



RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
Food Security**



**RPL South Asia
2013 technical report**

1. Activity Reporting

Activity 446-2013 (Milestone 1.1.1 2014)

Title: Climate risk analogue mapping for germplasm conservation and evaluation

Status: Complete. Passport data of almost 40,000 accessions of germplasm of sorghum, wheat, pearl millet, pigeon pea and chickpea was collected from genebanks of India and Nepal and these were geo-referenced. These were mapped and overlays of climate change scenarios were made to identify hotspots for germplasm collection and conservation for wheat. Climate risk analogue mapping for other crops will be completed in 2014.

Gender component:

Deliverables:

Partners:

BI; NBPGR; NARC

Locations:

South Asia (SAs)

Activity 462-2013 (Milestone 1.3.2 2014.)

Title: Analysis of national adaptation policies and institutions, and prioritizing adaptation options in India and Nepal.

Status: Partially complete. In 2013, prioritization of adaptation options for rice and wheat crop in climate smart villages has been completed. A land use planning approach for prioritization has been successfully piloted for Bihar state in India. An inventory of key national policies in South Asia that have implications on climate smart agriculture was done. Results show benefits of several past policies such as water management on adaptation and mitigation although such policies were not designed for this purpose.

Gender component:

Gender specific implications of prioritization of climate smart interventions is still to be done

Deliverables:

Partners:

IFPRI; NPC; NDRI; NICRA

Locations:

Activity 468-2013 (Milestone 2.1.3 2013 (1).)

Title: Evaluation of index based insurance and developing strategies for ICT based dissemination of climate services in India and Nepal.

Status: Complete. Community based insurance for groundnut and rice has been piloted in 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.

Gender component:

Deliverables:

Partners:

NDRI; NARC; DHM; eeMausam Weather Risk Management Services Private LTD; Acclimatise; AIC

Locations:

South Asia (SAs)

Activity 474-2013 (Milestone 2.3.1 2013.)

Title: Testing CCAFS toolkit for crop production forecasting in South Asia

Status: Complete. Partner organizations in Bangladesh, Sri Lanka and Nepal used CRAFT toolkit for crop yield forecasting. All partners in each location have developed database for CRAFT toolbox and run the model in 2013.

Gender component:

Deliverables:

Partners:

NARC; NDRI; CEGIS; Natural Resources Management Center

Locations:

South Asia (SAs)

Activity 490-2013 (Milestone 3.3.2 2013.)

Title: Baseline GHG emissions in key sites in South Asia

Status: Complete. GHG emissions estimation in the four CCAFS climate smart villages in South Asia has been completed. In one CCAFS site (Karnal, Haryana), GHG emissions estimation under different management practices in research and farmers field was done.

Gender component:**Deliverables:****Partners:**

IRRI; AGS

Locations:

South Asia (SAs)

Activity 199-2013 (Milestone 4.1.3 2013.)

Title: Capacity building of rural women leaders in understanding and practicing climate smart interventions.

Status: Complete. Training-of-trainers for women leader were organized in Kathmandu (Nepal) and Bihar (India). Government of Nepal facilitated participants of ToT in Kathmandu to conduct training on climate change, agriculture and food security in all 75 districts of Nepal. In Bihar, an assessment was conducted among the 60 women from 20 districts who had attended the ToT in 2012. The ToT also helped women leaders forge links with district-level Director of Agriculture Technology Management Agency (ATMA).

Gender component:

Project focuses on capacity building of rural women leaders.

Deliverables:**Partners:**

YSEF; Alternative Futures

Locations:

South Asia (SAs)

Activity 198-2013 (Milestone 4.1.3 2013.)

Title: Climate smart villages for activities related to risk management, adaptation, mitigation, and intensification of sustainable agriculture.

Status: Complete. Climate smart village program was continued in Karnal and Vaishali in India, and in Rupandehi in Nepal and Khulna district in Bangladesh. Several additional sites were started this year in collaboration with CIMMYT. Interventions related to conservation agriculture, crowdsourcing adapted varieties, water management, nutrient management using electronic sensors, and climatic services including insurance were piloted. Radio and FM based dissemination of climate information and agro-advisories were piloted in Rupandehi (Nepal). Capacity building activities especially of women farmers continued in 2013. The program will continue in 2014 as well.

Gender component:

In Bangladesh, there was specific focus on gender activities in climate villages. In Vaishali as well efforts were made to engage women farmers in capacity building programs.

Deliverables:

Partners:

IWMI; NARC; CIMMYT; WorldFish; IFFCO

Locations:

South Asia (SAs)

Activity 200-2013 (Milestone 4.1.4 2013 (1).)

Title: Pursue regional engagement and communication activities to build strategic partnership with multiple stakeholders.

Status: Complete. CCAFS-SA has engaged with scientists, researchers, policy makers, private industries, development institutions, farmers, and political leaders to build partnerships and strengthen regional capacity for climate risk management in agriculture and food security. Several meetings (formal and informal), workshops and policy dialogues were held in 2013. A workshop on impact pathways for climate change, agriculture and food security in South Asia was held in Bangladesh, a future scenarios workshop was held in Nepal, capacity building workshop on crop yield forecasting for scientists and researchers in India, training-of-trainers for women leaders for gender capacity building in climate change risk management in Nepal, and south-south policy dialogues on institution and policy for scaling out climate smart agriculture in Sri Lanka were organized in 2013.

Gender component:

Focus on capacity building of women leaders and developing impact pathways for women farmers were the key activities

Deliverables:

Partners:

NDRI; BCAS; Young Parliamentarians Forum

Locations:

South Asia (SAs)

Activity 502-2013 (Milestone 4.1.4 2013 (1).)

Title: Facilitation of upscaling of CCAFS research in global organisations.

Status: Complete. Global conference was shifted to South Africa and hence dropped

Gender component:

Deliverables:

Partners:

Locations:

Activity 505-2013 (Milestone 4.2.1 2013 (1).)

Title: Wrapping up the baseline surveys and analysis.

Status: Complete. Data from the baseline surveys of climate smart villages were analysed and final reports were prepared.

Gender component:

Some surveys, village baseline surveys for example, focus on gender disaggregated activities at the village level and also the household surveys cast some lights on gender activities, household and farm resource use.

Deliverables:

Partners:

Locations:

South Asia (SAs)

Activity 531-2013 (Milestone 4.2.1 2013 (5).)

Title: Development of new toolkits and pilot activities for South Asia

Status: Complete. Climate Smart Agriculture Prioritization (CSAP) toolkit has been developed to facilitate adaptation prioritization and investment decision-making in agriculture. This newly developed toolkit was piloted in Bihar state of India.

Gender component:

Deliverables:

Partners:

Locations:

South Asia (SAs)

2. Succinct summary of activities and deliverables by Output level

Output: 1.1.1

Summary:

Passport data of almost 40,000 accessions of germplasm of sorghum, wheat, pearl millet, pigeon pea and chickpea was collected from genebanks of India and Nepal and these were geo-referenced. These were mapped and overlays of climate change scenarios were made to identify hotspots for germplasm collection and conservation for wheat. Climate risk analogue mapping for other crops will be completed in 2014.

