1. Activity Reporting.

Activity 448-2014

Managing climate related risks to improve livelihood resilience and adaptive capacity in agricultural ecosystems in Southern Mozambique

Status	Complete	Milestone	1.1.1 2015 (1)
Start date	2012 Sep	End date	2014 Dec

Description: Within the Government of Mozambique there is a strong interest in, and a growing commitment to climate change issues. At the national level, the government is leading efforts to raise the topic of climate change on the development agenda. Mozambique is particularly vulnerable to climate change due to its geographic location at the confluence of many international rivers flowing into the Indian Ocean; its land area that is below sea level; high vulnerability to cyclones and storms; high temperatures; aridity; infertile soils; lack of communications infrastructure; a high level of illiteracy; high population growth rate; absolute poverty and a high dependence on natural resources that require predictable rain.
In the next twenty years Mozambique is predicted to lose 25 per cent of its agricultural productive capacity. These changes will negatively affect crop yields resulting in price increases for basic staples, which can have a serious effect on health and increasing child malnutrition. Systems need to be put into place to manage the risks from such weather and climate variability. The ability to smooth gains and losses due to climate variability requires improved climate information and an institutional framework in which the public and private sector can act quickly and efficiently when provided reliable information.

Status: Complete. All the activities planned for 2014 were successfully carried out. They completed the last phase of this 2 years project, and led to the production of a Final Project report and a wide range of outputs, such as:

* (4) Final Reports on the household and village level baseline surveys for Chicualacuala and Xai-Xai districts to identify the risks and opportunities posed by climate change to the agricultural system and the effective strategies farmers are already using to enhance their adaptive capacity.
* (2) Biophysical characterization reports issued from the analysis of biophysical survey made in the two districts (soil, water, vegetation, ecology and land use) aiming to design adaptation platfomrs and recommendatins for the main types of land use.
* (1) A vulnerability analysis report focused on both study sites.
* (2) Reports on the Community assessment of needs and training in technologies
* (3) CCAFS InfoNotes : Information and Technology Transfer Needs of Agricultural Producers to cope with the Climate Changes; Problems Faced and Strategies Adopted by Farmers for Adapting to

Climate Change in Xai-Xai District, Gaza Province; Enhancing small scale farmers' competencies and self-confidence to manage climate related risks.
* Production of leaflets and brochures for the community.

During the project, several practices and technologies were identified and tested through on-farms trials with the involvement of farmers' communities in the following thematic areas:
- Crop production systems,
- Animal husbandry,
- post- harvest technologies and processing of agricultural products,
- Community forest management, and
- Communities capacity building and improving skills.

Capacity Building activities resulted in:
- 7 community training sessions carried out on agro-processing technologies.
- 2 training workshops were carried out - with the support from CIAT-CCAFS team- in the use of the Ecocrop model for vulnerability analysis.

Gender Component: Not defined

Objectives:

1. To enhanced livelihood resilience and adaptive capacity to climate change related risks in food insecure areas in Southern Mozambique.
2. To improve food security of rural families, in areas prone to the climate change impacts, by promoting the use of "climate-mart" technologies that encourage the balance between improved livelihoods and sustained biological and ecological integrity of the natural resources

Deliverables:

Description	Type	Year	Status	Justification
Final Report on Ecological studies	Peer-reviewed journal articles	2015	Incomplete	
Publication reporting tested practices and results	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	
National Policy Workshop Report and background material (production of publications and leaflets)	Workshop	2014	Cancelled	one-day workshop on climate change and agricultural research "Climate Smart Agriculture: Lessons learnt and recommendations", was planned to be held in Maputo (2014). This activity has been delayed since the experiences and lessons learned are not yet fully synthetized.
Synthesize of lessons learned from the implementing of this project and policy and research recommendations established to address the existing policies and strategies gaps concerning the climate change impacts, adaptation measures and capacity at national, province and district levels.	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	

Description	Type	Year	Status	Justification
Final Technical Project Report	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	
Data from the Baseline Surveys carried out at the three levels (household, village and organizational) in the two selected districts in Mozambique uploaded into DataVerse	Data	2014	Complete	
Biophysical characterization reports (Xai-Xai and Chicualacuala, Mozambique)	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	
Vulnerability analysis report (Xai-Xai, Chicualacuala, Moz)	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	

Description	Type	Year	Status	Justification
Reports : Community assessment of needs and training in technologies	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	
InfoNotes and Leaflets	Reference material (booklets and training manuals for extension agents, etc.)	2014	Complete	

Partners:

1- Instituto Nacional de Gestão de Calamidades (INGC):
Marta Manjate <mmanjate@ingc.gov.mz>

2- Ministry of Coordination of Environmental Affairs (MICOA):
Telma Manjate <telma.manjate12@gmail.com>

3- Universidade Eduardo Mondlane (UEM):
Luísa Santos <luisasantos47@gmail.com>

4- Polytechnic Institute of Gaza province (ISPG):
Pedro Comissal <comissal@hotmail.com>

5- Lower Limpopo Irrigation Scheme:
Armando Ussivane <aussivane@gmail.com>

6- Provincial Directorate for Agriculture of Gaza Province (DPA - Gaza Province):
Ernesto Paulino <ernestopaulino3@gmail.com>

Location(s):

Countries: Mozambique,

Activity 455-2014

A methodological development of an online tool for the identification of Target Population Environments: improving the predictions of agricultural production using crop models

Status	Complete	Milestone	1.2.1 2015 (1)
Start date	2012 Sep	End date	2014 Dec

Description: The expected increases in temperature and shifts in precipitation regimes are predicted to cause significant changes in crop productivity across the globe, through direct abiotic influence or through associated changes in pest and disease pressure. While significant adaptive capacity exists within agricultural and socio-economic systems, models suggest that the germplasm that currently underpins production is likely to be out-reached in some places by change. Hence, crop improvement through conventional breeding or through biotechnological innovations is hailed as a crucial strategy to ensure long-term maintenance or gain in agricultural productivity. Given the long lead-time between commencement of a breeding program and the release and large-scale adoption of new cultivars in farmer's fields, it is critical that breeding programs are initiated today to address future problems. It is therefore key that priorities are developed for crop improvement programs based on sound ex-ante analysis of future benefits, and that coherent strategies across multiple countries and between institutions are adopted and implemented. International and national donor and government policies should be coordinated in enabling the conception and implementation of these strategies.

Status: Complete. The project arrived to succesfull completion. 2014 activities led to:

Research ouputs such as:
• TPE methodology development & Case studies (Outline for WP in preparation)
• Brief Note: Strategies for upland rice & bean improvement
• Research papers:
- Alexandre Bryan Heinemann, Camilo Barrios Perez, Julian Ramirez-Villegas, David Arango Londoño, Osana
Bonilla-Findji, João Carlos Medeiros and Andy Jarvis. "Variation and impact of drought stress pattern across
upland rice target population of environments in Brazil" (Accepted- to be published shortly). Journal of
Experimental Botany.
- In PREP: Environment Groups For Upland Rice In Brazil: I-Drought Profile and Yield Trend.
- In PREP. The use of Oryza2000 model to planning adaptation strategies due to climate variability in Colombian
rice production areas.
- In PREP: Environments groups for dry beans in Goiás State, Brazil.
- In PREP: Paper on the future climate impact on bean and rice yields that includes additional

judgment/review of
key climate change issues (i.e. HTS, TDS, CO2 response). Assessing the impact of climate change on each TPE
identified

* Climate and Soil Databases

* TPE online portal and documetnation

Gender Component: Not defined

Objectives:

1. To review approaches to target population environment identification and mapping and identify the most appropriate TPE approaches for defining breeding priorities under a changing climate.
2. To lead the development of models and scripts for defining TPEs, preferably using the R package of statistics to facilitate open access of methodologies
3. To carry out a Crop models analysis - Calibration and validation of models for improving rice and bean yield prediction (Latin America varieties); testing under different environmental conditions considering abiotic stresses (drought, heat) and different CO2 concentrations; Sensitivity analysis.
4. Apply the new TPE approach to rice and beans in Latin America as an initial trial
5. Development of an online tool that will facilitate their identification.
6. Together with CCAFS and CIAT team members, support the application of the TPE approach globally for additional crop of importance, adjusting the methodology accordingly

Deliverables:

Description	Type	Year	Status	Justification
Papers submitted on: 1) Environment Groups For Upland Rice In Brazil: I-Drought Profile and Yield Trend. 2) The use of Oryza2000 model to planning adaptation strategies due to climate variability in Colombian rice production areas. 3) Environments groups for dry beans in Goiás State, Brazil. 4) Paper on the future climate impact on bean and rice yields that includes additional judgment/review of key climate change issues (i.e. HTS, TDS, CO2 response). Assessing the impact of climate change on each TPE identified.	Peer-reviewed journal articles	2014	Complete	
Working paper proposing strategies for rice & bean improvement research in Latin America through the analysis of models based on TPE's results.	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	On going	Priority given to the production of peer reviewed papers. This document is ongoing and will be finalized in the coming months.
Workshop on the TPE approach together with 3-5 other CGIAR centers, hosted by EMBRAPA	Workshop	2014	Cancelled	It was commonly agreed with the Theme leader that this activity should not be carried out during the project.
Weather and soil databases for Latin America regions cultivated with rice and beans.	Data	2014	Complete	

Description	Type	Year	Status	Justification
TPE methodology development & Case studies (WP in preparation)	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	On going	Due to time constraints and priority given to the preparation of peer reviewed articles. The Outline for the WP is been made.

Description	Type	Year	Status	Justification
design and implementation of TPE platform. Initial version is expected on March 2, 2015 In order to show the results of the identification and characterization of TPE zones for rice and bean production areas in Colombia and Brazil, and provides a module for replicating the same kind of analysis in other geographical areas; CCAFS is developing an online visualization tool to support the implementation of TPEs globally for important crops, to understand their behavior under different environmental conditions and to help breeders, researchers, scientists and decision or policy makers. As part of the information that the system provides are maps (e.g. soil physical and chemical characteristics; average weather conditions (rainfall, temperatures and solar radiation); and crop specific environmental conditions (High Favorable Environments (HFE), Low Favorable Environment (LFE), and Favorable Environment (FE))). Complementary to the maps results, there are some statistical graphics such as yield trend, stress index, cumulative and average rainfall, total dry matter production and leaf area index. The results are down-loadable in various formats (png, jpg, pdf, etc).	Platforms - Data Portals for dissemination	2014	On going	In the recent five months the team has been focusing on the design and implementation of TPE platform. We are finalizing system development, and documentation. Initial version is expected on March 2, 2015

Partners:

1- Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA):

Alexandre Bryan Heinemann <alexandre.heinemann@embrapa.br>

Location(s):
Countries: Brazil, Colombia,

Activity 942-2014

Modeling of crop impacts to derive adaptation priorities

Status	On going	Milestone	1.2.1 2015 (1)
Start date	2014 Jan	End date	2014 Dec

Description: Through a postdoc at Leeds, this activity aims to develop strategic analysis on:
1. Four degrees reassessed and implications for crop improvement and adaptation processes
2. Agricultural cul de sacs: what is the extent of transformational adaptation required in Africa
3. Reducing uncertainty through model meta-analysis and synthesis of model results (i.e. AR5 and scaling studies)
4. Assessing robustness of climate impacts using perturbed-parameter and multi- crop model ensembles
5. Usefulness of climate information for crop breeding

Status: On going. Studies have all been completed, with the exception of (5) Usefulness of climate information for crop breeding, which is ongoing and expected to be completed in 2015. All other studies are now published either as journal articles or MSc/PhD theses. For these, journal articles are either nearing submission or under review.

Gender Component: Not defined

Objectives:
1. Assess the impacts of a +4 K increase in global mean temperature for ca. 30 globally important crops using a niche-based approach
2. Assess the extent of transformational change (i.e. changes in crop rotation, change in land use) needed with 21st century climate change in Africa using a niche-based approach for 10 regionally important crops.
3. Assess the consensus in projected climate change impacts for maize, wheat and rice globally using meta-data from the scientific literature and use this information to hypothesize on the usefulness of different types of models for impacts research.

4. Develop a perturbed parameter and multi-crop-model ensemble to assess the impacts of climate change, their robustness across the ensemble, and the consensus on the processes associated with such impacts.
5. Determine the spatial (e.g. mega-environment, TPE, grid cell) and temporal (e.g. decadal, multi-decadal) at which climate model information is robust and thus useful for crop breeding.

Deliverables:

Description	Type	Year	Status	Justification
Report and journal article on the impacts of a +4 K warmer world on crop suitability	Non-peer reviewed articles	2014	On going	Report has been completed but paper is to be written. Report is being reviewed for delivery to key policy / technical bodies (i.e. COMESA).
Report and journal article on the extent of transformational adaptation across Africa as driven by the climate change signal	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	MSc thesis
Journal article on consensus of existing literature with respect to climate change impacts on crop yields as well as on the effects of adaptation.	Peer-reviewed journal articles	2014	Complete	
Journal article on the effects of scale on climate change impacts on crop yields.	Peer-reviewed journal articles	2014	Complete	
Journal article on the robustness of projected climate change impacts on crop yields, as conditioned by parametric and structural uncertainty.	Peer-reviewed journal articles	2015	On going	Activity was originally planned to be completed in 2015, and possibly extending to 2016 due to establishment of collaboration / activities with FS1 projects in CCAFS transition phase.

