RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security

RPL East Africa

2013 technical report

1. Activity Reporting

Activity 167-2013 (Milestone 1.1.2 2013 (1).)

Title: Mapping risks and opportunities for targeting appropriate crop and livestock adaptation strategies in East Africa

Status: **Partially complete.** Activity initiated in late of 2012, following the Regional Science Workshop in June 2012. Several partners - national agricultural research and extension services (NARES), government departments, CGIAR centers and NGOs - have been working with community based organizations and individual farmers to test and evaluate cropping technologies for enhancing adaptive capacity across the CCAFS sites in East Africa (Nyando, Wote, Hoima, Rakai, Lushoto and Borana). Significant progress has been made in 2013 linking with the climate smart villages (CSV), although some of the activities will continue in 2014. In Hoima and Rakai (Uganda), CIAT Uganda evaluated promising bean based technologies for enhancing farmer capacity, where 15 bean genotypes with varying traits were successfully tested through a participatory approach with 320 farmers. In Lushoto (Tanzania), SARI evaluated horticultural and root crops. About 325 farmers from six villages participated in the evaluation of improved varieties of cassava, Irish and sweet potatoes. Another 200 farmers were involved in the evaluation of improved varieties of maize and beans. In Nyando, KARI evaluated improved varieties of sorghum, beans, cassava, cow peas, green grams, pigeon peas and maize. In Borana (Ethiopia), a study by MARIL to develop appropriate livestock genetic erosion indicators and to assess the loss of livestock genetic resources in pastoral areas resulting climate change and other related socio-economic factors was successfully completed. The study also identified the most significant causes of genetic erosion and their relationships with climate change, along with their intensity and appropriate interventions. Crop suitability mapping for major staple food crops in East Africa: maize, sorghum, common bean, teff, banana and cassava (Kenya, Tanzania, Uganda and Ethiopia) completed by ABCIC and the draft report is under review. A review of the risks, opportunities and coping strategies related to agriculture and climate change in East Africa partially completed by CIMMYT.

Gender component:

Women groups and youth groups were actively involved in selection and evaluation of the cropping technologies. In the evaluation of the bean genotypes at the CCAFS sites in Uganda, for example, 60% of the farmers who participated were women.

Deliverables:

- Report on risks, opportunities and coping strategies related to climate change and agriculture in EA

Literature review of the risks, opportunities and coping strategies related to agriculture and climate change in East Africa partially completed by CIMMYT, rapid rural appraisal completed and a writing workshop is planned for mid-February 2014.

- Database and interactive maps on current status of risks, opportunities and coping strategies related to climate change and agriculture

A draft report on crop suitability mapping for major staple crops in East Africa by ABCIC has been submitted and is under review.

- Reports and case studies of promising interventions and technologies across the CCAFS sites in East Africa

Significant progress has been made in 2013. Progress technical reports have been submitted by CIAT-Uganda, MARIL, KARI, SARI and ZARDI Bulindi. The final technical reports will be submitted in the first quarter of 2014 and some activities will continue in 2014.

Partners:

ABCIC; CIAT; KARI; SARI; MARIL-Ethiopia; CIMMYT

Locations:

East Africa (EA)

Activity 168-2013 (Milestone 1.1.2 2013 (3).)

Title: Regional capacity building on using Climate Scenarios and Analogues for designing adaptation strategies in agriculture

Status: **Complete.** In collaboration with CCAFS Theme 1, a national training workshop on "Using Climate Scenarios and Analogues for Designing Adaptation Strategies in Agriculture" was held in ILRI Nairobi, Kenya in November, 2013. The training brought together 23 participants from different institutions—NGOs, Universities, National Agricultural Research Institutions, Meteorological Agencies.A follow-up study of the FoFT learning journey held in 2012 in Tanzania was undertaken to assess the effectiveness of farmer-to-farmer learning for enhancing adoption of climate smart agriculture and adaptation learning, identify potential adaptation and diversification pathways, and explore the social and cultural factors that enhance or hinder adaptation. The data from the study is currently being analyzed. Outputs of the follow-up study will be a CCAFS Working Paper and journal article in 2014.

Gender component:

Of the 23 participant trained on climate scenarios and analogue tool, seven were women researchers. During the follow-up study in Lushoto, focus group discussions were held with women only groups to understand women's perception of climate smart agriculture and their experience during the exchange visit. Key interviews with some women and a resource/asset mapping were also conducted to explore what resources women need in order to enhance their adaptive capacity.

Deliverables:

- A working paper on the effectiveness of farmer-to-farmer exchange visits in enhancing adaptation, including social and cultural barriers to adaptation.

Data collected in October 2013. Data analysis ongoing and the report will be completed by mid 2014.

- Farmer exchange visits documented through videos and blog stories

Based on the lessons from the exchange visit in Tanzania, a national training on climate analogues before an exchange visit is more desirable. Hence, the exchange visit for farmers in Nyando has been planned for 2014.

- Training of researchers working on climate change and agriculture on the use of climate scenarios and the analogue tool for designing adaptation strategies.

Twenty three participants from different institutions—NGOs, Universities, National Agricultural Research Institutions, Meteorological Agencies trained in November, 2013.

Partners:

ARI-Mlingano; SARI; NRI

Locations:

East Africa (EA)

Activity 459-2013 (Milestone 1.3.2 2013.)

Title: Prioritizing national adaptation actions in agriculture

Status: **Complete.** Following a series of roundtable discussions initiated in June 2013 during the UNFCCC meeting in Bonn, the regional program in collaboration with the Ministry of Environment, Water and Natural Resources (MEWNR) and the Ministry of Agriculture, Livestock and Fisheries (MoALF) in Kenya, successfully hosted the National Adaptation Planning meeting for the Agriculture Sector in mid-September, 2013. The meeting aimed at building consensus on priority actions for agriculture proposed in the 2013 – 2017 National Climate Change Action Plan (NCCAP). Stakeholders from different areas of the agriculture sector including government ministries, private sector, non-governmental organizations, academia, donor agencies, national and international agricultural research institutions and farmers participated.An assessment of the status of NAPAs in Ethiopia, Tanzania and Uganda and NAP in Kenya completed in 2013. Evaluation of both NAPAs and NAPs is necessary to identify progress made, challenges and possible opportunities that countries in East Africa need to take into consideration in going forward. The findings from the regional review were used as input to CCAFS report 10 on “Planning climate adaptation in agriculture:Meta-synthesis of national adaptation plans in West and East Africa and South Asia.”

Gender component:

Deliverables:

- A series of roundtable discussion culminating into a national adaptation planning workshop for the agricultural sector in Kenya.

A total of six roundtable discussions from June 2013 on taking forward agricultural priority actions in the Kenya National Climate Change Action Plan 2013-2017 (KNCCAP), leading to the formation of four thematic working groups on Climate Smart Agriculture Technologies and Practices; Finance and Investments; Knowledge and Capacity building; and Policies and Legal Frameworks. A major outcome of the roundtable discussions was the "National Adaptation Planning for Agriculture meeting in September, 2013" (see the blog from the link below).

Partners:

MEWNR; MALF; Ministry of State for Development of Northern Kenya and Other Arid Regions

Locations:

East Africa (EA)

Activity 476-2013 (Milestone 2.1.3 2013 (1).)

Title: Gender and socially-equitable participatory pilot demonstrations of portfolios of agricultural risk management innovations, integrating traditional local knowledge

Status: **Complete.** As part of the climate smart villages (CSV) approach, researchers and development partners tested a number of risk management strategies and innovations with farming communities, linking these with the adaptation and mitigation interventions across CCAFS sites. In Nyando, farmers are diversifying their livelihoods on-farm, including other institutional innovations. The livelihood diversification interventions in Nyando include beekeeping, improved small livestock production and crop diversification with improved agronomic practices. Working with youth groups in Nyando to promote aquaculture and horticulture. Other institutional innovations to enhance resilience and improve risk management being tested in Nyando and Lushoto include the innovations funds to support livelihood activities and improve access to quality seed and fertilizer. In Wote, ICRISAT completed an evaluation and promotion of integrated sorghum - legume technologies for enhancing resilience and improving food security and incomes. Crops evaluated included three sorghum varieties, cowpeas, green grams, maize and beans.

Gender component:

Women and youth are actively involved in the interventions through Community Based Organizations. The documentation process (videos and photo stories) will highlight gendered access to resources, perceptions and motivations, roles and responsibilities.

Deliverables:

- Technical reports and journal articles

Emerging successful case studies will be synthesis in 2014. However, most of the activities have been documented through blog stories.

- Documentaries, photo stories and brochures

Short videos, photo stories, blogs of the shared on CCAFS website and through the quarterly newsletter.

Partners:

WN; Vi Agroforestry; SARI; ICRISAT

Locations:

East Africa (EA)

Activity 176-2013 (Milestone 2.3.2 2013.)

Title: Using improved downscaled seasonal forecasts for managing climate risks

Status: **Complete.** Activity builds on previous work in Wote, Eastern Kenya (ICRISAT), Uganda (NARO) and Tanzania (SUA). In Lushoto, activity focused on enhancing the utilization of integrated indigenous knowledge (IK) and scientific weather forecasting through strengthening capacity of the IK forecasting groups and the core team for integrating IK with scientific forecast, harmonizing and disseminating weather and climate forecasts led by SUA in collaboration with TMA. Consensus forecast for each zone were developed and identified IK indicators for

March, April and May (MAM) 2013 documented. Advisories for MAM 2013 were developed for each zone for agriculture, livestock, and agricultural input suppliers and distributed for use by farmers in the three villages and surrounding areas. Identification and documentation of plant indicators commonly used by IK custodians completed. Communication pathways strengthened and used for up-scaling. An SMS weather and information delivery system to farmers—FarmSMS—developed and promoted to facilitate access to and delivery of Agromet information to farmers. In Uganda, the activity focused on strengthening weather information flow networks for timely provision of location specific forecasts and advisories in Hoima and Rakai, in collaboration with NARO and the Uganda Meteorological Department (UMD). Twenty Casella rain-gauges have been installed in selected households and institutions in Hoima and Rakai. Thirty farmers have been trained in recording rainfall data and also on interpretation of rainfall forecast information and the probabilistic nature of rainfall. Well known ITK weather scenarios have also been documented and prioritized for monitoring. In Ethiopia, different types of traditional abiotic and biotic climate forecasting among the Borana pastoralists in Southern Ethiopia were identified and documented, including their level of utilization, limitations and public perception by MARIL. Other work led by ICRISAT and working with the meteorological agencies in Tanzania (TMA), Uganda (UMD) and Ethiopia (NMA) and University of Nairobi in Kenya, where an analysis of reliability of seasonal climate forecasts has been completed in Tanzania and Ethiopia.

Gender component:

Deliverables:

- Report on agroclimatology of selected districts in the four target countries

Draft reports submitted for Ethiopia and Tanzania (see ICRISAT Center report)

- Report on reliability of seasonal climate forecasts and its use in farm level decision making

Completed for Ethiopia and Tanzania, including the reports from commissioned studies at CCAFS sites and partially completed for Uganda.

Partners:

ICRISAT; NARL; SUA; MARIL-Ethiopia

Locations:

East Africa (EA)

Activity 487-2013 (Milestone 3.3.1 2013.)

Title: Identification, on-farm testing and documentation of sustainable agricultural intensification

Status: **Complete.** This is an ongoing activity as part of the Climate-Smart Villages (CSV), where researchers, local partners, and farmers are evaluating a portfolio of climate-smart agricultural interventions to improvefarmers' income and resilience to climatic risks and enhance their adaptive capacity. Agro-forestry and sustainable land and water management are among the interventions being evaluated in three CCAFS sites of Nyando, Lushoto and Hoima. Efforts to improve sustainable land management through agro-forestry and water management are integrated with other risk management interventions - livestock diversification and breed

improvement, and beekeeping. In Nyando, VI-Agroforestry and ICRAF are expanding the availability of agroforestry trees that provide forage for livestock and bees. Also, community members in Nyando have collectively financed and built 40 new water storage 'pans' and rehabilitated 12 others. The water pans provide water for livestock and also for irrigating the kitchen gardens during the dry seasons. Other sustainable land and water management interventions include terraces on community land, incorporation of tissue culture bananas and fruit trees developed by KARI to improve nutrition and enhance soil carbon content, incorporation of crop mixtures (pigeon peas developed by ICRISAT) and also supporting farmers and tree nursery management groups to share knowledge on how to reduce soil and nutrient losses from crop land, increase carbon and tree cover on-farm. In Lushoto, terraces have been established in two villages led by SARI, while TAFORI is leading agroforestry interventions - tree planting and establishment of tree nurseries.

Gender component:

Deliverables:

- Technical report, including a farmers manual on soil and water conservation

Focus in 2013 has mainly been on documentation through blogs. A synthesis of successful case studies based on field experiences in East Africa is planned in 2014.

- One farmer-to-farmer learning event

A farmer learning event organized for Nyando site in June, 2013, linking with the adaptation and risk management interventions. Over 1000 farmers learnt about new farming practices from their peers and champion farmers. A similar event has been planned for other CCAFS sites in 2014. Other farmer capacity building initiatives included training of 160 women farmers on climate-smart agricultural practices and agro-advisory services in Nyando.

- Blog stories and photo essays of promising water management, agroforestry and sustainable land management activities

In 2013, the regional program successfully documented a number of interventions being piloted at the CCAFS site in Nyando, linking with the farmer learning event. Several blogs on different CSA options including sustainable water and land management were vpublished on CCAFS website.

Partners:

KARI; SARI; Vi Agroforestry; TAFORI

Locations:

East Africa (EA)

Activity 488-2013 (Milestone 3.3.2 2013.)

Title: Quantification of GHG emissions to inform mitigation interventions in East African agricultural systems

Status: **Partially complete.** This is a multi-year activity ending in 2014. Most of the 2013 activities were successfully completed. To enhance regional capacity for GHG measurements - GHG equipment - a mobile lab was built. The mobile lab can be operated at all field sites. Training for six MSc and PhD students on GHG measurements from three different east African countries completed. The students were from different

universities in the region: Maseno University and University of Eldoret, University of Nairobi (Kenya) IITA Uganda and Sokoine University (Tanzania). For site level GHG assessment in Lushoto, Wote, Rakai, a targeting of sampling sites was undertaken prior to the measurements of GHG fluxes at the sites. Satellite information was used to derive landuse maps and statistics of land uses. The work is almost complete for Rakai and Wote, and still pending for Lushoto. Project scientists— Mariana Rufino and Klaus Butterbach-Bahl—contributed to the "Roundtable Discussions on Taking Forward Agricultural Priority Actions in the National Climate Change Action Plan of Kenya (KNCCAP) for the 2013-2017".

