other actors supporting agriculture, especially government officials, NGOs, and universities. A Facebook page was created for the project and 500 comments were made. Further research is needed to see if meaningful support for farmers arrives from this social media campaign. A

community technology fair was also organized, where the women's redesigned eco-stove and a soil testing kit were the most popular attractions among the attending farmers. At least two local NGOs are now looking at building experimental capacity as part of their work and moving away from a sole reliance on donations of food aid. Government officials have looked into supporting local experimentation as well, using an innovation in pineapple management that favours botanical pesticides as a way to attract interest.
A soil testing kit was introduced and women were asked to try it out. Initial resistance by men and women was eventually overcome, and women now feel comfortable using the technology. Combined with women's access to forest land and their role in generating income from vermi- compost and botanical pesticides, there are some changes in gender relations towards greater equality, though these may take more time to confirm.

(c)Participatory agroforestry and eco-stoves for reducing household labour, mitigating carbon emissions and improving health in Honduras: The second-phase pilot in Honduras achieved its goals. In addition to the 16 women involved in the first phase, 33 more women from 18 communities (in three municipalities) engaged in this phase of the pilot. Though soil testing was not completed by the farmers themselves, a baseline soil test was completed and can be used to measure carbon capture in the soil in coming years. For above ground carbon, four training events were carried out with the participation of 65 women and 16 men in four communities to define the methodology involving field sampling of trees and leaf litter. Participants also learned how to use registers and field books. Further technical support may be needed to build women's confidence in this work, but women are willing, and men supportive, and this represents an important advance in gender relations in Honduras.

Women took on technical roles related to eco-stove design in the project. A total of 45 stoves were built, and all of them were adapted to meet local women's needs by adding and re- designing an oven, sometimes through several iterations of innovation. Several women generated an additional income by constructing stoves for others. The women also developed a financial mechanism that would allow poorer women to obtain the stove. The stoves decrease fuel wood needs and labour time for collecting fuel wood, with positive impacts on carbon emissions, and further define women as innovators in technology and social organization.

The central focus of this second-phase pilot was the design of agroforestry systems by and for women. Four training events were carried out focusing on agroforestry systems, reaching 52 women and 16 men from 18 participating project communities. This led to 49 plots being established by 49 different "futuristas", women who are known as innovators through their association with CIALs. The systems with coffee as the main cash crop, included a number of species that contributed to food (especially avocado, citrus, pepper and cinnamon), fuel wood/shade and timber (cedar and mahogany), as well as soil fertility (Inga). Some of the species, especially Inga, were chosen specifically to increase soil organic matter. In the process of establishing the trees, the women also incorporated a biological fertilizer, a powdered form of local volcanic rock that is reducing the dependence on chemical fertilizers. Women have not yet calculated the total carbon savings from these inter-related activities, but the project team expects the numbers to be significant. Women were

social innovators too. They included consideration of harvest schedules for systems far from home, planting trees that might fruit simultaneously with coffee so that families could relocate at harvest time to harvest all tree crops together. If the experiments are successful, men will grant women access to land closer to home, which will expand the area covered by the systems.
Participating women and men also noted many social benefits of these innovations. Learning to experiment together, to solve problems socially, has increased confidence among members, both women and men. This translates into an ability to address other threats to local lives and livelihoods, including land grabs and violence.

The project has impacts beyond the original “futuristas” and their families. The Office of Science and Agricultural Technology (DICTA), a national research institute of the government, integrated the use of two organic fertilizers – Biomineral and Bocachi –both enriched with powdered volcanic rock, into its programme of research with avocado agroforestry systems. DICTA will visit the agroforestry systems established in the project to learn about the CIALs experience.

The Honduran Foundation of Agricultural Research (FHIA), a private research organization, will accompany the CIALs to help diffuse knowledge of the new agroforestry systems, with special interest in the valuation of new varieties of avocado in upland zones inside the agroforestry systems. The responses of DICTA and FHIA suggest that FIPAH’s work is already having national influence, initially in areas where avocado is grown, in the uplands, but with promise to reach all of the nation’s municipalities.
PROSUELOS, a project of Catholic Relief Services, has also shown interest in evaluating the organic fertilizers and foliates (Biomineral and enriched Bocachi). The local NGO Ayuda en Accion is also interested in replicating the experience of the Agroforestry program with women in the municipality of Victoria. These groups again work primarily in the uplands, but the process of experimenting with soil amendments may eventually be brought to lowland areas as well.

As a result of this project, the ASOCIAL Yorito has incorporated a gender committee to strengthen the development of capacities and financial resources for the women organized in the CIALs of the region. Their goal is to improve access to financing and to the means of production for women organized in CIALs.

(d) Publications: One academic article outlining the innovation framework has been submitted to the journal “Agriculture and Human Values”. A policy brief on how CCAFS can support farmer-led innovation that improves gender relations and mitigates climate change has been drafted. It makes programmatic recommendations for CCAFS and other institutions working at regional and global scales. This will be finalized drawing on the lessons from the pilots. An additional paper, not initially planned for, has been proposed by project team members based on experiences with the pilot. This paper will focus on how the PID process and specific innovations can be “scaled up” without compromising the “farmer-led” aspect of PID, nor the locally-led, contextually appropriate change in gender relations.

(e) Experiences of the pilot projects were shared with partners of the PROLINNOVA international network during its annual International Partners Workshop (IPW) in Cambodia in May 2014. The workshop was hosted by CEDAC as the coordinating partner of PROLINNOVA Cambodia and provided an excellent opportunity for the workshop participants to visit some of the pilot project's field sites. The participants benefited from their direct interactions with the experimenting farmers as well as with supporting staff of CEDAC and the Provincial Department of Agriculture. A session of the workshop was dedicated to sharing insights from the pilot project and the participants engaged in a small group discussion on a number of issues. Among the most prominent were: a) farmers' perception on the integration of climate change mitigation within their farming practices, b) how farmers might access to carbon markets in a way that fits in with farmers' values, thoughts and practices on agricultural livelihoods, c) what women and men value most about experimental and innovative processes and d) how men and women share labour, responsibilities and benefits of innovation.

(f) Two women students from the University of Virginia (USA) were supported by their university to join the PROLINNOVA IPW and to learn about the pilots on climate change mitigation, innovation and gender. The students also had the opportunity of visiting the field sites in Cambodia and interacting with the experimenting farmers, mainly women. Their enthusiastic feedback has resulted in more interest for collaboration between student researchers and the PROLINNOVA partners. Students of the university have written small grant proposals to provide continued research and writing support to country teams. They are also looking for marketing and funding opportunities that could support the work of the project partners.

5. IPCC Fifth Assessment Working Group III report release event in April 2014 collaboration with World Bank and GRA in Washington DC to indicate opportunities to turn research into action for policy makers.