Description	Type	Year	Status	Justification
Journal article on the need for delivering climate information and the usefulness of such information for crop breeding, including a multi-temporal and multi-spatial scale analysis.	Peer-reviewed journal articles	2015	On going	Originally planned to extend to 2015

Partners:

1- University of Leeds:

Andy Challinor <a.j.challinor@leeds.ac.uk>

Location(s):

Global

Activity 945-2014

A living database of climate impacts on crops for prioritising adaptation priorities

Status	On going	Milestone	1.2.1 2015 (1)
Start date	2014 Jan	End date	2014 Dec

Description: Follow up to IPCC report, use database of crop impacts and set up an online interface to query crop impacts at multiple scales

Develop functionality to maintain database up-to-date with new impact studies

Status: On going. Database and portal are now functional, but pending a few minor fixes and visualisation gadgets. See http://www.ag-impacts.org

Gender Component: Not defined

Objectives:

1. Develop a fully functional and "live" (i.e. constantly updated) database on climate change impacts on crop yields

Deliverables:

Description	Type	Year	Status	Justification
Database on climate change impacts on crop yields	Data	2014	On going	Originally planned to finish in 2015. Database is now functional, but needs a few standardization fixes to be fully operational and online.
Portal to query information on the crop yield impacts database	Platforms - Data Portals for dissemination	2014	Complete	

Partners:

1- University of Leeds:

Andy Challinor <a.j.challinor@leeds.ac.uk>

Location(s):

Global

Activity 458-2014

SIA - Integrated program of research into the resilience and adaptive capacity of socio-ecological systems to climate change

Status	Complete	Milestone	1.3.1 2014 (1)
Start date	2011 Dec	End date	2014 Dec

Description: Throught a 3 year strategic research endeavor, the University of Adelaide and the University of Oxford will jointly develop with CCAFS an integrated program of research into the resilience and adaptive capacity of socio-ecological systems to climate change across social, institutional, economic and environmental scales and levels. The program will produce site specific contextual insights as well as draw out scalable and replicable features which can guide regional, national and international climate adaptation policy, planning and decision-making processes.

Status: Complete. The Systemic Integrated Adaptation (SIA) Research Program draws together diverse forms of knowledge generation and sense-making from across disciplines, sectors and social worlds towards the interrelated goals of climate adaptation, sustainable development, environmental management and food security.

This reporting period represents the final stage of the SIA program. It has involved the analysis and synthesis of all project results (including two field programs: SA, WA) and the development of these results into products including workshop manuals, and academic papers. Specific 2014 publication outputs include:

* 3 CCAFS Working Papers
* 1 co-authored CCAFS Policy Brief
* 1 CCAFS report (collaboration with CCAFS LAM)
* 3 per-reviewd journals
* 4 journals submitted or under review

And 6 more papers in the pipeline.

All four DPhil students involved in the project (Political, Economical, Social and Environmental lens) approach completion, have passed their Transfer of Status and Confirmation of Status milestones which include publication submission.

Expected users and beneficiaries of the multiple project outputs include:

Africa:

• AGRA
• FARA

Ghana:
• Ministry of Food and Agriculture at District, Regional and National Level
• District Assembly, Upper West, Ghana
• Ghana Climate Adaptation Platform
• Ministry of Science, Technology and Environment
• Ministry of Finance
• National Development Planning Commission
• Regional Coordinating Committees
• CARE
• GIZ
• IDE
• University of Ghana
• Council for Scientific and Industrial Research and their units, such as Animal Research
• Environmental Protection Agency
• Community Groups

South Asia
• ICIMOD
• CEAPRED

Nepal
• National Planning Commission
• Ministry of Environment, Science, Technology and Innovation
• Ministry of Agriculture
• Ministry of Local Development
• Ministry of Finance
• District Development Council
• Village Development Council
• Friends Service Council Nepal
• Himalayan Climate Initiative
• WWF
• OXFAM
• Practical Action
• DFID
• Community groups

Gender Component: The social lens analyzes the socio-cultural, class, caste and gender components of adaptation and food security.
- What is the impact of different forms of social differentiation on adaptation of small-holder farmers ? This includes: What social, cultural and gender specific barriers and opportunities exist for adaptation of smallhoder farmers? How do particular adaptation strategies differencially affect different social groups?

* What adaptation actions are available to who??
* What priority is given to each adaptation action by who??
* Who gets to decide which adaptation actions are taken by whom?
* What are the consequences of this for whom??
* Who gets to judge whether those consequences are good or bad?

Objectives:

1. To clarify whether, and if so what, differences in meanings, principles, methods and tools are being realized in formal and informal adaptation practice and why.
2. To reveal implications for diagnosing and building resilience and adaptation through capacity development interventions
3. To identify implications for the development of meta-theory and meta-methodology for adaptation planning. The program will produce site specific contextual insights as well as draw out scalable and replicable features which can guide regional, national and international climate adaptation policy, planning and decision-making processes.

Deliverables:

Description	Type	Year	Status	Justification
Synthesis Report on all field programs and Final meta-theory and meta-methodology	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	On going	Final version in preparation.
Four University of Oxford DPhil Theses; Academic publications, minimum four per field program and one synthesis paper; Book titled Systemic Adaptation Planning: Integrating Social, Economic and Environmental Dimensions of Adaptation to Climate Change in Food an Agricultural Systems	Capacity	2014	On going	Dphil will finilized their PhDs in 2015
Policy briefs and draft version of book titled “Systemic Adaptation Planning: Integrating Social, Economic and Environmental Dimensions of Adaptation to Climate Change in Food an Agricultural Systems”	Policy briefs - Briefing paper	2014	Complete	
Final integrated toolkits Final practitioner training packages for the frameworks and toolkits	Reference material (booklets and training manuals for extension agents, etc.)	2014	Complete	Just pending layout and formating.

Description	Type	Year	Status	Justification
Workshop : Multi-level Adaptation Planning workshop	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	

Description	Type	Year	Status	Justification
Toolkit: The SIA workshop methodology (Systemic Integrated Adaptation: Community Diagnostic, Prioritization and Planning Toolkit: A guidebook for researches and adaptation practitioners working with local communities) was integrated into a UNEP World Conservation Monitoring Center (WCMC) program in West Africa. 20+ Government agency Staff persons in Senegal and Gambia were trained on the use of the methodology for use with communities living in protected area (June and July 2014). The program also adopted the SIA strategy to provide seed funding to Gambian and Senegalese communities based on the strategic plan coming out of the participatory workshop. The social lens researcher has been providing ongoing management support to these programs in both countries. The manual outlining the methodology was also translated into French for use throughout French-speaking West Africa.	Workshop	2014	Complete	
(Poster) Deconstructing Local Adaptation Plans for Action (LAPAs): Analysis of Nepal and Pakistan LAPA initiatives	Poster	2014	Complete	
CCAFS Working Paper No. 68	Peer-reviewed journal articles	2014	Complete	

Description	Type	Year	Status	Justification
Journal paper Chaudhury, A. S., HELFGOTT, A., THORNTON, T. F. & SOVA, C. 2014. Participatory adaptation planning and costing. Applications in agricultural adaptation in western Kenya.	Peer-reviewed journal articles	2014	Complete	
Journal paper Sova et al. 2014. Multi-level Stakeholder Influence Mapping	Peer-reviewed journal articles	2014	Complete	
CCAFS Working Paper # 67	Peer-reviewed journal articles	2014	Complete	
Infografia: Influencia de los actores sociales en América Central	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	
Journal paper Thorn et al.	Peer-reviewed journal articles	2014	Complete	
Journal article (In review) Thorn et al. A systematic map protocol	Peer-reviewed journal articles	2014	On going	Submitted and In review.
Toolkit: Submitted journal. Thorn, et al "Rapid Ecosystem Service Assessment Technique	Peer-reviewed journal articles	2014	On going	This paper is part of the deliverables of the SIA program and part of the Dphil reserach from Jessica Thorn. It has been submitted and we are pending response from reviewers.

Description	Type	Year	Status	Justification
Journal in Prep Thorn et al.	Peer-reviewed journal articles	2014	Complete	

Partners:

1- Friends Service Council Nepal (FSCN):
Thapa Surya Bahadur <fsc@wlink.com.np>

2- Himalayan Climate Initiative (HCI):
Prashant Singh <info@himalayanclimate.org>

Location(s):

Countries: Ghana, Nepal,

Benchmark Site: Lawra-Jirapa (Lawra), Rupandehi,

Activity 960-2014

Fostering south-south learning and cooperation between Latin America and Africa: joining forces to strengthen the resilience of the agricultural sector in the face of climate variability and change

Status	Complete	Milestone	1.3.2 2014
Start date	2014 Feb	End date	2014 Dec

Description: Agriculture, a key sector in world economy, is currently confronting perhaps the greatest challenge in its history: that of multiplying production levels by as much as 70% within the next 40 years. Such a jump will be needed to meet demand from 9 billion people predicted to be populating the planet in 2045. Compounding this challenge is the impact of climate variability and extreme climatic events, which are negatively affecting, and will continue to negatively affect, production systems, particularly in the tropics. Today's agriculture must be transformed to follow a new model that allows it to adapt to climate change, reduce (i.e., mitigate) its carbon footprint, and produce more food without altering the equilibrium of the ecosystems on which it depends. Several southern countries facing the same challenges have identify the South-South exchanges mechanisms as a great approach to share inspiring experiences to held them building effective and innovative responses and approaches to overcome them. Building on a first exchange carried out in 2013 between Colombia and Senegal, this activity aims to replicate this successful experience among other countries.

Status: Complete. Two sucessful South- South exchanges betwee Africa and LAM were carried out in 2014.

* The first took place between May 12- 16. It brought a diverse Senegalease delegation to Colombia on a visit that included Bogota (National Level echange) and the Rural areas of the Cauca deptartment, in the South West of the country were direct farmer to farmer exchanges occured, with paysans, afro-colombian and indigenous communities. The Senegalease delegation included representatives from diverse National to local level institutions such as:

- The National Assembly
- The Parliament of Senegal
- The Economic, Social and Environmental Council (CESE),
- The Ministry of Agriculture and national extension service,
- Projet d'Appui aux filières Agricoles- PAFA (Agricultural Support Project),
- National Agricultural Research Institute (ISRA- Bureau d'analyses macro-économiques)
- Kaffrine's Prefecture,
- The national meteorological agency (Agence Nationale de l'Aviation Civile et de la Météorologie (ANACIM),
- National Syndicate of farmers and fishermen from Sénégal - DIAPANDO,
- Groundnut seeds producers' cooperative, and

- Farmers representatives

* The second Exchange was organized in July (21-25) in collaboration with the Colombian Presidential Agency for International Cooperation. It brought national level delegates from Ghana, Senegal and Kenya to learn about Colombia's successesful initiatives in the agricultural sector and explore the possibility future bilateral cooperation to join efforts in the face of climate related challenges.

Gender Component: 3 women were part of the delegation that visited in May, representing a local farmer, a scientist from the Senegalease Met Office (ANACIM) and a reseracher.

Objectives:

1. To promote South-South cooperation and mutual learning on innovative focuses to strengthen the adaptive capacity of the agricultural sector to climate variability and change.
2. •To facilitate a meeting between stakeholders from LAM countries and representatives from the African countries delegations to share experiences and lessons learned in the development of adaptation strategies and different levels, highlight the quality and innovation of the work carried out and identify further cooperation opportunities.
3. •To document the visits and the rest of the project to generate learning cycles

Deliverables:

Description	Type	Year	Status	Justification
• Successful implementation of two South-South exchange visit among LAM and African countries.	Video	2014	Complete	

Description	Type	Year	Status	Justification
• Documentation work for the project with African and LAM partners	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Extended	Some processes (potential impacts been mapped) are still ongoing so we have not yet been able to finalized this documentation effort. This is been extended to 2015. Working Paper general objective: This double South-South exchange (trip to Senegal and trip to Colombia) is designed to produce social learning and collective action (South-South collaborative work, project reproduction in other countries, for example).Therefore, this documentation process should be focused on understanding how this kind of interaction, where two groups from different contexts, point of view, interests share and confront their knowledge and experience and how it could affect the co-construction of new knowledge and shared vision and the collective decision making. In other words, how South-South exchange trips can produce innovative solutions to a common problem: How to achieve farmers' adaptation to climate change? Specific objectives: • Understand different perceptions and interests in multi-actor groups and their effects (positive or negative) on the definition of common language and collective decision making ; • Understand which key factors trigger changes in the participants; • Analyze the different

Description	Type	Year	Status	Justification
				postures between Senegal and Colombia: bottom-up versus top-down; • Help to build from these exchanges a methodological learning that is of interest for other actors/ entities/ projects .

Partners:

Partners not defined

Location(s):

Countries: Colombia, Kenya, Senegal,

Benchmark Site: Kaffrine,

Activity 971-2014

Development and testing of a national CSA prioritization tool for targeting climate adaptation investment

Status	Extended	Milestone	1.3.2 2014
Start date	2014 Jan	End date	2014 Dec

Description: The CGIAR Climate Change, Agriculture and Food Security research program (CCAFS) and the World Bank have partnered to take on the challenge of creating a cutting edge CSA prioritization framework that addresses the synergies and tradeoffs between achieving the three pillars of CSA (food security, mitigation, and adaptation). Development and initial pilot studies are expected to be completed within one year.

Status: Extended. The CSA prioritization framework (CSA-PF) has been fully developed and an iterative approach has been taken continuously modifying the framework based on feedback and lessons from piloting. Pilot studies in Guatemala and Mali were initiated with national level government stakeholders. Scoping exercises, selection of indicators, long lists of CSA practices, and priority list of top 10 practices have been selected. Both pilots are currently in the process of conducting cost-benefit analyses on the short list of best-bet practices, and upon completion a final workshop will be held to create CSA investment portfolios. The results of the process are on target to effect policy decisions in both countries. Piloting in Vietnam is taking place in 2015 given challenges with bringing partners onboard and linking appropriately with the crowded CSA playing field in the country. Partnerships have now been informally agreed, with two Vietnamese institutions getting involved and focal points at each institution being identified to complete the project. Inception meetings will be held in February 2015 to finalize the MOU, budget, and workplan and initiate action on the ground.

A web platform that hosts the CSA compendium database and prioritization framework is under development, with a large advance being the development of a parser to pull data from thousands on data sheets into the backend database. The aim is to finalize the beta version of the platform with the completion of the pilots so that lessons learned can be incorporated.

Completed activities and outputs:
*Guidebook with volumes 1 and 2 finalized, volumes 3 and 4 are drafted and will be completed upon finalization of these phases in the pilots
*Suggested set of indicators for assessing CSA practice outcomes at the household level
*Workshop 1 in Guatemala and Mali, resulting in short lists of priority CSA pracitces
*Workshop reports and presentations of CSA practices and analyses
*Communications: 7 presentations of process, 3 blogs, video on framework, 1 and 2 page informational notes available in English and Spanish

Gender Component: Gender considerations have been integrated into the CSA-PF in two ways. First, a guiding principle in the stakeholder engagement has been to ensure that women are represented both with regards to voices in the room and also specifically with regards to extending invitations to women's organizations associated with the scope of the analyses. Secondly, gender specific indicators have been suggested for inclusion in the the evaluation of CSA practices. The challenge with the approach is that the research team is only able to suggest what the users/clients should do with regards to engagement and indicators.