Gender component:

Deliverables:

- Protocol for targeting, GHG emission measurements, and up-scaling

Key outputs on protocol development include two journal publications. Ogle et al 2013: Advancing national greenhouse gas inventories for agriculture in developing countries - improving activity data emission factors and software technology. Environ. Res. Lett. 8 (2013)Rosenstock et al 2013: Toward a protocol for quantifying the greenhouse gas balance and identifying mitigation options in smallholder farming systems Environ. Res. Lett.8 (2013)

- Training and capacity building of technicians and researchers from NARES and universities focused on GHG measurements, productivity and profitability evaluations in the East Africa.

A training on GHG measurements of six MSc and PhD students from Kenya, Uganda and Tanzania was conducted in June, 2013.

- Policy briefs from participating institutions and input to national fora such as NCCRS, and the National Adaptation Plan of Actions (NAPAs) of Kenya, Tanzania and Uganda.

Project scientists from ILRI and CIFOR, contributed to the "Roundtable Discussions on Taking Forward Agricultural Priority Actions in the National Climate Change Action Plan of Kenya (KNCCAP) for the 2013-2017". This is an on-going engagement activity, with action plans likely to be realized from 2014 onwards.

Partners:

ILRI; SUA; IITA

Locations:

East Africa (EA)

Activity 496-2013 (Milestone 4.1.2 2013.)

Title: Building capacity for evidence-informed policies in East Africa through the Regional Learning Partnership (RLP

Status: **Complete.** In partnership with CARE Adaptation Learning Programme in Africa (ALP) and PROCASUR, organized a Learning Route, “Learning from climate change adaptation innovative experiences of communities and local governments in ASAL” in September 2013. Eighteen national decision makers and researchers from Kenya, Ethiopia, Tanzania and Uganda interacted with farmers and local communities in three Arid and Semi-Arid Counties in Kenya to learnt about ongoing climate change adaptation planning and action in ASALs in

Kenya.Working with Common Market for Eastern and Southern Africa (COMESA) and the African Climate Policy Centre (ACPC), five consultative meetings and three writing sessions for the experts organized to support the African Group of Negotiators (AGN) to prepare Technical and Position Papers on "Agriculture and Climate Change: Challenges and Opportunities in Africa" to guide the AGN in the on-going SBSTA discussions and UNFCCC negotiations on agriculture.Discussions initiated with Rockefeller Foundation on establishing a regional learning and knowledge platform to facilitate sharing of knowledge.Other capacity building initiatives included site level outcome mapping workshops for Nyando (Kenya) and Hoima and Rakai (Uganda); a farmer learning event in Nyando which brought together farmers and partners from neighboring local communities; a learning visit by 64 farmers from Nyando to KARI Kibos Research Station - on-station research trials evaluating of improved agronomic practices in horticulture; and training of 160 women farmers from the Nyando CSV on climate-smart agricultural practices and agro-advisory services at the Agricultural Society of Kenya (ASK) Kisumu Regional Fair.

Gender component:

Training of 160 women farmers from the Nyando CSV on climate-smart agricultural practices and agro-advisory services.

Deliverables:

- Capacity building activities among partners members

PROCASUR/ CARE/ CCAFS Learning route, training of 160 women farmers, site level outcome mapping in Nyando and Uganda, farmer learning event in Nyando,

- Structured meeting and engagements such as side events and exhibitions on key thematic topics such as agriculture and climate change in the UNFCCC - Links to Activity 497

A series of 5 consultative workshops and three writing workshops of experts to support the African Group of Negotiators.

- A web-based knowledge sharing platform

Discussions initiated with Rockefeller on transtioning the Climate Exchange Network for Africa (CENA) into a Regional Learning and Knowledge Platform.

Partners:

COMESA; CARE; ALIN; Ecotrust; ACPC; The Rockefeller Foundation

Locations:

Activity 183-2013 (Milestone 4.1.4 2013 (1).)

Title: Building strategic partnerships at national and regional levels to ensure science informs national and regional policies and influence the agricultural development agenda.

Status: **Complete.** Activity focused on strengthening the existing partnerships and developing new partnerships at all levels. Organized and participated in various workshops and major international and regional conferences, and events, sharing CCAFS knowledge products and tools through exhibitions in collaboration with the CCAFS global communications team and other CGIAR centers communication teams. CCAFS products shared included policy briefs, journal papers, working papers, conference proceedings, fliers and newsletters. These events also

created opportunities for new partnerships and contacts. Key national events included supporting the National Adaptation Planning for the Agriculture Sector in Kenya in collaboration with MEWNR and MoALF; the World Bank Vice President visit to Nyando Climate Smart Village; and media visit to Nyando CSV to document climate smart practices in the CCAFS site, which resulted in media coverage in 4 TV programs and 11 articles in different national and international print media. Regional and international events included:Africa Agriculture Science Week (AASW6) and FARA General Assembly Ghana (July, 2013) where the regional program had an exhibition, shared a video on beekeeping and contributed three blogs;Organized and participated in the International Workshop on Agricultural Innovation Systems in Africa (AISA) and the East African Farmer Innovation Fair (EAFIF) In collaboration with the EU-funded project JOint Learning in Innovation Systems in African Agriculture (JOLISAA), the AusAID-funded project Food System Innovation for Food Security (FSIFS) and Prolinnova. CCAFS East Africa presented two posters on the Farms of the Future (FoTF) and seasonal weather forecasting;Contributed a case study on “Empowering a local community to address climate risks and food insecurity in Lower Nyando, Kenya” during the "Hunger – Nutrition – Climate Justice. A New Dialogue: Putting People at the Heart of Global Development" conference in Dublin, and moderated two of the Learning Cycles (CCAFS EA Science Officer);Shared ongoing research and engagement activities with farmers in East Africa during the Eastern Africa Farmers Federation – Farmers Congress in Kigali, Rwanda;Participated in the Africa Climate Conference Arusha, Tanzania, where the Regional Program Leader highlighted the role of CCAFS research in addressing climate risks related to agriculture food systems;CCAFS EA, ILRI and IWMI set up a CGIAR Booth to share research outputs and publications during the Climate Change and Development in Africa (CCDA-III) conference in Addis Ababa, Ethiopia;Global Landscapes Forum (GLF) in Poland in November 2013, CCAFS EA through the Kenya MEWNR shared their experiences on National adaptation plans: Opportunities for cross-sector synergies in the nexus between water, food security, forests and energy? And experiences on implementing the NCCAP priority actions for agriculture; Meeting with some members of the African Group of Negotiators (AGN) prior to COP 19 in Poland, where reviewers and experts provided critical input to shape the technical papers being developed on highlighting the links between agriculture and climate change in Africa;Regional partners also participated in the CCAFS UNFCCC side event: "Agriculture in National Adaptation Plans: Experiences and Lessons Learned".Gender Training and Strategizing Workshop held in October 2013 at ICRAF, Nairobi, Kenya and hosted by Theme 4.1. A gender and climate change East Africa working group was formed, comprising of 10 members from Ethiopia, Kenya, Uganda and Tanzania. A regional communication strategy has been developed.Activity linked with activity 496.

Gender component:

Deliverables:

- Communication products: newsletters, videos, blog and picture stories

Three issues of the quarterly CCAFS East Africa quarterly newsletter - SmartAG Partner were published and a soft copy emailed to over 500 partners. Over 30 blogs were published on CCAFS website and partners also contributed blogs and articles in the newsletter. Videos and picture stories documenting on-going research activities also shared.

- A technical and position paper on case studies to support investment in agriculture in Africa

Draft chapters have been submitted by some authors

- Regional communication and engagement strategy

Final document undergoing review

Partners:

COMESA; ACPC; MEWNR; Ministry of Agriculture, Kenya

Locations:

East Africa (EA)

Activity 530-2013 (Milestone 4.2.1 2013 (5).)

Title: Enhancing climate smart agriculture through innovative partnerships, decision support tools and climate information servicesHousehold modeling tools tested and adapted for evaluating impacts of climate risk and risk management interventions on rural livelihood resilience in 2 countries; Models for crop and water management applied to climate risk and its management in 4 countries.

Status: **Partially complete.** Four studies were commissioned and led by ICRISAT, ILRI, Maseno University and East Africa Farmers Federation (EAFF), out of which two have been completed. The East African Farmers Federation (EAFF) conducted a comprehensive scoping exercise of climate science tools to assess their relevance and applicability in the East Africa (Ethiopia, Kenya, Tanzania and Uganda). ICRISAT explored farmers' perceptions towards investments into soil and water conservation (SWC) technologies under variable climatic conditions, quantified the risks and the benefits of investments in soil and water conservation technologies in two watersheds (Mwania and Makindu) in Eastern Kenya, with 120 households. Potential opportunities to reduce risks and increase benefits of investments in soil and water conservation technologies were also identified. Maseno University initiated various activities in Nyando in 2013, focusing on building effective partnerships between rural communities, agricultural researchers, extension agents, meteorology services, agro-dealers and media to strengthen farmers' capacity to manage agricultural climate risks and adapt to climate change. Digitization and analysis of climate data with KMD completed for two counties (Kericho and Kisumu). A compilation of climate requirements of major crops in Nyando also completed in collaboration with KARI-Kibos. Other activities initiated in 2013 included an analysis of available historical rainfall for Kisumu and Kericho meteorological stations, compilation of other datasets for crop modeling, downscaling of seasonal forecast and training of farmers to use tailored climate information products. ILRI focused on development of near real-time rainfall intensity observation system for Kenya.

Gender component:

Deliverables:

- At least 3 researchers in each of the participating countries trained and using the models

In addition to exploring farmers' perceptions towards investments into SWC technologies by ICRISAT, the APSIM crop simulation model was also calibrated and validated using data from trials conducted at Katumani and Kiboko research stations to evaluate the potential of reducing risk and to assess the benefits of using irrigation, water harvesting and terraces.

Partners:

ICRISAT; Maseno University; ILRI

Locations:

2. Succinct summary of activities and deliverables by Output level

Output: 1.1.2

Summary:

Working with national agricultural research and extension services (NARES), government departments, CGIAR centers and NGOs, and community based organizations, cropping technologies for enhancing adaptive capacity were tested and evaluated across CCAFS sites. In some cases, these were integrated with risk management and mitigation strategies. Although some of these activities were initiated in late 2012, following the Regional Science Workshop in June, significant progress has been made in 2013 linking with the Climate-Smart Villages (CSV) and this will continue in 2014.In Hoima and Rakai (Uganda), CIAT Uganda in collaboration with the National Crops Resources Research Institute (NaCRRI) completed an evaluation of promising bean based technologies for enhancing farmer adaptive capacity over three seasons. Participatory evaluations of 15 bean genotypes with varying traits was conducted through existing farmer groups identified from the CCAFS baseline survey. Overall, 320 individual farmers participated in the trial evaluations of which 56% were female farmers. Results of the evaluations showed highly significant differences in the agronomic performance, diseases resistance and yield among the 15 genotypes. Marketability (based on seed size and colour), yield and adaptability were major drivers for farmer selection. The next step is to widely test these genotypes across other sites in East Africa and to work with NARO and KARI in Kenya on releasing these for drought prone areas of East Africa. In addition, ZARDI Bulindi (NARO) is working with 40 farmers to evaluate two cassava varieties which are resistant to mosaic virus, and two sweet potato varieties. In Lushoto (Tanzania), SARI evaluated maize, beans and root crops for yield, disease resistance, pest and water stress tolerance. Seventy seven farmers from four villages participated in evaluating three local varieties of sweet potatoes, 152 farmers participated in the evaluation of two varieties of cassava, while another 96 farmers evaluated two varieties of Irish potato. Preliminary observations indicate that the Kiroba variety will be more tolerant to the cold season raising hopes that the potato growing season can be extended in highland regions experiencing cold stress.In Nyando, KARI is supporting farmers to evaluate improved varieties of sorghum, pigeon peas, and sweet potatoes. Eight stable drought tolerant sorghum varieties developed by KARI and ICRISAT were evaluated against the commercial variety (KARI Mtama 1). The best progeny P1 yielded three times more than the commercial variety. If planted widely, this variety can triple sorghum yields on smallholder farms. Three varieties of pigeon pea were also evaluated, with at least 100 farmers expressing interest in growing the best performing pigeon pea variety. The growth characteristics and yield of seven sweet potato varieties was evaluated, out of which two varieties (Vita and SPK013) had the highest yields. Further trials will be conducted in subsequent seasons to establish the extent pigeon pea can be adopted as an alternative crop for food security in drought and flood prone regions of the Lake Victoria basin. In Borana (Ethiopia), the regional program commissioned a study by MARIL to develop appropriate livestock genetic erosion indicators and to assess the loss of livestock genetic resources in pastoral areas caused by climate change and other related socio-economic factors. The study identified the most significant causes of genetic erosion and their relationships with climate change, along with their intensity and appropriate interventions. The results show that the indigenous Ethiopian Borana Breed is under threat. Recurrent drought, feed and pasture deterioration, conflict between clans and ethnic groups, lack of awareness

about inbreeding and selective breeding, restocking programmes by NGOs, emergence of unplanned cultivation coupled with restricted mobility, the extension of markets and economic globalization were among the causes of genetic erosion. Indicators of livestock genetic erosion included small size, low milk yield, and mixed colors. The African Biodiversity Conservation and Innovation Center (ABCIC) undertook a crop suitability mapping for major staples food crops—maize, sorghum, common bean, teff, banana and cassava (Kenya, Tanzania, Uganda and Ethiopia). The draft is currently under review but it is hoped the study will inform selection of priority crops in the country National Adaptation Plans. In addition, CIMMYT partially completed a review of the risks, opportunities and coping strategies related to agriculture and climate change in 4 countries, Kenya, Uganda, Tanzania, and Ethiopia. The key climate risks identified included increased frequency of droughts, decrease in rainfall amount and erratic rainfall. Key coping strategies across the sites include adoption of agroforestry practices, changes in cropping practices, including the increased use of improved varieties (drought-tolerant varieties), intercropping, and change of crop species, better crop timing, and diversification of farm enterprises. Other strategies include changes in soil management practices such as increased use of rotation intercrop systems. However, unlike other East African countries, smallholder farmers in Uganda are increasingly using weather forecasts to plan farming activities. Milestone 2.1.2 in the CIMMYT Technical Report. This information will be used to determine risk profiles of rural districts in the 4 countriesIn collaboration with CCAFS Theme 1, a national training workshop on using climate scenarios and analogues for designing adaptation strategies in agriculture organized in Kenya in November, 2013. The training was a follow-up to the regional training workshop in 2012. The training brought together 23 participants (30% of which were women) from NGOs, universities, national meteorological service, and agricultural research institutes. The training focused on using the R package to perform climate analogue analysis to connect sites with statistically similar climates, across space and/or time. Participants also had an opportunity to use their own data for the analysis. CARE International is integrating climate scenarios in the participatory scenario planning approach to develop agro advisories using seasonal forecasts in Kenya. In Kenya, the national training will be followed by a farmer-to-farmer exchange visit in 2014. In order to assess the effectiveness of farmer-to-farmer learning for enhancing adoption of climate smart agriculture and adaptation learning, a follow-up study of the FoFT learning journey held in 2012 in Tanzania, was undertaken in October 2013. The study also aims to identify potential adaptation and diversification pathways, and explore the social and cultural factors that enhance or hinder adaptation. Results of the study will be published as a CCAFS Working Paper in 2014.