Output: 1.3.2

Summary:

In 2013, prioritization of adaptation options for rice and wheat crop in climate smart villages has been completed. A land use planning approach for prioritization has been successfully piloted for Bihar state in India. An inventory of key national policies in South Asia that have implications on climate smart agriculture was done. Results show benefits of several past policies such as water management on adaptation and mitigation although such policies were not designed for this purpose.

Output: 2.1.3

Summary:

Community-based insurance for groundnut and rice has been piloted in 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.

Output: 2.3.1

Summary:

Partner organizations in Bangladesh, Sri Lanka and Nepal used CRAFT toolkit for crop yield forecasting. All partners in each location have developed database for CRAFT toolbox and run the model in 2013.

Output: 3.3.2**Summary:**

GHG emissions estimation in the four CCAFS climate smart villages in South Asia has been completed. In one CCAFS site (Karnal, Haryana), GHG emissions estimation under different management practices in research and farmers field was done.

Output: 4.1.3**Summary:**

Training-of-trainers for women leader were organized in Kathmandu (Nepal) and Bihar (India). The Government of Nepal facilitated participants of ToT in Kathmandu to conduct training on climate change, agriculture and food security in all 75 districts of Nepal. In Bihar, an assessment was conducted among the 60 women from 20 districts who had attended the ToT in 2012. The ToT also helped women leaders to forge links with district-level Director of Agriculture Technology Management Agency (ATMA).

Output: 4.1.4**Summary:**

CCAFS- SA has engaged with scientists, researchers, policy makers, private industries, development institutions, farmers, and political leaders to build partnerships and strengthen regional capacity for climate risk management in agriculture and food security. Several meetings (formal and informal), workshops and policy dialogues were conducted in 2013. A workshop on impact pathways for climate change, agriculture and food security in South Asia in Bangladesh; a future scenarios workshop in Nepal; capacity building workshop on crop yield forecasting for scientists and researchers in India; training-of-trainers for women leaders for gender capacity building in climate change risk management Nepal; and south-south policy dialogues on institution and policy for scaling out climate smart agriculture in Sri Lanka were organized in 2013.

Output: 4.2.1**Summary:**

Data from the baseline surveys of climate smart villages were analysed and final reports were prepared. Climate Smart Agriculture Prioritization (CSAP) toolkit has been developed to facilitate adaptation prioritization and investment decision-making in agriculture. This newly developed toolkit was piloted in Bihar state of India.

3. Publications

Publication #1

Type: Policy briefs

CCAFS Themes: Theme 1, Theme 2, Theme 3, Theme 4.1, Theme 4.3

Citation: Campbell, B., Kinyangi, J., Nersisyan, A., Leigh, RA, Dibb-Leigh, J.A., Zougmore, RB, Seré, S. Aggarwal, P.K. & Hoefner, P. 2013. Perspectives: Legislating change: What should governments do to enhance sustainable agriculture and mitigate droughts?; Nature 501, S12–S14 (26 September 2013)

Publication #2

Type: Journal papers

CCAFS Themes: Theme 4.2

Citation: Asseng, S., F. Ewert, C. Rosenzweig, J. W. Jones, J. L. Hatfield, A. C. Ruane, K. J. Boote, P. J. Thorburn, R. P. Rötter, D. Cammarano, N. Brisson, B. Basso, P. Martre, P. K. Aggarwal, C. Angulo, P. Bertuzzi, C. Biernath, A. J. Challinor, J. Doltra, S. Gayler, R. Goldberg, R. Grant, L. Heng, J. Hooker, L. A. Hunt et al. 2013. Uncertainty in simulating wheat yields under climate change. Nature Climate Change, 3, 827-832

Publication #3

Type: Journal papers

CCAFS Themes: Theme 1, Theme 4.2

Citation: Naresh Kumar, S., P. K. Aggarwal, Rani Saxena, Swaroopa Rani, Surabhi Jain and Nitin Chauhan. 2013. An assessment of regional vulnerability of rice to climate change in India. Climatic Change. 118:683-699

Publication #4

Type: Journal papers

CCAFS Themes: Theme 1, Theme 4.2

Citation: Naresh Kumar, S. and P.K. Aggarwal. 2013. Climate change and coconut plantations in India: Impacts and potential adaptation gains. Agricultural Systems. 117:45-54.

Publication #5

Type: Journal papers

CCAFS Themes: Theme 1, Theme 4.2

Citation: Hebbar, K.B., Venugopalan, M.V., Prakash A.H. and Aggarwal, P.K.. 2013. Simulating the impacts of climate change on cotton production in India. *Climatic Change*, 118:701-713.

Publication #6

Type: Book chapters

CCAFS Themes: Theme 1, Theme 2, Theme 3

Citation: Aggarwal PK, Pathak H, Kumar SN and Sharma P (2013) South Asia Perspectives on Climate Change and Agriculture: Adaptation Options. In *Handbook of Climate Change and Agro-ecosystems: Global and Regional Aspects and Implications*. Eds. Daniel Hillel and Cynthia Rosenzweig. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. p. 209-222

4. Communications

Media campaigns:

More than 15 media mentions in leading newspapers in South Asia region. More targeted outreach to journalists covering agriculture, food security and climate change and involvement of media in key events such as in Colombo CSA Policy workshop.

- US supports Nepalese system to detect forest fires <http://www.trust.org/item/20130516145302-0t38o/>
- How predictable can you get? <http://www.thehindubusinessline.com/opinion/how-predictable-can-you-get/article4932150.ece>
- Climate Smart Villages in Bihar, http://articles.timesofindia.indiatimes.com/2013-07-24/patna/40771092_1_climate-change-agriculture-conservation-agriculture-rajapakar
- Conservation farming: Haryana village shows the way <http://www.financialexpress.com/news/conservation-farming-haryana-village-shows-the-way/1173689>
- Bihar and Haryana turn Climate Smart, <http://www.financialexpress.com/story-print/1199440>
- Weather-based crop cover finds favour with farmers
- Engaging the private sector for a climate-smart future in Nepal - Indian Subcontinent
- Female farmers taught new farming techniques - My Republica
- New program aims to train women on climate change in Nepal, UN Earth
- 5 villages adopted under Climate Smart Village project
- South Asia in search of coordinated climate policy
- Towards climate-smart agriculture, Annapoorna Post (Colombo meet) – Nepal coverage
- 7,000 women farmers trained, Republica , Nepal

Blogs:

1. Scaling out climate-smart agriculture: what can we learn from each other? <http://ccafs.cgiar.org/blog/scaling-out-climate-smart-agriculture-what-can-we-learn-each-other#.Uu-Z0fmSyAU>
2. Taking the lead: local champions train farmers on climate change and gender issues. <http://ccafs.cgiar.org/blog/taking-lead-local-champions-train-farmers-climate-change-and-gender#.Uu-aKpMmSyAU>
3. How to put climate adaptation into action? Lessons learned from Nepal. http://ccafs.cgiar.org/blog/how-put-climate-adaptation-action-lessons-learned-nepal#.Uu-aZ_mSyAU
4. Project tests new ways to deliver climate messages to farmers' cell phones. http://ccafs.cgiar.org/blog/project-tests-new-ways-deliver-climate-related-messages-farmers-cell-phones#.Uu-ao_mSyAU
5. Guiding policy-makers by exploring the future of food security under climate change in South Asia. <http://ccafs.cgiar.org/blog/guiding-policy-makers-exploring-future-food-security-under-climate-change-south-asia#.Uu-bDPmSyAV>
6. Radio jingles on climate change aim to reach a million listeners in Nepal. <http://ccafs.cgiar.org/blog/radio-jingles-climate-change-aim-reach-million-listeners-nepal#.Uu-bJvMmSyAU>
7. A call to action: building an index insurance community in Bangladesh. <http://ccafs.cgiar.org/blog/call->

[action-building-index-insurance-community-bangladesh#.Uu-bWPmSyAU](#)

8. Engaging the private sector for a climate-smart future in Nepal. http://ccaafs.cgiar.org/blog/engaging-private-sector-climate-smart-future-nepal#.Uu-bm_mSyAU
9. Researchers map actors' power and influence in adaptation policy. <http://ccaafs.cgiar.org/blog/researchers-map-actors%E2%80%99-power-and-influence-adaptation-policy-0#.Uu-b4vmSyAU>
10. How to accommodate farmers wary of rainfall insurance. <http://ccaafs.cgiar.org/blog/how-accommodate-farmers-wary-rainfall-insurance#.Uu-cFmSyAU>
11. Changing gender roles in Nepal could increase agricultural emissions. <http://ccaafs.cgiar.org/blog/changing-gender-roles-farming-could-increase-agricultural-emissions#.Uu-cTvmSyAU>
12. A trailblazer in adopting climate smart practices: one agriculture cooperative's success story in Nepal. <http://ccaafs.cgiar.org/blog/trailblazer-adopting-climate-smart-practices-one-agriculture-cooperative%E2%80%99s-success-story-nepal#.Uu-chvmSyAU>
13. Training women to train others: a smart way to spread the message about gender and climate change. <http://ccaafs.cgiar.org/blog/training-women-train-others-smart-way-spread-message-about-gender-and-climate-change#.Uu-dEvmSyAU>
14. How growing mangoes can make a difference in a farmer's life. <http://ccaafs.cgiar.org/how-growing-mangoes-can-make-difference-farmers-life#.Uu-dRfmSyAU>
15. What are climate-smart villages? <http://ccaafs.cgiar.org/what-are-climate-smart-villages#.Uu-eDfmSyAU>
16. Are there gender impacts from "climate-smart" agriculture? <http://ccaafs.cgiar.org/are-there-gender-impacts-climate-smart-agriculture#.Uu-eOvmSyAU>
17. New tool helps monitor crops in real time. <http://ccaafs.cgiar.org/blog/tool-help-monitor-crops-real-time-launched#.Uu-edPmSyAU>
18. Tool to help analyse rainfall variability in South Asia now available. http://ccaafs.cgiar.org/tool-help-analyse-rainfall-variability-south-asia-now-available#.Uu-ex_mSyAU
19. Staying one step ahead of South Asia's climate challenge. http://ccaafs.cgiar.org/blog/Staying-step-ahead-South-Asia-climate-challenge#.Uu-e9_mSyAU
20. If understood properly, crop insurance a viable solution for farmers. <http://ccaafs.cgiar.org/blog/cropinsurance-viable-solution-understood-properly#.Uu-fMfmSyAU>
21. Keeping fish in rice fields could help farmers adapt to a changing climate. <http://ccaafs.cgiar.org/blog/keeping-fish-rice-fields-could-help-farmers-adapt-climate-change#.Uu-fkfmSyAU>
22. How well climate do services work for farmers? http://ccaafs.cgiar.org/blog/how-well-do-climate-services-work-farmers#.Uu-fz_mSyAU
23. Climate smart villages in India show early signs of great reform achievement. <http://ccaafs.cgiar.org/blog/climate-smart-villages-india-show-early-signs-success#.Uu-gLvmSyAU>
24. Farmers become citizen scientists: Testing wheat crops for climate change adaptation. <http://ccaafs.cgiar.org/blog/testing-wheat-crops-climate-change-adaptation#.Uu-gZPmSyAU>
25. Participatory videos in Nepal: Voicing women's perceptions on climate change. <http://ccaafs.cgiar.org/participatory-videos-nepal-voicing-women%E2%80%99s-perceptions-climate-change#.Uu-gtvmSyAU>
26. Hundreds of Bihar women get trained on climate change and food security.

<http://ccafs.cgiar.org/hundreds-bihar-women-get-trained-climate-change-and-food-security#.Uu-g-mSyAU>

Websites:

Updates to the CCAFS website from South Asia- events, blogs, newslettersGoogle site created for Colombo workshop

Social media campaigns:

Twitter handle created for South Asia, 300 followers, 700 following, at least 5 daily updates. More media queries following twitter campaign

Newsletters:

- 4 newsletters sent out in 2013: January 2013 (No. 04), April 2013 (No. 05), July 2013(No. 06), and October 2013 (No. 07)
- Nearly 1000 subscribers to CCAFS South Asia newsletter
- Analytics show fewer bounces and increase views and clicks.
- Sign up forms created and disseminated through websites and social media online platforms.

Events:

- Training-of-trainers for rural women leaders on 'Gender, climate change and food security' in Kathmandu, Nepal
- Future scenarios workshop in Kathmandu, Nepal
- Workshop on developing regional impact pathways in Dhaka, Bangladesh
- Workshop on institutions and policies for scaling-out climate smart agriculture in Colombo, Sri Lanka
- Workshop on prioritization toolkits in Colombo, Sri Lanka
- Workshop on crop yield forecasting in Delhi, India

Videos and other multimedia:

Five videos produced in 2013

- Climate Smart Villages- long version
- Climate Smart Villages- short version
- Varietal seeds- Bioversity-CCAFS
- Dissemination of videos through village kiosks
- Gender and capacity building in Bihar- Impact video

Other communications and outreach:

Updated South Asia brochure Climate Smart Village 4-page brochure

5. Case studies

Case Study #1

Title: Farmers priorities for financial investments in climate smart agriculture

Author: Pramod K Joshi, Ghulam Hussain, Nagendra Bastakoti, Pramod K Aggarwal, and Arun Khatri-Chhetri

Type: Social differentiation and gender, Policy engagement, Participatory action research

Project description:

To adapt to climate change, farmers have several technological options. These could vary depending upon technologies, agro-climatic conditions and the socio-economic background of the farmers. Assessments of farmers' preferences over the available climate smart technologies and practices are needed to inform government and private sectors to increase their investment into the preferred CSA practices and technologies. This case study aims to explore the investment opportunities for building climate resilient agriculture in the region. The study employs the scoring and bidding protocols to elicit the technology choices of farmers' focus groups and their willingness to pay for these after a participatory rapid rural appraisal approach in four distinct agro-ecological zones of IGP. These locations are Vaishali district of Bihar (Eastern IGP), Karnal district of Haryana (Western IGP), seven districts of Bangladesh (Jodhpur, Rajsamand, Bhilwara, Jhalawar, Vidisha, Seoni, and Hoshangabad), and Rupandehi and Chitwan district of Nepal having vastly differing climate, natural resources and socio-economic development indicators. The approach for assessing farmers' preferences and willingness to pay is based on contingent valuation technique.