Objectives:

1. Develop a framework and tool that allows the screening and prioritization of climate smart agricultural (CSA) options for investment purposes
2. Test/Pilot a national CSA prioritization tool for targeting climate adaptation investment in at least three countries in LAM, WA, EA and SEA

Deliverables:

Description	Type	Year	Status	Justification
Beta version of the CSA Screening and Prioritization tool developped	Platforms - Data Portals for dissemination	2014	On going	The back end database for the compendium has been developed, but at this time, more work is needed to get the data entry sheets into a form where they can be fully parsed into the database. Without this, the search function on the web platform is limited and without data to go into the prioritization framework the use of the online version of the tool is limited. At this stage, it has been seen to be easier to use an excel database to track the information gathered through surveys and focus groups on the CSA practices related to the pilots and analyze the information offline. Lessons learned from the process are informing the further development of the online tool. Given set backs in the the development of the CBA methodology, there is also a delay in adding that section of the tool until the pilots have been finalized.
Reports on the Pilots carried out in three countries	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Complete	

Description	Type	Year	Status	Justification
Stakeholder workshops and data analysis by local technical partners	Workshop	2014	Complete	
CSA Guidebook on selecting and prioritizing CSA Investment Portfolios	Capacity	2014	On going	Volume I and II are complete Volume III (the cost-benefit analysis methodology) is udner development and is planned to be finished by April 2015 Volume IV will be finished as soon as Phase IV of the process will be completed, so that it can be based on lessons learned from the piltos in Guatemala and Mali

Partners:

1- Centro Internacional de agricultura Tropical (CIAT):
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Location(s):

Countries: Colombia, Kenya, Mali, Nicaragua, Sri Lanka, Vietnam,

Activity 1030-2014

Agricultural research for sustainable maternal/child nutrition and climate-proofing of smallholder farming in Sub-Saharan Africa

Status	Extended	Milestone	1.1.1 2015 (1)
Start date	2012 Dec	End date	2014 Dec

Description: The proposed agricultural research-for-impact research program explicitly supports all three priority areas of focus recommended by the Irish Aid's Hunger Task Force, namely:

1. Improving smallholder agricultural productivity in Africa, particularly women farmers.
2. Targeting prevention of maternal and infant under-nutrition.
3. Promote governance and leadership to reduce global hunger at both national and international level.

The goal of the CCAFS-NUI Galway Partnership is conduct agricultural research for development research and training to facilitate more sustainable and climate-resilient nutrition of rural smallholders (particularly women) through development, dissemination and utilization of drought-tolerant bean varieties (foods) with enhanced micronutrient (e.g. iron, zinc, selenium) content.

Status: Extended. This project has established a CCAFS-NUI Galway Partnership to conduct agricultural research for development research and training to facilitate more sustainable and climate-resilient nutrition of rural smallholders (particularly women) through development, dissemination and utilization of drought-tolerant bean varieties (foods) with enhanced micronutrient (e.g. iron, zinc, selenium) content.

The project, extended until the end of 2015, has to date:

(1) identified biofortified bean varieties that are higher yielding than commonly adopted non-biofortified varieties;

(2) established trials to test effects of drought on yields and nutrient composition of biofortified beans;
- The yield results obtained from the rainfed trials are very promising and it is hoped that the nutrient levels under rainfed, irrigated and drought conditions will allow the identification of promising varieties that can yield well and sustain high levels of nutrients under drought stress.

(2) established trials to determine whether agronomic biofortification with iron/zinc enriched fertilisers can be used to increase iron/zinc levels in non-biofortified beans.
- The agronomic biofortification work has revealed no major impact on yields and it is not yet known if

there will be an elevation in nutrient levels from the application of enriched foliar fertilisers.

(3) Dr. Una Murray and Marijke Hummel are conducting research on how facilitate improved impact pathways for climate-proofing and nutritional enhancement of bean legumes for improved smallholder food and nutritional security, particularly focused on improved nutritional status for children in first 1000 days

(4) Mapping of CCAFS identified hot spots (regions) of food insecurity and climate change vulnerability within three Irish Aid priority countries (Zambia, Malawi, Tanzania).
- The focus has been on the work on Malawi, so GIS maps and datasets have been assembled only for Malawi.

(5) Established an NUI Galway-CCAFS Masters degree on Climate Change, Agriculture and Food Security; 2 students in the first cohort (Ireland and Brazil) + 6 Science without Borders students.

(5) Dedicated website and e-communication strategy developed and rolled out (incl.for the MSc CCAFS component:
http://www.nuigalway.ie/ccafs/
http://www.plantagbiosciences.org/msc-ccafs
https://twitter.com/mscccafs_nuig

(6) Made efforts forward leverage of funds + Communication to new partners, donors, scientists, NGOs, farmers groups and policymakers

Gender Component: The CCAFS-NUIG program will focus on developing and harnessing biofortified drought tolerant bean varieties (and improved cropping practices) that under drought conditions can deliver higher levels of three key micronutrients (iron, zinc, selenium) to rural females and children in the CCAFS targeted vulnerability hotspot regions of Zambia, Malawi and Tanzania.

The team has developed a questionnaire to survey dissemination and impact pathways in March/April 2015 across the bean value chain in Malawi. The specific focus will be on identification of opportunities for increased access, delivery, uptake, income earning and nutritional benefits of biofortified beans for women smallholders, mothers and children (first 1000 days focus).

Objectives:

1. To develop a CCAFS-NUI Galway agricultural research for development partnership on climate-proofing of agriculture and food security, with a specific focus on maternal and child nutrition.
2. To identify and facilitate improved impact pathways for climate-proofing and nutritional enhancement of bean legumes for improved smallholder food and nutritional security, particularly focused on improved nutritional status for children in first 1000 days.

3. To map CCAFS identified hot spots (regions) of food insecurity and climate change vulnerability within three Irish Aid priority countries (Zambia, Malawi, Tanzania).
4. To develop joint CCAFS-NUI Galway curricula for establishment of a capacity-building oriented one year CCAFS-NUI Galway Masters degree on Climate Change, Agriculture and Nutritional Security.

Deliverables:

Description	Type	Year	Status	Justification
Dedicated website and e-communication strategy developed and rolled out	Social media outputs (including web sites, blogs, wikis, linkedin group, facebook, yammer, etc.)	2014	Complete	
Development and launch of a joint CCAFS-NUI Galway curricula for establishment of a capacity-building oriented 1 year CCAFS-NUI Galway International Masters degree on Climate Change, Agriculture and Nutritional Security.	Capacity	2014	Complete	

Description	Type	Year	Status	Justification
Identification of hot spots (regions) of food insecurity and climate change vulnerability within three Irish Aid priority countries (Zambia, Malawi, Tanzania).	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Extended	Initial work on identifying hot spots was done by Veronica Guwela, but since she left the project this was taken over by Marijke Hummel who was trained on the 4th of November on how to use ArcGIS by GIS expert Rico Santiago. The progress with collation and assembly of GIS maps datasets for vulnerability mapping has been as follows: • Kiersten Johnson (ICF International) was contacted on the 14th January 2015 and is providing us with maps on forests, SRS: Normalized Difference Vegetation Index and Vegetative Continuous Fields. • DHS maps on population and health data of 2004 and 2010 have been downloaded. • Louis Parker (CIAT) has been contacted on 29 July 2014 regarding maps on bean and maize and the impact climate change in 1 km grids. • Maize suitability maps are available in the Land Resources Department in Malawi. • Maps of land cover and bean growing areas have been identified in the report: Southern African Agriculture and Climate Change: A comprehensive Analysis by IFPRI. •Integration of maps is the next step combining all maps to be able to identify hot spots linking climate change, agriculture and health data. Using the CCAFS probability maps of climate change and

Description	Type	Year	Status	Justification
				the food security database, Marijke Hummel will conduct an assessment of the farming systems within each of the hot spots identified within Malawi to identify regions where improved legume (bean) varieties with increased micronutrient (biofortified) content and tolerance to drought would have a significant impact on smallholder productivity and maternal/child undernutrition
Research underway on identification and facilitation of improved impact pathways for climate-proofing and nutritional enhancement of bean legumes for improved smallholder food and nutritional security, particularly focused on improved nutritional status for children in first 1000 days. Bean breeding / crop improvement work underway to develop drought-tolerant varieties that can sustain high levels of micronutrients. Integrated crop management and agronomic biofortification work underway to develop drought-tolerant bean cropping systems that can sustain high levels of micronutrients.	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	Extended	This milestone has been reached to the extent that initial research is underway. However it is recognized that additional effort and focus on this milestone will be necessary in the next phases to translate research outputs into impact pathways and outcomes.

Description	Type	Year	Status	Justification
Leverage of additional financing for multi-annual activities and expansion of the overall CCAFS-NUI Galway partnership.	Research report (i.e. workshop report, consultant's report, discussion paper, project report, student thesis, etc.)	2014	On going	Significant efforts have been made throughout 2014 by Prof. Spillane, Dr. Andre Zandstra, Dr. Andy Jarvis and Dr. Una Murray to leverage multi-annual funding from Irish Aid for the next phases of the projects. These have involved face-to face meetings of Prof. Spillane with Irish Aid (Eddie Brannigan and Cait Moran) and meetings at the NY Climate Summit between Dr. Andy Jarvis and Head of Irish Aid (Michael Gaffey). In addition, Prof. Spillane and the project team have developed a concept note for a multi-annual funded continuation of the project so that it can reach along the impact pathway towards development outcomes. The Project Concept document is appended in Appendix 2 and was sent to Irish Aid by CIAT/CCAFS (Andre Zandstra) on 24 September 2014. Recognising that Irish Aid is undergoing a significant staff rearrangement and reorganisation of units, a number of polite enquires were made to Irish Aid as to status of concept note submission. It was also proposed to Irish Aid that NUI Galway/CCAFS could host a 1 day Climate Smart Conference in 2015 if there was significant interest from Irish Aid – however to date there has been no response on this suggestion. On 20 January Bronagh Carr from Irish Aid replied indicating that ""that Irish Aid will be reviewing our engagement

Description	Type	Year	Status	Justification
				with CGIAR this year (the review will be led by our Inclusive Economic Growth Policy Team, copied). Unfortunately we will not now be in a position to increase our support, or to provide any additional funds, pending the outcome of the review. Earnán O'Cleirigh and Eoghan Walsh will be in contact with you in due course of the review process.". The upshot of this is that consideration of multi-annual Irish Aid funding for the project (and indeed any CGIAR related activity) is on hold until irish Aid conduct their review of multilateral funding. In addition, Dr. Una Murray met with the Irish Ambassador and Irish Aid country officer in Malawi to investigate possible funding via Irish Aid/Embassy Malawi – however, the key message was that a joined-up value chain national bean platform would be the only approach likely to gain traction for funding from Irish Aid Malawi.
Field trials on existing and unreleased biofortified bean varieties. Micronutrient analysis (zinc, iron, selenium) is underway.	Datasets	2014	Extended	The field trials have been conducted for 2014, while the micronutrient analysis (zinc, iron, selenium) is underway.
Integrated crop management and agronomic biofortification to develop drought-tolerant bean cropping systems that can sustain high levels of micronutrients.	Data	2014	Extended	The field trials have been conducted for 2014, while the micronutrient analysis (zinc, iron, selenium) is underway.

Description	Type	Year	Status	Justification
Synergy, alliance and gap analysis mapping	Data	2014	Extended	This milestone has been partly met through the elaboration of the concept note for the multi-annual follow on phases of the project (Appendix 2, 2014 Annual Report NUIG) and also through engagement with CCAFS on research projects for MSc CCAFS students that can be conducted in the context of ongoing CCAFS flagship projects (e.g. Agroclimas, CSA East Africa).

Partners:

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6- National University of Ireland Galway (NUI Galway):
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7- National University of Ireland Galway (NUI Galway):
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Location(s):

Countries: Tanzania,

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

Output: 1.1.1

Summary: In 2014, Theme 1 continued to invest in developing the compendium of climate smart practices and technologies from within and beyond the CGIAR (Collaborative research by ICRAF and CIAT). ICRAF and CIAT worked on developing a systematic review and meta-analysis of the effects of ~65 farm management practices (leguminous intercropped agroforestry, increased protein content of livestock diets, etc) on 22 indicators consistent with CSA goals (yield, water use efficiency, carbon sequestration, etc). Mapping the location of the 6,000 studies that met our criteria shows geographic and topical clustering in relatively few locations and around relatively few measures of CSA, indicating potential for bias and highlighting gaps in the evidence for desired CSA objectives (e.g., gender inclusiveness). Furthermore, outcomes vary widely among studies and locations and are far from clearly positive or negative, suggesting the 'climate-smartness' of practices needs to be considered for local conditions and objectives to be meaningful. Co-located, cross-outcome research tends to be sparse except for a few outcome-by-practice combinations. Thus, grand conclusions about synergies and trade-offs among CSA components may be unsupported. See: http://www.slideshare.net/agroforestry/todd-rosenstockclimatesmartagriculture-panaceaorpropaganda for more information.

In Mozambique, a 3 year collaboration with IIAM on "Managing climate related risks to improve livelihood resilience and adaptive capacity in agricultural ecosystems in Southern Mozambique" finalized in 2014. A total of 21 Practices and technologies were identified and tested through on-farms trials (Crop production systems, Animal husbandry, post- harvest technologies and processing of agricultural products, Community forest management, and Communities capacity building and improving skills), The project also made a vulnerability analysis for Xai-Xai and Chicualacuala districts.