## Output: 3.2.1

Summary: 1. UNIQUE Forestry and Land Use completed the first year of a five year program: a (i) feasibility study, (ii) design of a tentative NAMA proposal and (iii) detailed NAMA design including consultation of development partners. For each phase field visits and stakeholder consultations were conducted; At the local level, consultations were held in Kisumu and Kericho County. Agricultural investment priorities were assessed on possible intensification measures and their adaptation and mitigation potential. Intensification of the dairy sector in Kericho County was identified as promising opportunity for a pilot NAMA at county level. Results of the mission were presented and discussed during the national stakeholder workshop, the `Consortium Consultation on Supporting the Implementation of the NCCAP 2013 – 2017 in the Agricultural Sector,' which took place 25 March 2014 in Nairobi. Alignment of the tentative NAMA proposal with the Kericho County agricultural investment priorities was consolidated by the county government representatives. Furthermore, value chain players from the dairy sector confirmed intensification opportunities and promised commitment to NAMA development and implementation. Field- based in-depth assessments were done within the pilot region of Kericho County to asses available resources, infrastructure and to identify potential

dairy groups and co-operatives for participation in the pilot NAMA. Results of the mission and the tentative NAMA proposal were presented during the African Dairy Conference and Exhibition (24 – 26 September 2014, Nairobi). A meeting with the Ministries of Agriculture, Livestock and Fisheries (MoALF) and Environment, Water and Natural Resources (MEWNR) confirmed their support for the dairy sector as priority for NAMA development. Pilot counties were selected.

2. EcoAgriculture, together with Vi Agroforestry and EcoTrust, completed their multiyear project to build community facilitation of carbon projects, by producing training manuals, training community facilitators and working with local policy makers. They successfully recruited 2000 farmers, yielding 675,000 tons of C02.

3. University of Michigan, in partnership with Oxford, U Sao Paolo and Rainforest Alliance initiated the Coffee and Cattle certification in Brazil project, with the following outputs:
(a) University of Oxford completed research on the social and procedural on-farm impacts of SAN (Sustainable Agriculture Network) coffee certification. Oxford MPhil Victoria Ferris interned for three weeks at the IMAFLORA partner's office in Paracicaba, analyzing ten years of SAN audit data on coffee certification, and participated in a certification field audit. Data were collected and analyzed and a research paper is in preparation.

(b) RA led the development of a research concept for research on landscape-scale effects of SAN/RA coffee certification in Brazil. RA identified priority research questions related to opportunities and barriers for cattle certification in Brazil, including market dynamics and cattle value chain characteristics. RA published a report analyzing certification audit data (in the context of tea production systems in East Africa) demonstrating a methodology that the GII project is now adapting for coffee in Brazil.

(c) Project planning meeting on Coffee and Cattle certification in Brazil, led by U of Michigan: Agreed on the substantive areas of focus for each project partner.

4. An IITA workshop, with FTA co-support, to assess drivers of deforestation in the Congo Basin: A.G. Kehbila, M. Yemefack, B. Vanlauwe, P. VanAsten, N.Mahungu, and P. Matungulu (eds). 2015. Charting Multidisciplinary Research and Action Priorities towards sustainable agricultural livelihoods and forest conservation in the Congo Basin, 13-14 November, 2014, Kinshasa, the Democratic Republic of Congo. International Institute of Tropical Agriculture workshop proceedings 74, 40 p.

The workshop yielded:
- A model for reconciling the diverse policies, visions and objectives of agricultural and conservation actors and future steps to facilitate cross-sectorial mutual interactions at the national, regional and international levels, and

- A 10-point Action Strategy on charting new directions on improving rural agricultural livelihoods and forest conservation in the Congo Basin. The 10-point Action Strategy includes:

5. The Forest Dialog, "4 Fs" CCAFS provided a modest contribution for a multistakeholder field event in Central Kalimantan to discuss options for reconciling oil palm production and forest benefits. http://theforestsdialogue.org/dialogue/field-dialogue-4fs-indonesia

6. CCAFS Working paper, a review co-commissioned and funded with IFPRI: Climate readiness in smallholder agricultural systems: Lessons learned from REDD+ Working Paper No. 75, by Monika Zurek, Charlotte Streck, Stephanie Roe, Franziska Haupt. Authors shared the paper directly with some 20 donors and policy makers and have followed up with personal meetings.

## Output: 3.3.2

Summary: 1. University of Edinburgh completed the SHAMBA tool (version 1), along with the accompanying tool description, user guide and methodology. The tool contains its own help. All of these documents and the tool are publically available on the SHAMBA website: http://shambatool.wordpress.com/outputs/
A review of SHAMBA has been undertaken by Plan Vivo and the tool has been approved (subject to minor revision) for use by Plan Vivo projects.
In addition, the team conducted a sensitivity analysis of the tool, which will be developed into a publication entitled: “What and how much needs to be measured to ‘know’ the climate benefits of climate smart agriculture?” Finally the web interface of the tool is up and running at: http://planvivoplatform.ourecosystem.com There is one example project showing on the system.

The remaining work consists of running the tool for each farm on three different Plan Vivo projects (Scole Te, Mexico; TFGB, Uganda; and Nhambita, Mozambique). This will allow us to assess the between farm variability and thus make recommendations about sampling intensities for monitoring.

2. Applied Geosolutions submitted a manuscript on Estimating Global Warming Potential for Agricultural Landscapes with Minimal Field Data and Cost. by Pete Ingraham et al. to Agriculture, Ecosystems and Environment. The article was rejected and will be resubmitted to Environmental Research Letters.

3. CCAFS researchers published 5 new articles on GHG quantification work under the Standard Assessment of Mitigation Potential and Livelihoods in Smallholder Systems (SAMPLES)program 2014 (this work was funded through the centers, but is summarized here to show the CG-wide corpus of work):
- Common practices for manual greenhouse gas gampling in rice production: a literature study on sampling modalities of the closed chamber method (Sander & Wassman, Greenhouse Gas Measurement and Management)
- Methane and nitrous oxide emissions from flooded rice fields as affected by water and straw management between rice crops (Sander et al., Geoderma)
- Optimal measurement strategies for aboveground tree biomass in agricultural landscapes (Kuyah &

Rosenstock, Agroforestry Systems)
- Greenhouse Gas Measurement from Smallholder Production Systems: Guidelines for Static Chamber Method (Sapkota et al., CIMMYT publication)
- Precision nutrient management in conservation agriculture based wheat production of Northwest India: profitability, nutrient use efficiency and environmental footprint (Sapkota et al., Field Crops Research)

There are also several more articles submitted or in preparation:
- GHG flux/yield in conservation agriculture from Tanzania (Rosenstock et al.)
- GHG flux from multiple land covers in Kenya (Rosenstock et al.)
- GHG calculators overestimate emissions from tropical systems (Richards, Rosenstock et al.)
- Algorithm for correcting diurnal variation in CH4 (Butterbach-Bahl et al.)
- GHG fluxes with nutrient management in wheat (Ortiz-Monasterio et al.)