Introduction / objectives:

The Indo-Gangetic Plain (IGP) is highly vulnerable to climate change; this has negative impacts on the rice-wheat production system and food security of the region. A technology-driven transformation of existing agriculture system into climate smart agriculture (CSA), which can negate the impact of climate change, is an appropriate strategy to address this emerging and unavoidable challenge. The overall objective of this case study is to examine farmers' preferences, and assess their willingness to pay (WTP), for the available potential climate smart technologies and other interventions.

Project results:

Laser-land levelling, drought resistant crop varieties, crop insurance and weather advisory services were most preferred interventions in Vaishali district of Bihar. Farmers preferred land levelling, direct seeding, zero-tillage, irrigation scheduling, and crop-weather insurance in Karnal district of Haryana. Farmers in Rupandehi and Chitwan districts of Nepal preferred zero tillage, laser land levelling, crop insurance, and agro-advisories. The choice of technologies was significantly different for crops and locations. For instance, the choice of technologies for rice in Karnal were significantly different from Vaishali as farmers there preferred direct seeding (DS) and irrigation scheduling (IS) and totally rejected system of rice intensification (SRI). The most preferred technology and intervention in the case of wheat in both districts (Karnal and Vaishali) was zero tillage followed

by weather advisories in Vaishali and irrigation scheduling (IS) in Karnal. The zero tillage was most preferred technology for rice and wheat followed by SRI in rice and power tillage seeding in wheat in Nepal. Results in the Bangladesh indicate that the farmers' preferences over the CSA practices and technologies vastly differ according to location, landholding size, and gender. For instance, farmers in Jodhapur highly prefer nutrient management, weather based crop advisories, crop insurances and rainwater harvesting whereas the farmers in Bhilwara highly prefer integrated pest management, laser levelling, and agroforestry. Similarly, in all locations, smallholders (<10 bigha) mostly preferred nutrient management, irrigation scheduling during critical crop growth states, laser levelling, and fodder management. The medium and big farmers (10 to 20 bigha and > 20 bigha) highly preferred crop insurance, weather-based agro-advisories, and contingent crop planning. Crop insurance, laser land levelling, weather based agro-advisories were highly preferred by male farmers and nutrient management, rainwater harvesting, and fodder management, integrated pest management were mainly preferred by female farmers.

Partners:

International Food Policy Research Institute (New Delhi), Nepal Development Research Institute (Nepal), consultants, and CCAFS South Asia

Links/sources for further information:

NA

Case Study #2

Title: Community managed individual farmer crop insurance

Author: Pramod K Aggarwal, Pramod Joshi (IFPRI), Srinivas Rao (eeMAUSAM), Agricultural Insurance Company, and Arun Khatri-Chhetri

Type: Successful communications, Policy engagement, Participatory action research

Project description:

Poor awareness, lack of transparency, and delays in getting claims are the biggest obstacles to large scale acceptance of crop insurance by farmers. A community-based pilot study was designed to exploit the potential use of ICT tools in agriculture to increase the acceptance of crop insurance as a risk management strategy. The Agriculture Insurance Company of India Limited (AIC) underwrites the risk, while CCAFS and IFPRI provided knowledge support. Implementation was done by eeMausam in the Anantapur district in Andhra Pradesh and Nawada district in Bihar, India for weather index based insurance for groundnut and rice. These two districts were selected based on the agro-climatic conditions, sensitivity to climate change and dependency of agriculture to rainfall. In the scheme, farmers voluntarily from a cooperative and appoint a Volunteer Insurance Management Committee to liaise with the insurance company. They are enrolled into the scheme along with

digital, geo-tagged, dated images of their insured fields. This is facilitated by a village-based farmer called an 'anchor'. The anchor together with the insured farmer regularly collects digital pictures and videos of the insured fields and shares these with the insurance company. The Committee is responsible for crop damage assessment and recommendation for payments. Claims, if any, are released into the bank account of the insured farmer within two weeks. This is followed by a SMS notification to the farmer's phone.

Introduction / objectives:

Despite government subsidies a large number of farmers remain dissatisfied with the insurance schemes due to scattered weather station and delivery of insurance services. An innovative scheme was conceptualized together with the largest insurance company in India-AICI to involve farmers themselves in measurement, reporting and verification of crop losses to improve farmers' satisfaction and trust in crop insurance and to use ICT to increase transparency and trust and ensure quick settlement of insurance claims.

Project results:

A community-based insurance scheme has been designed, developed and implemented. Committees have been formed in all selected villages and anchors were appointed to facilitate the insurance program. An intensive training was given to all anchors about the installation of weather stations, enrolment processes, data recording and reporting, and monitoring insured farmers' fields. Two insurance products have been tested: indemnity based; and top up insurance over industry's weather based crop insurance scheme (WBCIS). In the indemnity based insurance, the sum insured was Rs. 10,000/acre land which was equivalent to the cost of production per acre. The risks covered were natural calamities and non-preventable risks which seem to adversely affect the crops. The top-up with WBCIS applied for two crops: groundnut and rice. Top-up was fixed at 25% of the WBCIS sum insured (SI). The risks covered for top-up cover were same as those covered under indemnity based insurance. The scheme has been implemented for one crop season only. More than 350 farmers are enrolled in community-based insurance program in the Anantapur district in Andhra Pradesh and Nawada district in Bihar for groundnut and rice. Yield losses up to 60% were reported by farmers due to delay in monsoon and hence delay in transplantation; uneven rainfall distribution; and stagnation of water during cyclone. Loss assessment of individual farmer was analysed and estimated losses were compensated. Farmers have shown enthusiasm and satisfaction with the scheme. Before large scale application of the scheme, several technological, operational and legal issues need to be addressed. Bundling insurance with other community based risk reduction strategies such as in CCAFS's Climate-Smart Villages may be a preferable approach.

Partners:

Agriculture Insurance Company of India (India), eeMausam (India), International Food Policy Research Institute (IFPRI), and CCAFS South Asia

Links/sources for further information:

NA

Case Study #3

Title: ICT-based dissemination of climate information and agro-advisories in Nepal

Author: Jay Gurung, Gopal Bhatta

Type: Successful communications, Innovative non-research partnerships, Participatory action research

Project description:

This study was conducted in the Rupandehi district of Nepal to explore the potential use of Information and Communication Technologies (ICT) to disseminate climate information, information about climate-smart technology interventions and seasonal agro-advisories for the rural farmers. Several messages were developed and disseminated through local FM radios and cell phones. Messages were on climate change and agriculture, crop insurance, system of rice intensification (SRI), zero tillage, rainwater harvesting, farm yard management, organic farming, livestock insurance, effective use of fertilizers, and seasonal agro-advisories. A need assessment survey was conducted to explore which communication channels, such as radio, TV, mobile phone, farmers used for their primary source of information on weather and agricultural related. Follow-up surveys were conducted to collect farmers' feedback on ICT messages.