Local level studies on "appraisal of benefits and barriers affecting adaptation of climate-smart agricultural practices" were carried out in Ghana, Kenya and Colombia. A CCAFS Reports highlighting the barriers restricting uptake in Northern Ghana and Curiti, Colombia, as well as practices with high potential for further CCAFS investigation and/or on-farm participatory trials was produced: http://ccafs.cgiar.org/publications/local-level-appraisal-benefits-and-barriers-affecting-adoptation-climate-smart#.VOJPSC6xjLk; http://ccafs.cgiar.org/publications/local-level-appraisal-benefits-and-barriers-affecting-adoption-climate-smart#.VOJPcS6xjLk

The Analogue Tool (reported by CIAT) was continued to be developed. Several improvements and changes were made (http://www.ccafs-analogues.org/tool/) which included:
• The development and inclusion of breeding-specific algorithms and metrics
• Improved thresholding techniques and modification of k values to improve quantification of climatic distance and objectivity in the identification of analogue sites

• A new version of the library in R (Analogues 2.0), which contains new climatic data CMIP5 and the possibility to include non-climatic parameters (infrastructure, population, poverty and also some soil properties)
• Case studies initiated including socio-economic data (India, Kenya FOTF)
• A desktop version of the Analogues Tool
• A new friendly and more comprehensive Portal
• Capacity Building exercises (CCAFS EA, Sierra Exportadora, Univ del Pacifico/Peru).
The portal received a total of 4,732 visits (41% increase compared to 2013).

2014 was also the final year of the Univ. Florida- CIAT partnership on Intellectual support in gender analysis for Theme 1. This partnership with U. of Florida had the objectives of bridging the gap between research and the implementation of projects and strategies that effectively address gender issues, providing guidance in the implementation of the activities related to the gender strategies and their articulation with strategies and activities of other CRPs; consolidation of a Faculty research Network and research on the identification on how gender differences may influence the innovation strategies to reach intended beneficiary groups. As a result of this collaboration, the CCAFS-LAM gender survey was developed for implementation in the Cauca, Colombia CCAFS site and has and has also been translated into English and adapted for implementation in Nwoya, Uganda and in Tanzania (https://thedata.harvard.edu/dvn/dv/CCAFSbaseline/faces/study/StudyPage.xhtml?globalId=doi:10.7910/DVN/28324&studyListingIndex=1_497a9434efc11e277f7fb21065e7). Furthermore, the collaboration resulted in several publications and two masters student Thesis, as well as identifying areas of future collaborations, especially in terms of publications and student projects

Output: 1.2.1

Summary: Through a Theme 1 postdoc at the University of Leeds strategic analysis has been developed on:
a) Four degrees reassessed and implications for crop improvement and adaptation processes. Deliverable: Report “Sub-Saharan African agriculture in a +4 ºC world” completed and is being reviewed for delivery to key policy / technical bodies (i.e. COMESA). Paper in the pipeline.
b) What is the extent of transformational adaptation required in Africa : Changes in crop suitability at high levels of global warming reveal agricultural cul de sacs. Deliverable: Master thesis completed, Uni Bonn.
c) Reducing uncertainty through model meta-analysis and synthesis of model results (i.e. AR5 and scaling studies). Deliverable: A meta-analysis of crop yield under climate change and adaptation. Nature Climate Change (Challinor, A.J., Watson, J., Lobell, D.B., Howden, S.M., Smith, D.R., Chhetri, N.)
d) Assessing robustness of climate impacts using perturbed-parameter and multi- crop model ensembles. Deliverable: Journal article on the effects of scale on climate change impacts on crop yields. Crop yield response to climate change varies with cropping intensity.
e) Usefulness of climate information for crop breeding: is ongoing and expected to be completed in 2015. Deliverables: Conference “ Breeding Plants to Cope with Future Climate Change (University of

Leeds, Jun 15- 17, 2014) See: http://ccafs.cgiar.org/breeding-plants-cope-future-climate-change#.VN_kDS6xh30; Two journals published in the Special Issue of Journal of Experimental Botany (http://www.lancaster.ac.uk/other/bsajxb/JXB/2015.html#item3) : Developing genotypic adaptation strategies using crop models. J Ramirez-Villegas and A Challinor; Variation and impact of drought stress patterns across upland rice environmental groups in Brazil. AB Heinemann, C Barrios Perez, JC Medeiros, D Arongo, O Bonilla-Findji, J Ramirez Villegas and A Jarvis.

Follow up to IPCC report (See Outcome Story), in addition to the development of the Ag-Impacts (Collaborative effort Leeds-CIAT): A living database and portal of climate impacts on crops for prioritizing adaptation priorities developed and functional, but pending a few minor fixes and visualisation gadgets. See http://www.ag-impacts.org. Currently, only initial data is available but in 2015 more will be added.

The CCAFS-NUI- GALWAY Partnership continued to facilitate more sustainable and climate-resilient nutrition of rural smallholders (particularly women) through development, dissemination and utilization of drought-tolerant bean varieties (foods) with enhanced micronutrient content. The project achieved in 2014 the Identification of biofortified bean varieties that are higher yielding than commonly adopted non-biofortified varieties and established trials to test effects of drought on yields and nutrient composition of biofortified beans. Trials have also been established that determine whether agronomic biofortification with iron/zinc enriched fertilisers can be used to increase iron/zinc levels in non-biofortified beans. NUI Galway-CCAFS also established a Masters degree on Climate Change, Agriculture and Food Security (2 students in the first cohort (Ireland and Brazil) + 6 Science without Borders students). A dedicated website and e-communication strategy has been developed and rolled out. http://www.nuigalway.ie/ccafs/ ; http://www.plantagbiosciences.org/msc-ccafs; https://twitter.com/mscccafs_nuig.

EMBRAPA–CIAT project " Methodological development of an online tool for the identification of Target Population Environments: improving the predictions of agricultural production using crop models" led to a TPE methodology being developed and applied in Brazil and Colombia. Results have been published in the Journal of Economic Botany. Ongoing work is focused on the design, development and preliminary implementation of TPE platform (Initial version is expected on March 2015).

Improved CCAFS-CLIMATE portal (CIAT – T1 – T4) with a user interface with enhanced functionality and content. Improvements include: a) a friendly new search engine for the easy location of datasets; b) the option of downloading files by geographic tile rather than the entire globe; c) increased storage capacity, with the inclusion of a new system storage in Amazon AWS (https://aws.amazon.com/datasets/0241269495883982); d) increased download speed; e) the complete set of delta method downscaled IPCC AR5 GCM data for 4 RCP (RCP2.6, 4.5, 6.5 and 8.5), 106 GCM (about 25 models per RCP), 4 future periods, 5 climatological variables and 4 spatial resolutions (the highest at 1 Km2). In 2014, more than 10.300 people visited the CCAFS-Climate data portal, and more than one hundred thirty peer-reviewed publications have cited the use of the portal data, bringing the total sum of citations since 2009 to almost 300.

Output: 1.3.1

Summary: The final year of the Systemic Framework for Integrated Adaptation Planning- (SIA) project (Oxford/ Adelaide Univ) led to the Ghana Multilevel Adaptation Planning Workshop held in Accra, in partnership with Ghana's CSIR at the Ghana Institute of Management and Public Administration (GIMPA) Executive Conference. This work aimed to overcome disconnects in the flow of knowledge, experience and resources across levels -from households, district, region to national- and co-identify opportunities for greater alignment in Ghana's climate adaptation regime. Three CCAFS Working Papers and 3 journal articles came out of this work. The working papers included:
• Deconstructing Local Adaptation Plans for Action (LAPAs) - Analysis of Nepal and Pakistan LAPA initiatives;
• Climate Change Adaptation Policy in Ghana: Priorities for the Agriculture Sector;
• Systemic Integrated Adaptation: Community Diagnostic, Prioritization and Planning Toolkit: A guidebook for researches and adaptation practitioners working with local communities.

The SIA team also supported CCAFS Latin America to produce a series of power/influence mapping reports in Central America: See for Guatemala: http://ccafs.cgiar.org/node/38546#.VOJzZC6xjLk

Fostering south-south learning and cooperation (Collaborative work with CCAFS LAM, CCAFS WA): Two successful South- South exchanges between Africa and LAM were carried out in 2014. The first took place between May 12- 16 and brought a diverse Senegalese delegation to Colombia on a visit that included Bogota (National Level exchange) and the Rural areas of the Cauca department, in the South West of the country. (See more in the Case study). The second exchange was organized in July (21-25) in collaboration with the Colombian Presidential Agency for International Cooperation. It brought national level delegates from Ghana, Senegal and Kenya to learn about Colombia's successful initiatives in the agricultural sector and explore the possibility future bilateral cooperation to join efforts in the face of climate related challenges.(http://ccafs.cgiar.org/blog/benefits-cooperation-lessons-colombian-farmers%E2%80%99-associations#.U-teLvldWgK)

Output: 1.3.2

Summary: Development and testing of a national CSA prioritization tool for targeting climate adaptation investment initiated in Guatemala and Mali, in collaboration with CCAFS LAM and CCAFS WA and together with national level government stakeholders. A CSA prioritization framework (CSA-PF) was fully developed and an iterative approach has been taken continuously modifying the framework based on feedback and lessons from piloting. Scoping exercises, selection of indicators, long lists of CSA practices, and priority list of top 10 practices have been selected for both Mali and Guatemala. Both pilots are currently in the process of conducting cost-benefit analyses on the short list of best-bet practices, and upon completion a final workshop will be held to create CSA investment portfolios. A wide range of outputs such as Guidebooks, Workshop reports, Lessons learned; Communications products have also been produced.

Official Side Event SBSTA (Bonn, Germany, June 7, 2014) and Policy Brief launch on “Planning climate adaptation in agriculture: Advances in research, policy and finance”. See : http://ccafs.cgiar.org/planning-climate-adaptation-agriculture-advances-research-policy-and-finance#.VN_jni6xh30

Country profiles in LAC with WorldBank : Profiles for 7 countries were jointly produced with the CIAT team and presented to the Worldbank and external audiences during 2014. See more at: http://www.ciatnews.cgiar.org/2014/10/30/country-profiles-on-climate-smart-agriculture-well-received-at-the-world-bank/#sthash.0AxqfKl5.dpuf

3. Communications.

Media Campaigns:

• Delegación africana estará de visita en Santander de Quilichao, también irá a Puracé y Buga, Valle del Cauca. May 12, 2014. http://www.proclamadelcauca.com/2014/05/delegacion-africana-estara-de-visita-en-santander-de-quilichao-tambien-ira-a-purace-y-buga-valle-del-cauca.html

• Colombia aprende de la experiencia de Senegal Para enfrentar el cambio climático. May 5, 2014. http://www.magazincnc.com/colombia-aprende-de-la-experiencia-de-senegal-para-enfrentar-el-cambio-climatico/

• Alcalde Fuentes Meneses recibió Delegación de Senegal (África). May 15, 2014 http://www.radiosuperpopayan.com/840/noticias/salud/alcalde-fuentes-meneses-recibio-delegacion-de-senegal-africa/

• Intercambio de saberes entre indígenas y africanos. May 28, 2014. http://www.eltiempo.com/colombia/cali/intercambio-de-saberes-entre-indigenas-y-africanos/14049517

• Colombia le apuesta a la agricultura inteligente http://sostenibilidad.semana.com/actualidad/articulo/colombia-apuesta-agricultura-inteligente/31219

• Jarvis, A. December 13, 2014. OPINION: How Shifting to the Cloud Can Unlock Innovation for Food and Farming – Inter Press Service News Agency. http://www.ipsnews.net/2014/12/opinion-how-shifting-to-the-cloud-can-unlock-innovation-for-food-and-farming/

• Acosta, M. January 20, 2014. Climate-smart agriculture: A worm's eye view – Thomson Reuters Foundation http://www.trust.org/item/20140120142510-zo6pf/?source=spotlight

• Peterson, C. January 13, 2014. The right kind of helping hand for small farmers – Thomson Reuters Foundation http://www.trust.org/item/20140113141333-sj3ka/

Blogs:

Bailey, Meghan. January, 15, 2014. Time to recognize Nepal's third gender in climate adaptation work http://ccafs.cgiar.org/blog/time-recognize-nepals-third-gender-climate-adaptation-work#.UxdEzT9dXpY

Sova, Chase & Jarvis, Andy. February 14 2014. Adapting agriculture to changing landscapes (and climates) http://ccafs.cgiar.org/blog/adapting-agriculture-changing-landscapes-and-climates#.UxdCtz9dXpY

Sova, Chase. February 17, 2014. Feast or Famine: a tale of two agricultural cities
http://ccafs.cgiar.org/blog/feast-or-famine-tale-two-agricultural-cities#.UzGUPKhdXpY

National Adaptation Plans in Agriculture: A work in progress
Chase Sova, March 13 2014
http://ccafs.cgiar.org/blog/national-adaptation-plans-agriculture-work-progress#.UzGUU6hdXpY

The ways we divide our world
Meghan Bailey, March 27 2014
http://ccafs.cgiar.org/blog/ways-we-divide-our-world#.UzS4VPldVzY

The value in the difference - a new participatory framework to plan and cost local agriculture adaptation
Abrar Chaudhury, September 2 2014
http://ccafs.cgiar.org/blog/value-difference-new-participatory-framework-plan-and-cost-local-agriculture-adaptation#.VAnDgPldWgK

Bite-size planning: can local adaptation planning motivate south-south learning exchanges?
Abrar Chaudhury, October 6 2014 (SA)
http://ccafs.cgiar.org/blog/bite-size-planning-%E2%80%93-can-local-adaptation-planning-motivate-south-south-learning-exchanges#.VDLJN_ldUud

Ghana's climate change adaptation policy: priorities for the agriculture sector
Chase Sova, December 17 2014 (WA)
http://ccafs.cgiar.org/blog/ghana%E2%80%99s-climate-change-adaptation-policy-priorities-agriculture-sector#.VKxHCSvF9XE

Benefits of cooperation: Lessons from Colombian farmers' associations
Oluwabunmi Ajilore, August 13 2014 (LAM)
http://ccafs.cgiar.org/blog/benefits-cooperation-lessons-colombian-farmers%E2%80%99-associations#.U-teLvldWgK

A farmer's dilemma: To sell or to eat?
Caity Peterson, January 16 2014 (LAM)
http://ccafs.cgiar.org/blog/farmers-dilemma-sell-or-eat#.UxdE8D9dXpY

The right kind of helping hand for small farmers
Caity Peterson, January 16 2014 (LAM)

http://ccafs.cgiar.org/blog/right-kind-helping-hand-small-farmers#.UxdFOj9dXpY

Climate-smart agriculture: A worm's eye view
Mariola Acosta, January 21 2014 (Gender/LAM)
http://ccafs.cgiar.org/blog/climate-smart-agriculture-worms-eye-view#.UxdFXj9dXpY