4. Multiple data sets of GHG measurements from SAMPLES are now complete and will be made publicly available:
- Maize under conservation agriculture, forages, tea, and vegetables in Kenya and Tanzania
- Nutrient management t in Nyando, Kenya
- Precision N management in India
- N management in Mexico
- Alternate wetting and drying, rice straw and water management in fallow, rice straw burning in Philippines

5. Work on global emissions and mitigation hotspots under SAMPLES was completed and will be published in 2015. The results were presented by Rosa María Román-Cuesta at the COP20 Global Landscapes Forum in Peru.

6. SAMPLES protocol is available on a new website (http://www.samples.ccafs.cgiar.org/samples-protocol.html) and will be published in book form in early 2015.

## Output: 3.3.3

Summary: 1. 9 PhD students completed scientific partnerships with CGIAR centers in 2014 as part of the Climate, Food and Farming Network, administered by Aarhus University. An additional 8 grants were awarded (6 women, 2 men) in late 2014 for scientific partnerships in 2015. Previous CLIFF students published 8 journal articles in 2014.

2.CCAFS and FAO hosted a workshop for country representatives and leading scientists to identify how to reduce the cost of estimating greenhouse gas emissions from agriculture. We funded 11 country representatives to attend. Participants identified action points to reduce cost:
-Incorporate climate-relevant data into agricultural censuses and surveys
-Integrate measurements and modeling
-Target measurements to maximize utility

-Improve use of global databases for emissions
-Build the right capacities
-Link adaptation and mitigation to motivate action
-More information: http://ccafs.cgiar.org/quantification-data-unveils-opportunities-low-emissions-agricultural-development, http://ccafs.cgiar.org/blog/lower-cost-greenhouse-gas-emission-estimates-agriculture

# 3. Communications.

### Media Campaigns:

In collaboration with CCAFS/SEA organized press release and media campaign around CCAC launch: http://ccafs.cgiar.org/news/media-centre/press-releases/new-climate-and-clean-air-coalition-agriculture-effort-tackles#.VNu9QymmGMU

### Blogs:

The following blogs appeared on Low Emissions Agriculture webpage. Theme 3 and Theme 3 partners authored some, others were across regions and flagships. Below please find the name of the blog on the CCAFS website and the publication date.

Nationally appropriate mitigation actions increasing; Peru launches plan in December , 22-Dec-14
Building the base for climate-smart agriculture: Learning from national examples, 22-Dec-14
What have we learned about governing agricultural and forest areas to achieve climate change mitigation? 12/15/14
As Latin America embraces climate-smart agriculture, negotiators should do the same 5-Dec-14
Lower cost greenhouse gas emission estimates for agriculture 24-Nov-14
How can sustainable intensification make farming climate-smart? 16-Oct-14
Growing evidence for climate-smart agriculture 23-Sep-14
Does conservation agriculture work for smallholder farmers in Africa? New report highlights key points for action 29-Aug-14
Climate-smart agriculture: scientists show agricultural progress in responding to climate change 27-Aug-14
Gender, agriculture, climate change and policy responses in Africa 21-Aug-14
Country-level readiness for climate change in agriculture: lessons learned point way forward 18-Aug-14
New study estimates mitigation potential of soil carbon sequestration 28-Jul-14
Chocolate? Sure, as long as it's 55% shade 22-Jul-14
New manual on guidelines to measure greenhouse gas emissions in smallholder systems 16-Jul-14
Developing national mitigation plans for agriculture - status and guidance 16-Jul-14
Climate change adaptation and mitigation initiatives for agriculture in East Africa 4-Jul-14
New irrigation technique can ease drought effects for rice farmers 24-Jun-14
Who decides on tree planting: men or women? 4-Jun-14
A farm is greater than the sum of its parts 2-Jun-14
Sustainable agriculture land management is paying off for Kenyan farmers 22-May-14
Keys to climate-friendly coffee production 12-May-14
Meeting global food needs with lower emissions: IPCC report findings on climate change mitigation in agriculture 22-Apr-14
Tracing Vietnam's climate scars 11-Mar-14
Project pioneers: Understanding how women farmers lead the way in mitigation activities 6-Mar-14
Big Facts: Focus on Mitigation 4-Mar-14

The Landscape Fund: a new way to invest in sustainable agriculture 14-Jan-14

### Websites:

Theme 3 supported the SAMPLES website at samples.ccafs.cgiar.org and the Low Emissions Agriculture section of the CCAFS website. We provided all content and updates to the SAMPLES site and updated the following pages on the CCAFS website:
Quantifying smallholder GHG emissions & SAMPLES
The Climate Food and Farming Network
Linkages between climate-smart agriculture and REDD+
Reducing methane emissions in paddy rice
Testing innovative institutions and incentives to justly scale up impact
Decision-support for assessing mitigation priorities, baselines, and trade-offs
Read more page

### Social Media Campaigns:

Numerous facebook, twitter and linked in posts on publications, events, and blogs, mostly conducted through CU

### Newsletters:

Low Emissions Agriculture News - list grew from 69 to 208 recipients, including separate lists of a) CG-internal and b) external scientists and partners. Sent the following:
September 3 - 208 recipients 43% opens
June 19 - 208 recipients 37% opens
May 29 - 93 subscribers - 43% opens
May 2 - 93 subscribers - 44% opens
March 27 - 93 subscribers - 40% opens
Jan 30 - 69 subscribers 43% opens

### Events:

- Minor supporting role at 4Fs Field Dialog in Indonesia: http://ccafs.cgiar.org/field-dialogue-4fs-initiative-indonesia#.VNu7vCmmGMU
- Co-organized IPCC Working Group III release event at World Bank: Meeting global food needs with lower emissions: IPCC report findings on climate change mitigation in agriculture: April 16 2014 http://ccafs.cgiar.org/blog/meeting-global-food-needs-lower-emissions-ipcc-report-findings-climate-change-mitigation#.VNu0nSmmGMU
- Dhanush Dinesh organized a webinar on 18 Sept: Exploring GHG mitigation potential in rice production: http://ccafs.cgiar.org/webinar-18-sept-exploring-ghg-mitigation-potential-rice-production#.VNu6oimmGMU
- Lini attended and CCAFS/IRRI/CIAT co-organized launch of CCAC Paddy rice initiative project Oct 24-31. http://ccafs.cgiar.org/mitigation-options-reduce-methane-emissions-paddy-rice#.VNu7ZCmmGMU

- With FAO, co-organized workshop: Reducing costs of greenhouse gas emission estimates for agriculture, Nov 10-12 2014 http://ccafs.cgiar.org/blog/lower-cost-greenhouse-gas-emission-estimates-agriculture#.VNu1sSmmGMU
- Partner University of Aberdeen participated in workshop organized by Latin America team on December 1-2 called Herramientas y Métodos para la Planeación y Toma de Decisiones en Agricultura y Cambio Climático http://ccafs.cgiar.org/herramientas-y-métodos-para-la-planeación-y-toma-de-decisiones-en-agricultura-y-cambio-climático#.VNu7AymmGMU
- Organized learning session at COP 20 facilitated and led by partner University of Aberdeen, Mitigating GHG emissions from rural land uses: a screening tool December 3 http://ccafs.cgiar.org/mitigating-ghg-emissions-rural-land-uses-screening-tool#.VNu3CCmmGMU

### Videos and other Multimedia:

Presentations from IPCC WGIII videotaped, available on youtube and slideshare. Linked by CCAFS and World Bank websites.

