RESEARCH PROGRAM ON
Climate Change, Agriculture and Food Security

Theme leader 2

2013 technical report

1. Activity Reporting

Activity 463-2013 (Milestone 2.1.1 2013.)

Title: Maintain 3 thematic "Communities of Practice" across CGIAR and partners (e.g., index insurance, crop/rangeland/pest/disease forecasting, household bioeconomic modeling).

Status: **Partially complete.** Web portals and list servs are in place for climate services and index insurance. Household modeling workshop and portal in 2014

Gender component:

Deliverables:

Partners:

IFPRI; ICRISAT

Locations:

Global

Activity 464-2013 (Milestone 2.1.1 2013.)

Title: Evaluate alternative indexes and implementation designs for index-based agricultural insurance, through a shared post-doctoral associate.

Status: **Partially complete.** Helen Greatrex participated in the evaluation of alternative remote sensing indices for the Senegal R4 project; initiated development of a cross-CGIAR index insurance community of practice; collecting data and preparing for a modeling study of index design and basis risk in Ethiopia. Journal article is forthcoming

Gender component:

Deliverables:

- Journal article

Submitted to journal

Partners:

IRI

Locations:

South Asia (SAs)

Activity 465-2013 (Milestone 2.1.1 2013.)

Title: Continuation and expansion of seasonal forecasts and advisories at the Makuene benchmark site.

Status: **Partially complete.** Completed evaluation of use and benefits of seasonal climate forecasts and advisories; reports and journal articles are pending.

Gender component:

The evaluation was designed to evaluate the differences if any between men and women in their understanding of the probabilistic climate information and how the same is interpreted and used in planning farm operations. This information will help in tailoring the products (training module and information products) to meet the specific needs of both the groups.

Deliverables:

Partners:

ICRISAT

Locations:

East Africa (EA)

Activity 466-2013 (Milestone 2.1.2 2013.)

Title: Development and application of analytical framework and tools for modeling impact of risk management interventions on livelihood resilience at 2 CCAFs sites.

Status: **Partially complete.** Initial prototype tool completed for Borana site in Ethiopia. Refinements of the tool and publication are in process

Gender component:

Deliverables:

- Household modeling software tools

Pilot tool complete

Partners:

ILRI

Locations:

Activity 467-2013 (Milestone 2.1.3 2013 (1).)

Title: Develop and pilot/demonstrate methodology for analyzing and fostering gender and social equity within participatory action research focused on management of climate-related risk.

Status: **Partially complete.** Research protocol developed, pilot tests conducted in South Asia (February-March 2013) and East Africa (July-August 2013); journal article submitted.

Gender component:

Explicitly addresses gender considerations related to management of climate risk

Deliverables:

- Research framework developed

Journal article submitted

- PAR research partners trained

Training to occur in 2014.

Partners:

UF

Locations:

South Asia (SAs),West Africa (WA)

Activity 469-2013 (Milestone 2.2.1 2013.)

Title: Analyze state and national-level food security response policies and interventions in Ethiopia, with emphasis on linking information availability with the timing of key decisions related to crisis response and monitoring.

Status: **Complete.** Phase 1 and Phase 2 activities complete. Publication and development of Phase 3 in process.

Gender component:

Deliverables:

Partners:

GeoSAS

Locations:

East Africa (EA)

Activity 470-2013 (Milestone 2.2.1 2013.)

Title: 4 national level papers/consultations and a regional level report on climate risk and the sustainability of public food distribution and cash transfer programs at the national and regional level.

Status: **Complete.** Reported on in 2012. This activity received no additional funding in 2013. UNDP and WFP are taking the 2012 work forward by developed four case studies which will be submitted to the ASEAN Working Group on Climate Change by the end of 2014.

Gender component:

Deliverables:

- Four country level reports and a regional report

Reported on in 2012. This activity received no additional funding in 2013. UNDP and WFP are taking the 2012 work forward by developed four case studies which will be submitted to the ASEAN Working Group on Climate

Change by the end of 2014.

Partners:

UNDP

Locations:

South East Asia (SEA),South Asia (SAs)

Activity 471-2013 (Milestone 2.2.1 2013.)

Title: Development of food system-level research and partnerships, including decision support tools for national and international food security and humanitarian response.

Status: **Complete.** Integrated food security modeling workshops held for Southeast Asia; opportunities for CCAFS to add value to global and regional efforts identified; linked the Monsoon Forum outputs to Food Security Monitoring products, including IPC

Gender component:

Deliverables:

Partners:

IRRI

Locations:

Global

Activity 472-2013 (Milestone 2.3.1 2013.)

Title: Remote sensing data assimilation methodology development, evaluation, and workshop.

Status: **Complete.** Journal article describing and evaluating methodology published; workshop report published

Gender component:

Deliverables:

- Report and journal paper on methodology adapted to heterogeneous smallholder farming; http://www.sciencedirect.com/science/article/pii/S0034425713002307

Partners:

IRI; NASA JPL

Locations:

Global

Activity 473-2013 (Milestone 2.3.1 2013.)

Title: Crop forecasting software development: A software platform to integrate several lines of methodological research, support research and testing, and enable regional partners to test and operationalize improved methodology.

Status: **Complete.** Working version of the CCAFS Regional Agricultural Forecasting Toolkit has been released for South Asia; is being applied and evaluated by regional partners.

Gender component:

Deliverables:

Partners:

ARC

Locations:

South Asia (SAs)

2. Succinct summary of activities and deliverables by Output level

Output: 2.1.1

Summary:

The TL co-supervised a post-doctoral associate to advance knowledge on the implications of basis risk for effective index-based agricultural insurance, and options for reducing basis risk. This work initiated a review of case studies of index-based insurance for smallholder farmers in the developing world, that are scaling or show strong potential for scaling up.

Output: 2.1.2

Summary:

Theme 2 commissioned ILRI to develop a modelling framework and tools to analyse the feedbacks that drive the resilience (or conversely the poverty traps) of farming households, with a focus on the role of climate variability in these processes. The framework was pilot tested for Borana, Ethiopia and Wote, Kenya. This is in preparation for use of the analytical framework and household modelling tools to assess the potential impact of alternative suites of adaptation and risk management practices and institutional interventions on the future livelihoods of farmers at CCAFS Climate-Smart Village sites, in the face of a variable and changing climate.

Output: 2.1.3

Summary:

A commissioned project by University of Florida shifted its focus general methodology for gender-focused participatory evaluation of climate risk management strategies for CCAFS sites, to knowledge synthesis and guidelines for identifying and addressing gender and social equity challenges in climate information and advisory services for smallholder farmers. A submitted journal paper summarizes guidelines that are being expanded for incorporation in training resources for communication intermediaries.