Hot out of the oven! Fresh data from CCAFS-Climate
Caity Peterson, January 26 2014
http://ccafs.cgiar.org/blog/hot-out-oven-fresh-data-ccafs-climate#.UxdFYD9dXpY

Can Colombia lead the way to the agriculture of the future?
Caity Peterson and Melissa Reichwage, February 28 2014 (LAM)
http://ccafs.cgiar.org/blog/can-colombia-lead-way-agriculture-future#.UzGUCKhdXpY

World Bank: Scaling up investments in climate smart agriculture
Melissa Reichwage, March 29 2014
http://ccafs.cgiar.org/blog/world-bank-scaling-investments-climate-smart-agriculture#.VKwrSivF9XE

Amistoso 2014: Colombia Vs Senegal
Diana Carolina Giraldo, May 30 2014 (LAM, WA)
http://dapa.ciat.cgiar.org/amistoso-2014-colombia-vs-senegal/

Can countries embed climate adaptation in their development plans?
Oluwabunmi Ajilore, June 3 2014
http://ccafs.cgiar.org/research-highlight/can-countries-embed-climate-adaptation-their-development-plans#.U5sR4_ldUXs

Mainstreaming agriculture into national adaptation plans
Oluwabunmi Ajilore, June 12 2014
http://ccafs.cgiar.org/blog/mainstreaming-agriculture-national-adaptation-plans-0#.U5r7sPldUXu

Tuning in to Climate-Smart Agriculture
Andy Jarvis, July 17 2014
http://ccafs.cgiar.org/blog/tuning-climate-smart-agriculture#.U8g44fldWgI

Big data, big prospects: crunching data for farmers' climate adaptation
Oluwabunmi Ajilore, September 12 2014 (LAM)
http://ccafs.cgiar.org/blog/big-data-big-prospects-crunching-data-farmers-climate-adaptation#.VBigzPldWgL

New Latin America country profiles open pathways for reaching climate-smart agriculture
Nathan Russell, October 30 2014 (LAM)
http://ccafs.cgiar.org/research-highlight/new-latin-america-country-profiles-open-pathways-reaching-climate-smart#.VHMvCfnF9XE

Combating hidden hunger in a changing climate: harnessing biofortified crops
Oluwabunmi Ajilore, November 24 2014
http://ccafs.cgiar.org/blog/combating-hidden-hunger-changing-climate-harnessing-biofortified-crops#.VKw-aCvF9XE

The elephant in the room: Agriculture at the UNFCCC negotiations
Oluwabunmi Ajilore, December 15 2014
http://ccafs.cgiar.org/blog/elephant-room-agriculture-unfccc-negotiations#.VKxGESvF9XE

T1-related BLOGS FROM OTHER CCFAS UNITS

New field manual captures farmers' climate adaptation activities in Colombia
Taryn Devereux, January 3 2014 (Gender/LAM)
http://ccafs.cgiar.org/blog/new-field-manual-captures-farmers-climate-adaptation-activities-colombia#.VK1hLSvF9XE

Sowing unions to harvest hope: Senegal shares approaches with Colombia
José Luis Urrea, May 28 2014 (WA/LAM)
http://ccafs.cgiar.org/blog/sowing-unions-harvest-hope-senegal-shares-approaches-colombia#.VK1oryvF9XE

How to create climate change policies with a gender focus?
Manon Koningstein, December 8 2014 (Gender/LAM)
http://ccafs.cgiar.org/blog/how-create-climate-change-policies-gender-focus#.VK2UayvF9XE

Climate scenarios and analogues: A glimpse into past, present and future climates
Philip Kimeli and Thomas Mawora, January 30 2014 (EA)
http://ccafs.cgiar.org/blog/climate-scenarios-and-analogues-glimpse-past-present-and-future-climates#.VK1jbivF9XE

Farms of the future: a two-way learning exchange
Mathieu Ouédraogo (CCAFS EA), August 5 2014
http://ccafs.cgiar.org/blog/farms-future-two-way-learning-exchange#.VA20IPmwJ64

Websites:
http://www.ccafs-climate.org
http://www.ccafs-analogues.org/
http://www.amkn.org
http://www.agtrials.org/

Social Media Campaigns:
UNFCCC COP20 side event (NAP workshop, Side Event and GLF session) – live-tweeting during event, blogging

GLF Youth Session and Dragon's Den: Masterclass Program Design and Coordination (Landscape governance).

Live-tweeting during event
- Blog covering event (The elephant in the room: Agriculture at the UNFCCC negotiations http://ccafs.cgiar.org/blog/elephant-room-agriculture-unfccc-negotiations#.VKxGESvF9XE) CCAFS Workshop during COP20

- Blog covering event (Mainstreaming agriculture into national adaptation plans http://ccafs.cgiar.org/blog/mainstreaming-agriculture-national-adaptation-plans-0#.U5r7sPldUXu) Workshop during SBSTA 40

- Blog covering field trip (Benefits of cooperation: Lessons from Colombia's farmers' associations http://ccafs.cgiar.org/blog/benefits-cooperation-lessons-colombian-farmers%E2%80%99-associations#.U-teLvldWgK) Field trip during APC Colombia-Africa Exchange Week

Flickr photoset: https://www.flickr.com/photos/cgiarclimate/sets/72157644655661210/

Newsletters:
NA

Events:
* Official Side Event SBSTA (Bonn, Germany, June 7, 2014) : Planning climate adaptation in agriculture: Advances in research, policy and finance. See : http://ccafs.cgiar.org/planning-climate-adaptation-agriculture-advances-research-policy-and-finance#.VN_jni6xh30

* Breeding Plants to Cope with Future Climate Change (University of Leeds, Jun 15- 17, 2014). See: http://ccafs.cgiar.org/breeding-plants-cope-future-climate-change#.VN_kDS6xh30

* Senegal - Colombia Exchange visit: High Level Workshop (Bogota, Colombia, 12th May 2014). See: http://ccafs.cgiar.org/senegal-colombia-exchange-visit#.VN_jSy6xh30

* Workshop co-organized with the Colombian Presidential Agency forInternational cooperation: Climate change and Foos Security for Arica (Cali, Colombia, July 21-25, 2014) . See: http://ccafs.cgiar.org/node/37575#.VN_krC6xh30

* Hackathon (together with CCAFS LAM, CU) (Lima, Peru, Nov 29 2014) .See: http://ccafs.cgiar.org/hackathon#.VN_lci6xh30

* Side Event, COP 20 (Lima Peru, 4 Dec 2014): Towards a climate-smart approach Colombian agriculture

* Side Event, COP 20 Mountain and Water Pavilion, "Voices for Climate" (Lima, Peru, 5th Dec 2014): Prioritizing Knowledge Gaps in Climate Change Adaptation in the Andes. See: http://ccafs.cgiar.org/prioritizing-knowledge-gaps-climate-change-adaptation-andes#.VN_mUy6xh30

Videos and other Multimedia:

CCAFS Farms of the Future Video - Lushoto district Tanzania by NRI, University of Greenwich https://www.youtube.com/watch?v=oNGeRxZYVnI

CCAFS Farms of the Future Video - Jirapa & Lawra districts Ghana by NRI, University of Greenwich https://www.youtube.com/watch?v=BiARrwXNPic

Workshop on Climate Change and Food Security for Africa – (APC - CCAFS LAM). https://www.youtube.com/watch?v=ry0G_uLjs78

Senegal- colombia Excahnge visit, May 2014:
Photos of the whole exchange visit: https://www.dropbox.com/sh/ezthng3arrpz4v8/AAAHfcD38fsidrPwViyp1-Ooa

Video Testimonies from the Senegalese Delegation: http://www.youtube.com/playlist?list=PL8llMWXuQ6Fwfi0RnJGp1t-wUQGlcxK7H

Video: CSA Prioritization Framework: https://www.powtoon.com/show/b0JHzjnt6LT/csa-prioritization-framework/#/

Thorn, J. Video release of climate change adaptation planning process in Ghana http://oxlel.zoo.ox.ac.uk/news/climate-change-adaptation-planning-in-ghana/ 20 November 2014. Long Term Ecology Lab, Oxford.

Other Communications and Outreach:

Osana Bonilla-Findji, Ana Maria Loboguerrero, Caity Peterson, Lilian Nyaega. August 2014. Learning from each other: Latin America and Senegal exchange innovative climate approaches for smallholders. UNEP South-South Cooperation Case Studies
http://www.unep.org/south-south-cooperation/case/casedetails.aspx?csno=141

CCAFS- GALWAY MASTER CONTRIBUTIONS:

* CCAFS presentation (teaching materials): https://drive.google.com/a/cgxchange.org/?tab=wo#folders/0B14JUilycLvvdEFsSXpVbHdkczQ

* list of the CCAFS MSc contributors: https://docs.google.com/a/cgxchange.org/document/d/1ZVpEqero2VR5_5aat8i9IrqiV8nQlTEw9PQ9ZApZBeo/edit

4. Case studies.

Case Study #1

Title: Farmers without borders: an inspirational journey from Senegal to Colombia
Author: Osana Bonilla-Findji
Type: Capacity enhancement;

Project Description:

This case study illustrates the learning power but also the key ingredient of South-South exchanges: a spontaneous, generous and inspirational give and take. Building on the great success of the 2013 exchange that allowed a Colombian delegation to visit Kaffrine (Senegal) and learn from their unique and innovative experience on participatory approaches to bring seasonal climate forecast to farmers, in 2014 the CCAFS Adaptation Theme, the Colombian Ministry of Agricultural, the CCAFS WA and LAM regional programs, joined forces to invite their Senegalese partners to Colombia. The main goals of this exchange were:

- to reward their hospitality and share back their traditional climate adaptation knowledge, innovative projects, promising ongoing work and initiatives inspired by their Kaffrine's learnings (well beyond expectations); and
- to provide the opportunity to Kaffrine's protagonists to showcase their experience to their pairs at the international level and thus value their uniqueness and importance to upscale.
- to explore new opportunities for South-South cooperation.

The 15 members of the Senegalese delegation were strategically selected to include a unique

"cocktail" of representatives from National down to local level institutions:
• The Parliament of Senegal
• The National Assembly
• The Economic, Social and Environmental Council (CESE),
• The Ministry of Agriculture and national extension service,
• Projet d'Appui aux filières Agricoles- PAFA (Agricultural Support Project),
• National Agricultural Research Institute (ISRA)
• Kaffrine's Prefecture,
• The national meteorological agency (ANACIM),
• National Syndicate of farmers and fishermen - DIAPANDO,
• Groundnut seeds producers' cooperative, and
• Farmers representatives

The Colombian journey included two stops:
• Bogota at 2600 m, high up in the Andean cordillera, for a one day meeting with VIPs and high level national representatives.
• Cauca Valley from where several visits and field trips were organized to exchange from afrocolombian, peasant and indigenous communities.

Introduction / objectives:
• To facilitate meeting between National and subnational level stakeholders from Colombia and Senegal involved in the development of innovative adaptation options and strategies
• Share the current challenges that each country faces in the context of climate change and its impacts on the agricultural sector and rural communities.
• Share and exchange on their successful experiences
• Explore further opportunities for South-South Collaboration and mutual learning to strengthen the adaptive capacity of the agricultural sector to climate variability and change

Project Results:
• Successful high level meeting (ca. 60 people) held in Bogota that allowed highlighting the different and complementary strengths of both countries. Colombia representatives included: the Ministry of Agriculture, Ministry of Environment, National Planning Department (DNP), National Unit or Rural Planning (UPRA), Presidential Agency for International Cooperation (APC), National Agricultural Research center (CORPOICA), National Meteorological Institute (IDEAM), National Rice Growers Federation (FEDEARROZ), and National Cereals Growers Federation (FENALCE).
- Colombian stakeholders (speechless and incredibly inspired by the Senegalese) learned a great lesson and evidenced how much can be achieved when there is real will inter-institutional will and commitment to articulate efforts (in other words: All is not about money!)
- Senegalese realized that there is a wide scientific and technical/institutional climate related knowledge in Colombia that could be shared and brought to Senegal.
• Strengthened ties between the 2 countries and specifically between institutions
- This event also pushed further the momentum gained by FENALCE, FEDEARROZ, MADR and CIAT

to move on the establishment of “Agro-climatic tables” in two Colombian regions, inspired by KAffrine’s model (See LAM Case Study for further details).
• Specific bilateral cooperation topics identified to be further explored with the Colombian Presidential Agency of International Cooperation (APC) and others.
• On the short term, this exchange led APC to organize a new south-south exchange between Colombia and a small set of African countries (Senegal, Ghana and Kenya), which was held in Cali between July 21-25, 2014.
• The Senegalese partners (under the leadership of ANACIM) and in collaboration with CCAFS WA, CCAFS LAM and CCAFS Theme 1 submitted a Concept Note to the Colombian Presidential Agency (APC) for a Colombia-Senegal Cooperation project which was recently endorsed by their Ministry of Agriculture.
• Strong media coverage in Colombia
• Working Paper in Preparation

Partners:
CIAT, Colombian Ministry of Agriculture and Rural Development, National Rice Growers Federation (FEDEARROZ), National Cereals Growers Federation (FENALCE), Fundacion Rio Piedras.