Reducing Costs events available on slideshare. Linked by CCAFS and FAO websites.

Dhanush Dinesh - Webinar on 18 Sept: Exploring GHG mitigation potential in rice production: http://ccafs.cgiar.org/webinar-18-sept-exploring-ghg-mitigation-potential-rice-production#.VNu6oimmGMU

Gathered interview footage at Reducing Costs event. May be used later on.

### Other Communications and Outreach:

Coordinated with strategic partners: World Bank, FAO, and CCAC.

Coordinated communications with University of Vermont Gund Institute of Ecological Economics and Rubenstein School for Natural Resources

# 4. Case studies.

## Case Study #1

Title: Gender, innovation, and low emissions agricultural change

Author: Meryl Richards (based on report from Chesha Wettasinha of Prolinnova)

Type: Social differentiation and gender; Innovative non-research partnerships; Participatory action research ;

### Project Description:

The Climate Change, Agriculture and Food Security (CCAFS) program of the Consultative Group on international Agricultural Research (CGIAR) teamed up with PROLINNOVA, international network on promoting local innovation, in this project. It sought to demonstrate that enabling and supporting women's local low emission agricultural innovation, providing more visibility to these innovations, and encouraging wider learning from both individual innovations and the process of innovation is crucial to sustaining women's livelihoods and control over critical resources, improving food security and mitigating climate change. It started by bringing together a small group of researchers and practitioners from a range of backgrounds to take stock of current practice in relation to this theme. Based on their ideas, the project supported three action research pilots and analyses:

1. Participatory agroforestry and eco-stoves for reducing household labour, mitigating carbon emissions and improving health in Honduras. Women re-designed eco-stoves to meet local needs, sometimes through several iterations of innovation. Women were social innovators too. In designing agroforestry systems, they planted trees that might fruit simultaneously with coffee so that families with distant farms could relocate at harvest time to harvest all tree crops together. The eco-stove project reached 49 women. 52 women and 16 men planted agroforestry systems.
2. Improving soil condition and mitigating carbon emissions through a combination of bioslurry and biochar in Cambodia. 27 women and 13 men experimented with biochar, bioslurry and conventional compost and found mixes appropriate for different vegetables and soil types. The experimenting farmers increased the quantity of biochar produced.
3. Project participants in Bangladesh experimented with fuel efficient stoves, natural fertilizers and pesticides. 100 women and 40 men are now using the stoves. The Bangladesh team used video and social media to help farmers communicate what they needed from other actors supporting agriculture, especially government officials, NGOs, and universities.

### Introduction / objectives:

The objectives of this project were to demonstrate that enabling and supporting women's local low emission agricultural innovation, providing more visibility to these innovations, and encouraging wider learning from both individual innovations and the process of innovation is crucial to sustaining women's livelihoods and control over critical resources, improving food security and mitigating climate change.

## Project Results:

In the action research projects, there was evidence of innovation and experimentation creating spaces for gender and other social relations to change, generally in the direction of greater equality and justice. Women in Honduras and Cambodia expressed a sense of increasing confidence in their technical capacities, increasing control over decision-making and over the benefits of agricultural production, and an increased sense of solidarity with their neighbours that could be used to address higher scale problems.

The research also showed that farmers are willing to experiment with new technologies that address climate change if they meet other priorities. Several farmers became advocates for innovations and experiments that focus on climate change mitigation and adaptation. Incentives for individual farmers to engage in carbon markets are not large, but organizing farmers into groups and cooperatives can make such engagement more attractive.

We have also found that facilitating links between farmer-led groups and others within an innovation system can be quite positive, for example in generating support for soil testing of carbon capture or facilitating access to markets on favourable terms. Video and social media may be particularly influential with some audiences, such as university staff, NGOs and government officials.

The project has had local and national impact. The Honduran Office of Science and Agricultural Technology (DICTA) integrated the use of two organic fertilizers used by the women into its programme of research with avocado. In Cambodia, the Provincial Department of Agriculture in Kampong Chhnang noticed the strong farmer associations where the experiments have taken place, and is looking to support the associations for continued experimentation in biochar and other new farming technologies. An additional 56 farmers were trained. In Bangladesh, two local NGOs are moving away from a sole reliance on donations of food aid and building experimental capacity into their work.

## Partners:

ETC Prolinnova
Foundation for Participatory Research with Honduran Farmers (FIPAH)
Cambodian Centre for Study and Development in Agriculture (CEDAC)
Department of Agricultural Extension Education (DAEE) of Bangladesh Agricultural University (BAU)
University of Virginia
Ryan Hottle (consultant)

## Links / sources for further information:

http://ccafs.cgiar.org/blog/project-pioneers-understanding-how-women-farmers-lead-way-mitigation-activities
http://www.etc-international.org/portfolio/climate-change-innovation-and-gender-ccig/

Technical Report for the period 15 April 2013 to 31 December 2014 submitted by PROLINNOVA

International Secretariat, ETC Foundation (available by request)

## Case Study #2

Title: Developing a dairy NAMA in Kenya

Author: Meryl Richards (based on report by Timm Tennigkeit of Unique Forestry and Land Use)

Type: Policy engagement; Participatory action research ;

Project Description:

The government of Kenya, in the framework of the National Climate Change Action Plan, is interested in developing Nationally Appropriate Mitigation Actions (NAMA) in the agricultural sector. National development strategies such as the Vision 2020 framework and emerging national climate change policy, UK-German funding opportunities, availability of preliminary mitigation data and the devolution process in Kenya all provide a timely opportunity for action research, to test the design of a NAMA at county level. CCAFS has partnered with UNIQUE Forestry and Land Use to assess the feasibility and to design key elements of a NAMA and to develop a NAMA including the institutional, MRV and investment framework, focusing on one county and one commodity value chain and eventually to roll this out to more counties.