Output: 1.3.2

Summary:

An assessment of the status of National Adaptation Plan of Action (NAPAs) in Ethiopia, Tanzania and Uganda and National Adaptation Plan (NAP) in Kenya was completed in 2013. The review focused on assessment of vulnerability to current climate variability and of areas where risks would increase due to climate change, key adaptation measures identified in both NAPAs and NAPs as well as criteria used for prioritizing them,

institutional arrangements and socially differentiated adaptation planning approaches applied, and prioritized list of activities including profiles of projects/activities intended to address urgent and immediate adaptation needs. Evaluation of both NAPAs and NAPs is necessary to identify progress made, challenges and possible opportunities that countries in East Africa need to take into consideration in going forward. The findings from the regional study were used as input to CCAFS report 10 on "Planning climate adaptation in agriculture: Meta-synthesis of national adaptation plans in West and East Africa and South Asia."In collaboration with the Ministry of Environment, Water and Natural Resources (MEWNR) and the Ministry of Agriculture, Livestock and Fisheries (MoALF) in Kenya, a National Adaptation Planning meeting for the Agriculture Sector was organized in mid-September 2013. The meeting built consensus on the priority actions for agriculture proposed in the 2013 – 2017 National Climate Change Action Plan (NCCAP), and considered how Kenya should proactively deal with food production challenges and opportunities presented by climate change. The meeting brought together 47 stakeholders in agriculture and climate change—donors, international and national research institutions, academia, government, private sector representatives, civil society organizations and the media. Prior to that, six roundtable meetings were convened on Climate-Smart Agriculture (CSA) to identify Technologies and Practices; Finance and Investments; Knowledge and Capacity building and Policies and Legal Frameworks for CSA in Kenya. A number of priority actions for climate smart agriculture related to improved water management were identified, including water harvesting, storage and efficient use for agricultural production. Actions were also proposed to support agro-forestry and sustainable land management as well as adoption of improved livestock and fisheries technologies. The key recommendation from the adaptation planning meeting was formation of a consortium to generate specific investments in targeted areas, timelines and budgets, based on the agreed priorities.In Uganda, IITA examined the role of policy frameworks in facilitating adaptation of climate smart options, focusing on the inter-relationships between policies (and its actors) at national, district and community levels and the constraints hampering policy implementation. The study reviewed national policies that guide natural resource use and management, combined with key informant interviews across the policy implementation continuum. Policies reviewed include National Agriculture Policy 2011; Uganda Forestry Policy 2001 (and acts and regulations); Uganda National Climate Change Policy 2012; National Adaptation Programmes of Action (NAPA); National Wetlands Policy; National Environment Management Policy; and Rakai District Environment Management Bill. Findings show that the policy formulation process follows a top down approach. Apart from actors from government agencies, other actors such as civil society and local communities are minimally involved in the policy formulation. Other factors constraining implementation and enforcement of policies include limited awareness of the existing policies, poor linkages across implementation levels, and lack of coordination and lack of clarity on the role of the different unclear actors. Also, key implementers are often excluded in the formulation process, and implementation is dependent on donor funding. The limited resources also limit exchanges between communities and districts. Technically, policies are not clear to the users; environmental benefits are not appreciated by many actors and are therefore often excluded from development plans at district and lower levels. The study will form a baseline for the policy analysis work under the CCAFS flagship 4 trials.

Output: 2.1.3

Summary:

In Nyando, livelihood diversification interventions include beekeeping, improved small livestock production and crop diversification with improved agronomic practices. Under improved small livestock production, the regional program works with World Neighbors and ILRI on a pilot breed improvement program for poultry, sheep and goats. For improving local goats and sheep, 100 breeding units have been established through the introduction of 65 heat tolerant Gala goats and 35 Red Maasai sheep which resist internal parasites selected by ILRI. Confined ranges for improved indigenous Kenbro chicken from the MoALF have been introduced. From an initial, 500 selected hens and cockerels, the activity resulted in the multiplication of over 4000 birds in 400 households. The improved chicken mature two months earlier than the conventional free range chicken. In collaboration with World Neighbours, 20 farmer groups (including eight women groups) have been trained on beekeeping, using 210 improved Langstroth hives. The honey is sold locally. Youth groups have also been supported to engage aquaculture and horticulture. In collaboration with the private sector; Thin Qubator Aquaculture and MoALF, a fish farming initiative was started in 2013 to examine the potential of intensive fish farming as an alternative source of food and for income. Greenhouse farming and drip irrigation systems have been introduced as part of a smart farm strategy on intensification. These will be integrated into the county integrated agriculture plans and linked to microfinance to reach 500 units through 200 farmer groups in Kenya. Institutional innovations being piloted in Nyando include the Innovation Fund with three CBOs to support micro-financing for trialing agricultural innovations and increasing access to improved seeds and fertilizers. In Wote, ICRISAT completed an initial evaluation of integrated sorghum - legume technologies for enhancing resilience and improving food security and incomes. Cereal legume intercropping is important in the face of climate change and variability. Intercropping (growing two crop species) can also help minimize the risks associated with crop failures due to drought and as a diversification strategy. The crops and varieties evaluated included three sorghum varieties, cowpeas, green grams, maize and beans. These varieties have been developed by ICRISAT, CIMMYT and KARI and tolerate soil moisture stress and pests, and are disease resistant. Seven different combinations of intercrops were evaluated with 120 farmers. In addition, 90 farmers tested intercropping new sorghum and pigeon pea varieties. Sorghum outperformed maize in these ASAL areas and can provide food security. There were no significant differences in performance of the three sorghum varieties evaluated. An innovation fund will be established as part of the investments in the NAP process as a strategy to increase access to improved sorghum and legume seeds in order to scale up integrated technologies in the dry land farming region of Eastern Kenya where drought affects nearly 500,000 households

Output: 2.3.2

Summary:

Three studies were commissioned in Ethiopia, Uganda and Tanzania. In Borana (southern Ethiopia), different types of traditional abiotic (astrological) and biotic (plants and animals) climate forecasting among the Borana pastoralists were identified and documented, including their level of utilization, limitations and public

perception by MARIL. Indigenous climate forecasting is the main source of climate information in these pastoral where access to climate information from the meteorological agency is limited. However, popularity of traditional climate forecasting and number of traditional climate forecast experts is declining.The Uganda study focused on strengthening weather information flow networks for timely provision of location specific forecasts and advisories in Hoima and Rakai districts, in collaboration with NARO and the Uganda Meteorological Department (UMD). The aim was to develop a reliable scientific weather information network, promote integration of ITK and scientific weather forecasting and develop basic agro-advisories for farmers building on the previous work in 2012. Twenty Casella rain-gauges have been installed in selected households and institutions in Kyabigabire sub county (Hoima) and Ddwaniro and Lwanda sub counties (Rakai). Thirty farmers have been trained in recording rainfall data by technical staff from UMD. The farmers were also trained in interpretation of rainfall forecast information and the probabilistic nature of rainfall. Well known ITK weather scenarios have been documented and prioritized for monitoring. Rainfall data has been collected for four-months (September-December, 2013) together with ITK scenario observations by 20 households. After proof of concept, a larger program to reach farmers in at least 10 districts of western Uganda will be proposed to the government for support.In Lushoto, building on the findings of an earlier study which showed that farmers use a combination of local indicators in predicting the local weather and climate, CCAFS in collaboration with Sokoine University of Agriculture (SUA) and Tanzania Meteorological Agency (TMA) undertook a detailed study on the identified IK indicators, building capacity of weather forecast core team, and up-scaling the information dissemination system. Consensus forecast and advisories for each zone were developed for March, April and May (MAM) 2013. Through consultative discussions with elders and IK custodians, identification and documentation of plant indicators commonly used by IK custodians has been completed. To support dissemination and up-scaling of weather forecast information, consensus forecasts issued by the core team were disseminated and communication pathways strengthened and used for up-scaling. An SMS weather and information delivery system to farmers—FarmSMS—has been developed and promoted. FarmSMS facilitates access to and delivery of Agromet information to farmers through mobile telephone Short Messages (SMS) technology. FarmSMS ensures specific and timely dissemination of climate information including warnings and advisories, weather and climate forecasts that are issued by TMA to farming communities. FarmSMS provides a special kind of inputs in agricultural planning and farm management. With weather alerts and advisories, farmers can plan and make adjustments to their farm operations. FarmSMS was launched in Lushoto in June 2013. This model of forecast integration will be shared through a learning partnership with TMA to inform scaling out options of weather advisories for a nationwide program with CCAFS, WMO and WFP in TanzaniaIn collaboration with ICRISAT and working with the meteorological agencies in Tanzania, Uganda and Ethiopia and University of Nairobi in Kenya, an analysis of reliability of seasonal climate forecasts has been completed in Tanzania and Ethiopia. Seasonal weather forecasts issued by Tanzania Meteorological Agency (TMA) were verified for the period of March-April-May (MAM) and October-November-December (OND), 1983-2013. These forecasts were developed through downscaling of regional seasonal climate forecast to national level taking into account the results from preliminary seasonal climate forecast and micro-climatic features in various climatological zones across the country. Based on the verification approaches used, the seasonal forecasts issued by TMA were found to be accurate and skillful. The usefulness of the seasonal weather forecasts in planning and managing farming activities in Bagamoyo district was assessed. The results showed while about 86% of the respondents are aware of the seasonal climate forecasts issued by TMA, 55% of the respondents

used the forecasts information for planning and managing farming activities. The study recommends training of small holder farmers, agriculture extension officers on how to use seasonal weather forecasts products from TMA as a strategy that could help to improve the knowledge and use of the seasonal weather forecast for on-farm decision making nationwide. Analysis of forecasts in other countries has also been completed and the reports are under preparation.

Output: 3.3.1

Summary:

Agro-forestry and land and water management are among the mitigation interventions being evaluated. In collaboration with Vi-Agroforestry, farmers and tree nursery management groups in Nyando have been supported through farm visits and learning events to share knowledge on how to reduce soil and nutrient losses from crop land, increase carbon and tree cover on-farm while managing 25 group nurseries initiated by ICRAF with a capacity to supply over 150,000 tree seedlings. Farmers have planted agro-forestry trees that include Grevillea robusta, Casuarina species, Croton species, Markhamia lutea, and Gliricidia species. These species grow faster under water stress conditions, and have multiple uses such as fuel wood, N-fixing for improved soil fertility, fodder, and soil erosion control. Efforts to improve sustainable land management through agro-forestry are well integrated with the livestock diversification and breed improvement, and beekeeping interventions. Through the existing partnership, for example, VI-Agroforestry and ICRAF are expanding the availability of agroforestry trees that provide bee forage such as Calliandra species. To improve soil moisture retention and reduce erosion, the Ministry of Agriculture is working with farmers to promote contour farming and terracing, composting and conservation agriculture. Collectively, community members have also financed and built 40 new water storage 'pans' and rehabilitated 12 others. KARI is supporting farmers to improve land management practices, incorporating 6,000 tissue culture bananas and 5,000 fruit trees, working with 300 farmers. In 2014 there will be discussions with the county government to expand these integrated activities to reach 5,000 farmers while investments in CSA through the Kenya NAP may provide resources to reach nearly 100,000 farmers in the 2 counties of Kericho and Kisumu. In Lushoto, soil and water conservation interventions included terraces and contoured grass strips. Soil fertility assessment by SARI has been completed for 36 farms. Other interventions include agroforestry, where 25,000 tree seedlings were planted on farm and three tree nurseries with a capacity of producing 45,000 seedlings a season established. The tree nurseries are run by community based organizations, with technical support from the Tanzania Forest Research Institute (TAFORI). In Hoima, Bulindi zonal agricultural research and development institute (ZARDI) is promoting improved agroforestry and land management practices. A total 70 farmers are working with researchers in evaluating three varieties of mangoes, one pawpaw variety, and three agroforestry cover crops (Calliandra carlothysus, Lueceana leucocephala and Mucuna). Water retention ditches and trenches have also been dug. These activities will be expanded through the partnership with the farmer's organization (HODIFA).

Output: 3.3.2

Summary:

In order to enhance regional capacity for GHG measurements and inform mitigation interventions in East African agricultural systems, ILRI in collaboration with CIFOR and ICRAF are working with scientists from the national research institutions and students from Uganda, Kenya and Tanzania to build their capacity on measurement and quantification of GHG emissions. This is part of a larger project on Standard Assessment of Mitigation Potential and Livelihoods in Smallholder Systems (SAMPLES) and has a strong focus on capacity building. Measurements of soil GHG emissions have been initiated at selected CCAFS sites in Kenya (Nyando, Wote), Uganda (Rakai) and Tanzania (Lushoto). GHG measurement equipment—a mobile lab was acquired—which can be operated at all field sites. In Nyando, parameterization of soil GHG emissions for 36 plots across the landscape has already been completed. Two journal articles have been published—Ogle et al 2013 and Rosenstock et al 2013 (see ILRI publications list for details).In June, a training was held for researchers and technicians from NARES (six MSc and PhD students) on GHG measurements. The students were successfully trained on the how to design and implement experiments and analyse the data so they can measure GHG emissions from agriculture. The students were also provided with the knowledge and skills to design both field and laboratory experiments, to collect and analyse the appropriate samples as well as measuring other important explanatory variables such as temperature (air and soil), humidity, and other soil physicochemical properties. The training also included some basic laboratory techniques such as how to analyse the gas samples on a gas chromatograph, as well as some simple data manipulation and statistical methods of analysis. It is expected that this expertise will help create a critical mass of scientists who can support the estimation of emissions from smallholder agriculture in East Africa.Moreover, all sites were visited in 2013, discussions with extension services were initiated, and targeting of sampling sites was undertaken prior to the measurements of GHG fluxes at the sites. Satellite information was used to derive landuse maps and statistics of land uses. The work is almost complete for Rakai and Wote, and still pending for Lushoto. In 2014, much of work on the ground will be in Wote, Rakai and Nyando. In Lushoto, however, lack of active participation of the local contacts has been a limiting factor. In addition, the project scientists— Mariana Rufino (CIFOR) and Klaus Butterbach-Bahl (ILRI)—contributed to the "Roundtable Discussions on Taking Forward Agricultural Priority Actions in the National Climate Change Action Plan of Kenya (KNCCAP) for the 2013-2017". This is an on-going engagement activity, with action plans likely to be realized from 2014 onwards. Discussions have been initiated in Lushoto (Tanzania) on the feasibility of a demonstration project on climate smart landscapes. Large parts of Lushoto (Usambara Mountains) are highly degraded as a result of poor agricultural practices on steep slopes. Changes in rainfall intensities and variability, will further threaten food security of the local communities. Rehabilitation of degraded land and re-design of land management at landscape scale (climate smart landscapes) will enable the communities to increase agricultural production, decrease the land pressure on the remaining forest reserves and improve the environment water quality and water productivity. A catchment scale approach has been discussed with local stakeholders, with run-off, sediment load and water quality besides landscape GHG fluxes being parameters to evaluate the effectiveness of climate smart interventions.