Introduction / objectives:

The use of information and communication technologies (ICT) has created new opportunities for South Asian farmers to adapt to climate change. The potential and scope of ICT in climate risk management remains one of the least explored areas in Nepal, making research and development in this area all the more critical. The overall objective of this case study was to assess the potential of ICT based information dissemination to minimize the risks of climate change in agriculture.

Project results:

The need assessment survey indicates that nearly one third of farmers received general weather and agriculture related information from the radio and television. Other information sources include farmers' groups, newspapers, local agro-vets, and training programs conducted by local organizations. This survey showed that about 21% households have a radio, more than 90% households have mobile phones, and 69% households own and watch television. Altogether, twenty messages were prepared in both Nepali and English in consultation with a research team that included agriculture and extension experts. These messages mainly focused on three major crops (rice, wheat and maize). There were two general climate change messages and eighteen messages on climate smart interventions. Eleven messages of the 20 were selected for the awareness campaign. The selected messages were transformed into one minute Public Service Announcement (PSA)/jingles to be aired during Prime-Time shows on agriculture on the national radio channel- Radio Nepal. ICT based messages were disseminated through different electronic media targeting Rupandehi district covering thousands of farmers in eleven districts. Seasonal agro-advisories services were delivered to the farmers of four VDCs of Rupandehi district (Sau Pharsatikar, Manpakadi, Kerwani and Patkhauri). A follow-up survey indicates that about 90% farmers found ICT based messages and agro-advisories useful for their farming activities. Local FM radios were found most effective for dissemination of climate information and agro-advisories. A large proportion of farmers

(84%) indicated their willingness to pay NRs. 10-20 per month to subscribe to such climate information and seasonal agro-advisory messages.

Partners:

Nepal Development Research Institute (NDRI), Department of Hydrology and Meteorology (DHM), Nepal Agriculture Research Institute (NARC), and Department of Agriculture (DoA), and CCAFS South Asia

Links/sources for further information:

NA

Case Study #4

Title: Baseline GHG emissions estimation in the CCAFS site

Author: Agnes Tirol-Padre, William Salas, Pramod K Aggarwal, and Gopal Bhatta

Type: Successful communications, Capacity enhancement, Participatory action research

Project description:

This case study compared GHG flux in rice-wheat system under key major best management practices including components of conservation agriculture with the conventional farmers' practices in the two locations of CCAFS site (Karnal, Haryana). DeNitrification-DeComposition (DNDC) computer simulation model for GHG emissions was used to estimate nitrous oxide (N₂O) and methane (CH₄) under 3 management practices in 2 experimental plots at CSSRI, Karnal and in 3 farmer's fields in Buddenpur Village in Karnal. Three management scenarios were considered: 1) farmer's practice (this scenario was based on farmer's practices of crop rotation and management), 2) best integrated crop and resource management (this scenario was designed with the aim to increase productivity and income through intensification and best management practices), and 3) best integrated crop and resource management based on the principles of conservation agriculture (this scenario was designed to deal with increasing scarcity of water, labour, and energy; rising input costs; and degrading soil health). The farmer's fields were completely under farmer's management without researcher's intervention. Similarly, CCAFS South Asia in collaboration with Applied GeoSolutions, LLC has estimated GHG emissions from 10km*10km sampling frames using DNDC biogeochemical model with maps of land cover/land use derived from remote sensing data in CCAFS's climate smart villages (Karnal, Vaishali, and Rupandehi). Emissions were modelled for all expected crop rotations and averaged over a last year period to provide expected nominal annual emissions for different soil types that were found in the CCAFS sites. The crop rotation maps were used with the modelled emissions to generate total emission maps of all the greenhouse-gas (GHG) emissions from each site.

Introduction / objectives:

Rice-wheat cropping system, predominant in many parts of South Asia, is a major source of methane and nitrous

oxide gases. However, very limited information is available on baseline emissions from different cropping regime in South Asia. Actual measurements of GHG fluxes from various cropping systems and current management practices, including climate-smart agricultural practices, need to be made for the development of GHG mitigation strategies in agriculture. Therefore, an accounting of the GHG contributions of agricultural soils is vital for determining the true mitigation potential of climate-smart practices.

Project results:

The comparison of GHG emission between CSSRI research and farmer's fields in Karnal shows low CH₄ fluxes from the conventional farmers' practices in rice. Significant N₂O emissions were observed in rice under both the conventional practice and direct seeded rice (DSR) in CSSRI research field. CH₄ emission was significantly lower (3.1 - 10.4 kg CH₄ ha⁻¹ season⁻¹) under DSR with no tillage, as compared to the conventional puddled-transplanted rice (11.2 – 25.5 kg CH₄ ha⁻¹ season⁻¹). On the other hand, N₂O emissions under the conventional practice and DSR were not significantly different from each other. Results show that mitigation options in Haryana must be geared towards controlling the N₂O emissions since CH₄ emissions are already low. N₂O emissions from the wheat fields were directly related to N fertilizer application. The net greenhouse gas emissions from the agricultural area had mean GHG emissions of 9.8 t CO₂eq/ha in Karnal, 5.0 t CO₂eq/ha in Vaishali, and 2.8 t CO₂eq/ha in Rupandehi. Over the entire sampling frame (10km*10km) the net emissions from agriculture were estimated to be 78,620 t CO₂eq/year in Karnal, 17,062 t CO₂eq/year in Rupandehi, and 56,630 t CO₂eq/ year in Vaishali. The majority (68%) of emissions in Karnal were due to rice methane emissions. The maize-wheat system emits majority (92%) of direct N₂O emissions in Vaishali. In Vaishali, Rice based crop rotations had emission about 36% higher than the maize-wheat systems with methane emissions from rice contributing approximately 50% of net emissions. Per hectare emissions were relatively low in Rupandehi, with N₂O emissions account for over 60% of the total emissions.

Partners:

International Rice Research Institute (IRRI), Applied GeoSolutions, LL, and CCAFS South Asia

Links/sources for further information:

NA

6. Outcomes

Outcomes #1

Title:

Strengthening the capacity of rural women leaders in managing climatic risks

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

The Government of Nepal and the state government of Bihar, India strengthened the capacity of 8000 rural women leaders and farmers in managing climatic risks in agriculture

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

A Training-of-Trainers Manual on Gender and Climate Change in South Asia, Training-of-trainer workshops organized in India and Nepal, and Summary manuals translated and published into Nepali and Hindi. Nearly 10,000 copies of the Nepali version were printed and distributed

What partners helped in producing the outcome?

Alternative Futures, YSEF- Ministry of Finance, Government of Nepal

Who used the output?

Trainers, local government officials, local elected leaders, participants at the trainings

How was the output used?

The output was used as a resource material for training-of-trainers and workshops. All resource materials were translated into local languages which was seen as a valuable knowledge product in climate change and gender..

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.

Documentation of trainings (in person registration, photos and testimonials) in all 75 districts of Nepal is one of the evidences for this outcome. All trainees were registered for the trainings and documented by the YSEF, Ministry of Nepal. A Press meet was also organised on conclusion of all the trainings with local and national media reporting on the outcomes. In Bihar, the impact of the trainings has been documented through video testimonials from the participants and the Agriculture Technology Management Agency district official.