2014 was the first year of this five-year project, but significant progress has already been made. UNIQUE conducted stakeholder consultations in two counties to assess agricultural intensification measures and their adaptation and mitigation potential. Ultimately, intensification of the dairy sector in one county was identified as promising opportunity for a pilot NAMA at the county level. Field- based assessments were done within the county to assess resources, infrastructure and to identify potential dairy groups and cooperatives for participation in the pilot NAMA.

Introduction / objectives:

The objective of this project was to conduct a feasibility study for an agricultural NAMA in Kenya, to define the design features of a NAMA and to finally develop a NAMA proposal including the institutional, MRV and investment framework.

### Project Results:

The result of the consultations and field assessments was a NAMA investment proposal that highlights climate-smart investment opportunities in the dairy sector, the institutional framework, required financing mechanisms and a proposed monitoring and reporting framework. The proposed NAMA has the potential to reduce emissions by 2 Mt CO2e per year in 2025, provide milk to an additional 30 million consumers, and improve resilience of grasslands and livestock to climate change.
Implementation of the NAMA looks promising. The tentative NAMA proposal was presented during the African Dairy Conference and Exhibition (24 – 26 September 2014, Nairobi). Value chain players from the dairy sector promised commitment to NAMA development and implementation. The Ministries of Agriculture, Livestock and Fisheries (MoALF) and Environment, Water and Natural Resources (MEWNR) confirmed their support for the dairy sector as priority for NAMA development. Future phases of the project will identify and assess on-farm best practices, establish and test an MRV system and pilot the NAMA within the three main dairy production regions in Kenya: the Lake Victoria region (i.e. Nyanza and the western highlands), the Rift Valley region and the Central Highlands. Led by the Ministry of Environment, Water and Natural Resources (MEWNR) the NAMA proposal will be submitted to providers of international fast start climate finance initiatives or the Green Climate Fund.

### Partners:

County governments two counties
Kenyan Ministries of Agriculture, Livestock and Fisheries (MoALF) and Environment, Water and Natural Resources (MEWNR)
World Agroforestry Center (ICRAF)

### Links / sources for further information:

Inclusive and sustainable dairy development in Kenya: NAMA Investment Proposal
Contact: Robin Mbae, State Department of Livestock, Ministry of Agriculture, Livestock and Fisheries, Kenya
UNIQUE Forestry and Land Use technical report to CCAFS 2014 (available by request)

# 5. Outcomes.

## Outcome #1:

Scaling up low emissions agriculture in Kenya and Uganda

### What is the outcome of the research (i.e. use of research results by non-research partners)?

Vi Agroforestry and ECOTRUST scaled up two low agricultural carbon projects in Eastern Africa using training materials developed through CCAFS research in collaboration with EcoAgriculture Partners, contributing to an additional 2,000 farmers joining the projects. The two projects are expected to mitigate an additional 711 to 1614 tonnes of CO2e per year through tree planting and sustainable agricultural land management, equivalent to removing 150 to 340 cars from the road each year.

### What outputs produced in the three preceding years resulted in this outcome?

Recha J, Kapukha M, Wekesa A, Shames S, Heiner K. 2014. Sustainable agriculture land management practices for climate change mitigation: a training guide for smallholder farmers. Washington, DC: EcoAgriculture Partners.

Masiga M, Kalunda PN, Kiguli L, Ssempala A, Shames S, Heiner K, Miller M. 2014. Capacity Building for Stakeholders in Smallholder Agricultural Carbon Projects in Eastern Africa. Training Manual. Washington, DC: EcoAgriculture Partners

Shames S, Bernier W, Masiga M. 2013. Development of a participatory action research approach for four agricultural carbon projects in east Africa. CAPRi Working Paper No. 113. Washington, D.C.: International Food Policy Research Institute.

Shames S. 2013. How can small-scale farmers benefit from carbon markets? CCAFS Policy Brief No. 8. Copenhagen, Denmark: CCAFS.

Shames S, Wollenberg E, Buck LE, Kristjanson P, Masiga M, Biryahwaho B. 2012. Institutional innovations in African smallholder carbon projects. CCAFS Report 8. Copenhagen, Denmark: CCAFS.

### What partners helped in producing the outcome?

EcoAgriculture Partners together with Vi Agroforestry and ECOTRUST led the action research that developed the training materials

Environmental Resources Management Center for Sustainable Development (ERMCSD) contributed to the development and writing of training materials in Kenya

ENR Africa Associates contributed to the development and writing of training materials in Uganda

### Who used the output?

In Uganda: farmers, trainers and district extension officers as part of the Trees for Global Benefits

Project managed by ECOTRUST

In Kenya: community facilitators and farmers as part of the Kenya Agricultural Carbon Project managed by Vi Agroforestry

How was the output used?

Vi staff: To train community facilitators and inform government officials about how to incorporate SALM into policy in Bungoma County, Kenya
ECOTRUST staff: To train extension staff and farmers
Community facilitators/extension staff: To recruit 1,902 (Kenya) and 59 (Uganda) new farmers

What is the evidence for this outcome? Specifically, what kind of study was conducted to show the connection between the research and the outcome? Who conducted it?

EcoAgriculture blog (http://peoplefoodandnature.org/blog/kenyan-farmers-earn-carbon-credits-generated-from-soil-carbon-sequestration/) cites CCAFS support.
World Bank news release (http://www.worldbank.org/en/news/press-release/2014/01/21/kenyans-earn-first-ever-carbon-credits-from-sustainable-farming) reports on carbon credits generated from Vi project
ECOTRUST and Vi Reports (available by request) describe trainings and outreach where the research outputs were used.
Reporting by community facilitators (available by request) shows numbers of farmers trained

## Outcome #2:

New tool for GHG accounting

### What is the outcome of the research (i.e. use of research results by non-research partners)?

With CCAFS support, the University of Edinburgh refined the Small-Holder Agriculture Mitigation Benefits Assessment (SHAMBA) tool and methodology for approval by the Plan Vivo Foundation. This will allow Plan Vivo projects, for the first time, to derive carbon credits from soil carbon and other agricultural sources, increasing the volume of carbon credits for which they are eligible and enhancing their access to other climate finance.

### What outputs produced in the three preceding years resulted in this outcome?

Plan Vivo approved approach to climate benefit quantification:
https://shambatool.files.wordpress.com/2014/08/shambaapprovedapproach.pdf
User-friendly tool for project developers to produce technical specifications and monitoring reports:
https://shambatool.wordpress.com/outputs/
Web-based tool for Plan Vivo projects to record and display the estimates of climate benefits from their activities:
http://planvivoplatform.ourecosystem.com/interface/
Berry, N.J., Harley, R., Ryan, C.M., 2013. Enabling communities to benefit from REDD+: pragmatic assessment of
carbon benefits. Carbon Management 4, 571–573.
Berry, N.J., Ryan, C.M., 2013. Overcoming the risk of inaction from emissions uncertainty in smallholder agriculture.
Environmental Research Letters 8, 011003.