Output: 4.1.2

Summary:

To strengthen the regional learning partnership (RLP) and build capacity for evidence-informed policies, a Learning Route, "Learning from climate change adaptation innovative experiences of communities and local governments in Arid and Semi-Arid Lands (ASAL)" was organized in September 2013, in partnership with CARE Adaptation Learning Programme in Africa (ALP) and PROCASUR. The event brought together 18 national decision makers and researchers Kenya, Ethiopia, Tanzania and Uganda who interacted with farmers and local communities on ongoing climate change adaptation planning and actions in three ASAL Counties in Kenya (http://ccafs.cgiar.org/blog/east-african-policy-makers-learn-innovative-climate-change-adaptation-experiences#.UooRc-K2X7A). The policy makers and researchers visited the CCAFS site in Wote (Eastern Kenya) to learn from some of the ongoing adaptation practices being tested by farmers, development practitioners and research institutions, including the collaboration with KARI and ICRISAT on training farmers in understanding probabilistic climate forecast information. This initiative is also testing the potential of local language radio as a tool for motivating dialogue and understanding by the local community of climate change and its impact on food security (http://ccafs.cgiar.org/blog/getting-grips-how-farmers-perceive-climate-variability-and-its-impacts#.Uv4pwLSSVbV). CCAFS, Common Market for Eastern and Southern Africa (COMESA) and the African Climate Policy Centre (ACPC) continued to support the African Group of Negotiators (AGN) to prepare Technical and Position Papers on "Agriculture and Climate Change: Challenges and Opportunities in Africa" to guide the AGN in the on-going SBSTA discussions and UNFCCC negotiations on agriculture. CCAFS organized five consultative meetings for the AGN and three writing sessions for the technical experts. To strengthen the Technical and Position papers, CCAFS organized a one-day meeting in October in Warsaw, Poland, where reviewers and a panel of experts provided critical inputs to inform the papers under development. Other initiatives included discussions with Rockefeller Foundation and Pamoja Media to transition the Climate Exchange Network for Africa (CENA) into a Regional Learning Knowledge Platform to facilitate knowledge sharing among network partners and other climate change adaptation and mitigation actors in Africa. Initially, the platform will target 19 CCAFS RLP partners and 14 other institutions supported by Pamoja media. It is expected that the platform will ensure timely sharing and access to information by all the participating partners. Following from the regional outcome mapping in 2012, two site level outcome mapping workshops were organized in Uganda and Nyando with local partners from research institutions, government extension services, NGOs, CBOs and farmer representatives. A key output of the outcome mapping workshops was the identification of actor oriented outcomes and the roles and responsibilities of the different partners and development of progress and performance indicators. This information will be used to inform and plan site level activities in 2014. Other capacity building initiatives in 2013 included: • Farmer learning event in Nyando: Innovative farmers got the chance to show off their activities to other neighbouring farmers. The three-day learning event gave more than 1,000 farmers the experience to learn about new farming practices - happening in real time. They visited 14 farmers in the area. (http://ccafs.cgiar.org/pioneering-peers-inspire-farmers-kenya-get-climate-proofed; www.flickr.com/photos/cgiarclimate/sets/72157634585146839/)• Farmer training and field visit: Sixty four farmers in Nyando were trained on horticulture and aquaculture farming and later visited

integrated farms for new and emerging agricultural practices at KARI Kibos Research Station.• Visit to Agricultural Society of Kenya (ASK) Kisumu Regional Fair: One hundred and sixty (160) women farmers from the Nyando trained on climate-smart agricultural practices, accessing markets and micro-credit facilities and agro-advisory services that could help improve on-farm decision-making. (http://ccafs.cgiar.org/blog/empowering-women-farmers-feed-world)

Output: 4.1.4

Summary:

This output is closely linked to output 4.1.2 and 1.3.2. Activities in 2013 focused on strengthening the existing partnerships and developing new partnerships at all levels. The regional program hosted and participated in various workshops and major international and regional conferences and events, sharing CCAFS knowledge products and tools in collaboration with the CCAFS global communications team and other CGIAR centers. These events also created opportunities to reach out to new partners and new contacts. Some of the key national events included supporting and hosting the National Adaptation Planning for the Agriculture Sector in Kenya in collaboration with MEWNR and MoALF (see output 1.3.2); a media visit to Nyando CSV to document climate smart practices, which resulted in media coverage in four TV programs and 11 articles in different national and international print media; and a visit by the World Bank Vice President and Special Envoy for Climate Change—Rachel Kyte to Nyando CSV. Rachel wrote a blog story following her visit (http://blogs.worldbank.org/voices/plump-goats-and-pawpaws-story-climate-smart-farming-kenya), and subsequently shared about the Nyando CSV during the Global Landscapes Forum at the 2013 UNFCCC Conference of Party (COP 19) meetings. The regional and international conferences and events included:• Africa Agriculture Science Week (AASW6) and FARA General Assembly Ghana (July, 2013), where the regional program had an exhibition, shared a video on beekeeping and contributed three blogs. • Organized and participated in the International Workshop on Agricultural Innovation Systems in Africa (AISA) and the East African Farmer Innovation Fair (EAIF) in collaboration with the EU-funded project JOint Learning in Innovation Systems in African Agriculture (JOLISAA), the AusAID-funded project Food System Innovation for Food Security (FSIFS) and Prolinnova. CCAFS East Africa presented two posters on the Farms of the Future (FoTF) and seasonal weather forecasting.• Contributed a case study on “Empowering a local community to address climate risks and food insecurity in Lower Nyando, Kenya” during the "Hunger – Nutrition – Climate Justice. A New Dialogue: Putting People at the Heart of Global Development" conference in Dublin, and moderated two of the Learning Cycles.• ASARECA CRP workshop in May 2013 to explore specific areas of collaboration with the ASARECA programs, as part of the Dublin process initiative that aims to deepen alignment and collaboration between Africa’s agricultural research, extension and education programs and institutions.• Shared ongoing research and engagement activities with farmers in East Africa during the Eastern Africa Farmers Federation – Farmers Congress in Kigali, Rwanda.• Participated in the Africa Climate Conference Arusha, Tanzania, where the Regional Program Leader highlighted the role of CCAFS research in addressing climate risks related to agriculture food systems.• CCAFS EA, ILRI and IWMI set up a CGIAR Booth to share research outputs and publications during the

Climate Change and Development in Africa (CCDA-III) conference in Addis Ababa, Ethiopia.• Global Landscapes Forum (GLF) in Poland in November 2013, where CCAFS EA through the Kenya MEWNR shared their experiences on National adaptation plans: Opportunities for cross-sector synergies in the nexus between water, food security, forests and energy? And experiences on implementing the NCAAP priority actions for agriculture—a process supported by the regional program. • One-day meeting with the African Group of Negotiators (AGN) prior to COP 19 in Poland, where reviewers and experts provided critical input to shape the technical papers being developed on highlighting the links between agriculture and climate change in Africa.• Regional partners also participated in the CCAFS UNFCCC side event: "Agriculture in National Adaptation Plans: Experiences and Lessons Learned". The side event was organized by Theme 1 with support from the regional programs.• The Gender Training and Strategizing Workshop held in October 2013 at ICRAF, Nairobi, Kenya and hosted by Theme 4.1. A gender and climate change East Africa working group was formed, comprising of 10 members from Ethiopia, Kenya, Uganda and Tanzania. To strengthen the program's communication and knowledge sharing efforts in East Africa, a Regional Communication and Knowledge Management Strategy has also been developed.

Output: 4.2.1

Summary:

Four studies were commissioned and led by ICRISAT, ILRI, Maseno University and East Africa Farmers Federation (EAFF). ICRISAT explored farmers' perceptions towards investments into soil and water conservation technologies under variable climatic conditions, quantified the risks and the benefits of investments in soil and water conservation technologies with due consideration to short term trends in climate. The study was carried out in Mwania and Makindu watersheds in Eastern Kenya, with 120 households. Potential opportunities to reduce risks and increase benefits of investments in soil and water conservation technologies were identified. The crop simulation model APSIM was also calibrated and validated using data from trials conducted at Katumani and Kiboko research stations to evaluate the potential of reducing risk and to assess the benefits of using irrigation, water harvesting and terraces. Results indicate that farmers who were non-users of SWC technologies perceived high cost and input unavailability locally as the key constraints. The benefits from investing in SWC technologies were perceived as the reason behind changing preferences for agricultural enterprises. Investing in irrigation is more costly than terraces and water harvesting in maize production while under beans production. Returns obtained under irrigation are 40% and 43.5% higher in maize and beans respectively in the study sites. The modeling results indicated that investing during above normal seasons is risky in all technologies but beneficial during normal seasons. Irrigation gives the highest returns during below normal seasons. Model simulations further indicate 73% and 61% yield gains in maize and beans production when up to 30kg N/ha fertilizer is applied. The study will inform choices that farmers make in matching promising portfolios of technologies for mitigation and adaptation.ILRI focused on development of near real-time rainfall intensity observation system for Kenya. Maseno University is working with other partners in Nyando site on digitization

and analysis of climate data with Kenya Meteorological Services at Kericho and Kisumu. A compilation of climate requirements of major crops in Nyando in collaboration with KARI-Kibos has also been completed. Results of the analysis have been used to train farmers on participatory use of decision support tools, using an analysis of available historical rainfall data from Kisumu and Kericho Meteorological stations. Compilation of other datasets needed for crop modeling (temp, radiation) based on existing historical data is on-going. Forty farmers have been identified for participatory crop modeling and resource allocation maps have been done for these farms. These data will be used to develop a decision tool for estimating seasonal rainfall onset to plan farm activities that could gain wide scale use in the 2 counties.The East African Farmers Federation (EAFF) conducted a comprehensive scoping exercise of climate science tools to assess their relevance and applicability in the East Africa (Ethiopia, Kenya, Tanzania and Uganda). Partners were trained in using the identified tools and farmers sensitized on their suitability and relevance to their farm activities. Climate science tools hold a great potential for utilization in East Africa. There are many meteorological services and products available to the farmers including weather, seasonal and long term-forecasts, but the seasonal forecasts were the most relevant to farmers. However, seasonal forecasts issued by national meteorological agencies are usually in forms (probabilistic) that are not readily useable by farmers. Tools for making seasonal forecasts beneficial to farmer decision making include adjustment of seasonal forecasts using ENSO indices and Surface Sea Temperatures-SST (e.g. Climate Predictive Tool-CPT); and adjustment of seasonal forecasts using historical climate records and statistical methods (Monte Carlo simulations, mass curves, time series-forecasting using moving averages) as is the case with FEWSNET Agro-Climatology Toolkit Forecast Interpretation Tool (FACT-FIT). FACT-FIT was piloted in Kenya and Uganda. The study is part of ongoing efforts to tests seasonal forecasting tools that have potential for wide-scale use in East Africa.

3. Publications

Publication #1

Type: Other

CCAFS Themes: Theme 1, Theme 2, Theme 3

Citation: Aggarwal P, Zougmoré R and Kinyangi J. 2013. Climate-Smart Villages: A community approach to sustainable agricultural development. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #2

Type: Journal papers

CCAFS Themes: Theme 1, Theme 2, Theme 3, Theme 4.3

Citation: Campbell, B, Kinyangi, J, Nersisyan, A, Leigh, R. A, Leigh, J. A et al.(2013) Perspectives: Legislating Change. Nature 501, S12–S14

Publication #3

Type: Working papers

CCAFS Themes: Theme 1, Theme 2, Theme 3

Citation: Cooper PJM, Cappiello S, Vermeulen SJ, Campbell BM, Zougmoré R, Kinyangi J. 2013. Large-scale implementation of adaptation and mitigation actions in agriculture. CCAFS Working Paper No. 50. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #4

Type: Conference proceedings

CCAFS Themes: Theme 1, Theme 2, Theme 3

Citation: Macoloo C, Recha J, Radeny M, Kinyangi J. 2013. Empowering a local community to address climate risks and food insecurity in Lower Nyando, Kenya. Case Study prepared for Hunger • Nutrition • Climate Justice • 2013 | A New Dialogue : Putting People at the Heart of Global Development. Dublin, Ireland: Irish Aid.

Publication #5

Type: Other

CCAFS Themes: Theme 2

Citation: Recha J, Kinyangi J, Omondi H. 2013. Climate Related Risks and Opportunities for Agricultural Adaptation in Semi-Arid Eastern Kenya. CCAFS East Africa Program project report. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Publication #6

Type: Other

CCAFS Themes: Theme 4.2

Citation: Sijmons K, Kiplimo J, Förch W, Thornton PK, Radeny M, Kinyangi J. 2013. CCAFS site atlas – Albertine Rift / Hoima. CCAFS Site Atlas Series. Copenhagen, Denmark: The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #7

Type: Other

CCAFS Themes: Theme 4.2

Citation: Sijmons K, Kiplimo J, Förch W, Thornton PK, Radeny M, Kinyangi J. 2013. CCAFS site atlas – Kagera Basin / Rakai. CCAFS Site Atlas Series. Copenhagen, Denmark: The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #8

Type: Other

CCAFS Themes: Theme 4.2

Citation: Sijmons K, Kiplimo J, Förch W, Thornton PK, Radeny M, Kinyangi J. 2013. CCAFS site atlas – Nyando / Katuk Odeyo. CCAFS Site Atlas Series. Copenhagen, Denmark: The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #9

Type: Other

CCAFS Themes: Theme 4.2

Citation: Sijmons K, Kiplimo J, Förch W, Thornton PK, Radeny M, Kinyangi J. 2013. CCAFS site atlas – Usambara / Lushoto. CCAFS Site Atlas Series. Copenhagen, Denmark: The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #10

Type: Other

CCAFS Themes: Theme 4.2

Citation: Sijmons K, Kiplimo J, Förch W, Thornton PK, Radeny M, Kinyangi J. 2013. CCAFS site atlas – Borana / Yabero. CCAFS Site Atlas Series. Copenhagen, Denmark: The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #11

Type: Journal papers

CCAFS Themes: Theme 1, Theme 4.2

Citation: Vermeulen, S. J, Challinor, A. J, Thornton, P. K, Campbell, B. M, Eriyagama, N, Vervoort, J. M, Kinyangi, J, Jarvis, A, Läderach, P, Villegas, J. R, Nicklin, K. J, Hawkins, E., & Smith, D. R. (2013).Addressing uncertainty in adaptation planning for agriculture. Proceedings of the National Academy of Sciences of the United States of America. 110 (21).

Publication #12

Type: Other

CCAFS Themes: Theme 4.1, Theme 4.2

Citation: Förch W, Sijmons K, Mutie I, Kiplimo J, Cramer L, Kristjanson P, Thornton P, Radeny M, Moussa A and Bhatta G (2013). Core Sites in the CCAFS Regions: East Africa, West Africa and South Asia, Version 3. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.