Links / sources for further information:
Blog posts:
• Bogotá: http://ccafs.cgiar.org/senegal-colombia-exchange-visit#.VNUrTy6xjLk
• Cauca visits: http://ccafs.cgiar.org/blog/sowing-unions-harvest-hope-senegal-shares-approaches-colombia#.VNpqUy6xh31
• http://dapa.ciat.cgiar.org/amistoso-2014-colombia-vs-senegal/

• APC Africa-Colombia exchange (july): Lessons from Colombia’s farmers’ associations http://ccafs.cgiar.org/blog/benefits-cooperation-lessons-colombian-farmers%E2%80%99-associations#.U-teLvldWgK)

* Photos of the whole exchange visit:
https://www.dropbox.com/sh/ezthng3arrpz4v8/AAAHfcD38fsidrPwViyp1-Ooa

* Video Testimonies from the Senegalese Delegation:
http://www.youtube.com/playlist?list=PL8llMWXuQ6Fwfi0RnJGp1t-wUQGlcxK7H

•APC Africa-Colombia exchange (Opening event and field vistis):
https://www.youtube.com/watch?v=ry0G_uLjs78

Media Coverage
• Delegación africana estará de visita en Santander de Quilichao, también irá a Puracé y Buga, Valle del Cauca.
http://www.proclamadelcauca.com/2014/05/delegacion-africana-estara-de-visita-en-santander-de-

quilichao-tambien-ira-a-purace-y-buga-valle-del-cauca.html
• Colombia aprende de la experiencia de Senegal Para enfrentar el cambio climático
http://www.magazincnc.com/colombia-aprende-de-la-experiencia-de-senegal-para-enfrentar-el-cambio-climatico/
• Alcalde Fuentes Meneses recibió Delegación de Senegal (África)
http://www.radiosuperpopayan.com/840/noticias/salud/alcalde-fuentes-meneses-recibio-delegacion-de-senegal-africa/
• Intercambio de saberes entre indígenas y africanos
http://www.eltiempo.com/colombia/cali/intercambio-de-saberes-entre-indigenas-y-africanos/14049517
• Colombia le apuesta a la agricultura inteligente
http://sostenibilidad.semana.com/actualidad/articulo/colombia-apuesta-agricultura-inteligente/31219

Case Study #2

Title: Compendium of climate-smart practices and technologies from within and beyond the CGIAR

Author: Todd Rosenstock

Type: Inter-center collaboration;

Project Description:

The concept of ‘climate-smart agriculture’ (CSA) - food systems that increase food security, improve resilience (adaptive capacity), and mitigate climate change when possible - has quickly been integrated into the global development agenda. Momentum on CSA action recently reached a crescendo when the UN Secretary General launched the Global Alliance on Climate-smart Agriculture, which intends to reach 500 million smallholder farmers at the United Nations ‘Climate Week’. CSA by definition is an integrative and multi-faceted topic. One particular challenge is that the empirical basis for CSA is disparate and, perhaps, wanting, which complicates translating it from concept to concrete actions and contributes to ideological disagreements about it among development practitioners. Thus there is an urgent need to evaluate current knowledge on the effectiveness of CSA to achieve the benefits it intends and inform discourse on food, farming and climate.

The systematic map and review intends to establish the scientific basis of CSA, providing boundary conditions of what we know and what is more uncertain about CSA practices to inform the next steps in development programming and policy formulation.

We assessed the most often cited (and promising) management activities, such as conservation agriculture for field crops or feed management for ruminant livestock, for their impact on the three CSA components: (1) food production, (2) resilience/adaptive capacity, and (3) climate change mitigation.

We supplemented this information by reviewing evidence on the economic costs/benefits of each management practice and the constraints and barriers to its adoption. The resulting data is being compiled into a searchable Web-based database and analytical engine that can be used to assess the relative effectiveness and strength of evidence for CSA and identify best-fit for specific farming and development contexts. Data will be publically available under Creative Commons License prior to 2016.

Introduction / objectives:

The objective of this project is to evaluate the evidence on the impacts of changing farm management practices to CSA practices on food security, resilience/adaptive capacity and climate change mitigation to inform development programming and policy formulation.. Specifically, the World Agroforestry Centre (ICRAF) is leading the review with support from International Centre for Tropical Agriculture (CIAT).

Project Results:

We conducted a systematic review and meta-analysis of the effects of ~65 farm management practices (leguminous intercropped agroforestry, increased protein content of livestock diets, etc) on 22 indicators consistent with CSA goals (yield, water use efficiency, carbon sequestration, etc). Our search of peer-reviewed articles in Web of Science produced 144,567 candidate papers. We screened titles, abstracts and full-text against predetermined inclusion criteria, for example that the investigation took place in a tropical developing country and contains primary data on how both a CSA practice and non-CSA control affect a preselected CSA indicator.

The following are trends in the results based on the data extraction and analysis that has taken place so far (< 10% of the papers). But because the data extraction has been on a random selection of papers, we expect the patterns to hold for the entire dataset. Mapping the location of the studies that met our criteria shows geographic and topical clustering in relatively few locations and around relatively few measures of CSA, indicating potential for bias and highlighting gaps in the evidence for desired CSA objectives (e.g., gender inclusiveness).

Furthermore, outcomes vary widely among studies and locations and are far from clearly positive or negative, suggesting the ‘climate-smartness’ of practices needs to be considered for local conditions and objectives to be meaningful. Co-located, cross-outcome research tends to be sparse except for a few outcome-by-practice combinations. Thus, grand conclusions about synergies and trade-offs among specific CSA components may be unsupported. This meta-analysis provides a useful benchmark of CSA’s scientific basis and can support the transition from hype to meaningful impact on the ground.

Partners:

The CSA Compendium is part of a broader CSA decision-support partnership between ICRAF and CIAT. In the partnership, ICRAF and CIAT have taken a knowledge sharing approach while developing individual and co-developed products. Specifically with the CSA Compendium, while it has been led by ICRAF, it has benefited from extensive work CIAT and the World Bank had launched on indicators for understanding CSA. A reduced set of these indicators served as the search terms for

CSA outcomes in the initial literature search. In addition, ICRAF and CIAT work closely on designing the infrastructure and analytical framework supporting a forthcoming Web portal that will house the Compendium that will both include the data compiled from peer-reviewed literature and provide a crowd sourcing mechanism for others to upload their own information.
What started as fairly separate activities of ICRAF and CIAT has now developed into an integrated CCAFS (ICRAF-CIAT) Flagship Program ('Partnerships for Scaling Climate-Smart Agriculture', (P4S)) that is informing national-level planning for climate-smart agriculture in countries throughout sub-Saharan Africa.

Links / sources for further information:

http://www.slideshare.net/agroforestry/todd-rosenstockclimatesmartagriculture-panaceaorpropaganda

Case Study #3

Title: Rice, Gender and Climate change in Peru

Author: P. Useche (UF) & B. Anglade (UF), Jennifer Twyman and Juliana Muriel (CIAT)

Type: Social differentiation and gender;

Project Description:

There are few studies regarding women's roles in rice production in Latin America and fewer still that include perceptions of climate change and coping strategies by men and women. To begin to fill this gap, CIAT in collaboration with CCAFS, GRiSP, and INIA undertook a study of rice production with small-scale rice producers in the northern coast and amazon regions of Peru, where rice production is concentrated. Surveys were conducted at the end of 2012 to collect data regarding rice variety adoption and production, the gender division of labour, and perceptions of climate change. In total, 497 smallholder rice producers, with land sizes between 0.5-10 hectares were interviewed. Data regarding variety adoption and production as well as the gender division of labour climate change perceptions and coping strategies were analysed. This research is ongoing so analysis and publications will continue in these areas.

Introduction / objectives:

Rice farmers in Peru represent one of the world's social groups that are more highly and heterogeneously exposed to climate change. To determine climate perceptions and coping behaviour observations provide a unique view into the heterogeneity of households' exposure to climate risks and related livelihood stresses. This study examines the complexity of adaptation strategies by

evaluating the complementarity/substitutability between different coping actions. This serves to complement aggregate climate predictions for impact mitigation policies. This study also allows researchers to understand how and why improved rice varieties are adopted and to reveal the role of women in rice production.

Project Results:

Results indicate that even though women do not generally own or manage many rice plots (23% and 9% respectively), they play important roles that often go unrecognized. For example, women make up 31% of the hired labour in rice production and up to 60% of family labour when production support, such as cooking, is included. Also, differences in yields were found by sex of plot manager; plots managed by women have lower yields, likely because they have access to fewer resources and inputs compared to male managers. For example, less hired labour is used on plots managed by women; also, women often have less access to credit, extension services, and other inputs.

Furthermore, the results of this study show how farmer perceptions provide a nuanced picture of climate change in Northern Peru and how agricultural households use different coping mechanisms to respond to diverse climate stress factors. This study finds that households adopting new rice varieties as a coping strategy use this option as a substitute to getting credit, reducing the rice area or diversifying the crop. Moreover, it finds that non-agricultural strategies such as migrating, mortgaging the land and pawning assets are high complements of asking for credit, reducing area or diversifying the crop, and relying on the help of family and friends.

Partners:

* CIAT
* Univ. Florida
* GRiSP
* INIA Peru

Links / sources for further information:

• Muriel, Juliana. Differences in yield of rice production in northern Peru under the gender variable. Undergraduate Thesis. University of Valle, Cali, Colombia. (http://ciat-library.ciat.cgiar.org/thesis/Thesis_diferencias_en_el_rendimiento_de_la_produccion_de_arroz_en_el_norte_de_peru_Muriel_2013.pdf or http://bibliotecadigital.univalle.edu.co/bitstream/10893/5663/1/0461886-p.pdf)

• Muriel, Juliana, Jennifer Twyman and Carolina Gonzalez. 2014. Women's roles in rice production in northern Peru. Presentation prepared for International Rice Congress, Bangkok, Thailand; 27 – 31 October, 2014. (http://www.slideshare.net/CIAT/womens-roles-in-rice-production-in-northern-peru)

* Abstract de Pilar y Boaz—Work in progress

5. Outcomes.

Outcome #1:

Colombian rice farmers use CCAFS informed big data analyses and reduce production losses

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

Early statement (more in 2015): CIAT's findings on the predictive ability of big data revealed the importance of climate as a parameter (up to 50%) in determining rice yield outcomes and won a high profile UN prize. CIAT's findings prompted Colombia's rice producers federation (FEDEAAROZ) to incorporate climate information in farm extension systems. A decision not to plant in Cordoba – informed by seasonal forecasts and big data – prevented 1,800Ha of rice crop loss (saving US$3.5m in input costs).

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

Through artificial neural networks and clustering techniques CIAT team analysed big data on Colombian rice production and found that climate change was able to account for up to half of the variability in rice yields. In money terms, this is nearly US$1,000 of commercial value per Hectare, which is the difference between viable commercial production and ruin for rice farmers in Colombia. The analyses nail down the relationship between crop and climate, and identify the best agricultural practices a farmer might employ, namely what to plant, when to plant and how to plant. In close collaboration with FEDEARROZ, a Colombian trade federation representing >50,000 farmers covering half a million hectares, results are disseminated through workshops, trainings and ICT applications to extensionists and farming groups. FEDEARROZ started using CIAT's identified climate trends to inform decision making – such as planting times and variety selection – and have already averted significant losses.

What partners helped in producing the outcome?

- CIAT – International Centre for Tropical Agriculture – Colombia (Lead)
- FEDEARROZ - Rice producers federation in Colombia – Colombia
- Fenalce – Federation of maize and bean producers – Colombia
- MADR – Ministry of Agriculture and Rural development – Colombia

Who used the output?

- FEDARROZ-rice producers federation
- Rice breeders
- Colombian horticulture association
- Colombian federation of maize and bean producers
- Colombian government branches and rural advisory services (Municipality of Pereira, Ministry of Agriculture and Rural Development)
- FLAR – Latin American fund for Irrigated rice
- Misión Rural – National Department of Planning

•UPRA-National Rural Planning Unit

How was the output used?

FEDEARROZ and the Colombian government are using CIAT's big data insights to incorporate climate data and seasonal forecasting into existing extension service systems. They provide site-specific recommendations to help farmers make better decisions on what to plant, where to plant and how to plant which have already averted crop loss.

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?

Evidence includes:

a) Capacity building (Government, federations, institutions)

b) Global media attention on avoided crop losses by Colombian rice farmers making decisions informed by climate data and seasonal forecasting.

c) Global Pulse Big Data award (UN Climate Summit)

- World Bank Group Innovation Challenge winners

See ANNEX: http://dataccafs.ciat.cgiar.org/2014/TL1/Theme_1_2014_Outcome_1_Annexes.docx

Outcome #2:

Policy makers to scaleout knowledge gap prioritization methdology

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

A workshop hosted by Flagship 1 leader and the CIAT team piloted a methodology for effectively and efficiently identifying knowledge gaps in Climate Change Adaptation in support of the priorities set out in the UNFCCC Nairobi Work Programme. A pilot for the water sector in the Andes identified areas for adaptation action in the Andes and demonstrated that the method is appropriate. The UNFCCC recognized it as a good practice for scaling out to other regions and sectors.

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

The mayor research outputs include:

• A formal Joint Action Pledge statement between CIAT and UNEP for the UNFCCC Nairobi Work Programme (NWP).
• Report from the pilot workshop held in collaboration between UNFCCC, UNEP, GAN and CIAT (Bogota, September 24-26, 2014), which led to:
- A report on prioritized knowledge gaps in the Andean water sector to guide investments and adoption activities
- A CIAT policy brief
- A methodology for knowledge gap identification and prioritization to scale up and out

What partners helped in producing the outcome?

• CIAT (International Centre for Tropical Agriculture)
• UNEP (United National Environment Program)

Partners participating in the Pilot Workshop that led to the identification of the 10 Mayor Knowledge Gaps in the Andean region:

• Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)
• Consorcio para el Desarrollo Sostenible de la Ecorregión Andina (CONDESAN)
• Direction of Water Resources Integrated Management, Ministry of Environment and Sustainable Development, Colombia (Min. Ambiente)
• Economic Commission for Latin America and the Caribbean (ECLAC)
• Inter-American Institute for Cooperation on Agriculture (IICA)
• Intergovernmental Panel on Climate Change (IPCC)
• Ministry of Environment, Ecuador (MAE)
• Ministry of Environment, Peru (MINAM)
• Climate Change Office, Ministry of Environment, Chile (MMA)
• Pan American Health Organization (PAHO)
• United Nations Environment Programme (UNEP)
• Universidad Nacional de Colombia (UNAL)

• World Wildlife Fund for Nature, Colombia (WWF–Colombia)

Who used the output?

• The United National Environment Program (UNEP),
• the United Nations Framework Convention on Climate Change (UNFCCC)
• Other members of the Nairobi Work Programme (NWP).

How was the output used?

Prioritized knowledge gaps for the Andes were presented to policy makers at a COP20 side event and to assist targeting adaptation initiatives. The COP20 presidency endorsed the initiative and its input to the NWP. It is being prioritized for action pledges to outscale in other regions and sectors.

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?

Outcome evidence is present online and includes:

• Recognition by the UNFCCC (it appears in the official minutes);
• CIAT policy brief;
• Copies of the high level presentations online,
• Mention by many media sources covering COP20.