### What partners helped in producing the outcome?

University of Edinburgh (developer of the SHAMBA methodology and tool)

### Who used the output?

Plan Vivo Foundation
Three Plan Vivo projects (Scole Te, Mexico; Trees for Global Benefits, Uganda; and Nhambita, Mozambique) are using SHAMBA in an initial pilot

### How was the output used?

Plan Vivo Foundation adopted the refined SHAMBA methodology for use in certifying projects for carbon benefits. Three Plan Vivo projects (Scole Te, Mexico; Trees for Global Benefits, Uganda; and Nhambita, Mozambique) are using SHAMBA to derive Plan Vivo carbon credits from soil carbon stock increases.

### What is the evidence for this outcome? Specifically, what kind of study was conducted to show the connection between the research and the outcome? Who conducted it?

Plan Vivo acknowledged CCAFS support for development of the SHAMBA methodology and tool for

their use: http://www.planvivo.org/plan-vivo-gains-funding-for-developing-climate-smart-agriculture/

# 7. Outcome indicators.

## Outcome Indicator:

Findings and evaluation tools on mitigation and livelihoods benefits of alternative agricultural development pathways used by global agencies and decision-makers in two countries in each of the three regions

Achievements:

(1) Peru developed an agricultural landscape NAMA based on expert consultations and a workshop with CCAFS partners in Costa Rica and Colombia. Peru, with CCAFS input, also submitted a proposal for funding to the CDKN for development of the NAMA.
(2) Kenya's Department of Livestock and Kericho county agreed to partner with Danone and prepare a NAMA based on analysis of the mitigation potential of the dairy sector.
(3) Bungoma County in Kenya incorporated sustainable agriculture and land management practices into their policies based on input from Vi Agroforestry and EcoAgriculture.
(4) In Mbale, Manafwa, and Bududa, Uganda, extension officers and local government officials are using information from ECOTRUST training to plan local management of carbon projects.
(5) Plan Vivo Foundation is testing the refined SHAMBA tool in projects in Uganda, Mozambique ad Mexico.
(6) Colombian LEDS policy and the decision to prioritize a NAMA for reconverting pastures into fruit crops used CIAT 2011-2012 research identifying highest potential regions for silvo-pastoral systems and improved pastures and a study on reduction of carbon emissions in Colombia. CIAT-led activity with Flagship 3 and 4 funds.
(7) In the state of Haryana, India, decision support tools for nutrient management ("Nutrient Expert" developed by CIMMYT) are being used by agriculture development officers, extension experts and farmers in climate smart villages.
(8)Vietnam developed national low emissions development strategies based on tools and training provided by IFPRI.

Evidence:

Email from Valentina Robiglio, 29 Nov, 2014; powerpoint of Fabiola Minoz Dodero from MINAGRI made at the COP to present the NAMAs; email by Roxana Orrego MINAGRI/SERFOR consultant, blog http://blog.worldagroforestry.org/index.php/2014/12/10/peru-launches-its-nationally-appropriate-mitigation-actions-namas-plan-for-agriculture/
UNIQUE Forestry and Land Use technical report
Activity report of Vi Agroforestry and ECOTRUST Uganda to EcoAgriculture Partners
CIAT outcome report
Haryana State Farmers' Newsletter
Workshop reports and email from Ole Sander, February 2015
All available on request

## Outcome Indicator:

Decision-makers in three regions better informed re options and policy choices for incentivizing and

rewarding smallholders for GHG emission reductions

Achievements:

(1) Kenya's Department of Livestock and Kericho county agrees to partner with Danone and prepare a NAMA based on analysis of the mitigation potential of the dairy sector. At a recent interminsterial coordination meeting, the Livestock Department within the Ministry of Agriculture, Livestock and Fisheries advocated with other ministries to have the dairy sector NAMA included in the list of Kenya's Intended Nationally Determined Contributions (INDC).

(2) In Cambodia, the Dutch NGO, SNV is interested in promoting biochar and bioslurry mixes as soil amendments in connection with their bio-digester programme. The major NGO CEDAC has assigned one, full-time staff member to promote biochar/bioslurry soil conditioning projects in support of organic vegetable production. The project also built support for continuing the farmer-led joint experimentation (PID) process. The Provincial Department of Agriculture is looking to support the associations for continued experimentation in biochar and other new farming technologies.

(3) In Honduras, The Honduran Foundation of Agricultural Research (FHIA) is working with farmers' organizations (CIALs) to diffuse knowledge of the new agroforestry systems. PROSUELOS, a project of Catholic Relief Services, has also shown interest in evaluating the organic fertilizers and foliates. The local NGO Ayuda en Accion is also interested in replicating the experience of the Agroforestry program with women in Victoria municipality. The ASOCIAL Yorito has incorporated a gender committee to strengthen the development of capacities and financial resources for the women.

(4) World Bank, DFID and BMZ staff aware of climate change readiness indicators based on consultations and a report prepared by Climate Focus.

(5) Seminar in Brazil reporting on SAN cattle standard certification study results? COP side event.

Evidence:

Final technical report, ETC Prolinnova 2014

Email from Monika Zurek Feb Feb 2015

Email from Timm Tennigkeit 14 Feb 2015

Final report from University of Michigan

## Outcome Indicator:

Project design and monitoring guidelines for smallholder agriculture in developing countries produced and contributing to global standards

Achievements:

(1) Vietnam adopted guidelines co-developed with IRRI for estimation of GHGs in paddy rice

(2) Plan Vivo is using the SHAMBA tool and methodology to calculate GHG mitigation for agriculture in three projects Scole Te, Mexico; TFGB, Uganda; and Nhambita, Mozambique.

(3) ECOTRUST in Uganda and Vi Agroforestry in Kenya produced and used training manuals for carbon market projects and technical practices developed with Ecoagriculture to recruit 2000 new farmers to the program.

(4) Indian agricultural institutes are using GHG measurement guidelines prepared by CIMMYT.

Evidence:

2013 technical reports of ECOTRUST and ViAgroforestry 2014
Final technical report of University of Edinburgh
Email from Indian Directorate of Maize Research July 2014
All available on request

# 8. Leveraged funds.

## Leveraged funds #1

Title:

Climate change mitigation, avoided deforestation and commodity agriculture: Assessing private sector innovation for sustainable coffee and cattle in Brazil. Global Innovations Initiative grant.

Partner Name: University of Michigan

Budget: $249,931.00

Theme :3

## Leveraged funds #2

Title:

Institutional Analysis and Capacity-Building of Agricultural Carbon Projects in Africa, Phase 2

Partner Name: EcoAgriculture Partners

Budget: $15,000.00

Theme :3

# 9. Publications.

## Publication #1:

This publication has not a title defined.