Outcomes #2

Title:

Climate-smart villages scaled out in Nepal

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

In Nepal, Practical Action Consulting (PAC) won a \$1.5 million grant from the International Finance Corporation (IFC) to scale out the CCAFS model of Climate Smart Villages in three districts of Nepal (Morang, Sunsari and Bara) focusing on three major crops (sugarcane, rice, and maize). The project aims to reach 15000 farmers.

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

Customised package of interventions in a climate smart village; videos of climate smart interventions, farmer testimonial videos, climate smart package of practices for rice, maize and sugarcane in Nepal

What partners helped in producing the outcome?

CG Centres, NARS, NGOs, local government, farmer community groups, private sector partners (IKSL and Agriculture Insurance Company)

Who used the output?

International Finance Corporation and Practical Action Consulting, Nepal

How was the output used?

Climate-smart technologies and practices implemented in the CCAFS climate smart villages were used to develop climate-smart package-of-practices (PoP) for three crops (Rice, Maize and Sugarcane) in Nepal..

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 project grant document awarding 1.5 USD million to Practical Action, Nepal, for scaling out climate smart villages for specific crop commodities using CCAFS as knowledge partner.

Outcomes #3

Title:

Improved rainfall thresholds for index insurance schemes for crops in India

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

In 2013, the Agriculture Insurance Company of India, Ltd (AIC) developed improved index based insurance schemes for various crops that led to protection of more than 50,000 rain-fed farmers from the vagaries of rainfall in one crop season alone. The number will go up in next crop seasons.

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

Strategic use of spatial weather, soil and crop management data together with regionally validated crop modelling work led to identification of critical rainfall thresholds for different crop growth stages which were used by the Agricultural Insurance Company of India to develop rainfall index insurance schemes for rice and other crops.

What partners helped in producing the outcome?

NA

Who used the output?

Agriculture Insurance Company of India, Ltd. (AIC)

How was the output used?

The output was used to develop index insurance policies for rainfed crops in India.

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.

A letter from the Agricultural Insurance Company of India acknowledging CCAFS work in developing the policies and its dissemination to farmers.

7. Outcome indicators

Outcome indicator #1

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:

In Nepal, Practical Action Consulting (PAC) won a \$1.5 million grant from the International Finance Corporation (IFC) to scale out the CCAFS model of Climate Smart Villages in three districts of Nepal (Morang, Sunsari and Bara) focusing on three major crops (sugarcane, rice, and maize). The project aims to reach 15000 farmers.

Evidence:

The project grant document awarding 1.5 USD million to Practical Action, Nepal, for scaling out climate smart villages for specific crop commodities using CCAFS as knowledge partner.

Outcome indicator #2

Outcome indicator:

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

Achievements:

The Agricultural Insurance Company of India has implemented rainfall index insurance schemes in some districts in the State of Andhra Pradesh and Bihar during Kharif 2013 based on CCAFS inputs and helped in insuring 56,623 farmers against weather related crop losses in paddy, maize, cotton, groundnut, and redgram

Evidence:

Evidence for this outcome is a letter from the AIC acknowledging CCAFS work in developing the policies and its dissemination to farmers.

8. Leveraged funds

Leveraged fund #1

Title:

Promoting climate resilient agriculture in Nepal

Partner name: Practical Action Consulting

Budget: \$1500000

Theme: T4

Leveraged fund #2

Title:

Crop germplasm collection and application of climate analogue in South Asia

Partner name: Bioversity International

Budget: \$3500000

Theme: T1

9. Synthesis report

Provide a synthesis of research activities at CCAFS sites

CCAFS South Asia and several CGIAR centres have continued their work with local, national, and Future Earth partners to supplement regional research leading to the development of climate-smart farming communities in 2013. It focused on social, biophysical and policy research, supporting the formulation of enhanced adaptation and mitigation plans, strengthening regional capacity, and developing and demonstrating sustainable intensification technologies, institutions and policies in South Asia. Passport data of almost 40,000 accessions of germplasm of sorghum, wheat, pearl millet, pigeon pea and chickpea was collected from genebanks of India and Nepal and these were geo-referenced by Bioversity International and the National Bureau of Plant Genetic Resources in India and the Nepal Gene Bank. These were mapped and overlays of climate change scenarios were made to identify hotspots for germplasm collection and conservation for wheat. A special mission for collection of germplasm from such hotspots will be sent soon. Our work on Climate-Smart Villages continued in 2013 in Karnal, Vaishali districts (India), Rupandehi district (Nepal) and Khulna district (Bangladesh) in collaboration with several CGIAR centres and NARS partners. CIMMYT developed “nitrogen smart” fertilizer recommendations based on field research in CCAFS sites. CIMMYT has also assessed the performance of “energy smart” production technologies. Conservation agriculture in rice-wheat was the main focus of CIMMYT in several sites of the Indo-Gangetic Plains. WorldFish continued to focus on climate-smart management of aquatic farm ecosystems in coastal regions of Bangladesh. The major focus was on research on ponds fish culture, farmer field schools, experiments for vertical space vegetable cultivation at the homestead level, and development of rice-fish sanctuaries on farmers’ fields and the development of climate safe housing. Identification and development of climate risks management strategies in water resources were the main research focus of IWMI in CCAFS sites. IWMI conducted research on needs and suitability of water storage options, climate smart intervention for aquifer recharge. ICRISAT projects included identifying role of social institutions, social capital and social networks in adaptation processes and practices; testing and promotion of effective communication methods with farmers; analysis of long-term crop pest dynamics data; and mapping climate variability and change in the drylands. IFPRI and CCAFS-SA used targeted farmers focused group discussions to identify priorities for investment by farmers in climate risk management. This study employs the scoring and bidding protocols to elicit the technology choices of farmers’ focus groups after a participatory rapid rural appraisal approach in three distinct agro-ecological zones of IGP. These locations are Vaishali district of Bihar (Eastern IGP), Karnal district of Haryana (Western IGP) and Rupandehi and Chitwan districts of Nepal. The selected sites have vastly differing climatic, natural resources and socio-economic development indicators. This research has estimated the farmers’ preferences and willingness-to-pay for climate smart agricultural technologies. This input will be used to further refine the concept of Climate-Smart Villages. Work on the CRAFT toolkit continued with involvement of national partners from Bangladesh, Nepal, India and Sri Lanka. CCAFS’s research partners in each country developed a database for the CRAFT toolbox in 2013. Partners also conducted a pilot evaluation of CRAFT for small study regions. Results were fairly satisfactory although much more work needs to be done on calibration and validation of the tools available. ICT-based dissemination of climatic services and agro-advisories continued in Climate- Smart Villages. CIMMYT made extra efforts in conducting a pilot 2013 to fine tune these services and make these advisories demand driven and tailored to farmers’ needs. In Nepal, NARC and NDRI joined CCAFS in developing and implementing pilot projects for dissemination of climate information and agro-advisories to farmers in Rupandehi district using FM, national radio, TV, and mobile phones. These research projects also collected farmers’ feedback about the usefulness of this approach. CCAFS-SA together with IFPRI and the Agriculture Insurance Company of India Limited started a pilot project on community-managed