Output: 2.2.1

Summary:

Theme 2 continued work on Integrated Food Security Modelling. Based on this work, CCAFS was asked to join the Global Technical Advisory Group (TAG) of the IPC (Food Security Integrated Phase Classification) secretariat. Theme 2 and IRRI jointly organized a workshop on Integrated Food Security Modelling in the Philippines with participants from the CGIAR (CIMMYT, CIAT, and IRRI); the FAO; RIMES; and key government institutions. Since this event, work in the Philippines is ongoing. Theme 2, IPC, WFP, and FAO agreed to build upon the work in Southeast Asia, as well as CGIAR expertise in East Africa, to explore a second Integrated Food Security Modeling project in East Africa. An initial workshop with representatives from 8 CGIAR centers and key food security partners was held.Theme-commissioned work with national partners in Ethiopia completed surveys of food security decision-makers in 24 Woredas as part of the Climate Resilient Planning Pilot Project. Two working

papers outlining decision processes and information flows for the inputs sector and food security assessment were completed. As the project shifts to dissemination of tailored analyses of climate and agriculture information for decision-makers, a wide network of experts have been mobilized to help link research outputs to local decision processes, including Ethiopian experts (Ethiopian Institute of Agricultural Research, National Meteorological Agency, and multiple Ethiopian universities) and international experts (CGIAR, USAID-FEWSNET, WFP, and academics at leading global universities). Bioversity submitted a successful proposal to ITII to replicate the methodological framework in Guatemala with both CIAT and CATIE. Work in Guatemala will start in early 2014. In Southeast Asia, commissioned work by the Regional Multi-Hazard Early Warning System for Asia and Africa (RIMES) and IRRI evaluated the use of climate information for food security, early warning, and/or disaster risk reduction in the Philippines, Cambodia, Lao PDR, and Myanmar. Together with UNDP, two previous CCAFS studies on food security safety net programs in Cambodia and Indonesia were further developed and broken into four studies stress testing specific social safety net programs, which will be delivered to ASEAN in 2014.

Output: 2.3.1

Summary:

The Theme leadership contributed to this output through supporting and leveraging capacity development with several African climate institutions, supporting and guiding commissioned development of crop forecasting tools, initiating development of an online “dynamic risk atlas” for South and Southeast Asia, and participating in the strategic direction of African climate research. CCAFS leveraged, guided and selectively co-funded (with USAID, WMO, UNDP) a coordinated effort (with IRI, U. Reading and others) to build the capacity of African meteorological institutions to provide historic data and new climate information products and services that are relevant to the needs and local spatial scale of smallholder farmers. As a result, the national meteorological services of Ethiopia, Tanzania and Madagascar, and AGRHYMET regionally in West Africa, now maintain high-quality, high-resolution, spatially-complete historic data sets; provide at least a basic set of new web-based high-resolution historic and monitored climate information products; and have the capacity to produce new climate information services tailored to the needs of agriculture. Theme 2 supported additional training to prepare the Tanzania Meteorological Agency to respond quickly to demands and opportunities to provide climate services for smallholder farmers under the GFCS national implementation project. At a continental scale, an organizing role in the African Climate Conference ensured that the issues and time scales that are important to agriculture were incorporated into a new African Climate Research for Development strategic agenda and planned coordination. Commissioned work supported further development of the CCAFS Regional Agricultural Forecasting Toolbox (CRAFT), including protocols and tools (in partnership with AgMIP) that will allow CRAFT to run several different families of crop models with common data. A proof-of-concept study on assimilating remote sensing data into crop simulation models to improve the accuracy of crop production monitoring and forecasting concluded with journal articles and successful prototype tools.

3. Publications

Publication #1

Type: Working papers

CCAFS Themes: Theme 2

Citation: Tall A, Jay A, Hansen J. 2013. Scaling Up Climate Services for Farmers in Africa and South Asia Workshop Report. CCAFS Working Paper no. 40. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.

Publication #2

Type: Working papers

CCAFS Themes: Theme 2

Citation: Sheffield J, Chaney N. 2013. Developing high-quality meteorological data for East and West Africa from merged sources. CCAFS Working Paper No. 45. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #3

Type: Working papers

CCAFS Themes: Theme 2

Citation: Ramakrishna YS. 2013. Current status of agrometeorological services in South Asia, with special emphasis on the Indo-Gangetic Plains. CCAFS Working Paper No. 53. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #4

Type: Working papers

CCAFS Themes: Theme 2

Citation: Krishnamurthy PK, Hobbs C, Matthiasen A, Hollema SR, Choularton RJ, Pahari K, Kawabata M. 2013. Climate risk and food security in Nepal—analysis of climate impacts on food security and livelihoods. CCAFS Working Paper No. 48. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #5

Type: Journal papers

CCAFS Themes: Theme 2

Citation: Ines AVM, Das NN, Hansen JW, Njoku EG. 2013. Assimilation of remotely sensed soil moisture and vegetation with a crop simulation model for maize yield prediction. Remote Sensing of Environment 138: 149–164.

Publication #6

Type: Conference proceedings

CCAFS Themes: Theme 2

Citation: May S, Hansen J, Tall A. 2013. Workshop report: Developing a methodology to communicate climate services for farmers at scale: CCAFS workshop, Nairobi, Kenya, 12-14 June 2013. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #7

Type: Conference proceedings

CCAFS Themes: Theme 2

Citation: Tall A, Njinga JL. 2013. Developing a methodology to evaluate climate services for farmers in Africa and South Asia workshop report. CCAFS workshop held 19-25 May 2013 in Kaffrine, Senegal. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Publication #8

Type: Conference proceedings

CCAFS Themes: Theme 2

Citation: Ndiaye O, Moussa AS, Seck M, Zougmore R, Hansen J. 2013. Communicating seasonal forecasts to farmers in Kaffrine, Senegal for better agricultural management. Case Study prepared for Hunger

- Nutrition
- Climate Justice
- 2013 | A New Dialogue : Putting People at the Heart of Global Development. Dublin, Ireland: Irish Aid.

Publication #9

Type: Working papers

CCAFS Themes: Theme 2

Citation: Robertson AW, Bell M, Cousin R, Curtis A, Li S. 2013. Online tools for assessing the climatology and predictability of rainfall and temperature in the Indo-Gangetic plains based on observed datasets and seasonal forecast models. Working Paper no. 27. Cali, Colombia: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

4. Communications

Media campaigns:

None

Blogs:

http://ccafs.cgiar.org/blog/how-well-do-climate-services-work-farmers#.UvU1QWRDtcg
http://ccafs.cgiar.org/blog/reaching-farmers-climate-information-mission-possible#.UvU1VWRDtcg
http://ccafs.cgiar.org/blog/providing-climate-services-make-sense-farmers#.UvU1aGRDtcg
http://ccafs.cgiar.org/gender-being-considered-within-climate-services#.UvU1fGRDtcg
http://ccafs.cgiar.org/blog/whats-needed-help-smallholders-make-better-use-agricultural-information#.UvU1lGRDtcg
http://ccafs.cgiar.org/blog/bridging-gap-between-climate-forecasters-and-farmer-communities#.UvU3Q2RDtcg
http://ccafs.cgiar.org/tool-help-analyse-rainfall-variability-south-asia-now-available#.UvU1qWRDtcg
http://ccafs.cgiar.org/blog/developing-methodology-evaluate-climate-services-farmers#.UvU1x2RDtcg
http://ccafs.cgiar.org/blog/how-can-we-reach-million-farmers-climate-services#.UvU122RDtcg
http://ccafs.cgiar.org/blog/call-action-building-index-insurance-community-bangladesh#.UvU16mRDtcg
http://ccafs.cgiar.org/blog/climate-proofing-major-development-efforts-east-and-southern-africa#.UvU2BmRDtcg
http://ccafs.cgiar.org/blog/defining-climate-research-agenda-development-africa#.UvU2F2RDtcg
http://ccafs.cgiar.org/blog/strengthening-availablity-and-use-climate-services-africa#.UvU2LWRDtcg
http://ccafs.cgiar.org/blog/showing-how-climate-services-can-work-smallholder-farmers#.UweRVEJdVcg
http://ccafs.cgiar.org/blog/project-tests-new-ways-deliver-climate-related-messages-farmers-cell-phones
http://ccafs.cgiar.org/blog/climate-services-farmers-learning-journey-through-mafoota-jamaica
http://ccafs.cgiar.org/blog/getting-grips-how-farmers-perceive-climate-variability-and-its-impacts#.UwjEmUJdVch

Websites:

http://scalingup.iri.columbia.edu/
http://iicop.iri.columbia.edu/http://cscop.iri.columbia.edu/
http://agrobiodiversityplatform.org/refarm/

Social media campaigns:

n/a

Newsletters:

n/a

Events:

Developing a methodology to evaluate climate services for farmers in Africa and South Asia workshop, 18-20 May, Kaffrine, Senegal
http://ccafs.cgiar.org/blog/developing-methodology-evaluate-climate-services-farmers

Developing a methodology to communicate climate services for farmers at a scale workshop, 12-14 June, Nairobi, Kenya
http://ccafs.cgiar.org/blog/bridging-gap-between-climate-forecasters-and-farmer-communities#.UwNxCEKSxcg

Theme 2 co-organized four USAID-funded proposal writing and planning workshops with Engility Corporation in June-July 2013 in Nairobi, Dakar and Kathmandu.Africa Climate Conference, 15-18 October, Arusha, Tanzania. Arame Tall was co-chair of the steering committee
www.africaclimateconference.org
http://ccafs.cgiar.org/blog/defining-climate-research-agenda-development-africa#.UwT5TkKwKZJ

Integrated Food Security Modeling (IMCASE) project inception workshop, 3-5 September, Los Banos, Philippines. CCAFS Theme 2 and IRRI co-sponsored.
http://imcase-updates.blogspot.com/p/about.html

FAO-WFP-CCAFS joint meeting on Climate, Crop and Food Security Forecasting. 9 October, Rome at FAOThird International Conference on Climate Services, 4-6 December, Montego Bay, Jamaica. Theme 2 co-sponsored.
http://www.climate-services.org/iccs/iccs-3/home;
http://ccafs.cgiar.org/blog/showing-how-climate-services-can-work-smallholder-farmers

Videos and other multimedia:

Theme 2 and IRI communications provided input (photos, narration) on the Senegal Public Information video prepared by the Coordinating Unit for the Food Security and Climate Justice conference.IRI Video of a field trip to Mafoota Farmers' Cooperative at ICCS 3 was used in conference blogs:
http://vimeo.com/83609930;
http://ccafs.cgiar.org/blog/showing-how-climate-services-can-work-smallholder-farmers#.UweRVEJdVcg

IRI Video of Arame Tall at ICCS 3 also used in conference blogs from IRI and CCAFS:
http://www.climate-services.org/iccs/iccs-3/thursday-review-arame-tall-cgiar-research-program-climate-change-agriculture-and-food;

Other communications and outreach:

Worked with IRI communications staff to co-promote Theme 2/CCAFS content through IRI and Earth Institute networks and social media.CCAFS/IFAD Webinar: Supporting Smallholder Farmers' Adaptation to Climate Change through Climate Services, 13 March 2013Other media coverage:
http://www.wmo.int/pages/mediacentre/press_releases/pr_982_en.htmlGFCS side event at African Climate Conference, and coverage:
http://www.gfcs-climate.org/content/gfcs-related-side-events-africa-climate-conference-2013
http://www.trust.org/item/20131213115309-u2rxt/

5. Case studies

Case Study #1

Title: Integrated food security modeling
Author: Kevin Coffey and Michael Sheinkman
Type: Inter-center collaboration,Food security

Project description:

The humanitarian aid community depends on regular analysis and prediction of food security situations throughout the world. The goal of this project is to increase the accuracy and lead time of food security forecasting through a pilot project in the Philippines, technical advisory to the global IPC, and expansion of the current pilot to East Africa. This work is done with a wide range of national and global partners with an explicit focus on connecting CGIAR expertise in modelling and prediction to the humanitarian aid community.

Introduction / objectives:

Over the past three decades, major progress has been made on analysis of risk and vulnerability, food security monitoring, and emergency needs assessment. This includes advances in models and tools related to the meteorological, biophysical, economic, and sociological components of climate related acute food security analysis. Sophisticated approaches and tools now exist for simulating meteorological processes (seasonal climate forecasting), biophysical process (crop and soil models), spatial distribution (remote sensing and geospatial analysis), economic models (price forecasting models), and impact on household food security. CCAFS has identified a research gap in the effective integration of these tools. The IPC is a global standard for food security classification, but lacks methods for communicating the uncertainty and probabilistic nature of the forecasting, which is one factor leading to donor hesitancy to respond based on early warning results. The current model for integration is based purely on expert intuition and no modeling tools exist to effectively integrate the outputs of the different models. The goal of this effort is to bring together experts from relevant fields to design innovative approaches to improve the integration of model outputs and ensure that the integrated product represents the most up-to-date and scientifically rigorous approaches available for each of the sub-compone

Project results:

The integration of these approaches in the IMCASE Philippines Pilot project has led to new CGIAR partnerships for simulating the impacts of seasonal climate variability on agricultural output and food security among farm households and their communities. The group is currently working with the FAO and national partners to evaluate the results of integrated models for decision-making. Based on this work, the FAO, WFP, IPC, and CCAFS Theme Two held a meeting in Rome to plan expansion of this work to East Africa. A workshop in East Africa in early February 2014 included six CGIAR centers, WFP, FAO, RIMES, IPC, and UNISDR. CCAFS has also been asked to become a member of the IPC Technical Advisory Group (TAG).

Partners:

CCAFS Theme 2, IRRI, FAO, WFP, IPC, RIMES, CIMMYT, and Philippine National Partners (for Philippines Pilot)

Links/sources for further information:

http://imcase-updates.blogspot.com/

Case Study #2

Title:

CCAFS supports the development of the first national implementation project, in Tanzania and Malawi, under the UN Global Framework for Climate Services

Author: Jim Hansen

Type: Capacity enhancement,Policy engagement

Project description:

The Global Framework for Climate Services (GFCS) is a UN initiative, endorsed by all member states, that seeks to enable society to better manage the risks and opportunities arising from climate variability and change, especially for those who are most vulnerable. CCAFS is part of a consortium that worked through 2013 to design, mobilize resources, and develop institutional capacity, for the first national, multi-sector implementation project under the GFCS. The project, "Climate Services Adaptation Programme in Africa," funded by a $10M grant from the Norwegian government, will work both with national meteorological services to produce user-relevant climate information; and with stakeholders involved in agriculture and food security, health and disaster risk reduction to build their capacity to use climate information in decision-making. As a core partner and steering committee member, CCAFS is working to ensure that the reaches smallholder farmers in the target countries of Tanzania and Malawi.