Citation:

"Berry NJ, Harley R, Ryan CM. 2014. Enabling communities to benefit from REDD+: Pragmatic assessment of carbon benefits. Carbon Management. http://www.tandfonline.com/doi/abs/10.4155/cmt.13.62?journalCode=tcmt20#.VMfQ5lqmGMU"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI:10.4155/cmt.13.62 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #2:

This publication has not a title defined.

Citation:

Agrawal A, Wollenberg E, Persha L. 2014. Governing agriculture-forest landscapes to achieve climate change mitigation. Global Environmental Change 29: 270-280. DOI: http://www.sciencedirect.com/science/article/pii/S095937801400168X

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1016/j.gloenvcha.2014.10.001 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #3:

This publication has not a title defined.

Citation:

De Leeuw J, Njenga M, Wagner B, Iiyama M, (Eds.) 2014. Treesilience: An assessment of the resilience provided by trees in the drylands of Eastern Africa. Nairobi, Kenya. ICRAF 166 pp.

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Book chapters | Gold |

## Publication #4:

This publication has not a title defined.

Citation:

Borner J, Wunder S, Wertz-Kanounnikoff S, Hyman G, Nascimento N. 2014. Forest law enforcement in the Brazilian Amazon: Costs and income effects. Global Environmental Change 29: 294-305. http://www.sciencedirect.com/science/article/pii/S0959378014000879

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1016/j.gloenvcha.2014.04.021 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #5:

This publication has not a title defined.

Citation:

Fox J, Castella JC, Ziegler AD. 2014. Swidden, rubber and carbon: Can REDD+ work for people and the environment in Montane Mainland Southeast Asia? Global Environmental Change 29: 318-326. http://www.sciencedirect.com/science/article/pii/S0959378013000964

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1016/j.gloenvcha.2013.05.011 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #6:

This publication has not a title defined.

Citation:

"Kansiime KM, Shisanya AC, Wambugu KS. 2014. Effectiveness of technological options for minimising production risks under variable climateic conditions in eastern Uganda. African Crop Science Journal 2: Issue supplement s4, 859-974. See: http://www.ajol.info/index.php/acsj/article/view/108492/98307"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| http://www.ajol.info/index.php/acsj/article/view/108492/98307 | Not defined | Peer-reviewed journal articles | Green |

## Publication #7:

This publication has not a title defined.

Citation:

"Lotze-Campen H, von Lampe M, Kyle P, Fujimori S, Havlík P, Meijl HV, Hasegawa T, Popp A, Schmitz C, Tabeau A, Valin H, Willenbockel D, Wise M. 2013. Impacts of increased bioenergy demand on global food markets: an AgMIP economic model intercomparison. Agricultural Economics 45:1–14.
http://onlinelibrary.wiley.com/doi/10.1111/agec.12092/pdf"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI: 10.1111/agec.12092 | Not defined | Peer-reviewed journal articles | Green |

## Publication #8:

This publication has not a title defined.

Citation:

Milder, J.C., Arbuthnot, M., Blackman, A., Brooks, S., Giovannucci, D., Gross, L.H., Kennedy, E.T., Komives, K., Lambin, E.F., Lee, A., Meyer, D., Newton, P., Phalan, B., Schroth, G., Semroc, B., van Rokxoort, H., Zrust, M. 2014. An agenda for assessing and improving conservation impacts of sustainability standards in tropical agriculture. Conservation Biology

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI: 10.1111/cobi.12411 | Theme 3, | Peer-reviewed journal articles | Limited |

## Publication #9:

This publication has not a title defined.

Citation:

"Mujuru L, Gotora T, Velthorst E J, Nyamangara J, Hoosbeek MR. 2014. Soil carbon and nitrogen sequestration over an age sequence of Pinus patula plantations in Zimbabwean Eastern Highlands. Forest Ecology and Management 313: 254–265.
http://www.sciencedirect.com/science/article/pii/S0378112713007792"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1016/j.foreco.2013.11.024 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #10:

This publication has not a title defined.

Citation:

"Mujuru L, Mureva A, Velthorst E.J, Hoosbeek MR. 2013. Land use and management effects on soil organic matter fractions in Rhodic Ferralsols and Haplic Arenosols in Bindura and Shamva districts of Zimbabwe. Geoderma 209-210: 262–272.
http://www.sciencedirect.com/science/article/pii/S0016706113002255"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1016/j.geoderma.2013.06.025 | Not defined | Peer-reviewed journal articles | Green |

## Publication #11:

This publication has not a title defined.

Citation:

"Muller C, Robertson RD. 2013. Projecting future crop productivity for global economic modeling. Agricultural Economics. 45: 1–14
http://onlinelibrary.wiley.com/doi/10.1111/agec.12088/pdf"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI: 10.1111/agec.12088 | Not defined | Peer-reviewed journal articles | Green |

## Publication #12:

This publication has not a title defined.

Citation:

"Newton P, Alves-Pinto HN, Guedes-Pinto LF. 2014. Certification, forest conservation, and cattle: theories and evidence of change in Brazil. Conservation Letters 0: 1–8. http://onlinelibrary.wiley.com/doi/10.1111/conl.12116/abstract"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi: 10.1111/conl.12116 | Not defined | Peer-reviewed journal articles | Limited |

## Publication #13:

This publication has not a title defined.

Citation:

"Nyamadzawo G, Shi Y, Chirinda N, Oleson J, Mapanda F, Wuta M, Wu W, Meng F, Oelofse M, de Neergaard A, Smith J. 2014. Combining organic and inorganic nitrogen fertilisation reduces N2O emissions from cereal crops: a comparative analysis of China and Zimbabwe. Mitigation and Adaptation Strategies for Global Change. http://download.springer.com/static/pdf/285/art%253A10.1007%252Fs11027-014-9560-9.pdf?auth66=1399139120_415b2dbe0727877979f4b440acfdb85f&ext=.pdf"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI 10.1007/s11027-014-9560-9 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #14:

This publication has not a title defined.

Citation:

Nyamadzawo G, Wuta M, Nyamangara J, Nyamugafata P, Chirinda N. 2014. Optimizing dambo (seasonal wetland) cultivation for climate change adaptation and sustainable crop production in the smallholder farming areas of Zimbabwe. International Journal of Agricultural Sustainability,

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI: 10.1080/14735903.2013.863450 | Theme 3, | Peer-reviewed journal articles | Limited |

## Publication #15:

This publication has not a title defined.

Citation:

"Nyamadzawo G, Wuta M, Nyamangara J, Smith JL, Rees, RM. 2014. Nitrous oxide and methane emissions from cultivated seasonal wetland (dambo) soils with inorganic, organic and integrated nutrient management. Nutrient Cycling in Agroecosystems. http://link.springer.com/article/10.1007%2Fs10705-014-9634-9#page-1"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI 10.1007/s10705-014-9634-9 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #16:

This publication has not a title defined.