Publication #13

Type: Journal papers

CCAFS Themes:

Citation: Mahoo H, Radeny R, Kinyangi J, Cramer L, eds. 2013. Climate change vulnerability and risk assessment of agriculture and food security in Ethiopia: Which way forward? CCAFS Working Paper no. 59. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.

Publication #14

Type: Journal papers

CCAFS Themes:

Citation: Nyasimi M, Radeny R, Kinyangi J 2013. Climate Change Adaptation and Mitigation Initiatives for Agriculture in East Africa Working Paper no. 60. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.

4. Communications

Media campaigns:

Two successful major media campaigns in 2013. • A media visit to the Nyando Climate Smart Villages (CSVS) by local and international journalists prior to the National Adaptation Planning (NAP) meeting for the Agriculture sector in Kenya. The purpose of the media visit was to stimulate interest on climate change and agriculture in Kenya. • During the NAP meeting, the Kenyan chapter of the IFPRI monologue on East Africa Agriculture and Climate Change was launched. Following Nyando CVS media visit and the launch of the IFPRI monologue, a number of media items both print and broadcast were published. A blog summarizing the media campaigns is available at: (http://ccafs.cgiar.org/blog/agriculture-focus-climate-change-planning-kenya#.UvCmh7SSVbV)

The media visit provided an opportunity for the regional program to introduce CCAFS to local and regional media and illustrated that CCAFS is a reliable source of information on climate change, agriculture and food security in East Africa. Subsequently, the Regional Program Leader received over 10 media interview requests in connection with climate change issues in the region. A major outcome of the media campaign on the CCAFS CSVs, was the visit in November by the Chair of the CGIAR Fund Council and World Bank Vice President and Special Envoy for Climate Change, Rachel Kyte, to the Nyando CSV to learn about ongoing work.

Blogs:

Over 30 blogs published on CCAFS website by the CCAFS EA team highlighting ongoing field activities, science and policy news. Regional partners also contributed to the blogs. The blogs are summarized below, including the URL:

East Africa reached by participatory action research activities(http://ccafs.cgiar.org/blog/East-Africa-reached-participatory-action-research-activities%2520#.UooJZ-K2X7A)

Improving science in Africa key to implement mitigation strategies for livestock (http://ccafs.cgiar.org/blog/improving-science-africa-key-implement-mitigation-strategies-livestock#.UooJiuK2X7A)

Intercrop innovations may help build resilience in semi-arid areas(http://ccafs.cgiar.org/blog/Intercrop-innovations-build-resilience-dryland-areas%2520#.UooJ-uK2X7A)

Climate action in Kenya: New national plan launched(http://ccafs.cgiar.org/blog/Action-climate-Kenya-New-plan-launched%2520#.UooKIeK2X7A)

Smallholders need a hand-up not a hand-out(http://ccafs.cgiar.org/smallholders-need-hand-not-hand-out#.UooKTeK2X7A)

Push for agriculture within climate discussions in East Africa continues (http://ccafs.cgiar.org/blog/climate-dicussions-east-africa-pushing-agriculture#.UooKdOK2X7A)

Rangeland enclosures could help pastoralists cope with climate variability (http://ccafs.cgiar.org/blog/rangeland-enclosure-could-help-pastoralists-cope-climate-variability#.UooKmeK2X7A)

Harnessing farmers' valuable agricultural knowledge the right way (http://ccafs.cgiar.org/blog/harnessing-valuable-indigenous-farm-knowledge-right-way#.UooKxOK2X7A)

Kenyan farmers battle hunger with chicken, goats and bees (http://ccafs.cgiar.org/blog/empowering#.UooLFOK2X7A)
Surfing the wave, brain-gain and life under the hedge. What's farming got to do with this? (http://ccafs.cgiar.org/blog/life-under-hedge-brain-gain-and-surfing-wave#.UooLPuK2X7A)
Kenyan farmers use climate 'entertainment' for empowerment(http://ccafs.cgiar.org/blog/kenyan-farmers-use-climate-entertainment-empowerment#.UooLaeK2X7A)
Can videos, songs and drama be used to promote agricultural innovations? (http://ccafs.cgiar.org/blog/can-videos-songs-and-drama-be-used-promote-agricultural-innovations#.UooLkOK2X7A)
Farmers get latest solutions for climate 'shape-up'(http://ccafs.cgiar.org/blog/farmers-get-latest-solutions-climate-shape#.UooLxOK2X7A)
Celebrating creative and innovative farmers from around East Africa (http://ccafs.cgiar.org/blog/celebrating-creative-and-innovative-farmers-around-east-africa#.UooL8-K2X7A)
Supporting grass-roots efforts key to climate change adaptation(http://ccafs.cgiar.org/blog/supporting-grass-roots-efforts-key-climate-change-adaptation#.UooMoeK2X7A)
Pioneering peers inspire farmers in Kenya to get 'climate-proofed' (http://ccafs.cgiar.org/pioneering-peers-inspire-farmers-kenya-get-climate-proofed#.UooMyeK2X7A)
Villages can become climate-resilient. This is how! (http://ccafs.cgiar.org/villages-can-become-climate-resilient-how#.UooM8OK2X7A)
Beekeeping can help women farmers manage climate risks(http://ccafs.cgiar.org/beekeeping-can-help-women-farmers-manage-climate-risks#.UooNIuK2X7A)
Influencing policy through action research in Climate-Smart Villages(http://ccafs.cgiar.org/influencing-policy-through-action-research-climate-smart-villages#.UooNi-K2X7A)
From honey-making bees to fried termites: could insect science contribute to Africa's food security?(http://ccafs.cgiar.org/honey-making-bees-fried-termites-could-insect-science-contribute-africa%E2%80%99s-food-security#.UooOmeK2X7A)
"Farmers should use trees to cushion their farms from degradation"(http://ccafs.cgiar.org/blog/farmers-should-use-trees-cushion-their-farms-degradation#.UooPguK2X7A)
Empowering women farmers to feed the world(http://ccafs.cgiar.org/blog/empowering-women-farmers-feed-world#.UooPyeK2X7A)
With proper planning, farmers can thrive in a world of shifting climates (http://ccafs.cgiar.org/blog/proper-planning-farmers-can-thrive-world-shifting-climates#.UooQV-K2X7A)
Tackling climate change: Kenya holds first national adaptation planning meeting for agriculture(http://ccafs.cgiar.org/blog/tackling-climate-change-kenya-holds-first-national-adaptation-planning-meeting-agriculture#.UooQmuK2X7A)
Maps illustrating climate variability in various regions now available(http://ccafs.cgiar.org/blog/maps-illustrating-climate-variability-various-regions-now-available#.UooQxeK2X7A)
Agriculture in focus: climate change planning in Kenya (http://ccafs.cgiar.org/blog/agriculture-focus-climate-change-planning-kenya#.UooRKOK2X7A)
East African policy-makers learn from innovative climate change adaptation experiences(http://ccafs.cgiar.org/blog/east-african-policy-makers-learn-innovative-climate-change-adaptation-experiences#.UooRc-K2X7A)

Which way forward for climate-smart agriculture? (http://ccafs.cgiar.org/blog/which-way-forward-climate-smart-agriculture#.UooSCeK2X7A)
The time is now to engage youth in agriculture(http://ccafs.cgiar.org/blog/time-now-engage-youth-agriculture#.UooSLeK2X7A)
Defining a climate research agenda for development in Africa(http://ccafs.cgiar.org/blog/defining-climate-research-agenda-development-africa#.UujqcLTfqM9)
Climate scenarios and analogues: A glimpse into past, present and future climates (http://ccafs.cgiar.org/blog/climate-scenarios-and-analogues-glimpse-past-present-and-future-climates?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+CgiarClimateBlogs+%28CGIAR+Climate+blogs%29#.Uu9P6LT9w5Y)
Some of the blogs by partners include: Getting to grips with how farmers perceive climate variability and its impacts (http://ccafs.cgiar.org/blog/getting-grips-how-farmers-perceive-climate-variability-and-its-impacts#.Ut5gOLTfodU)
Searching for better bean varieties in Uganda(http://ccafs.cgiar.org/blog/searching-better-bean-varieties-uganda#.Ut5g57TfodU)
Smart Farming Yields Fruits in Nyando (http://ccafs.cgiar.org/blog/smart-farming-yields-fruit-nyando#.UujDzrTfqM9)

Websites:

The regional program provided content for the new CCAFS website launched in 2013 (See CCAFS EA page). Initiated discussions with Rockefeller foundation and Pamoja Media on the establishment a Regional Climate Change Learning Platform (CENA). This work begin in 2014.

Social media campaigns:

Promoted and supported a number of social media campaigns spearheaded by the coordinating unit and partners during key meetings and events such as the Africa Agriculture Science Week (FARA) and the Global Landscapes Forum, through the EA twitter account: https://twitter.com/cgiarclimate_EA. We successfully reached over 1000 followers, comprising of researchers, media, and government agencies among others.

Newsletters:

Increased communication and outreach in 2013 by launching the CCAFS East Africa Quarterly Newsletter - SmartAG Partner. Three issues were published and accompanied by a soft copy that was mailed to over 500 partners. The newsletter shares updates on research, policy initiatives, and field updates from the climate smart villages (CSVs). Online issues are found here: SmartAG Partner – Issue 1 - 3 2013, (http://us2.campaign-archive1.com/home/?u=08ae10c64755d59976763ea1f&id=1b4bc56e7e). After the first issue of the newsletter, regional partners expressed interest to contribute articles from ongoing or recently completed projects. The second and third issues included stories from CCAFS EA commissioned projects by different partners.

Events:

The regional program participated in major international and regional conferences and events, sharing CCAFS knowledge products and tools through exhibitions in collaboration with the CCAFS global communications and other CGIAR center communications teams in some cases. The CCAFS products shared included policy briefs, journal papers, working papers, conference proceedings, fliers and newsletters. These events also created a platform to reach out to new partners, where contacts were established with over 300 scientists with an interest on climate change and agriculture. The main conferences and workshops included:

• Agricultural Innovation Systems in Africa Workshop (AISA), Nairobi – May, 2013. CCAFS East Africa presented two posters on "Farms of the future": an innovative approach for strengthening adaptive capacity and Seasonal weather forecasting: integration of indigenous and scientific knowledge in Lushoto, Tanzania.

• Africa Agriculture Science Week (AASW6), Ghana – July, 2013. CCAFS East Africa shared a video on beekeeping and contributed three blogs on the conference theme of "Africa feeding Africa" - Beekeeping can help women farmers manage climate risks, From honey-making bees to fried termites: could insect science contribute to Africa's food security?. The third blog was based on an interview by one of our scientists: Villages can become climate-resilient. This is how! The regional program had an exhibition which enabled networking, information and knowledge exchange on agricultural innovations and on topical issues with a bearing on agriculture research, policies and development.

• The National Adaptation Planning for Agriculture in Kenya and in September, 2013 in Naivasha. The meeting was organized together with the Ministry of Environment, Water and Natural Resources (MEWNR)and the Ministry of Agriculture, Livestock and Fisheries (MoALF).

• Africa Climate Conference 2013, in Arusha, Tanzania, October, 2013. The Regional Program Leader highlighted the role of CCAFS research in addressing African development priorities.

• Climate Change and Development in Africa (CCDA-III, Ethiopia – October, 2013. This an annual event organized by the African Climate Policy Centre (ACPC). In 2013, CCAFS, ILRI and IWMI set up a CGIAR Booth to share research outputs and publications.

• A visit to Nyando CSVs by the Chair of the CGIAR Fund Council and World Bank Vice President and Special Envoy for Climate Change, Rachel Kyte, to learn about the ongoing work. Subsequently, Rachel shared about the Nyando CSV during the Global Landscapes Forum at the 2013 UNFCCC Conference of Party (CoP 19) meetings.

• During the Global Landscapes Forum (GLF) in Poland in November 2013, CCAFS EA through the Kenya MEWNR shared their experiences on National adaptation plans: Opportunities for cross-sector synergies in the nexus between water, food security, forests and energy? And experiences on implementing the NCAAP priority actions for agriculture - a process supported by the regional program.

• Prior to COP 19 in Poland, the regional program held a meeting with some members of the African Group of Negotiators (AGN), where reviewers and experts provided critical inputs to shape the technical papers being developed on highlighting the links between agriculture and climate change in Africa. During COP 19, the regional partners also participated in the CCAFS UNFCCC side event: "Agriculture in National Adaptation Plans: Experiences and Lessons Learned".

• A farmer learning event in the Nyando CSV in June, 2013. More than 1000 farmers had the opportunity to learn about new farming practices, happening in real time from their peers and champion farmers. During this event, key messages were prepared of what farmers would learn at each of the visited farm. These were

summarized on banners. Photos were taken and they are available for use in CCAFS publications at: www.flickr.com/photos/cgiarclimate/sets/72157634585146839/

Videos and other multimedia:

Regular documentation of CCAFS EA research work undertaken through short videos and photo stories. Several photos were uploaded onto Flickr for use by CCAFS and other CGIAR centers and programs under the creative commons license. Some of our videos in 2013 include:

- Kenyan farmers battle hunger with chicken, goats and bees (http://ccafs.cgiar.org/blog/empowering#.UooLFOK2X7A)
- Beekeeping in Lower Nyando – Kenya(http://www.youtube.com/watch?v=PbLyZV0l16E&list=PLD632736EE276E119)
- Agroforestry – Lower Nyando (http://www.youtube.com/watch?v=a-tKhowsbns&list=PLD632736EE276E119)
- Flood stricken Nyando residents embrace smart villages – KBC(http://www.youtube.com/watch?v=MyixWEMG3ig&list=PLD632736EE276E119)
- Climate Change Effects: Interview with James Kinyangi –KTN (http://www.youtube.com/watch?v=GS-ograxJ5A&list=TLNYUa8kRXOIHvEMP2-wPLByDuOWHFoXzM)
- Huge pressure ahead of Kenyan productive resources – CNBC(http://www.cnbcafrica.com/video/?bctid=2680899977001)Other short videos from the Nyando CSV will be completed in the first quarter of 2014.