Introduction / objectives:

The overall aim of the programme is to increase the resilience of people most vulnerable to the impacts of weather and climate-related events through the development, implementation and evaluation of a joint programme of Climate Services in programme countries. The work plan will invest in capacity at national, local and regional levels.

Project results:

Key results in 2013 were the design and successful funding proposal for the program, initial work planning, draft governance structure, and November launch of the project through an MOU signed by the WMO and Norway government at the COP in Warsaw. CCAFS worked through the year to strengthen the capacity of institutions in Tanzania to respond to the opportunity. This included working with the Tanzania Meteorological Agency (TMA), with IRI technical support, to develop high-resolution historic rainfall and temperature data sets needed to

provide climate information at the spatial scale that farmers need, a software platform to produce and disseminate a range of climate information through online "maprooms," a basic set of climate information products built on the historic gridded data, and capacity to downscale seasonal climate forecasts onto the high resolution data. CCAFS also piloted training to equip agricultural extension and World Vision staff to communicate downscaled climate forecasts with farmers.

Partners:

• Centre for International Climate and Environmental Research - Oslo (CICERO)• International Federation of Red Cross and Red Crescent Societies (IFRC) including Norwegian Red Cross and Red Cross/Red Crescent Climate Centre • UN World Food Programme (WFP)•

Links/sources for further information:

http://www.gfcs-climate.org/content/gfcs-related-side-events-africa-climate-conference-2013

http://www.wmo.int/pages/mediacentre/press_releases/pr_982_en.html

http://ccafs.cgiar.org/blog/strengthening-availablity-and-use-climate-services-africa#.Uwefknmn6cM

Case Study #3

Title:
Partnership with USAID on Scaling Up Climate Services For Farmers in Africa and Asia
Author: Jim Hansen
Type: Innovative non-research partnerships

Project description:
A partnership with USAID enabled both organizations to advance their objectives of mobilizing communities of practice around strengthening climate services for farmers, regionally and through South-South learning, in West Africa, Eastern and Southern Africa, and South Asia. The effort builds on the joint USAID-CCAFS-WMO-Climate Services Partnership (CSP) workshop "Scaling up Climate Services for Farmers in Africa and South Asia," in Saly, Senegal, December 2012, where participants proposed initial ideas for advancing efforts within and between their regions. CCAFS and USAID organized USAID-sponsored regional workshops in June-July 2013 to support further definition of regional plans of action for strengthening climate services, and the development of proposals for implementing components of each regional plan. The four workshops, in Nairobi, Dakar and Khatmandu, provided expert guidance as groups formulated regional strategies, and prepared proposals to resource initial steps toward those strategies. CCAFS, CSP and WMO partnered with USAID to develop a small grant program (to be awarded early 2014) to enable participants of the Saly workshop to start implementing these plans in each region.

Introduction / objectives:
The objective of this effort was to provide the guidance and initial resources need to empower participants from the Saly workshop to turn their preliminary ideas into regional and cross-regional action.

Project results:
The workshop process enabled groups from each of the targeted regions to refine their vision for scaling up climate services for farmers. Through its Climate Change Resilient Development Small Grants Program, USAID has committed $600,000 to funding all five proposals that were submitted following the workshops, beginning in 2014. Involvement of Regional Program Leaders ensures that the resulting projects align and build on CCAFS regional priorities and strategy.

Partners:
USAID

Links/sources for further information:

6. Outcomes

Outcomes #1

Title:

Mobilizing African meteorological institutions to serve the needs of smallholder farmers

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

In contrast to weather services that provide monitoring and forecasts out to a few days, climate services (capturing trends and variability in the past, and forecasts at seasonal or longer time scales) for agriculture absolutely depend on quality historical meteorological records. Inadequate observing infrastructure, data gaps, and the limited resources of National Meteorological Services have made the prospects for scaling up climate services for smallholder farmers, beyond pilot locations with long-term station records, unrealistic – until now. As a result of research and capacity investments CCAFS co-sponsored (with USAID and WMO, and technical support of IRI and University of Reading), several African national and regional meteorological institutes now produce and disseminate historic and monitored climate information at a scale that is relevant to rural communities, with complete spatial coverage. The national meteorological services of Ethiopia (NMA), Tanzania (TMA) and Madagascar (DGM); and AGRHYMET regionally in West Africa; produced high-quality, high-resolution, spatially complete historic gridded rainfall and temperature data sets, by blending satellite and station data. The three national institutes provide new suites of historic and monitored climate information products, through web-based "maprooms" that are built on the high-resolution historic data, and a highly customizable software platform. In the process, these institutions are engaging agriculture and other sectors more openly. For example, NMA posted staff contact information when it redesigned its website to make information more accessible, and convened a meeting with other government agencies (agriculture, water, disaster risk reduction) to invite criticism and feedback on how to improve their services. In an unprecedented step, AGRHYMET made their full set of blended historic data freely available. The newly developed national capacity to develop and disseminate climate information tailored to the needs and spatial scale of farmers addresses one of the key bottlenecks to reaching millions of smallholder farmers with effective climate services. To achieve the full potential, this must be linked with efforts to develop capacity to communicate and respond to climate information, such as those CCAFS is co-leading in West Africa (with AGRHYMET) and in the UN GFCS project that is starting in Tanzania.

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

The CCAFS-related outputs that resulted in this outcome were:

- Evidence from CCAFS pilot projects and knowledge synthesis of farmers' climate information needs;
- A processed, Africa-wide, METEOSAT thermal infrared time series data set;
- An algorithm developed and tested for blending on a daily time step;
- Methods and tools for station data quality control, and for blending station and satellite data;
- Training on: station data quality control, blending, seasonal forecast downscaling, and Data Library software.

What partners helped in producing the outcome?

The capacity development work at the four meteorological institutions was supported technically by the IRI and University of Reading (for Ethiopia). CCAFS leveraged co-funding from USAID and WMO.

Who used the output?

The primary users of the outputs listed are NMA, TMA, DGM and AGRHYMET. Indirect users, who factored the new capacity of the targeted meteorological institutions into other activities, include (a) the GFCS "Climate Services Adaptation Programme in Africa" consortium (WMO, WFP, WHO, CICERO, IFRC), (b) project partners and government planners (230 participants, woreda to federal level) in Ethiopia, (c) a range of West Africa stakeholders (national meteorological services, agricultural extension, development NGOs) working with AGRHYMET on bringing climate services to farmers at the CCAFS climate-smart villages in Burkina Faso, Ghana, Mali, Niger and Senegal.