individual farmer insurance to engage farmers directly in the measurement, reporting and verification of crop losses. The pilot locations are Anantapur district in Andhra Pradesh and Nawada district in Bihar in India for weather index-based insurance in groundnut and rice. This research has also focused on the use of ICT to increase transparency and trust in crop insurance, and ensure quick settlement of claims. CCAFS-SA partner organization Applied GeoSolutions LLC (AGS) has estimated GHG emissions for sampling frames of CCAFS sites using DNDC biogeochemical model with maps of land cover/land use derived from remote sensing data in Karnal, Vaishali (India), Bagerhat (Bangladesh), and Rupandehi (Nepal). The International Rice Research Institute has estimated nitrous oxide (N₂O) and methane (CH₄) emissions under different management practices in rice and wheat crops in farmers' fields in Karnal district. This research will be used to develop improved MRV protocols. A GHG mitigation related research was piloted by CIAT in the tropical forage to test the potential options of mitigation. CIFOR has implemented similar research project to assess the carbon stocks and land quality improvement from farmer assisted regeneration trails in the IGP. It was noted that several CGIAR centres work in South Asia on similar topics around climate-smart technologies and interventions, but not necessarily on CCAFS sites. There is also weak inter-centre collaboration. This needs to change.

Provide a synthesis of cross-center activities

CCAFS-SA put an emphasis on CG cross-center research activities in 2013 too. CG centers were involved in collaborative research in CCAFS Climate-Smart Villages. In Karnal (Haryana, India), IFPRI, CIMMYT, IRRI, Bioversity, and CIP were involved in research activities focusing on climate change, agriculture and food security issues. IFPRI conducted research on prioritization adaptation/mitigation options by assessing farmers' preferences and their willingness-to-pay for climate smart technologies/practices; CIMMYT provides technical support for minimum tillage, residue management and efficient use of N fertilizers to farmers; Bioversity and CIP are evaluating crop germplasm and varieties with farmers' direct participation; and IRRI has estimated the GHG emissions under rice-wheat system and various climate smart interventions. The Climate-Smart Village in Vaishali district, Bihar has emerged as a research hub for CG centers. IFPRI has extended research activities on prioritization adaptation/mitigation options in this Climate-Smart Village for comparative study between Eastern IGP (Vaishali, Bihar) and Western IGP (Karnal, Haryana). CIMMYT in close collaboration with other CG partners IWMI, Bioversity, and IFPRI has implemented various climate smart interventions in farmers' fields. The research activities include demonstration and validation plots on climate smart interventions, development of innovative climate risk management systems and partnership with local farmers groups, application of ICT in collaboration with IKSL, and capacity building and gender empowerment. IFPRI, CIMMYT and IWMI are working in collaboration in the CCAFS climate smart village in Rupandehi, Nepal. IFPRI has conducted research on prioritization adaptation/mitigation option for cross-country comparison (India and Nepal); CIMMYT has tested abiotic stress-tolerant germplasm and planting strategies, needs-based irrigation scheduling for rice, developed nitrogen smart fertilizer recommendations, and assessed performance of conventional and climate smart interventions in wheat and rice crops; IWMI is addressing the issue of lack of water, through rainwater harvesting (construction of ponds). IFPRI and IWMI, in collaboration with Agriculture Insurance Company India, have piloted community based insurance in agriculture in two CCAFS sites. This ongoing project aims to develop community-based insurance products for farmers. A low emission development strategy in agriculture was another inter-center research activity in South Asia. IFPRI and CIAT in collaboration with other partner organizations have mapped probable land use changes and effects on carbon stock and GHG emissions in Bangladesh. Similarly, IFPRI and ILRI conducted research on women's capacity to tackle climate change in Bangladesh. This research project has focused on gender disparities in climate risks impacts and management. IRRI and IFPRI have developed a generic spreadsheet model (Technical Coefficient Generator) for assessing technological and socio-economic viability of adaptation and mitigation projects in rice-based production systems. Similarly, eight CGIAR Centres and their national partners have developed the Crop Ontology (CO), which currently includes breeders' trait descriptions for 15 crops. CO is an open source of standard lists of traits,

methods and scales for breeders' field-books and crop information systems. Some progress was also made in the region around Theme 4 research. CIMMYT made an excellent compilation of experimental data on various climate smart technologies and their impact in different agro-ecological systems. They also implemented projects relating to market risks management to reduce climate change vulnerability, economic incentives for adaptation of conservation agriculture, and identification of policy options for adaptation and mitigation of climate change. IFPRI also evaluated the impact of climate extremes on future water and food security, risk management financial packages, GHG mitigation strategies, application of IMPACT model, and quantification of regional scenarios. ILRI collected household data using IMPACTlite. It was noted that several CGIAR centres have worked in South Asia on similar topics around climate-smart technologies and interventions but with no inter-centre collaboration. This needs to change.

Provide a synthesis of regional engagement and communications activities

In 2013, CCAFS- SA regularly engaged with scientists and researchers, policy makers, investment partners, development institutions, farmers, and political leaders to strengthen regional capacity for climate risk management in agriculture and food security. In early 2013, CCAFS-SA organised a workshop on Impact Pathways for Climate Change, Agriculture and Food Security in South Asia, in Bangladesh. Participants were scientists and researchers from CG centers and national research institutes and ministries in Bangladesh, India, Nepal and Sri Lanka; universities, and representatives from the Asian Development Bank, UN, and private organizations. The exercises during the workshop were designed to get representatives from the different South Asian countries to explicitly outline how CCAFS can work with partners in the region to achieve the desired regional vision for climate change, agriculture and food security. Experts and stakeholders from Bangladesh, India, Nepal, Pakistan, and Sri Lanka met in a Future Scenarios Workshop, in Kathmandu, Nepal. The team got the opportunity to explore the future of food security, livelihoods and environments in South Asia under climate change. Participants in the South Asia scenarios process worked together to ensure the usefulness of the alternate future contexts for decision-makers (<http://ccaafs.cgiar.org/blog/guiding-policy-makers-exploring-future-food-security-under-climate-change-south-asia#.UvRWEGKSzh0>). They shared innovative ideas, experience and provide guidance to policy-maker exploring the future of food security under climate change in South Asia. CCAFS South Asia has been closely working with stakeholders in the region to enhance their capacity in crop yields forecasting and to bring together policy makers to inform them about the kinds of tools and techniques that would be helpful for them while planning and making decisions. Participants from Nepal, India, Bangladesh and Sri Lanka representing NARS, Ministries of Environment and Agriculture, NGOs and the CGIAR attended a workshop and worked on their country-specific studies to understand CRAFT's structure and functions (<http://ccaafs.cgiar.org/blog/tool-help-monitor-crops-real-time-launched#.UvRfDWKSzh0>). Similarly, National Adaptation Plans (NAP) of South Asian countries require decision-support tools in locating vulnerability to climate change and in targeting adaptation strategies in agriculture. Recognising this demand, CCAFS-SA organized a workshop to engage and communicate about the prioritization toolkit among scientists, researchers and policy makers in 2013 (<http://ccaafs.cgiar.org/blog/new-toolkit-climate-smart-agriculture-can-help-policymakers-make-better-decisions#.UvRhBa1WGUK>). Participants in the workshop provided excellent feedback on which parameters to include in the toolkit and expressed interest in implementing it in their countries. The National Planning Commission (NPC) of Nepal has recently invited CCAFS-SA to implement this prioritization toolkit for national adaptation prioritization in agriculture. This toolkit is also being used in national adaptation planning in Bangladesh in 2014. CCAFS-SA continued its engagement on gender, climate change and food security issues in 2013. Bringing women's voices and knowledge on climate risk management into the mainstream discussion is one of the challenges in South Asia. CCAFS-SA has advocated for a bottom-up approach in gender capacity building for climate risk management in agriculture. A series of training-of-trainers workshop for women cooperative leaders on gender aspects within climate change, agriculture and food security issues was organized in Nepal by CCAFS-SA and Ministry of Finance, Government of Nepal.