Other communications and outreach:

- Regional fliers - East Africa version was updated and printed.
- Printing and distribution of CCAFS branded bags for COP19 events
- Sharing of regional presentations via slideshare

5. Case studies

Case Study #1

Title: Communicating and documenting CCAFS work in East Africa
Author: Vivian Atakos, Maren Radeny, Catherine Mungai and Solomon Kilungu
Type: Successful communications

Project description:

The regional program significantly increased communication and outreach in 2013, to share widely CCAFS products, tools, policy engagement and field updates through multiple strategies: blogs, media campaigns, exhibitions and newsletter. Partners were actively involved in contributing and co-producing blog stories of CCAFS commissioned work. The regional program participated in and mounted exhibitions at major international and regional conferences and events to share CCAFS knowledge products and tools, in some cases in collaboration with the CCAFS global communications and other CGIAR centers. Some of the key conferences included the Africa Agriculture Science Week (AASW6) in Ghana, Africa Climate Conference in Tanzania, Climate Change and Development in Africa (CCDA-III) in Ethiopia, and the Agricultural Innovation Systems in Africa Workshop (AISA) in Kenya. CCAFS products shared included policy briefs, journal papers, working papers, conference proceedings, fliers and newsletters. These events also created a platform to reach out to new partners and news contacts. A series of media campaigns were initiated, starting with a visit to the Nyando Climate Smart Villages by eight local and international journalists to showcase ongoing work and share valuable lessons on a number of climate change adaptation and mitigation interventions. These included livelihood diversification interventions—beekeeping, improved small livestock production (goats, sheep and poultry) and crop diversification with improved agronomic practices; mitigation interventions—agro-forestry, land and water management. These activities generated significant media coverage by the local and international press. To stimulate interest on climate change and agriculture in Kenya, the media visit was organized prior to the National Adaptation Planning for the Agriculture Sector in Kenya and the launch of the Kenyan chapter of the IFPRI monologue on East Africa Agriculture and Climate Change.—. A quarterly CCAFS East Africa Newsletter—SmartAG Partner—was launched. Three issues were published and accompanied by a soft copy that was mailed to over 500 partners in 2013. The newsletter shares updates on research, policy initiatives, and field updates from the climate smart villages (see the online link below). The first issue of the newsletter generated a lot of interest from the regional partners who wanted to contribute articles from ongoing or recently completed projects. As a result, the second and third issues included stories from CCAFS EA commissioned projects by different partners working at CCAFS sites in East Africa.“Thanks for the effort, let us keep up this communication in 2014” Judith Akolo, Environment Journalist – Kenya Broadcasting Corporation. “I wish to inform you that at CIP we are planning a second potato yield gap analysis workshop to take place on the 14th – 18th October 2013 in Addis Ababa. Would it be possible to announce this event in the CCAFS East Africa Regional Program Quarterly Newsletter” Harahagazwe, Dieudonne (CIP-SSA)“I will be happy to contribute an article to the SmartAG Partner in the near future to share updates from ongoing work on Greenhouse Gas emissions” Butterbach-Bahl, Klaus -

ILRI ScientistRegular documentation of CCAFS EA research work was undertaken through short videos and photo stories. Several photos were uploaded onto Flickr for use by CCAFS and other CGIAR centers and programs under the creative commons license. In addition, the regional program promoted and supported a number of social media campaigns spearheaded by the coordinating unit and partners during key meetings and events such as the Africa Agriculture Science Week (FARA) and the Global Landscapes Forum, through the EA twitter account: https://twitter.com/cgiarclimate_EA. We successfully reached over 1000 followers, comprising of researchers, media, and government agencies among others.

Introduction / objectives:

In 2013, the regional program sought to raise awareness among policymakers and farmers of climate change impacts and support research in long term adaptation, risk management and . In order to achieve this, it was vital to strengthen the program's communication. A communication and knowledge sharing strategy was developed. A number of communication and knowledge sharing strategies were identified and used. These strategies were aimed at:Strengthening partnerships through information and knowledge exchanges; Enhancing the profile of the regional program as a leader in the dialogue and research informed actions related to climate change, agriculture and food security in East Africa; Accelerate uptake of knowledge and scientific evidence on climate change, its impacts and mitigation and resilience measures at different scales; andIncrease linkages between climate change research and policy actions.

Project results:

Over 30 blog stories were published, many of them co-produced with partners highlighting ongoing and completed field activities, science and policy news. A total of six short videos were also published, including photo stories as well as 38 media stories (see link to sources of information below). Following the media visit to Nyando CSV, a number of media items both print and broadcast were published. The media visit provided an opportunity for the regional program to introduce CCAFS to local and regional media as a reliable source of information on climate change, agriculture and food security in East Africa."These are great initiatives that touch on the lives of local people. From this visit, I will file several stories" Agatha Ngotho – Journalist, the Star NewspaperA blog summarizing the media campaigns is available at: (http://ccafs.cgiar.org/blog/agriculture-focus-climate-change-planning-kenya#.UvCmh7SSVbV). As a result of the media engagement activities, the regional program's work was highlighted in over 40 local and international media. We summarize some of the key highlights below: The Kenya Broadcasting Corporation aired a news clip on Flood stricken Nyando residents embrace smart villages. All Africa published a photo essay on combating climate change in Kenya with images from our media site visit, illustrating the activities taking place in Nyando that will hopefully boost the ability of farmers in the area adapt to climate change. From the Xinhua News Agency, the Coast Week reported that scientists set up gas measurement sites in Kenyan villages. Klaus Butterbach-Bahl with the International Livestock Research Institute (ILRI) explained how the aim is to inform policy on GHG emissions as well as build local capacity to handle the problem. The Star also carried a story on New centre to monitor greenhouse emissions. The Coast Week story on Community approach to farming yields fruit highlighted the diverse interventions being tested in Nyando and achievements. According to John Recha, from CCAFS East Africa, the problem witnessed in Nyando was due to lack of innovative ideas and use of traditional farming systems that no

longer work in these areas. But now as a result of research by CCAFS and partners, the farmers are already earning more money from keeping improved breeds of goats, sheep and chicken that withstand stress but mature faster, compared to indigenous breeds they have kept for the past three decades. The Coast week story on Varsities team up to avail farmer's latest climate change information explained a new initiative by CCAFS, Britain's Reading University's, Walker Institute for Climate System Research and Maseno university that will see farmers receive rainfall pattern information at the beginning of every planting season through their cell phones. The Star highlighted John Obuom, a farmer who is benefitting from the activities on his farm by practicing mixed farming. John keeps improved breeds of goats and sheep and grows diverse crops on his farm. He also practices agroforestry.Subsequently, the Regional Program Leader received over 10 media interview requests on climate change in East Africa. A major outcome of the media campaign was the visit in November, 2013 by the Chair of the CGIAR Fund Council and World Bank Vice President and Special Envoy for Climate Change, Rachel Kyte, to the Nyando CSV to learn about ongoing work. Rachel shared about the Nyando CSV during the Global Landscapes Forum at the 2013 UNFCCC Conference of Party (COP 19) meetings. "CCAFS's on-farm experimentation with emissions levels is providing data that will serve us all" Rachel Kyte"CCAFS researchers bring new technologies and expertise to the farm – improved livestock breeding, improved food crops, water management, fish harvesting, agroforestry, and farming systems, plus on-farm emissions tracking and data collection" Rachel Kyte

Partners:

ILRI, Maseno University, ICRISAT, CIAT-Uganda, KARI, Ministry of Agriculture, Livestock and Fisheries, Swedish Cooperative Centre's Vi Agroforestry, World Neighbours, ICRAF, CIFOR

Links/sources for further information:

Videos

• Kenyan farmers battle hunger with chicken, goats and bees (http://ccafs.cgiar.org/blog/empowering#.UooLFOK2X7A)

• Beekeeping in Lower Nyando – Kenya(http://www.youtube.com/watch?v=PbLyZV0l16E&list=PLD632736EE276E119)

• Agroforestry – Lower Nyando (http://www.youtube.com/watch?v=a-tKhowsbns&list=PLD632736EE276E119))

• Flood stricken Nyando residents embrace smart villages – KBC(http://www.youtube.com/watch?v=MyixWEMG3ig&list=PLD632736EE276E119)

Media interviews

• Climate Change Effects: Interview with James Kinyangi –KTN (http://www.youtube.com/watch?v=GS-ograxJ5A&list=TLNYUa8kRXOIHvEMP2-wPLByDuOWHFoXzM)

• Huge pressure ahead of Kenyan productive resources – CNBC(http://www.cnbcafrica.com/video/?bctid=2680899977001)

http://us2.campaign-rchive1.com/home/?u=08ae10c64755d59976763ea1f&id=1b4bc56e7e

Case Study #2

Title: Adaptation to progressive climate change and climate variability: A case study of common bean adaptability in Uganda

Author: Clare Mukankusi, Enid Katungi, Gabriel Luyima, Stanley Nkalubo, Bruno Awio, Maren Radeny and Catherine Mungai

Type: Participatory action research

Project description:

This study was initiated in 2012 and carried out in CCAFS sites of Hoima and Rakai in Uganda by CIAT-Uganda under the Pan Africa Bean Research Alliance (PABRA) in collaboration with National Agricultural Crop Research Institute (NaCRRI). The study was implemented in two phases, with nine farmer groups from Hoima and Rakai comprising of both men and women farmers. The first phase involved evaluation of four drought tolerant bean genotypes for one crop season. Participatory variety selection sessions were organized and over 300 farmers engaged in discussions to identify preferred traits and respective trade-offs. Using the results and lessons from the first phase, the number and diversity in the second phase was increased to 15 bean genotypes of varying market classes and traits, drought tolerance, disease resistance, micro nutrient rich, and local adaptation. Bean varieties evaluated in the second phase included six released bean varieties (one of which is a universal susceptible check), seven regional varieties, one local landrace and one variety grown by the farmers. Replicated trials were set up in the same villages among the two districts using a mother baby trial design. A total of nine mother trials and 45 baby trials were established. In addition, in 4 sub-counties within the two districts, rain gauges were set up at one of the host farmer's homesteads and farmers were trained on how to record the daily rainfall amounts. Others farmers staying far from the farmer hosting the rain gauge were requested to record the date and describe qualitatively the intensity of rainfall received in small exercise books. The monthly rainfall readings were obtained from the nearby meteorological stations.

Introduction / objectives:

Common beans (Phaseolus vulgaris L.) provide an inexpensive source of protein for both rural and urban households in East Africa. However, bean production is greatly affected by several environmental stresses—drought, excessive rain or flooding, heat, and cold temperatures as well as biotic constraints (field and post-harvest pests and diseases). CIAT through PABRA has been collaborating with the national Agricultural research systems (NARS) in Africa to adapt beans to the various environmental stresses, improved its productivity and nutritional quality. Through PABRA, over 400 improved genotypes—disease resistant, drought tolerant, low soil fertility tolerant, and high yielding—have been developed and released. In Uganda, common bean is widely grown and is sensitive to climate change and variability. The study aimed at contributing to adaptation to immediate climate change related stress by building on farmers' functional coping strategies. Specifically, the

study tested and adapted farmer-acceptable improved multiple stress tolerant bean genotypes through a participatory approach in CCAFS sites of Hoima and Rakai in Uganda. These sites are characterised by significant weather variability, highly degraded landscapes, decreasing soil fertility and increasing soil erosion.

Project results:

The trails were hosted by already existing farmer groups identified through the CCAFS baseline survey. A total of 320 individual farmers participated in the trial evaluations of which 56% were female farmers. Two hundred (60% female) consistently participated through-out the two phases. Performance of the different genotypes were assessed based on a number of parameters that included days to 50% flowering, days to maturity, plant height, number of pods per plant, disease incidence and severity and yield. The results show the importance of diversity in adaption to climate change. There were significant differences in the agronomic performance, diseases resistance and yield of the 15 genotypes over the different environments. In particular, all the 15 varieties had at least one characteristic that attracted some farmers with varying levels of preference. Individual based interviews with farmers participating in the baby trials show that yield, marketability and early maturity were the key attributes in high demand. Other important traits included drought tolerance, taste, cooking and uniformity in maturity. The “test varieties” significantly outperformed the local varieties. Climatic, edaphic and crop management differences were high within very small physical areas. Soil analysis revealed that the soils in most of the sites were sandy clay loam soil, or clay loam to loamy soils and sandy clay soil. Phosphorous levels in all the sites was below the critical levels while, nitrogen levels in most of the sites was sufficient. Findings also indicate that diversified cropping systems do stand a better chance in the face of changing climate as there is buffering effect when there is failure of a component of the system. The study also highlighted the ability, capacity and willingness of farmers to adopt and adapt new technologies in the face of varying climate scenarios. Site and context specific recommendations rather than blanket variety and management recommendations to cover large physical areas is the best option especially in the view of climate and soil variability being observed.

Partners:

National Agricultural Crop Research Resources Institute (NaCRRI)International Centre for Tropical Agriculture (CIAT) - Pan Africa Bean Research Alliance (PABRA)

Links/sources for further information:

Blog - Searching for better bean varieties in Uganda - http://ccafs.cgiar.org/blog/searching-better-bean-varieties-uganda#.UvyQwvmSz_E

Case Study #3

Title: Informing agricultural development agenda at national, regional and international levels through strategic partnerships

Author: Catherine Mungai, Mary Nyasimi, Tabitha Muchaba, Maren Radeny

Type: Innovative non-research partnerships,Capacity enhancement,Policy engagement

Project description:

In 2013 the regional program continued to work with partners at national and regional levels to support the integration of agriculture into national and international climate change policy discussions. Since the fifteenth Conference of the Parties (COP 15) in Copenhagen, international negotiations on agriculture and climate change under the United Nations Framework Convention on Climate Change (UNFCCC) have gained momentum judging by the number of high level dialogues and side events during the subsequent COPs and inter-sessional meetings. Given the importance of agriculture in Africa, Africa needs to lead in the agriculture negotiations. Therefore, agricultural scientists and experts in Africa met in Arusha, Tanzania in February 2013 to review progress made in agriculture negotiations under the UNFCCC and identified the critical need to provide evidence to support a common African position. The Chair of the African Group of Negotiators (AGN) requested CCAFS East Africa, the Common Market for Eastern and Southern Africa (COMESA) and the African Climate Policy Centre (ACPC) of the United Nations Economic Commission for Africa (UNECA) to support the preparation of Technical and Position Papers on Agriculture and Climate Change in Africa—"Agriculture and Climate Change: Challenges and Opportunities in Africa." The papers will guide the AGN in the on-going SBSTA and UNFCCC discussions on agriculture. A team of experts was constituted to work on the papers and will ensure that priority issues for Africa are safeguarded: ensuring food security; achievement of sustainable development, agriculture and livelihood; eradication of poverty; and job creation.To inform policy process at regional level, CCAFS also commissioned an assessment of the status of National Adaptation Plans of Action (NAPAs) in Ethiopia, Tanzania and Uganda and the National Adaptation Plan (NAP) in Kenya. Evaluation of both NAPAs and NAPs is necessary to identify progress made, challenges and possible opportunities that countries in East Africa need to take into consideration in going forward. The review focused on assessment of vulnerability to current climate variability and of areas where risks would increase due to climate change, key adaptation measures identified in both NAPAs and NAPs as well as criteria used for prioritizing them, institutional arrangements and socially differentiated adaptation planning approaches applied, and prioritized list of activities including profiles of projects/activities intended to address urgent and immediate adaptation needs. This information was critical to inform the ongoing NAP process in Kenya. The Government of Kenya (GoK) has made concrete steps towards tackling climate change. The government has developed a National Climate Change Response Strategy (NCCRS) launched in 2010. NCCRS outlines various measures to address climate change and climate variability in Kenya. Subsequently, a comprehensive National Climate Change Action Plan (NCCAP) 2013-2017 to implement the NCCRS was launched in February 2013. From June 2013, CCAFS EA, the Ministry of Environment, Water and Natural Resources (MEWNR) and the Ministry of Agriculture, Livestock and Fisheries (MoALF) have brought together various stakeholders from government, national and international research institutions, public benefit organizations (NGOs), civil society organizations (CSOs), farmer organizations and private sector to discuss and develop priority actions for the agricultural sector, including sector specific areas of investments drawing upon the NCCAP.