SEE ANNEX: http://dataccafs.ciat.cgiar.org/2014/TL1/Theme_1_2014_Outcome_2_Annexes.docx

7. Outcome indicators.

Outcome Indicator:

One to five flagship technical and/or institutional approaches identified and developed with farmers, key development and funding agencies (national and international), civil society organizations and private sector in three regions, which would directly enhance the adaptive capacity of the farming systems to the climate change conditions

Achievements:

• IRRI-CCAFS have taken further steps in disseminating the technology Alternate Wetting and Drying (AWD) of rice by introducing it in the Bac Lieu province through large scale field models (LSFM) and conducting an effectiveness assessment. This has paved the way for easier and faster implementation of the One Must Five Reduction Program of the Department of Agriculture and Rural Development

• Laser levelling in South Asia has also been promoted heavily, with significant adoption levels. The benefits of laser land levelling has been well documented in previous years of CCAFS activities, including in climate smart villages.

• Supplemental irrigation evaluation took place in previous years in the CCAFS program, and this year ICARDA have been broadening the work to combine with other practices to enhance benefits, and national level promotion of the technology in Morocco to significant success.

• Previous studies showing heavy impacts of climate change on coffee and cocoa by IITA and CIAT are spurning a range of adaptation efforts in East Africa and Central America, including efforts on intercropping and livelihood diversification.

Evidence:

• IRRI-CCAFS:

- http://ccafs.cgiar.org/blog/elite-rice-combat-flooding-vietnam%E2%80%99s-mekong-delta#.VSVMVvnF8k2
- http://www.merid.org/en/Content/News_Services/Food_Security_and_AgBiotech_News/Articles/2014/Sep/24/rice.aspx
- http://irri-news.blogspot.com/2014/06/vietnam-ccafs-sea-holds-workshop-on.html
- http://ccafs.cgiar.org/news/media-centre/press-releases/new-climate-and-clean-air-coalition-agriculture-effort-tackles#.VSVN3fnF8k2
- http://futureag.info/news/new-climate-and-clean-air-coalition-agriculture-effort-tackles-climate-change-supports-rice-production/

• CIMMYT- Laser levelling in South Asia :

-See CIMMYT Case Study # 2, 2014 Annual Report: Adoption of laser land leveling in the north-western Indo-Gangetic Plains: A case of Haryana, India.

-Jat ML and Aryal, JA. 2014. Laser Assisted Precision Land Leveling: Impact at Scale in Rice-Wheat

Systems of Haryana. CIMMYT - CCAFS Brochure 2014/02, p.2
-Jat, ML; Yadvinder-Singh, Gill, G; Sidhu, HS; Aryal, JA; Stirling, C and Gerard, B. 2014. Laser Assisted Precision Land Leveling Impacts in Irrigated Intensive Production Systems of South Asia. Advances in Soil Science (Accepted)
-Aryal, JP; Bhatia, M; Jat, ML and Sidhu, HS. 2014. Impacts of Laser Land Leveling in Rice-Wheat
-Systems of the North-western Indo-Gangetic Plains of India. Food Security (Accepted)

• ICARDA - Adoption of supplemental irrigation technique by farmers in wheat as adaptation to Climate Change:
- See ICARDA 's Outcome in Annual Technical report 2014: Evidence includes: 1) Surveys of 100 + 120 farmers were conducted and showed that 72% of farmers adopted FSI and 21% of them applied DSI. 2) The testimony of farmers and extension services.

• IITA –CIAT
- See IITA Case study in 2014 Annual Technical Report: Innovative non-research partnership: Climate change adaptation through the private and public actors in the coffee/cocoa actors.
- http://www.eafca.org/wwc/downloads/AFCCE12/presentations/IITA-Needs_for_climate_change_adaptation_in_coffee%20.pdf
- http://www.fairtrade.org.uk/en/farmers-and-workers/cocoa/kuapa-kokoo
http://www.snvworld.org/en/regions/africa/news/snv-and-iita-launch-the-cocoa-eco-project-in-cameroon
- https://twitter.com/snvredd/status/393672108699828224

Outcome Indicator:

Breeding strategies of regional and national crop breeding institutions in three target regions are coordinated, informed by CCAFS-led crop modeling approaches that are developed and evaluated for biotic and abiotic constraints for the period 2020 to 2050

Achievements:

• In partnership with EMBRAPA, CCAFS developed a target population environment modelling framework for assessing impacts of climate change on specific breeding target populations, and the means to evaluate different breeding objectives and understand the impacts in terms of mitigating climate impacts. This work, developed for rice in Brazil and Colombia, is influencing the breeding priorities for the EMBRAPA rice program, and the FEDEARROZ and CIAT rice programs in Colombia.

• Further work in Zimbabwe by CIMMYT has also lead to the Crop Breeding Institute incorporating heat tolerance into their breeding activities in maize. CIMMYT research has been instrumental in changing the national crop breeding institute's policy on maize breeding and on the ongoing effort on redefining the 5 natural regions that form the basis of all governmental recommendations to farmers.

Evidence:

• EMBRAPA:
- Alexandre Bryan Heinemann, Camilo Barrios Perez, Julian Ramirez-Villegas, David Arango

Londoño, Osana Bonilla-Findji, João Carlos Medeiros and Andy Jarvis. "Variation and impact of drought stress pattern across upland rice target population of environments in Brazil": http://jxb.oxfordjournals.org/content/early/2015/04/03/jxb.erv126/F7.expansion.html
- TPE Portal under construction: http://172.22.52.56:8080/tpe/
- Working paper in prep.
- Seminar “Drought Tolerance in Rice” at Embrapa Rice and Beans, 29/10/2014, presentation of “VARIATION AND IMPACT OF DROUGHT STRESS PATTERNS ACROSS UPLAND RICE TARGET POPULATION OF ENVIRONMENTS IN BRAZIL” ;

* Theme 1-CIAT:
- Barrios, P., Giraldo, M., Rodriguez, E., “Impacto de la variabilidad climática sobre el sector agropecuario y medidas de adaptación (http://www.copandes.org/#!webfviiipres01/c1l0w)”. Foros virtuales – Comunidad de Practica ANDES. Plataforma Regional para la Transferencia de Tecnología y la Acción frente al Cambio Climático en América Latina y Caribe (REGATA – PNUMA). Centro Internacional de Agricultura Tropical (CIAT). Agosto de 2014.

* CIMMYT:
- See CIMMYT Outcome story #1, Annual Technical Report 2014: CIMMYT-CCAFS research prepares maize breeding programs for future climates.
- http://dtma.cimmyt.org/index.php/component/content/article/110-news-articles/176-cimmyt-ccafs-scientists-identify-maize-varieties-that-can-withstand-drought-and-high-temperatures-in-zimbabwe
- Evidence: Interviews between Gerry Gill (external consultant) and Crop Breeding Institute, AgriSeeds and ProGene confirmed the influence of CCAFS outputs on influencing their research strategies.Interviews with key breeders with the CIMMYT maize breeding pipeline and CIMMYT DTMA regional trial reports showing the increase in area under heat stress (see DTMA website).

Outputs used:
- Downscaled climate projections for Zimbabwe at the maize mega-environment level including temperature and monthly rainfall projections (Cairns et al. 2013a)
- Relationship between drought, heat and combined drought and heat stress (Cairns et al. 2013b)
- Paper presented at 6th International Crop Science Congress, 6-10 August 2012, Bento Goncalces, Rio Grande do Sul State, Brazil. “Progress in breeding for drought stress tolerant maize in Eastern and Southern Africa” JE Cairns, GN Atlin, T Abate, W Mwangi, P Setimela, B Raman, C Thierfelder, PH Zaidi, S Nair, B Das, C Magorokosho, A Tarekegne, J Crossa, G Mahuku, B Masuka, J MacRobert and BM Prasanna
- Presentation to the FAO Agriculture Coordination Forum on “Future climate scenarios in Zimbabwe and its implications for maize production” JE Cairns and K Sonder. 25th July 2013.
- Presentation at the Agricultural Research Trust, Zimbabwe “future climate for Zimbabwe” JE Cairns and K Sonder. 25th February 201

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:

• CIAT/theme 1/theme 4/LAM research outputs were used in the Colombia National Adaptation Strategy by the National Planning Department (DNP), the Institute of Hydrology, Meteorology, and Environmental Studies (IDEAM), and the National Disaster Risk Management Unit (UNGRD). They also led to DNP and the Ministry of Agriculture and Rural Development (MADR) to draft a proposal to invest on adaptation and mitigation and to include a strategy for CSA in the National Development Plan 2015-2019.

• In India, as a result of research and policy engagement by Bioversity International and its partners, showing the value of small millets, the government started to implement the National Food Security Act, targeting more than 800 million people. This new law supports CSA by stimulating the inclusion of several food grains (called “coarse grains”) which are more resistant to climate-induced stresses than wheat and rice, into publicly funded food distribution schemes.

• Adoption of the National Agricultural Biodiversity Policy and the National Biodiversity Strategy and Action Plan (NBSAP) in Nepal, which creates a legal space for implementation of the multilateral system of access and benefit-sharing. In Uganda, an interministerial policy across three ministries was proposed to allocated mandates for mutually supportive implementation of the Nagoya Protocol and the ITPGRFA.

Evidence:

• CIAT/Theme 1:

-Study on Economic Impacts of Climate Change by DNP: DNP-BID (2014). Impactos Económicos del Cambio Climático en Colombia. Bogotá, Colombia. http://dataccafs.ciat.cgiar.org/2014/CIAT/DNP_Impactos_economicos_Cambio_climatico.pdf - https://colaboracion.dnp.gov.co/CDT/Prensa/Impactos%20Econ%C3%B3micos%20del%20Cambio%20Climatico_Sintesis_Resumen%20Ejecutivo.pdf

-Wilson-Grau, R. 2015. Validation Report – Outcome Stories for CIAT-CCAFS Projects in Colombia during 2014. http://intranet.ccafs.cgiar.org/Institutional%20Contact%20Points%20Library/Reviewing%20and%20Reporting/Center%20Technical%20Reports/2014/CIAT/Outcome%20Stories%20Anex/Validation%20Report%20CIAT%20Outcome%20Stories%20A4%20format.pdf

• Bioversity:

- See Bioversity Outcome # 2, in Annual Technical Report 2014: Food Security Bill Supports Climate-Smart Agriculture in India through Sourcing of Climate-Resilient, Nutritious Cereals.
- http://econpapers.repec.org/paper/esswpaper/id_3a3702.htm
- Full evidence in a separate document:

https://drive.google.com/?pli=1&authuser=0#folders/0B0VTAnaUDXLBSW1JRGxtWTl6SDQ
- Explanatory Note of the draft Food Bill, which mentions small millets in relation to climate resilience http://econpapers.repec.org/RePEc:ess:wpaper:id:3702
- Email from Dr M.S. Swaminathan acknowledging the contribution of the Bioversity-MSSRF project.
- http://www.bioversityinternational.org/news/detail/supporting-international-cooperation-in-access-and-benefit-sharing-of-germplasm-for-climate-change-adaptation/
- Nepal National Bioversity Strategy and Action plan : https://www.cbd.int/doc/world/np/np-nbsap-v2-en.pdf

8. Leveraged funds.

There is no Leverage funds

9. Publications.

Publication #1:

Making the most of climate impacts ensembles.

Citation:

Challinor AJ, Martre P, Asseng S, Thornton P and Ewert F. 2014. Making the most of climate impacts ensembles. Nature Climate Change 4: 77–80. DOI:10.1038/nclimate2117. http://www.nature.com/nclimate/journal/v4/n2/full/nclimate2117.html

Identifier	CCAFS Themes	Type	Access
doi:10.1038/nclimate2117	Theme 1,	Peer-reviewed journal articles	Limited

Publication #2:

Climate-driven spatial mismatches between British orchards and their pollinators: increased risks of pollination deficits

Citation:

Polce C., Garrat M., Termansen M., Ramirez-Villegas J., Challinor A.J., Lappage M., et al. (2014) Climate-driven spatial mismatches between British orchards and their pollinators: increased risks of pollination deficits. Global Change Biology, Vol. 20, Issue 9: 2815-2828
DOI: 10.1111/gcb.12577
http://onlinelibrary.wiley.com/doi/10.1111/gcb.12577/abstract

Identifier	CCAFS Themes	Type	Access
DOI: 10.1111/gcb.12577	Theme 1,	Peer-reviewed journal articles	Gold

Publication #3:

Climate variability and vulnerability to climate change: a review

Citation:

Thornton P.K., Ericksen P., Herrero M., Challinor A.J. 2014. Climate variability and vulnerability to climate change: a review. Global Change Biology, Vol. 20, Issue 11: 3313-3328
http://onlinelibrary.wiley.com/doi/10.1111/gcb.12581/abstract

Identifier	CCAFS Themes	Type	Access
doi: 10.1111/gcb.12581	Theme 1,	Peer-reviewed journal articles	Gold

Publication #4:

Using species distributions models for designing conservation strategies of Tropical Andean biodiversity under climate change

Citation:

Julián Ramírez-Villegas, Francisco Cuesta C.,Christian Devenis,Manuel Peralvo, Andy Jarvis, Carlos Arnillas. 2014. Using species distributions models for designing conservation strategies of Tropical Andean biodiversity under climate change. Journal for Nature Conservation, Vol. 22, Issue 5: 391-404 http://dx.doi.org/10.1016/j.jnc.2014.03.007
http://www.sciencedirect.com/science/article/pii/S1617138114000387

Identifier	CCAFS Themes	Type	Access
http://dx.doi.org/10.1016/j.jnc.2014.03.007	Theme 1,	Peer-reviewed journal articles	Limited

Publication #5:

Increasing homogeneity in global food supplies and the implications for food security

Citation:

Khoury, C.K., Bjorkman, A.D., Dempewolf, H., Ramirez-Villegas, J., Guarino, L., Reiseberg, L.H., Jarvis, A., and Struik, P. 2014. Increasing homogeneity in global food supplies and the implications for food security. Proceedings of the National Academy of Sciences, vol. 111 no. 11 doi: 10.1073/pnas.1313490111.
http://www.pnas.org/content/early/2014/02/26/1313490111.full.pdf+html