How was the output used?

The technical outputs were provided to the target African meteorological institutions in the form of tools, methods and training; and were used these to develop their historic data sets, implement initial sets of climate information "maproom" products, and develop the human capacity and processes to maintain the data, derived products, and software platform. Evidence from CCAFS pilot projects and knowledge synthesis of farmers' climate information needs contributed to the strategy supported technically by the IRI and financially by USAID. The resulting new products and capacity of AGRHYMET were incorporated into efforts, led by the West Africa Regional program, to extend farmer-focused climate services that had been piloted initially in Kaffrine, Sengal, into the CCAFS Climate-Smart Villages in Burkina Faso, Ghana, Mali, Niger and Senegal. This effort included training more than 350 staff, from several relevant organizations in each of these countries, to interpret and communicate downscaled seasonal climate information with farming communities. The new capabilities of TMA have been factored into the design of the newly launched GFCS project in Tanzania and Malawi. NMA's new products and services provide a foundation for work with project partners and 230 government decision-makers in Ethiopia, to explore potential improvements to food security planning processes in response to new information.

What is the evidence for this outcome? Specifically, what kind of study was conducted to show the connection between the research and the outcome? Who conducted it? Please provide a reference or source.

The websites of NMA (http://www.ethiomet.gov.et), TMA (http://www.meteo.go.tz) DGM (http://www.meteomadagascar.mg/) and AGRHYMET (http://www.agrhymet.ne/eng/) are the primary evidence of new maproom products, services, and (for Ethiopia) communication.

The NMA meeting with agriculture and other national stakeholders in Ethiopia is documented in: Vaughan, C., Cousin, R., Dinku, T., Hailemariam, K., and M. Lemma. 2013.

Workshop Report: Improving Resilience to Climate Impacts in Ethiopia Through Improved Availability, Access

and Use of Climate Information: Dialogue With Users. 3-4 June 2013, Addis Ababa, Ethiopia (http://iri.columbia.edu/resources/publications/workshop-report-enacts-stakeholder-jun2013/).

A journal article at an early stage of development, involving all the implementing institutions, will provide more thorough documentation.

AGRHYMET newsletter articles on “Training on techniques of merging estimate satellite rainfall data with those of observed ground networks,” and “Training on techniques of merging estimate satellite rainfall data with those of observed ground networks”: http://www.agrhymet.ne/eng/PDF/News2013/newsletter_septembre2013_eng.pdf

7. Outcome indicators

Outcome indicator #1

Outcome indicator:

One to five flagship risk management interventions evaluated and demonstrated by farmers and agencies at benchmark locations in three regions

Achievements:

Flagship risk management interventions evaluated at CCAFS locations in 2013 include weather-related insurance (East Africa, South Asia), livelihood diversification (East Africa) and climate-based advisories (East and West Africa, South Asia). Index insurance was demonstrated through ILRI's Index-Based Livestock Insurance (IBLI) program in Borana, Ethiopia. The South Asia Regional Program piloted community-based insurance in Bihar, India.The East Africa Regional Program led capacity building and participatory evaluation of livelihood diversification practices in Nyando, Kenya.The West Africa Regional Program communicated, discussed and evaluated downscaled seasonal forecasts with farmers and other agricultural stakeholders at the CCAFS sites in Burkina Faso, Ghana, Mali, Niger and Senegal. ICRISAT expanded its work in climate information and advisories for farmers from the Wote CCAFS site to surrounding Makueni and Machakos counties. CIMMYT piloted an ICT-based system for communicating climate information and advisories with farmers in CCAFS sites in India.

Evidence:

Journal article, http://onlinelibrary.wiley.com/store/10.1111/j.1539-6975.2012.01463.x/asset/j.1539-6975.2012.01463.x.pdf?v=1&t=hry1v6h5&s=f170ed454ed0cc379f89eae8bf6b26447ad555cf

Case study, http://www.mrfcj.org/pdf/case-studies/2013-04-16-Nyando.pdf

Case study, http://www.mrfcj.org/pdf/case-studies/2013-04-16-Senegal.pdf

Blog describing CIMMYT ICT project, http://ccafs.cgiar.org/blog/project-tests-new-ways-deliver-climate-related-messages-farmers-cell-phones#.UwZnEEKwKZL

Outcome indicator #2

Outcome indicator:

Three food crisis response, post-crisis recovery, and food trade and delivery strategies tested and evaluated with partner crisis response organizations at benchmark locations in three regions

Achievements:

A methodology for assessing climate risk exposure and targeting food security interventions presented in CCAFS Working Paper 48 was picked up by the government of Nepal and cited in their national food security assessment. The results of this output are currently being used to inform WFP, Nepal Government, and World Bank food security programmes in Nepal. The Integrated food security modelling pilot project in Philippines increased the scientific rigor for predicting and targeting household food insecurity in Philippines and is

currently being evaluated by the national meteorological and disaster risk management agencies. In Ethiopia, the climate resilient planning project has connected 220 decision-makers in 4 states and 24 Woredas to improved historical climate analysis, which is currently being integrated with household livelihood statistics in collaboration with FEWSNET. Dissemination of new "information packages" and a call center linking decision-makers to experts is currently underway. Bioversity, in collaboration with CIAT and CATIE, received a two year grant to replicate the Ethiopia project in Guatemala. Further, based on its work in Integrated Food Security Modeling, CCAFS has been invited to be a member of the global Integrated Food Security Phase Classification (IPC), which operates in 24 developing countries.

Evidence:

Working paper, http://ccafs.cgiar.org/publications/climate-risk-and-food-security-nepal%E2%80%94analysis-climate-impacts-food-security-and#.UwfU30JdVcg

Report, http://www.wfp.org/content/nepal-thematic-report-food-security-and-nutrition-march-2013

Workshop report, https://docs.google.com/file/d/0B5W6ZnIyIREBaU16T1BsbGdIWlE/edit (final version forthcoming)

Outcome indicator #3

Outcome indicator:

National meteorological services and regional climate centers trained and equipped to produce downscaled seasonal forecast products for rural communities in two countries in each of three regions

Achievements:

The West Africa Regional Program, with AGRHYMET and ANACIM, trained national meteorological service staff from 16 ECOWAS countries on climate data quality control and on the calibration of daily satellite rainfall estimation algorithms (co-funded by USAID and DANIDA, with technical support from the IRI). The processed data were used to downscale seasonal rainfall forecasts for use with agricultural stakeholders at CCAFS sites in Burkina Faso, Ghana, Mali, Niger and Senegal. In Ethiopia and Tanzania, CCAFS supported (with USAID and WMO, and technical support of IRI) the development of high-quality, high-resolution historic data sets by merging station observations with satellite data; and capacity and tools to build climate information products (historic, monitored and seasonal prediction) from those data that are tailored to user needs and provided to users through web-based "maprooms." In Tanzania, the effort included training in statistical downscaling using the Climate Predictability Tool (CPT). CCAFS commissioned the IRI to develop online tools to assess the seasonal predictability of rainfall and temperature in the Indo-Gangetic plains, based on the 0.5° APHRODITE observed datasets and a range of seasonal forecast models.