Introduction / objectives:

Working with regional and national partners, CCAFS EA has made significant progress in integrating agriculture and climate change issues at national, regional, international levels. At regional and international level, CCAFS EA is working with COMESA and ACPC to build the capacity of the African Group of Negotiators to gather evidence to support ongoing SBSTA work and UNFCCC negotiations on agriculture. In Kenya, the regional program is working with MEWNR and MoALF to coordinate the efforts of other stakeholders to move forward the implementation of the adaptation and mitigation actions in agriculture identified within the National Climate Change Action Plan (NCCAP) 2013–2017.

Project results:

To support the AGN, a multidisciplinary team of African experts in agriculture and climate change from the five sub-regions of Africa was constituted: Southern, Eastern, Central, Western and Northern Africa. The first meeting of the experts was hosted by ACPC in May 2013, in Addis Ababa, where the teams agreed on the conceptual framework of the technical paper, roles and responsibilities and developed a road map. Between May and December 2013, three writing sessions supported by CCAFS were held for the experts in Swaziland, Kenya and Ethiopia. To strengthen the technical and position papers, CCAFS facilitated a half-day side meeting in October in Warsaw, Poland during COP 19. The meeting brought together the authors of the different chapters, reviewers and a panel of experts. The reviewers and experts provided critical inputs to shape the chapters, and ensure that important information is not overlooked as well as discuss what the various audiences will be expecting from the papers. The authors have been working on the seven chapters: • State of Africa's agriculture;• Vulnerabilities of African agriculture under a changing climate; • Impacts and adaptation strategies for a climate resilient agriculture; • Opportunities for adaptation co-benefits in agriculture;• Enabling framework to support agricultural adaptation to climate;• Agriculture issues under the UNFCCC process; and• Successful 10 case studies on agricultural adaptation to climate change in Africa.In Kenya, the regional program in collaboration with MEWNR and MoALF successfully hosted the National Adaptation Planning for the Agriculture Sector meeting in September 2013. The meeting aimed at building consensus on the priority actions for agriculture sector proposed in the NCCAP 2013–2017. The meeting brought together 47 stakeholders in agriculture and climate change from government, international and national research institutions, donors, academia, private sector representatives, public benefit organizations, CSOs and the media to consider how Kenya should proactively deal with food production challenges and opportunities presented by climate change. The NAP meeting was a culmination of six roundtable discussions during which four thematic working groups on climate smart agriculture technologies and practices; finance and investments; knowledge and capacity building; and policies and legal frameworks identified priority actions for creating an enabling environment for CSA in Kenya. Several priority actions for climate smart agriculture related to improved water management were identified, including water harvesting, storage and efficient use for agricultural production. Actions were also proposed to support agro-forestry and sustainable land management as well as adoption of improved livestock and fisheries technologies. Some of the proposed CSA priority actions are already being piloted at the Nyando CCAFS site on a smaller scale. The key recommendation from the NAP event was formation of a consortium to generate specific activities (short, medium or long term) in targeted

areas, timelines and budgets, based on the priority actions presented in the forum. Activities in 2014 will focus on defining the investments, resource mobilization and reaching out to the county governments.

Partners:

Common Market for East and Central Africa (COMESA), Africa Climate Policy Centre (ACPC), ILRI, CIFOR, Ministry of Environment, Water and Natural Resources (MEWNR) and Ministry of Agriculture, Livestock and Fisheries (MoALF), The National Treasury, Univers

Links/sources for further information:

Africa Portal Backgrounder No. 64 - African Group of Negotiators: http://www.africaportal.org/articles/2013/08/22/evolution-african-group-negotiators-unfccc

CCAFS report 10 on "Planning climate adaptation in agriculture: Meta-synthesis of national adaptation plans in West and East Africa and South Asia - http://ccafs.cgiar.org/publications/planning-climate-adaptation-agriculture#.UuektrTfqM8

National Climate Change Action Plan: http://cdkn.org/wp-content/uploads/2012/12/Kenya-Climate-Change-Action-Plan_Executive-Summary.pdf

Kenya Climate Change Action Plan - http://www.kccap.info/

National Climate Change Response Strategy (NCCRS) - http://www.environment.go.ke/wp-content/documents/complete nccrs executive brief.pdf

Op-ed - Africa roots for agriculture in global climate change talks - http://ccafs.cgiar.org/news/media-centre/in-the-news/africa-roots-agriculture-global-climate-change-talks-star-kenya#.UvntRbT9w5a

Blogs Climate action in Kenya: New national plan launched - http://ccafs.cgiar.org/blog/Action-climate-Kenya-New-plan-launched%2520#.UooKIeK2X7A

Push for agriculture within climate discussions in East Africa continues - http://ccafs.cgiar.org/blog/climate-dicussions-east-africa-pushing-agriculture#.UooKdOK2X7A

Tackling climate change: Kenya holds first national adaptation planning meeting for agriculture - http://ccafs.cgiar.org/blog/tackling-climate-change-kenya-holds-first-national-adaptation-planning-meeting-agriculture#.UooQmuK2X7A

Agriculture in focus: climate change planning in Kenya - http://ccafs.cgiar.org/blog/agriculture-focus-climate-change-planning-kenya#.UooRKOK2X7A

Africans put agriculture in climate focus - http://ccafs.cgiar.org/africans-put-agriculture-climate-focus#.Uvnt6bT9w5a

6. Outcomes

Outcomes #1

Title:

Taking Forward the Implementation of the Agricultural Priority Actions in the Kenya National Climate Change Action Plan (NCCAP) 2013 – 2017

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

In Kenya, we supported the government through the Ministry of Environment, Water and Mineral Resources (MEWNR) and Ministry of Agriculture, Livestock and Fisheries (MoALF) to develop and implement the National Climate Change Action Plan (NCCAP) 2013 - 2017. As a result of the support, a national vision for Climate Smart Agriculture (CSA) in Kenya has been defined which focuses on 3 pillars; food security, resilience of farming systems and mitigation of GHG emissions intensity. The vision is aligned with the Kenya government Medium Term 2 development and plan and ensures that CSA responds to Vision 2030, Kenya's economic blue print. From a portfolio of several options highlighted in the NCCAP, CCAFS facilitated a participatory process that led to the identification of criteria, arriving at 4 key investment areas for agricultural adaptation and mitigation that have potential for large scale implementation in Kenya. The key areas are: 1. Improving crop and livestock breeding and management strategies to enhance resilience and mitigate emissions intensity, taking advantage of resilience traits in indigenous crops and breeds2. Increasing utilization and protection of the arid and semi-arid lands to increase productivity through water harvesting and agroforestry land use3. Strengthening delivery of climate informed services linked to micro-credit, index-based insurance products; as a bundle to increase uptake in agriculture,4. Creating public-private platforms to promote agricultural value chains for important commodity crops in Kenya with focus on water efficient cereal crops and drought resilient crop seeds.Some of the proposed CSA priority actions are already being integrated at CCAFS sites in Kenya on a smaller scale; including improved crop varieties such as pigeon peas with ICRISAT, cassava and bananas with IITA, agroforestry and land management with ICRAF, and improved Red Maasai sheep with ILRI. With MoALF and MEWNR, CCAFS has been supporting the identification of possible investments to support the implementation of the NCCAP. A key output of the consultative process was the national adaptation planning workshop held in September. The key recommendation from the national adaptation planning meeting was formation of a consortium to generate specific investments in targeted areas, timelines and budgets, based on the agreed priorities and present these to the government of Kenya.

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

In 2011, a national priority setting workshop which identified the needs for research in Kenya in the climate change and agriculture sector, in 2012, a regional science workshop where specific research areas for the region were identified. Participation in the NCCAP development process where the RPL gave input into the Thematic Working Group 3 which focused adaptation; in 2013, 6 consultative roundtable sessions and National Adaptation Planning Event held in Naivasha.

What partners helped in producing the outcome?

The consultations were facilitated and supported by MEWNR and MoALF who provided the background on the national food security situation and appraisal of ongoing programmes in the climate change and food security sectors as well as elaborating the national climate change action plan, CGIAR centers such as ILRI, CIFOR, ICRAF promoted exchange of knowledge on potential crop and livestock technologies in the arid and semi-arid regions of Kenya, The National Treasury guided discussions for mainstreaming the investments into the current MTP 2 development plan, University of Nairobi - Institute for Climate Change & Adaptation (ICCA) steered the thematic working group which identified the knowledge and capacity building elements as well as enabling frameworks , Kenya Agricultural Research Institute (KARI) collaborated with MoALF to guide discussions on identifying CSA technologies and practices and The Kenya Institute for Public Policy Research and Analysis (KIPPRA) spearheaded the identification of a suitable policy and legal framework for CSA implementation.

Who used the output?

MEWNR, MoALF, DFID and MEDIA

How was the output used?

Following discussions, DFID expressed interest to support the implementation and requested a concept highlighting the key investment areas. “This is to express DFID support for such a Consortium approach which can take forward the CCAFS pilot work and bring synergy to the technical expertise of these organisations in order to deliver vital climate change results and reduce the vulnerability of communities in Kenya”. Dr Virinder Sharma the Climate Change Adviser of DFID Kenya & SomaliaDFID also requested that CCAFS takes the lead in setting up a consortium of partners to guide the NCCAP implementation process in the agriculture sector in Kenya. “I would request ILRI under CCAFS to take the lead, set up a Consortium of key agencies in Kenya (ILRI, ICRAF, CIFOR, UNEP and MoA/KARI etc.) and share a short 2 page concept note on Climate Change integration in the Agriculture sector comprising of the following: Prioritised list of actions at policy, programmatic and farmer/community level; People specific results to be delivered in the next 1-2 years; Funds/Technical support coming from various agencies; and Gap and funds required”. Dr Virinder Sharma the Climate Change Adviser of DFID Kenya & SomaliaThe MoALF Climate Change Unit requested for support to organize a National Climate Change Sensitization Conference for Agriculture and Food Security Sector. Discussions were initiated with MoALF and the Office of the Deputy President, recognizing that food security policies in Kenya still do not reflect the risks posed by climate variability.“It is true that our policy makers are not keen to address issues that will shape the food security and build resilience to communities most likely to be adversely affected by aspects of climate change.” Dr. James Karanja Nyoro, the Senior Food Security and Climate Change Advisor to the Presidency based at the Office of Deputy PresidentThe Media publicized the National Adaptation Planning event for Agriculture widely – for example, CNBC Africa potentially reaching audiences in 41 African countries broadcast a live interview with the RPL on the huge pressure ahead of Kenyan productive resources. The blog: Agriculture in focus: climate change planning in Kenya on the CCAFS website http://ccafs.cgiar.org/blog/agriculture-focus-climate-change-planning-kenya#.Uv9zWrT9w5a gives a summary of the media reports following the event..

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? Please provide a reference or source.

Four thematic working groups were created: i) Climate Smart Agriculture (CSA) to identify technologies and practices, ii) Finance and investments, iii) Knowledge and capacity building, and iv) Policies and legal frameworks which identified the priority actions in the agriculture sector and the enabling frameworks. These working groups are coordinating by CCAFSRelated reports and blogs:National Climate Change Action Plan: http://cdkn.org/wp-content/uploads/2012/12/Kenya-Climate-Change-Action-Plan_Executive-Summary.pdfClimate action in Kenya: New national plan launched - http://ccafs.cgiar.org/blog/Action-climate-Kenya-New-plan-launched%2520#.UooKIeK2X7ATackling climate change: Kenya holds first national adaptation planning meeting for agriculture - http://ccafs.cgiar.org/blog/tackling-climate-change-kenya-holds-first-national-adaptation-planning-meeting-agriculture#.UooQmuK2X7A

7. Outcome indicators

Outcome indicator #1

Outcome indicator:

Integrated adaptation strategies for agricultural and food systems inserted into policy and institutional frameworks at regional, national or sub---national level in 2 target regions. Policy makers and key stakeholders use CCAFS research outputs - guidelines, tools and methods--- to support the development of NAPAS, sector specific adaptation plans, or germplasm benefit sharing policies.

Achievements:

A review of the status of NAPAs in Ethiopia, Tanzania and Uganda and NAP in Kenya completed and findings of the review used as input to CCAFS report 10 on "Planning climate adaptation in agriculture: Meta-synthesis of national adaptation plans in West and East Africa and South Asia." Participation in the Kenya National Climate Change Action Plan development process where the RPL gave input into the Thematic Working Group 3 which focused adaptation. Supported the MEWNR and MoALF to identify priority actions in the NCCAP for implementation in the agricultural sector.

Evidence:

CCAFS Report

10 - http://ccafs.cgiar.org/publications/planning-climate-adaptation-agriculture#.Uv98ZrT9w5Y

National Climate Change Action Plan: http://cdkn.org/wp-content/uploads/2012/12/Kenya-Climate-Change-Action-Plan_Executive-Summary.pdf

Climate action in Kenya: New national plan launched - http://ccafs.cgiar.org/blog/Action-climate-Kenya-New-plan-launched%2520#.UooKIeK2X7A

Tackling climate change: Kenya holds first national adaptation planning meeting for agriculture - http://ccafs.cgiar.org/blog/tackling-climate-change-kenya-holds-first-national-adaptation-planning-meeting-agriculture#.UooQmuK2X7A

Agriculture in focus: climate change planning in Kenya - http://ccafs.cgiar.org/blog/agriculture-focus-climate-change-planning-kenya#.UooRKOK2X7A

Outcome indicator #2

Outcome indicator:

Agriculture mainstreamed into the global climate change policies, and major international food security initiatives fully incorporate climate change concerns

Achievements:

Collaborated with the Common Market for Eastern and Southern Africa (COMESA) and the African Climate Policy Centre (ACPC) of the United Nations Economic Commission for Africa (UNECA) to support the preparation of Technical and Position Papers on Agriculture and Climate Change in Africa—"Agriculture and Climate Change: Challenges and Opportunities in Africa." The papers will guide the AGN in the on-going SBSTA and UNFCCC discussions on agriculture. A team of experts was constituted to work on the papers.