(<http://ccafs.cgiar.org/blog/training-women-train-others-smart-way-spread-message-about-gender-and-climate-change#.UvRmya1WGUK>). The Honorable Minister Riddhi Baba Pradhan, Minister for Women, Children and Social Welfare, and Land Reform and Management inaugurated the program. These trained women leaders were able to reach 100 other women and educate them on climate change issues in agriculture throughout the country. Similarly, in Bihar, CCAFS-SA team, Alternative Futures and the Bihar Mahila Samakhya organized a training-of-trainers workshop with elected women representatives, local farmers and government policy makers (<http://ccafs.cgiar.org/blog/taking-lead-local-champions-train-farmers-climate-change-and-gender#.UvRtIK1WGUK>). CCAFS-SA brought together various scientists, researchers and policy makers from government and non-governmental organization to deliberate on the need for seed bank to meet the challenges of climate change in South Asia, in New Delhi. Participants from the Ministry of Agriculture, National Academy of Agriculture Science (NAAS), senior level government representatives from agriculture sectors, and experts from independent research organizations and private sector discussed the potentials and challenges of seed bank development for climate risk management in Indian agriculture. Institutions and policies are crucial to scaling out climate smart technologies and practices. South Asian countries lack appropriate institutions and policies to implement climate risk management strategies and technologies. There are a number of developing countries which are piloting policies and establishing institutions to manage climatic risks in agriculture on large scale. The experience gained in these countries located in somewhat similar socio-economic and cultural environments may offer lessons with regard to planning, financing, partnerships and programme implementation at different scales. With this in mind, CCAFS-SA brought together 65 delegates from 14 countries, 4 CGIAR institutes, CCAFS network stations including leading experts, policy makers, financial institutions, corporate and media personnel together to communicate their experiences and findings to each other (<http://ccafs.cgiar.org/blog/scaling-out-climate-smart-agriculture-what-can-we-learn-each-other#.UvRyiGKSzh0>). A regional Climate Smart Learning Platform was launched in 2011 to increase stakeholder engagement. To support this, 4 volumes of the e-newsletter and print version were developed and disseminated in 2013 to stakeholders. Several blogs on success stories in South Asia have posted on the CCAFS website. In addition, CCAFS-SA team has given seminars in several national, regional, and international meetings. Also, several visits were made to partners to discuss and promote CCAFS/IWMI research and development outputs. Some CGIAR centres in South Asia such as CIMMYT, Bioversity, and WorldFish have also engaged in capacity building activities for climate change adaptation with the support from CCAFS South Asia. CIMMYT conducted several capacity development events (training, meetings, and workshops) cover range of topic such as use of nutrient expert tool, gender empowerment awareness, and farmers' consultations in India and Nepal. A training workshop was conducted by Bioversity on application of GIS and Climate Analogue Tools (CAT) for Agricultural Plant Genetic Resources (APGR) management and increased varietal adaptation in Bhutan and Nepal. WorldFish has organized seasonal farmer field schools about climate smart interventions in Bangladesh. Similarly, ICRISAT organized workshop on identifying role of social institutions, social capital and networks in adaptation process and practices, use of climate data and interpretation, and use of ICT in the climate risks management in agriculture. IFPRI's regional engagement activities include training of partners on key climate change modelling tools and analytical methods, and IMPACT and Land Use modelling. ILRI has organized training for use of survey instruments (IMPACTLite). The CG centres have also published thirteen blogs and six videos covering their works in South Asia.

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

CCAFS-SA has extensively engaged on developing a decision-support tool, Climate Smart Agriculture Prioritization (CSAP) Toolkit, in 2013. The CSAP was piloted in Bihar district of India to assess the performance of toolkit including calibration and validation of models at the local context. During 2013, a non-technical overview of modelling approach, input-output data structure and prioritization process was prepared. A demonstration model for case-study outlining step-by-step analysis for prioritization exercise using toolkit was also developed.

CCAFS-SA team has prepared a data dictionary to summarize all the model input data, sources and pre-model manipulation, key assumptions that are explicit and implicit in modelling framework, and a detail technical documentation outlining mathematical formulation and model structure. The spatially-explicit modelling framework is capable of handling a wide range of constraints and scenarios. Future crop yields, water-use and emissions are then forecast for different climate-scenarios (CMIP5) using crop-modelling techniques (InfoCrop) and empirical evidence. Detailed socio-economic data can be derived from production cost model based on biophysical database and reported cost of cultivation datasets. Through spatially explicit dynamic land-use model and growth pathways under range of objectives and constraints tool users can determine priorities for investment, production etc. in each model period, both in delivering baseline growth and in adapting to the additional burden of climate-change. These land-use patterns comprise crop-technology combinations with land units, labour and water constraints in the particular area. The toolkit is able to prioritise investment decisions for the short-term (e.g. to 2020), medium-term (2020-2050) and long-term (2050-2080) in the agricultural growth pathway. The CSAP Toolkit will be piloted in Nepal and Bangladesh in 2014. CG centres have also used decision support systems and tools in their research in South Asia. Bioversity implemented climate analogue tool for mapping and analysis of crop germplasm in the region. Bioversity is also preparing “Training Resource Kit on Resilient Seed System” for climate change adaptation. This Kit integrates a series of research processes that countries would need to carry out in order to identify, acquire, test with farmers, conserve and evaluate seeds adapted to climate change. The IMPACT and Land Use Modelling Tool was used by IFPRI to map probable land use changes and effects on carbon stock and GHG emissions in Bangladesh. This analysis could help formulate low emission development strategies (LEDS) in agriculture. ILRI adopted IMPACTlite tool to carry out household surveys in South Asia and a develop detail household level dataset. This dataset would allow the analysis of site specific impact of adaptation and mitigation strategies on livelihoods, food security and environment. A generic spreadsheet model (Technical Coefficient Generator) was developed by IRRI to assess technological and socio-economic viability of adaptation and mitigation projects in rice-based production systems. This model compiles GIS-maps on land use and estimate yields and GHG emissions.