Evidence:

Ethiopia maproom: http://www.ethiometmaprooms.gov.et:8082/maproom/

Tanzania maproom: http://maproom.meteo.go.tz/maproom/

IGP maproom: http://iridl.ldeo.columbia.edu/maproom/Agriculture/index.html

Working paper: http://ccafs.cgiar.org/publications/online-tools-assessing-climatology-and-predictability-rainfall-and-temperature-indo#.Uwa1XHmn7xY

8. Leveraged funds

Leveraged fund #1

Title:

Global Framework for Climate Services Adaptation Programme in Africa

Partner name: Government of Norway

Budget: $883000

Theme: T2

Leveraged fund #2

Title:

Scaling up climate services for smallholder farmers in Africa and South Asia - USAID CCRD small grants program

Partner name: USAID

Budget: $600000

Theme: T2

Leveraged fund #3

Title:

IRI research funding for CCAFS-focused work

Partner name: NOAA

Budget: $180000

Theme: T2

9. Theme Leader Summary by outputs

Output: 2.1.1

Summary:

Bioversity produced a literature review on the role of crop diversification to manage climate risk, and a portal of diversification case studies based on this literature review. Innovative varietal diversification approaches are being tested in the field to deal with climate risk, through the Seeds for Needs program. In East Africa, the approach was further tailored to user needs through participatory tools and household surveys.

ICARDA demonstrated the effects of extreme events on basin-level runoff and sediment yield, and worked with stakeholders from Jordan and Ethiopia to identify, test and fine-tune promising sustainable land management (SLM) options to mitigate and adapt to the extreme events. ICARDA's work to develop guidelines for drought risk management focused on testing the standardized precipitation index (SPI) for Morocco and Jordan, and supplemental irrigation field trials in Morocco. Work on index insurance indicated that schemes based on 3 different indexes show potential for coping with increasing climate risk, but that cultural barriers to uptake by farmers in Morocco would require new, culturally sensitive schemes.

An ICRISAT study generated policy-relevant evidence on the role of social institutions, social capital and social networks in risk management strategies of women and men in rural communities at two sites in Andhra Pradesh, India.

Within IFPRI's work on investigating the impact of climate extremes on future water and food security, a household survey that was completed in the Nile Basin in Ethiopia is being used to assess the impacts of climate shocks, including drought, on men and women; and explore how different household livelihood and agricultural strategies contribute to resilience to climate shocks, with particular focus on gender differences. The work includes studies on drought impacts in India and Pakistan, and consultations with stakeholders from India, Kenya and Ethiopia.

ILRI's work on Index-Based Livestock Insurance (IBLI) in Borana, Ethiopia, focused on a second annual panel survey of 525 households, bi-annual intensive herd migration survey, and publication of an IBLI Process Manual (Guide for partners interested in IBLI implementation) and software automating the complete process of calculating and communicating the index. While contract sales continue to be unimpressive, assessments conducted with partners led to a redoubling of efforts as well as the introduction of new partners (Mercy Corps and CIFA) and additional funds and capacity support targeted to insurance companies.

As a step toward Identifying region-specific germplasm options for improved resilience of rice production to storms, IRRI demonstrated the feasibility of post-hazard mapping of typhoon damage to rice in the Philippines, using remote sensing and GIS-based cropping calendars. The recent experience of typhoon Haiyan in Eastern Visayas, Philippines, highlighted the need to assess the magnitude and spatio-temporal patterns of these

extreme tropical depressions.

IWMI completed flood extent mapping and flood risk analysis for Asia, to identify flood hotspots for mitigation measures. The results led to engagement with the insurance industry. Implications of flooding for irrigation and crop performance have been analyzed in select African countries. Results are disseminated through an online repository.

Output: 2.1.2

Summary:

Theme 2 commissioned ILRI to develop a modelling framework and tools to analyse the feedbacks that drive the resilience (or conversely the poverty traps) of farming households, with a focus on the role of climate variability in these processes. The framework was pilot tested for Borana, Ethiopia and Wote, Kenya. This is in preparation for use of the analytical framework and household modelling tools to assess the potential impact of alternative suites of adaptation and risk management practices and institutional interventions on the future livelihoods of farmers at CCAFS Climate-Smart Village sites, in the face of a variable and changing climate.

In collaboration with a research team in UC Davis, CIMMYT advanced work on the use of farm household bioeconomic models to evaluate differential roles and impacts of risk management strategies on women and men, in maize-legume systems. The work included integration of a socially- and gender-differentiated farm household typology across agroecological zones, and analysis of experimental data on risk behavior of male and female maize farmers.

IFPRI work on methodology to assess the impact of appropriate risk management financial packages on household's asset portfolios in Bangladesh included design of a randomized control trial, and extension of modeling tools to incorporate empirical results from project behavioral research.

Several modeling activities at ICARDA contributed to this Output, including biophysical modeling of crop production in Morocco and Central Asia under future climate scenarios, and a diagnostic field of changes in the farming systems of selected Moroccan regions driven by climate and other drivers. Results of a stochastic, bioeconomc farm modeling study indicate that reducing trade barriers between Central Asian countries (Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan) could improve the adaptive capacity of small-scale farmers particularly in Uzbekistan and Tajikistan.

Output: 2.1.3

Summary:

As part of the climate smart villages (CSV) approach, the East Africa Regional Program worked with researchers and development partners to test a number of risk management innovations with farming communities, linking these with the adaptation and mitigation interventions across CCAFS sites. In Nyando, the work emphasized livelihood diversification, introducing and providing training in beekeeping, improved small livestock production, crop diversification with improved agronomic practices, and promoting aquaculture and horticulture with youth groups. Resilience-building institutional innovations tested in Nyando and Lushoto include innovations funds to support livelihood activities and improve access to quality seed and fertilizer. In Wote, ICRISAT completed farmer participatory evaluation and promotion of integrated sorghum - legume technologies for enhancing resilience and improving food security and incomes. Crops evaluated included stress-tolerant varieties of sorghum, cowpeas, green grams, maize and beans. Videos and photo stories will highlight gendered access to resources, perceptions and motivations, roles and responsibilities.

The South Asia Regional Program piloted community based insurance for groundnut and rice in the Anantapur district in Andhra Pradesh and Nawada district in Bihar, India. Indices for monsoon season crops were developed for the index insurance program of the Agricultural insurance Company of India. NARC and NDRI in Nepal and IFFCO Kisan Sanchar Limited in India designed and implemented pilot projects for dissemination of climate information and agro-advisories in 2013.