Evidence:

Op-ed - Africa roots for agriculture in global climate change talks –

http://ccafs.cgiar.org/news/media-centre/in-the-news/africa-roots-agriculture-global-climate-change-talks-star-kenya#.UvntRbT9w5a

Africans put agriculture in climate focus

http://ccafs.cgiar.org/africans-put-agriculture-climate-focus#.Uvnt6bT9w5a

8. Leveraged funds

Leveraged fund #1

Title:

Regional Learning Knowledge Platform in Africa

Partner name: Rockefeller Foundation and Pamoja Media

Budget: $50000

Theme: T4

Leveraged fund #2

Title:

Post Doha and Pre-Warsaw dialogues with policy makers in Eastern and Southern Africa

Partner name: COMESA

Budget: $50000

Theme: T4

Leveraged fund #3

Title:

Post Doha and Pre-Warsaw dialogues with policy makers in Eastern and Southern Africa

Partner name: ACPC

Budget: $170000

Theme: T4

Leveraged fund #4

Title:

Improved delivery of climate services for Tanzania and Malawi

Partner name: Norway funds

Budget: $883000

Theme: T2

9. Synthesis report

Provide a synthesis of research activities at CCAFS sites

Building on the research activities initiated in 2012, significant progress has been made in 2013, linking with the climate-smart villages (CSVs). Working with national agricultural research and extension services (NARES), national meteorological services, government departments, CGIAR centers and NGOs, and community based organizations various integrated cropping technologies and practices for adaptation to climate change and variability, including mitigation interventions were evaluated in climate smart villages across East Africa. As part of a larger project on mapping risks and opportunities for targeting appropriate crop and livestock adaptation strategies in East Africa, CIMMYT partially completed a review of the risks, opportunities and coping strategies related to agriculture and climate change in East Africa (Kenya, Uganda, Tanzania, and Ethiopia). Key climate risks identified across the CCAFS sites in East Africa included increased frequency of droughts, decrease in rainfall amount and erratic rainfall. In Hoima and Rakai, CIAT-Uganda under the Pan African Bean Research Alliance (PABRA) in collaboration with National Agricultural Crop Research Institute (NaCRRI) evaluated 15 bean genotypes over three seasons through a participatory process with farmer groups: March-July 2012 season, March-July 2013 season, and August-December 2013 season. Results of the evaluations showed highly significant differences in the agronomic performance, diseases resistance and yield among the 15 genotypes over the different environments. Marketability (based on seed size and colour), yield and adaptability were major drivers for farmer selection. Also, Bulindi ZARDI is working with 40 farmers to evaluate two cassava varieties which are resistant to mosaic virus, and two sweet potato varieties. In Lushoto, SARI evaluated maize, beans and root crops for yield, disease resistance, pest and water stress tolerance. A total of 77 farmers from four villages participated in evaluating three varieties of sweet potatoes, 152 farmers participated in the evaluation of two varieties of cassava, while another 96 farmers evaluated two varieties of Irish potato. Two hundred farmers evaluated two water stress tolerant bean varieties, while the evaluation of two maize varieties is still ongoing. In Nyando, KARI is working with farmers to evaluate improved varieties of sorghum, pigeon peas, and sweet potatoes. Additional livelihood diversification interventions evaluated include beekeeping, improved small livestock production and crop diversification with improved agronomic practices and supported by other partners—ILRI, World Neighbors and MoALF. In collaboration with the private sector a fish farming initiative was started to examine the potential of intensive fish farming. Three greenhouses have been set-up and planted with tomatoes. Other vegetables such as kales, cabbages, water melons, cowpeas, and fodder (Napier and Rhodes grass) are also being tested by the farmers outside the greenhouses, mainly through drip irrigation. Apart technologies and practices, other institutional innovations are also being piloted in Nyando. These include the Innovation Fund with three CBOs to support micro-financing for trialing agricultural innovations and increasing access to improved seeds and fertilizers. Agro-forestry and land and water management are among the mitigation interventions being evaluated in Nyando and Lushoto. Contour farming and terracing, composting and conservation agriculture activities have been initiated. Farmers and tree nursery management groups in Nyando have been trained on how to reduce soil and nutrient losses from crop land, increase carbon and tree cover on-farm. Farmers have planted various agro-forestry trees: Grevillea robusta, Casuarina species, Croton species, Markhamia lutea, and Gliricidia species. These interventions in Nyando are supported by VI-Agroforestry and ICRAF and are integrated with the livestock diversification and breed improvement, and beekeeping interventions, where agroforestry trees provide bee and livestock forage. Through collective action and pooling of financial resources 40 new water storage 'pans' have been built and 12 others rehabilitated by community members in Nynado. KARI is also supported 300 farmers to improve land management practices, incorporating 6,000 tissue culture bananas and 5,000 fruit trees. In Lushoto, soil fertility assessments by SARI were completed for 36 farms and 25,000 tree seedlings were planted on farm and three tree nurseries

established with technical support from Tanzania Forest Research Institute (TAFORI). In Hoima, Bulindi ZARDI is working with 70 farmers to evaluate different varieties of mangoes, pawpaw variety, and agroforestry cover crops (Calliandra carlothysus, Lueceana leucocephala and Mucuna). Water retention ditches and trenches have also been constructed. In Wote, ICRISAT completed an evaluation of integrated sorghum - legume technologies for enhancing resilience and improving food security and incomes. Crops and varieties evaluated included three sorghum varieties, cowpeas, green grams, maize and beans—developed by ICRISAT, CIMMYT and KARI and are tolerate soil moisture stress and pests, and are disease resistant. Seven different combinations of intercrops were evaluated with 120 farmers. In Borana, MARIL completed an assessment of the loss of livestock genetic resources in pastoral areas caused by climate change and other related socio-economic factors, including developing appropriate livestock genetic erosion indicators. To enhance climate services, three studies were commissioned in Ethiopia, Uganda and Tanzania. In collaboration with MARIL, different types of traditional abiotic and biotic indicators of climate forecasting among the Borana pastoralists were identified and documented. In Uganda, NARO and the Uganda Meteorological Department (UMD) focused on strengthening weather information flow networks for timely provision of location specific forecasts and advisories. Specifically, the aim is to develop a reliable scientific weather information network, promote integration of ITK and scientific weather forecasting and develop basic agro-advisories for farmers in Hoima and Rakai districts. In Lushoto, SUA and TMA focused on examining IK indicators, building capacity of weather forecast core team, and up-scaling the information dissemination system. Through consultative discussions with elders and IK custodians, identification and documentation of plant indicators commonly used by IK custodians has been completed. An SMS weather and information delivery system to farmers—FarmSMS—was launched in June 2013. ILRI, ICRAF and CIFOR are also working with scientists from the national research institutions and students from Uganda, Kenya and Tanzania to build their capacity on quantification of GHG emissions. While the project has a strong focus on capacity building, measurements of soil GHG emissions have been initiated at selected CCAFS sites in Kenya (Nyando, Wote), Uganda (Rakai) and Tanzania (Lushoto). GHG measurement equipment—a mobile lab was built—which can be operated at all field sites.

Provide a synthesis of cross-center activities

As part of the Standard Assessment of Mitigation Potential and Livelihoods in Smallholder Systems (SAMPLES) project, ILRI ICRAF and CIFOR are working together to enhance regional capacity for GHG measurements and inform mitigation interventions in East African agricultural systems. The project has a strong focus on capacity building and is partly supported by the regional program. Measurements of soil GHG emissions have been initiated at selected CCAFS sites in Kenya (Nyando, Wote), Uganda (Rakai) and Tanzania (Lushoto). GHG measurement equipment—a mobile lab was built—which can be operated at all field sites. Parameterization of soil GHG emissions for 36 plots across the landscape has already been completed in Nyando. Six MSc and PhD students were trained on GHG measurements from different universities in the region in June 2013. In addition, the project scientists— Mariana Rufino (CIFOR) and Klaus Butterbach-Bahl (ILRI)—contributed to the "Roundtable Discussions on Taking Forward Agricultural Priority Actions in the National Climate Change Action Plan of Kenya (KNCCAP) for the 2013-2017".CIAT-Uganda and CIMMYT are also working together on a CCAFS EA supported project on mapping risks and opportunities for targeting appropriate crop and livestock adaptation strategies in East Africa. CIMMYT is leading the socio-economic component and working with other national partners to review the risks, opportunities and coping strategies related to agriculture and climate change in East Africa (partially completed). The information will be used to determine risk profiles of rural districts in the 4 countries. CIAT-Uganda in collaboration with NaCRRI evaluated promising bean based technologies for enhancing farmer capacity over three seasons, where 15 bean genotypes with varying traits were successfully tested through a participatory approach with 320 farmers.

Provide a synthesis of regional engagement and communications activities

Engagement and communication activities in 2013 focused on strengthening national, regional and international policy and research processes. In partnership with MEWNR and MoALF, the regional program hosted the National Adaptation Planning for the Agriculture Sector in Kenya in September. The regional program partnered with CARE Adaptation Learning Programme in Africa (ALP) and PROCASUR to organize a Learning Route to expose policy makers from Uganda, Tanzania, Ethiopia and Kenya to ongoing climate change adaptation strategies in ASALs. Together with COMESA and ACPC, CCAFS EA continued to support the AGN in 2013, to prepare Technical and Position Papers on "Agriculture and Climate Change: Challenges and Opportunities in Africa" to guide the AGN in the on-going SBSTA discussions and UNFCCC negotiations on agriculture. Other initiatives included discussions with Rockefeller Foundation and Pamoja Media to transition the Climate Exchange Network for Africa (CENA) into a Regional Learning Knowledge Platform to facilitate knowledge sharing among network partners and other climate change adaptation and mitigation actors in Africa. The regional program hosted and participated in various workshops and major international and regional conferences and events, sharing CCAFS knowledge products and tools in collaboration with the CCAFS global communications team and other CGIAR centers. Outreach and knowledge sharing activities included a media visit to Nyando CSV to document climate smart practices, which resulted in media coverage in four TV programs and 11 articles in different national and international print media; and a visit by the World Bank Vice President and Special Envoy for Climate Change—Rachel Kyte to Nyando CSV. Major regional and international events, where the regional program was actively involved included:

• Africa Agriculture Science Week (AASW6) and FARA General Assembly Ghana (July, 2013), where the regional program had an exhibition, shared a video on beekeeping and contributed three blogs.

• Organized and participated in the International Workshop on Agricultural Innovation Systems in Africa (AISA) and the East African Farmer Innovation Fair (EAIF) in collaboration with the EU-funded project JOint Learning in Innovation Systems in African Agriculture (JOLISAA), the AusAID-funded project Food System Innovation for Food Security (FSIFS) and Prolinnova. CCAFS East Africa presented two posters on the Farms of the Future (FoTF) and seasonal weather forecasting.

• Contributed a case study on "Empowering a local community to address climate risks and food insecurity in Lower Nyando, Kenya" during the "Hunger – Nutrition – Climate Justice. A New Dialogue: Putting People at the Heart of Global Development" conference in Dublin, and moderated two of the Learning Cycles.

• Represented CCAFS program during the ASARECA CRP workshop in May 2013 to explore specific areas of collaboration with the ASARECA programs, as part of the Dublin process initiative that aims to deepen alignment and collaboration between Africa's agricultural research, extension and education programs and institutions.

• Shared on-going research and engagement activities with farmers in East Africa during the Eastern Africa Farmers Federation – Farmers Congress in Kigali, Rwanda. The Regional Program Leader highlighted the role of CCAFS research in addressing African development priorities during the Africa Climate Conference Arusha, Tanzania.

• Global Landscapes Forum (GLF) in Poland in November 2013, where CCAFS EA through the Kenya MEWNR shared their experiences on National adaptation plans: Opportunities for cross-sector synergies in the nexus between water, food security, forests and energy? And experiences on implementing the NCAAP priority actions

for agriculture—a process supported by the regional program. Regional partners also participated in the CCAFS UNFCCC side event: "Agriculture in National Adaptation Plans: Experiences and Lessons Learned", organized by Theme 1 with support from the regional programs.Other regional conferences included Africa Climate Conference Arusha, Tanzania and the Climate Change and Development in Africa (CCDA-III) conference in Addis Ababa, Ethiopia. Over 30 blogs were published on CCAFS website. A quarterly newsletter—SmartAG Partner—was launched and three issues published and soft copies mailed to over 500 partners. Other communication products included 38 media stories in local and international press. A regional Communication and Knowledge Management Strategy has been developed and documentation of CCAFS EA work undertaken through 6 short videos and photo stories.

Provide a synthesis of activities related to decision support systems and tools

In collaboration with CCAFS Theme 1, a national training workshop on using climate scenarios and analogues for designing adaptation strategies in agriculture was organized for Kenya, where 23 participants (30% of which were women) from different institutions—NGOs, universities, national meteorological service, and agricultural research institutes were trained. Four studies were commissioned in collaboration with ICRISAT, ILRI, Maseno University and East African Farmers Federation (EAFF). ICRISAT explored farmers' perceptions towards investments insoil and water conservation technologies under variable climatic conditions, quantified the risks and the benefits of investments in soil and water conservation technologies in two watersheds (Mwania and Makindu) in Eastern Kenya with 120 households. The crop simulation model APSIM was also calibrated and validated using data from trials conducted at Katumani and Kiboko research stations to evaluate the potential of reducing risk and to assess the benefits of using irrigation, water harvesting and terraces. Results indicate that farmers who were non-users of SWC technologies perceived high cost and input unavailability locally as the key constraints. The modeling results indicated that investing during above normal seasons is risky in all technologies but beneficial during normal seasons. Irrigation gives the highest returns during below normal seasons. Model simulations further indicate 73% and 61% yield gains in maize and beans production when 30kg N/ha fertilizer is applied. The study recommends development of strategies that will ensure reduction of prices of farm inputs and their availability to resource poor farmers to enhance investment in irrigation to ensure food security in semi-arid Eastern Kenya. ILRI focused on development of near real-time rainfall intensity observation system for Kenya. Maseno University is working with other partners in Nyando and focuses on building effective partnerships between rural communities, agricultural researchers, extension agents, meteorology services, agro-dealers and media to strengthen farmers' capacity to manage agricultural climate risks and adapt to climate change. Digitization and analysis of climate data with Kenya Meteorological Services at Kericho and Kisumu completed. A compilation of climate requirements of major crops in Nyando in collaboration with KARI-Kibos has also been completed. Results of the analysis have been used for training of the farmers. On participatory use of decision support tools for climate risk management, an analysis of available historical rainfall data has been initiated for Kisumu and Kericho Meteorological stations. Compilation of other datasets needed for crop modeling (temperature, radiation) based on existing historical data is on-going. Forty farms have been identified for participatory crop modeling and resource allocation maps have been done for these farms. In order to support the generation of information for climate risk assessment, Maseno University working with the Kenya Meteorological Service in Kisumu and Kericho counties produced a downscaled seasonal forecast for their respective counties in 2013 and the work will be expanded to counties. Thirty seven farmers were trained on the use of tailored climate information products in order to improve farm level decision making. The East African Farmers Federation (EAFF) conducted a comprehensive scoping exercise of climate science tools to assess their relevance and applicability in the East Africa (Ethiopia, Kenya, Tanzania and Uganda). Partners were trained in using the identified tools and farmers sensitized on their suitability and relevance to their farm

activities. FACT-FIT was piloted in Kenya and Uganda. The study concludes that FACT-FIT is a relevant tool to be used to downscale seasonal forecasts for locations in the region and EAFF is fully supportive of its up-scaling across the region through its members.