Identifier	CCAFS Themes	Type	Access
doi: 10.1073/pnas.1313490111	Theme 1,	Peer-reviewed journal articles	Gold

Publication #6:

Ensembles and uncertainty in climate change impacts

Citation:

Falloon P., Challinor A., Dessai S., Hoang L., Johnson J., Koehler A.K. 2014. Ensembles and uncertainty in climate change impacts. Front. Environ. Sci. 2:33. DOI:10.3389/fenvs.2014.00033 http://journal.frontiersin.org/Journal/10.3389/fenvs.2014.00033/full?utm_source=newsletter&utm_medium=web&utm_campaign=Environmental_Science-w40-2014

OPEN ACCESS: YES

ISI PUBLICATION: YES

ESS RELATED ACADEMIC DEPT:

ACKNOWLEDGES CCAFS: NO

Identifier	CCAFS Themes	Type	Access
DOI:10.3389/fenvs.2014.00033	Theme 1,	Peer-reviewed journal articles	Gold

Publication #7:

Impacts of El Niño Southern Oscillation on the global yields of major crops

Citation:

Iizumi T., Luo J., Challinor A.J., Sakurai G., Yokozawa M., Sakuma H., Brown M.E., Yamagata T. 2014. Impacts of El Niño Southern Oscillation on the global yields of major crops. Nature Communications 5, Article number: 3712 DOI:10.1038/ncomms4712 http://www.nature.com/ncomms/2014/140515/ncomms4712/full/ncomms4712.html?message-global=remove&WT.ec_id=NCOMMS-20140521

Identifier	CCAFS Themes	Type	Access
DOI:10.1038/ncomms4712	Theme 1,	Peer-reviewed journal articles	Green

Publication #8:

Prediction of seasonal climate-induced variations in global food production

Citation:

Iizumi T., Sakuma H., Yokozawa M., Luo J., Challinor A.J., Brown M.E., Sakurai G., Yamagata T. 2014. Prediction of seasonal climate-induced variations in global food production. Nature Climate Change 3, 904–908 (2013) DOI:10.1038/nclimate1945

http://www.nature.com/nclimate/journal/v3/n10/full/nclimate1945.html

Identifier	CCAFS Themes	Type	Access
DOI:10.1038/nclimate1945	Theme 1,	Peer-reviewed journal articles	Green

Publication #9:

Comparing the effects of calibration and climate errors on a statistical crop model and a process-based crop model

Citation:

Watson J., Challinor A.J.,Fricker T.E., Ferro C.A.T. 2014. Comparing the effects of calibration and climate errors on a statistical crop model and a process-based crop model. Climatic Change DOI:10.1007/s10584-014-1264-3
http://link.springer.com/article/10.1007/s10584-014-1264-3

Identifier	CCAFS Themes	Type	Access
DOI:10.1007/s10584-014-1264-3	Theme 1,	Peer-reviewed journal articles	Gold

Publication #10:

Equipped to deal with uncertainty in climate and impacts predictions: lessons from internal peer review

Citation:

Wesselink A., Challinor A.J., Watson J., Beven K., Allen I., Hanlon H., Lopez A., Lorenz S., Otto F., Morse A., Rye C., Saux-Picard S., Stainforth D., Suckling E. 2014. Equipped to deal with uncertainty in climate and impacts predictions: lessons from internal peer review. Climatic Change DOI:10.1007/s10584-014-1213-1
http://link.springer.com/article/10.1007/s10584-014-1213-1

Identifier	CCAFS Themes	Type	Access
DOI:10.1007/s10584-014-1213-1	Theme 1,	Peer-reviewed journal articles	Gold

Publication #11:

Regional impacts of climate change on agriculture and the role of adaptation

Citation:

Berry, Pam; Ramírez Villegas, Julián; Bramley, Helen; Mgonja, Mary A.; Mohanty, Samarendu. 2013. Regional impacts of climate change on agriculture and the role of adaptation. In: Jackson, Michael; Ford-Lloyd, Brian V.; Parry, Martin L. (ed.). 2014. Plant Genetic Resources and Climate Change. CABI Climate Change Series No. 4. CAB International, p. 78-97.

Identifier	CCAFS Themes	Type	Access
DOI:10.1079/9781780641973.0078	Theme 1,	Book chapters	Limited

Publication #12:

Response of Perennial Horticultural Crops to Climate Change

Citation:

Glenn M, Kim SH, Ramirez-Villegas J, Ladërach P. 2014. Response of Perennial Horticultural Crops to Climate Change. In: Janick J, ed. Horticultural Reviews Vol. 41. Hoboken, USA: Wiley-Blackwell. p. 47-130.

Identifier	CCAFS Themes	Type	Access
DOI: 10.1002/9781118707418	Theme 1,	Book chapters	

Publication #13:

Climate-smart agriculture for food security

Citation:

Lipper, L. et al. 2014. Climate-smart agriculture for food security. Nature Climate change 4: 1068–1072.
doi:10.1038/nclimate2437 http://www.nature.com/nclimate/journal/v4/n12/full/nclimate2437.html

Identifier	CCAFS Themes	Type	Access
doi:10.1038/nclimate2437	Theme 1,	Peer-reviewed journal articles	Green

Publication #14:

Food security in a perfect storm: using the ecosystem services framework to increase understanding

Citation:

G. M. Poppy, S. Chiotha, F. Eigenbrod, C. A. Harvey, M. Honzák, M. D. Hudson, A. Jarvis, N. J.Madise, K. Schreckenberg, C. M. Shackleton, F. Villa and T. P. Dawson. 2014. Food security in a perfect storm: using the ecosystem services framework to increase understanding. Phil. Trans. R. Soc. B 369: 20120288. http://dx.doi.org/10.1098/rstb.2012.0288 http://rstb.royalsocietypublishing.org/content/369/1639/20120288.abstract

Identifier	CCAFS Themes	Type	Access
http://dx.doi.org/10.1098/rstb.2012.0288	Theme 1,	Peer-reviewed journal articles	Gold

Publication #15:

A global alliance declaring war on cassava viruses in Africa

Citation:

Legg, J. et al. 2014. A global alliance declaring war on cassava viruses in Africa. Food Sec 6: 231-248. DOI: 10.1007/s12571-014-0340-x http://link.springer.com/article/10.1007%2Fs12571-014-0340-x

Identifier	CCAFS Themes	Type	Access
DOI: 10.1007/s12571-014-0340-x	Theme 1,	Peer-reviewed journal articles	

Publication #16:

Patrimonial Violence: A Study of Women's Property Rights in Ecuador.

Citation:

Deere, Carmen Diana, Jacqueline Contreras, and Jennifer Twyman. 2014. "Patrimonial Violence: A

Study of Women's Property Rights in Ecuador." Latin American Perspectives, 41: 143 – 165.

Identifier	CCAFS Themes	Type	Access
doi: 10.1177/0094582X13492133	Theme 1,	Peer-reviewed journal articles	

Publication #17:

Quién toma las decisiones agrícolas? Mujeres propietarias en el Ecuador

Citation:

Deere, Carmen Diana and Jennifer Twyman. 2014. "Quién toma las decisiones agrícolas? Mujeres propietarias en el Ecuador." (Who makes agricultural decisions? Women Landowners in Ecuador). Agricultura, Sociedad y Desarrollo, 11(3): 425-440.

Identifier	CCAFS Themes	Type	Access
http://hdl.handle.net/10568/51653	Theme 1,	Peer-reviewed journal articles	Gold

Publication #18:

Género, estado civil y la acumulación de activos en el Ecuador: una mirada a la violencia patrimonial

Citation:

Deere, Carmen Diana, Jackeline Contreras and Jennifer Twyman. 2014. "Género, estado civil y la acumulación de activos en el Ecuador: una mirada a la violencia patrimonial," (Gender, marital status and asset accumulation in Ecuador: The role of patrimonial violence). Eutopía, No. 5: 93-119.

Identifier	CCAFS Themes	Type	Access
ISSN: 1390 5708	Theme 1,	Non-peer reviewed articles	

Publication #19:

Getting to the Source: understanding community involvement in adaptation planning and costing

Citation:

Corner-Dolloff, C.; Moll-Rocek, J.. 2014. Getting to the Source: understanding community involvement in adaptation planning and costing . In: Louis Lebel, Chu Thai Hoanh, and Chayanis Krittasudthacheewa (Eds.). Climate risks, regional integrarion and sustainability in the mekon region. . Strategic Information and Research Development Centre, Malaysia. p. 309-334.

Identifier	CCAFS Themes	Type	Access
ISBN: 9789670630250	Theme 1,	Book chapters	

Publication #20:

Potential Impact of Road Projects on Habitat Loss and Greenhouse Gas Emissions in Guyana from 2012 to 2022

Citation:

Reymondin, L; Coca, A; Arango, D; Jarvis, A; Navarrete, C; Suding, P; Watkins, G. 2014. Potential Impact of Road Projects on Habitat Loss and Greenhouse Gas Emissions in Guyana from 2012 to 2022. Published technical note by Inter-American Development Bank (IDB). 45 p.

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #21:

The changing composition of the global diet: Implications for CGIAR research

Citation:

Khoury CK; Jarvis A. 2014. The changing composition of the global diet: Implications for CGIAR research. CIAT Policy Brief No. 18. Centro Internacional de Agricultura Tropical. 6 p.

Identifier	CCAFS Themes	Type	Access
CIAT Policy Brief No. 18	Theme 1,	Other	

Publication #22:

Genotypic adaptation of Indian groundnut cultivation to climate change: an ensemble approach.

Citation:

Ramirez- Villegas, Julian. 2014. Genotypic adaptation of Indian groundnut cultivation to climate change: an ensemble approach. Doctoral Thesis. The University of Leeds, School of Earth and Environment. England

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #23:

Climate Change, Agriculture, & Gender Dynamics: A Case Study of Campesinos in the Piedras River Watershed

Citation:

Marsala-Bell, Seth. 2014. "Climate Change, Agriculture, & Gender Dynamics: A Case Study of Campesinos in the Piedras River Watershed," Field Practicum Report of Master of Sustainable Development Practice Degree, University of Florida: Gainesville. Available online at: http://ufdc.ufl.edu/AA00025566/00001?search=marsala-bell.

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #24:

Gender Dynamics in the Adoption of Climate Adaptation Practices: A Case Study in the Cauca Department of Colombia

Citation:

Devereux, Taryn. 2014. "Gender Dynamics in the Adoption of Climate Adaptation Practices: A Case Study in the Cauca Department of Colombia," Field Practicum Report for Master of Sustainable Development Practice Degree, University of Florida: Gainesville. Available online at: http://ufdc.ufl.edu/AA00023802/00001.

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #25:

Local-level appraisal of benefits and barriers affecting adoptation of climate-smart agricultural practices: Ghana

Citation:

Peterson, C. 2014. Local-level appraisal of benefits and barriers affecting adoption of climate-smart agricultural practices: Ghana. CCAFS Technical Report.

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #26:

Climate-Smart Agriculture in Costa Rica

Citation:

World Bank; CIAT; CATIE. 2014. Climate-Smart Agriculture in Costa Rica. CSA Country Profiles for Latin America Series. Washington, D.C.: The World Bank Group. Click Here

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #27:

Climate-Smart Agriculture in El Salvador

Citation:

World Bank; CIAT; CATIE. 2014. Climate-Smart Agriculture in El Salvador. CSA Country Profiles for Latin America Series. Washington, D.C.: The World Bank Group. Click Here

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #28:

Climate-Smart Agriculture in Mexico

Citation:

World Bank; CIAT; CATIE. 2014. Climate-Smart Agriculture in Mexico. CSA Country Profiles for Latin America Series. Washington, D.C.: The World Bank Group. Click Here

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #29:

Plant genetic engineering, climate change and food security. CCAFS Working Paper No.72

Citation:

Rodomiro Ortiz, Andrew Jarvis, Paul Fox, Pramod K. Aggarwal, Bruce M. Campbell. 2014. Plant genetic engineering, climate change and food security. CCAFS Working Paper No.72 https://cgspace.cgiar.org/bitstream/handle/10568/41934/CCAFS%20WP%2072.pdf

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #30:

Climate-Smart Agriculture in Peru

Citation:

World Bank; CIAT; CATIE. 2014. Climate-Smart Agriculture in Peru. CSA Country Profiles for Latin America Series. Washington, D.C.: The World Bank Group. Click Here

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #31:

Climate-Smart Agriculture in Sinaloa, Mexico

Citation:
World Bank; CIAT; CATIE. 2014. Climate-Smart Agriculture in Sinaloa, Mexico. CSA Country Profiles for Latin America Series. Washington, D.C.: The World Bank Group. Click Here

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #32:

Adaptation Actions in Africa: Evidence that Gender Matters

Citation:
Twyman J, Green M, Bernier Q, Kristjanson P, Russo S, Tall A, Ampaire E, Nyasimi M, Mango J, McKune S, Mwongera C, and Ndourba, Y. 2014. Adaptation Actions in Africa: Evidence that Gender Matters. CCAFS Working Paper no. 83.
https://cgspace.cgiar.org/bitstream/handle/10568/51391/WP83.pdf

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #33:

Climate-Smart Agriculture in Argentina

Citation:
World Bank; CIAT; CATIE. 2014. Climate-Smart Agriculture in Argentina. CSA Country Profiles for Latin America Series. Washington, D.C.: The World Bank Group. Click Here

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #34:

Climate-Smart Agriculture in Chiapas, Mexico

Citation:

World Bank; CIAT; CATIE. 2014. Climate-Smart Agriculture in Chiapas, Mexico. CSA Country Profiles for Latin America Series. Washington, D.C.: The World Bank Group. Click Here

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #35:

Rapid Rural Appraisal Report of Northern Uganda

Citation:

Mwongera, C., K. M. Shikuku, J. Twyman, L. Winowiecki, A. Ampaire, M. Koningstein and S. Twomlow. 2014. Rapid Rural Appraisal Report of Northern Uganda. International Center for Tropical Agriculture (CIAT), CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)
https://cgspace.cgiar.org/bitstream/handle/10568/35639/Report_Northern%20Uganda%202014.pdf

Identifier	CCAFS Themes	Type	Access
	Theme 1,	Other	

Publication #36:

Climate-Smart Agriculture in Colombia

Citation:

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