Citation:

"Nyamadzawo G, Wuta M, Nyamangara J,Rees R, Smith J. 2014. The effects of catena positions on greenhouse gas emissions along a seasonal wetland (dambo) transect in tropical Zimbabwe. Archives of Agronomy and Soil Science. http://www.tandfonline.com/doi/pdf/10.1080/03650340.2014.926332"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI:10.1080/03650340.2014.926332 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #17:

This publication has not a title defined.

Citation:

"Ogle SM, Olander L, Wollenberg E, Rosenstock T, Tubiello F, Paustian K, Buendia L, Nihart A, Smith P. 2013. Reducing greenhouse gas emissions and adapting agricultural management for climate change in developing countries: providing the basis for action. Global Change Biology 20:1–6. http://onlinelibrary.wiley.com/store/10.1111/gcb.12361/asset/gcb12361.pdf?v=1&t=i62ffdvk&s=b61afdd0e549da950d4f8cf58cc7347a1871d760"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI: 10.1111/gcb.12361 | Theme 3, | Peer-reviewed journal articles | Limited |

## Publication #18:

This publication has not a title defined.

Citation:

"Olander L, Wollenberg E, Tubiello F, Herold M. 2014. Synthesis and Review: Advancing agricultural greenhouse gas quantification. Environmental Research Letters 9: 075003. http://iopscience.iop.org/1748-9326/9/7/075003/"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1088/1748-9326/9/7/075003 | Theme 3, | Peer-reviewed journal articles | Gold |

## Publication #19:

This publication has not a title defined.

Citation:

Oosterzie PV, Dale A, Preece ND. 2014. Integrating agriculture and climate change mitigation at landscape scale: Implications from an Australian case study. Global Environmental Change 29: 306-317. http://www.sciencedirect.com/science/article/pii/S0959378013001878

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1016/j.gloenvcha.2013.10.003 | Not defined | Peer-reviewed journal articles | Green |

## Publication #20:

This publication has not a title defined.

Citation:

Robinson B, Holland M, Naughton-Treves L. 2014. Does secure land tenure save forests? A meta-analysis of the relationship between land tenure and tropical deforestation. Global Environmental Change 29: 281-293. http://www.sciencedirect.com/science/article/pii/S0959378013000976

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI: 10.1016/j.gloenvcha.2013.05.012 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #21:

This publication has not a title defined.

Citation:

"Seebauer M. 2014. Whole farm quantification of GHG emissions within smallholder farms in developing countries. Environmental Research Letters 9 (2014) 035006. http://iopscience.iop.org/1748-9326/9/3/035006/pdf/1748-9326_9_3_035006.pdf"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1088/1748-9326/9/3/035006 | Theme 3, | Peer-reviewed journal articles | Gold |

## Publication #22:

This publication has not a title defined.

Citation:

"Steenwerth K, Hodson A, Bloom A, Carter M, Caattaneo A, Chartres C, Hatfield J, Henry K, Hopmans J, Horwarth W, Jenkins B, Kebreab E, Leemans R, Lipper L, Lubell M, Msangi S, Prabhu R, Reynolds M, Solis S, Sischo W, Springborn M, Titonell P, Wheeler S, Vermeulen S, Wollenberg E, Jarvis L, Jackson L. 2014. Climate-Smart Agriculture Global Reseach Agenda: Science for Action. Agriculture & Food Security, 2014 3:11 http://www.agricultureandfoodsecurity.com/content/3/1/11"

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| doi:10.1186/2048-7010-3-11 | Theme 3, | Peer-reviewed journal articles | Gold |

## Publication #23:

This publication has not a title defined.

Citation:

Vu QD, Neergaard A, Tran TD, Hoang HTT, Vu VTK, Jensen LS. 2014. Greenhouse gas emissions from passive composting of manure and digestate with crop residuesbiochar on small-scale livestock farms in Vietnam, Environmental Technology, http://dx.doi.org/10.1080/09593330.2014.960475

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| DOI: 10.1080/09593330.2014.960475 | Theme 3, | Peer-reviewed journal articles | Green |

## Publication #24:

This publication has not a title defined.

Citation:

Richards M, Sander BO. 2014. Alternate wetting and drying in irrigated rice. Climate-smart agriculture practice brief. Copenhagen: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at www.ccafs.cgiar.org

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |

## Publication #25:

This publication has not a title defined.

Citation:

The citation is not defined yet.

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |

## Publication #26:

This publication has not a title defined.

Citation:

Campbell B, Wamukoya G, Kinyangi J, Verchot L, Wollenberg L, Vermeulen P. 2014. The Role of Agriculture in the UN climate talks. Info Note. Copenhagen: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |

## Publication #27:

This publication has not a title defined.

Citation:

Schuetz T, Förch W, Thornton P, Wollenberg L, Hansen J, Jarvis A, Coffey K, Bonila-Findji O, Loboguerrero Rodriguez AM, Martínez Barón D, Aggarwal P, Sebastian L, Zougmoré R, Kinyangi J, Vermeulen S, Radeny M, Moussa A, Sajise A, Khatri-Chhetri A, Richards M, Jost C, Jay A. 2015. Lessons in Theory of Change from a Series of Regional Planning Workshops – CCAFS Learning Brief 11. Copenhagen: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |

## Publication #28:

This publication has not a title defined.

Citation:

Masiga M, Kalunda PN, Kiguli L, Ssempala A, Shames S, Heiner K, Miller M. 2014. Capacity Building for Stakeholders in Smallholder Agricultural Carbon Projects in Eastern Africa. Training Manual.

Washington, DC: EcoAgriculture Partners
http://ccafs.cgiar.org/publications/smallholder-agricultural-carbon-projects-eastern-africa#.VNptpymmGMU

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |

## Publication #29:

This publication has not a title defined.

Citation:

Recha J, Kapukha M, Wekesa A, Shames S, Heiner K. 2014. Sustainable Agriculture Land Management Practices for Climate Change Mitigation: A training guide for smallholder farmers. Washington, DC. EcoAgriculture Partners.
http://cgspace.cgiar.org/handle/10568/35643
http://ecoagriculture.org/publication_details.php?publicationID=588

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |

## Publication #30:

This publication has not a title defined.

Citation:

De Beule H, Jassogne L, van Asten P. Cocoa: Driver of Deforestation in the Democratic Republic of the Congo? CCAFS Working Paper no. 65. Copenhagen: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |

## Publication #31:

This publication has not a title defined.

Citation:

Zurek M, Streck C, Roe S, Haupt F. 2014. Climate Readiness in Smallholder Agricultural Systems: Lessons Learned from REDD+. CCAFS Working Paper no. 75. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

| Identifier | CCAFS Themes | Type | Access |
|---|---|---|---|
| | Theme 3, | Other | |