CIMMYT's work to understand the practices that farmers currently employ to reduce exposure to climate variability, and how more efficient provision of information services can enhance these risk management strategies, includes participatory action research in the IGP and East Africa. In Eastern and Southern Africa, participatory experimentation with risk management strategies in maize-legume-based systems builds on the SIMLESA project, which has reached several hundred thousand farmers with conservation agriculture, and with climate smart germplasm such as new drought-tolerant maize varieties. Agricultural Innovation Platforms, provide a crucial forum for consultation and planning among strategic partners (government, private sector, insurance, key NGOs, CBOs, etc.) at regional and local levels. At CCAFS Climate Smart Village sites in India (Haryana and Bihar), participatory analysis of production system constraints; and potential strategies to reduce climate risks, increase productivity and profitability; contributed to a multi-country, multi-institute demonstration of how community-based adaptation and risk management strategies can be mainstreamed in government policy. Two key risk management interventions – management of terminal heat in wheat, and raised bed planting, are being tested with farmers in collaboration with Krishi Vigyan Kendras (KVKs), agricultural universities, and the state departments of agriculture.

ICRAF's work on adapting to extreme events in Southeast Asia through sustainable land management systems involved workshops, gender-based household surveys to assess impacts, and training of local partners. In the Philippines, response was positive to new agroforestry practices, and to including climate change concerns in land use planning and barangay development plans. The "Talking Toolkit," an online aid to assist researchers, development practitioners and government policy makers in communicating with local populations on the role

of trees in adaptation, was developed and published online. In Yunnan, China, ICRAF completed research fieldwork gender-disaggregated data collection to identify gendered impacts of water stress, including ways in which specific groups of men or women are more vulnerable, and ways in which institutions and policies contribute to and potentially could further contribute to stronger adaptive capacity among vulnerable groups in the face of probable continuing water stress. ICRAF contributions to this Output for East Africa focused on communication through a book and a special issue of African Crop Science Journal; training on fruit tree propagation for farmers, nursery managers and extension workers; and baseline data collection at 6 project sites.

In Kenya and Zimbabwe, ICRISAT led participatory testing of resilience-building farm technologies, including forecast-based management advisories, precision fertilizer micro-dosing, seed priming, tied ridges, and improved agronomy. Women farmers reported adopting higher number of technologies than men farmers, but the benefit achieved by the adoption of these technologies is higher in the case of men farmers. The percentage of farmers expressing willingness to continue these technologies was higher for women than men.

Within their Smart Farm project in coastal Bangladesh, World Fish advanced "climate-smart housing;" and resilience-building agricultural practices that include homestead ponds, landscape modification, and index-based insurance. The work explored barriers to women engaging in aquaculture. The Cage and Pond Aquaculture project in Malawi, Cambodia and Bangladesh, is designed to contribute to the adaptive capacity of communities and inform National Adaptation Plans. Results provided insights into how gender norms, attitudes and practices influence the way women and men assess the opportunities related to these technologies, and whether and how these gendered assessments create barriers to households being able or willing to sustain the activity. Results from Malawi on the effectiveness of alternative fish solar drying technologies will inform what technologies are appropriate for which individuals, households, communities and environments to enable scaling-up.

Output: 2.2.1

Summary:

National partners in Ethiopia completed surveys of food security decision-makers in 24 Woredas as part of the Climate Resilient Planning Pilot Project. Two working papers outlining decision processes and information flows for the inputs sector and food security assessment were completed. As the project shifts to dissemination of tailored analyses of climate and agriculture information for decision-makers, a wide network of experts have been mobilized to help link research outputs to local decision processes, including Ethiopian experts (Ethiopian Institute of Agricultural Research, National Meteorological Agency, and multiple Ethiopian universities) and international experts (CGIAR, USAID-FEWSNET, WFP, and academics at leading global universities). Bioversity submitted a successful proposal to ITII to replicate the methodological framework in Guatemala with both CIAT and CATIE. Work in Guatemala will start in early 2014.

In Southeast Asia, the Regional Multi-Hazard Early Warning System for Asia and Africa (RIMES) and IRRI evaluated the use of climate information for food security, early warning, and/or disaster risk reduction in the Philippines, Cambodia, Lao PDR, and Myanmar. Together with UNDP, two previous CCAFS studies on food security safety net programs in Cambodia and Indonesia were further developed and broken into four studies stress testing specific social safety net programs, which will be delivered to ASEAN in 2014.

Theme 2 continued work on Integrated Food Security Modelling. Based on this work, CCAFS was asked to join the Global Technical Advisory Group (TAG) of the IPC (Food Security Integrated Phase Classification) secretariat. Theme 2 and IRRI jointly organized a workshop on Integrated Food Security Modelling in the Philippines with participants from the CGIAR (CIMMYT, CIAT, and IRRI); the FAO; RIMES; and key government institutions. Since this event, work in the Philippines is ongoing. Theme 2, IPC, WFP, and FAO agreed to build upon the work in Southeast Asia, as well as CGIAR expertise in East Africa, to explore a second Integrated Food Security Modeling project in East Africa. An initial workshop with representatives from 8 CGIAR centers and key food security partners was held.

CIMMYT initiated a new study to provide policy recommendations on approaches to manage market risks and create strategies to reduce vulnerability of poor households (producers and consumers) arising due to price volatility. The objectives of this study were to assess recent trends in prices in the wheat markets (World, South Asia and specific to India) and explore whether wheat price volatility has an impact on food security; and to discuss the policy options that the government adopted to tackle price volatility of wheat. In addition to trend analysis, further analysis has been undertaken to understand the reasons and causal relationship between different prices and the policies that may lead to these changes in prices, or factors responsible for a mismatch in production and consumption that may lead to temporary volatility. This analysis is in progress; data compilation has been completed and continuous updating of the data base undertaken as new data points are made available by national agencies.

Output: 2.3.1

Summary:

The Theme leadership contributed to this output through supporting and leveraging capacity development with several African climate institutions, supporting and guiding commissioned development of crop forecasting tools, initiating development of an online “dynamic risk atlas” for South and Southeast Asia, and participating in the strategic direction of African climate research. CCAFS leveraged, guided and selectively co-funded (with USAID, WMO, UNDP) a coordinated effort (with IRI, U. Reading and others) to build the capacity of African meteorological institutions to provide historic data and new climate information products and services that are relevant to the needs and local spatial scale of smallholder farmers. As a result, the national meteorological services of Ethiopia, Tanzania and Madagascar, and AGRHYMET regionally in West Africa, now maintain high-quality, high-resolution, spatially-complete historic data sets; provide at least a basic set of new web-based high-resolution historic and monitored climate information products; and have the capacity to produce new climate information services tailored to the needs of agriculture. Theme 2 supported additional training to prepare the Tanzania Meteorological Agency to respond quickly to demands and opportunities to provide climate services

for smallholder farmers under the GFCS national implementation project. At a continental scale, an organizing role in the African Climate Conference ensured that the issues and time scales that are important to agriculture were incorporated into a new African Climate Research for Development strategic agenda and planned coordination. Commissioned work supported further development of the CCAFS Regional Agricultural Forecasting Toolbox (CRAFT), including protocols and tools (in partnership with AgMIP) that will allow CRAFT to run several different families of crop models with common data.

The West Africa Regional Program, in partnership with AGRHYMET Regional Center and ANACIM in Senegal, worked to improve the quality of climate information tailored to the needs of West African farmers included training of national meteorological service staff from 16 ECOWAS countries on climate data quality control and on the calibration of daily satellite rainfall estimation algorithms (co-funded by USAID and DANIDA, with technical support from the IRI). The processed data were used to downscale seasonal rainfall forecasts, which were communicated, discussed and evaluated with farmers and other agricultural stakeholders at CCAFS sites in Burkina Faso, Ghana, Mali, Niger and Senegal.

The South Asia Regional Program engaged and supported partner organizations in Bangladesh, Sri Lanka and Nepal to test the use of the CCAFS Regional Agricultural Forecasting Toolbox (CRAFT) for crop yield forecasting. All partners in each location have developed database for CRAFT toolbox and run the model in 2013. Feedback is being incorporated into improvements to CRAFT.

CIAT's work on the climate and crop yield forecasting for climate risk management combines seasonal climate forecasts produced by INPE, with the Climate Predictability Tool (CPT), as a starting point to produce seasonal forecasts of crop productivity. Activities in 2013 focused on developing the system and testing its potential uses for crop yield forecasting, and included development of a 10 km seasonal hindcast data set for 2001-2010, and training activities related to atmospheric modeling and statistical tools. In Colombia, on-farm production data for maize, rice, beans, avocado and plantain were collected to understand the impact of climate variability on crop performance and support crop yield forecasting.

CIP contributed to this Output through modelling climate-sensitive pest and diseases in potato systems and their impact on yield, and an expert system to capture indigenous climate indicators. Pest modelling included a reduced form metamodel framework for late blight, an online tool for spatial late blight modelling, and completion of Insect Life Cycle Modeling (ILCYM) software for regional and global insect risk assessment. Work on ethnometeorological indicators targeted Bolivia (documenting traditional knowledge through a workshop); and Uganda, where a prototype expert system was developed and validated as a way to capture and preserve the use of traditional climate indicators.

Output: 2.3.2

Summary:

The Theme leadership, including an ICRISAT-based Theme 2 climate services scientist, played an active role in developing this Output. This included preparations for the launch (in early 2014) of the first national implementation project under the UN Global Framework for Climate Services, in Tanzania and Malawi. CCAFS and WFP co-lead the agriculture and food security component. CCAFS partnered with USAID in a small grant competition, and a series of workshops to support regional and cross-regional planning and proposal development around ideas that were initiated at the workshop on "Scaling up Climate Services for Smallholder Farmers in Africa and South Asia" (Saly, Senegal, December 2012). A workshop brought together several organizations with experience communicating complex climate information with smallholder farmers, to share approaches and experiences, and initiate development of a joint sourcebook for training agricultural extension and other intermediaries to provide effective climate services for farmers. A gender-responsive monitoring and evaluation tool was developed, and elements of it were piloted at the Kaffrine, Senegal CCAFS site, in partnership with ICRISAT and USAID.

The East Africa Regional Program commissioned studies in Ethiopia, Uganda and Tanzania on using improved, downscaled seasonal forecasts for managing climate risks. In Lushoto, Tanzania, the work focused on integrating indigenous knowledge and scientific climate forecasting into advisories (SUA, TMA. Efforts to strengthen communication included an SMS weather and advisory delivery system for farmers (FarmSMS). In Hoima and Rakai, Uganda, the activity focused on equipping farmers to measure and use rainfall data, and strengthening communication networks (NARO, UMD. In southern Ethiopia, traditional abiotic and biotic climate indicators among the Borana pastoralists were identified and documented. The work builds on previous work in Wote, Kenya (ICRISAT), Uganda (NARO) and Tanzania (SUA).

The West Africa Regional Program, in partnership with AGRHYMET and ANACIM (Senegal), worked to scale up the pilot work on climate services for farmers at Kaffrine to three new regions in Senegal, and extend it to Burkina Faso, Ghana, Mali and Niger. Downscaled seasonal rainfall forecasts were communicated, discussed and evaluated with farmers and other agricultural stakeholders at the CCAFS Climate-Smart Villages in Burkina Faso, Ghana, Mali, Niger and Senegal. Workshops across the CCAFS sites equipped more than 350 staff from relevant organizations to interpret and communicate downscaled seasonal forecast information with farming communities. Scaling up to new regions in Senegal involved rural radio and partnership with the Millennium Village Project (with the Union of Rural Radio (URAC)), a federation of NGOs (FONGS), and ISRA).

The Latin America Regional Program incorporated South-South learning activities, between Latin America and Senegal, on climate services for farmers, in support of a Theme 1 project on CSA prioritization tools, with CIAT and the Colombian Ministry of Agriculture and Rural Development (MADR). A team from Columbia and Honduras joined officials from Senegal's meteorological agency and agricultural extension service for a one-week exchange visit around CCAFS work in Kaffrine. Lessons for Latin America were the focus of a workshop in Manizales, Colombia, sponsored by MADR and CIAT, involving representatives from Colombia, the Central American Council (CAC), Senegal, and the IRI.

ICRISAT contributions to this Output included continuation and expansion of forecast communication and advisory activities in East Africa, participatory evaluation of the use of seasonal forecasts in Zimbabwe and in South India, and development and piloting of methodology to evaluate benefits of climate services. In Kenya, scaling up the climate services work from the Wote CCAFS site to the surrounding Makueni and Machakos counties involved training for agricultural extension officers, and use of radio programs. Expansion into Tanzania and Ethiopia, in partnership with the national meteorological agencies and University of Nairobi, focused on evaluating skill of seasonal forecasts. In the Bagamoyo district of Tanzania, most (86%) respondents were aware of the seasonal forecasts issued by TMA, but only 55% used the information for farm decision-making. Investigation of the scope for seasonal forecasts in combination with crop simulation modeling in two districts of Zimbabwe used Farmer Field Schools to train particularly female-headed farm households. Results are currently being analyzed from farmer participatory evaluation of seasonal forecast-based crop management options in the Kurnool and Anantapur districts in South India.

CIMMYT piloted an ICT-based system for communicating climate information and advisories with farmers in CCAFS benchmark sites of India. Participating farmers receive daily voice and SMS messages covering weather predictions, information about pests and remedies, details of climate smart technologies, and general awareness about climate change and solutions. Ensuring equitable access required efforts with local government and farmer groups to overcoming the cultural barrier to men sharing contact numbers of their wives, and working with the Telecom Regulatory Authority of India. A helpline allows farmers to provide feedback and access expert answers to questions, which are then incorporated into voice messages if relevant to a wider group. Feedback from field scouts, focus group discussions and structured feedback forms is used to further tailor information to farmers' diverse needs.

IWMI led the implementation of mobile and internet-based service on irrigation, crop growth and weather parameters for the project farmers in Ethiopia, Egypt and Sudan. The cellphone and web-based information system on climate and water and crop monitoring was tested with farmers (about 60 in each case) in Ethiopia (Chufa Arat) village, Sudan (Gash river catchment area) and in Egypt (Naubariya area). Additional information on flooding was provided in Sudan. The work included training programs at project sites, and training manuals on flood forecasting.