Lessons learnt in CCAFS Flagship 4 Phase II

Working Paper No. 343

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Lorna Born

CGIAR
RESEARCH PROGRAM ON
Climate Change, Agriculture and Food Security
CCAFS

Working Paper

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To cite this working paper
Born L. 2021. Lessons learnt in CCAFS Flagship 4 Phase II. CCAFS Working Paper no. 343. Cali, Colombia: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

About CCAFS working papers
Titles in this series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

About CCAFS
The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is led by the International Center for Tropical Agriculture (CIAT), part of the Alliance of Bioversity International and CIAT, and carried out with support from the CGIAR Trust Fund and through bilateral funding agreements. For more information, please visit https://ccafs.cgiar.org/donors.

Contact us
CCAFS Program Management Unit, Wageningen University & Research, Lumen building, Droevendaalsesteeg 3a, 6708 PB Wageningen, the Netherlands. Email: ccafs@cgiar.org

Abstract

This review of work conducted under Flagship Program 4 of CCAFS aims to document some of the challenges, opportunities and lessons learnt in the past 5 years of research and implementation. Flagship 4 focuses on Climate Services and Safety Nets in Latin America, Asia and Africa, encompassing climate services design and implementation, insurance and early warning systems. An approach to quantifying lessons learnt was developed, based on the climate services value chain and the institutions, assumptions and scaling strategies employed in the projects. Interviews with project leads offered insight into nuances and context-specific learning on implementing impactful projects. Results highlighted, amongst others, the importance of using varied metrics and strategies to measure impact; of considering timescales of the projects, from the macro-scale enabling environment to the granular decisions made by farmers; of actively working to understand the context of interventions; and of evaluating how climate information is used in decision-making.

Keywords

Climate services; climate risk; institutional learning; impact pathway; theory of change

About the authors

Lorna Born is an independent climate consultant with a previous affiliation to the Alliance of Bioversity and CIAT. Email: lorna.erin@gmail.com

Acknowledgements

This working paper was commissioned by the CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS). The author would like to thank Alison Rose, Steve Prager, and Steve Zebiak, who conceived the idea for the paper, and who supplied continual input and feedback. Thanks as well to each of the interviewees who gave their time to describe their experiences as project leads and collaborators.

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Acronyms

AR4D	Agricultural Research for Development
CGIAR	Consultive Group on International Agricultural Research
CSRD	Climate Services for Resilient Development
CSV	Climate Smart Village
ENACTS	Enhancing National Climate Services
FP4	Flagship 4
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IRI	International Research Institute for Climate and Society
LTAC	Local Technical Agro-Climate Committee
MARLO	Managing Agricultural Research for Learning and Outcomes
NFCS	National Framework for Climate Services
NMS	National Meteorological Services
PICSA	Participatory Integrated Climate Services for Agriculture
ROI	Return on Investment
SEA	Southeast Asia
WMO	World Meteorological Organisation

Introduction

Agricultural systems and their participants are vulnerable to the effects of climate variability and change. Smallholder farmers and rural communities in developing countries are particularly at risk of their livelihoods being compromised. Climate risk management strategies for smallholders range from those that aid in disaster avoidance such as insurance, to those that avoid harm and take advantage of opportunity such as using inputs and diversifying crops (Baethgen, 2010). Climate services in the agricultural context, encompassing agro-advisories and weather services, involve the generation, translation and communication of legitimate and relevant climate information to next-users for use in their decision-making. Climate services offer the opportunity for farmers to manage climate risk in bad years and capitalize on favourable conditions in good years.

This review aims to establish lessons learnt in CCAFS Flagship 4: Climate Services and Safety Nets, formerly known as Theme 2: Climate Information Services and Climate-Informed Safety Nets in phase 1 of CCAFS (2010-2015). Phase 2 of CCAFS runs from 2017 until 2022 and is characterized by the shift to an outcome-based management system called Managing Agricultural Research for Learning and Outcomes (MARLO). MARLO purports to promote impact pathways bridging the gap between research outputs and developmental outcomes through the use of theories of change and results-based management. The projects chosen for analysis in this review were those that focused on climate services, which included both completed and active projects. Some projects in the analysis began before 2017, during the transition period of CCAFS, so while MARLO could not supply project reports from inception, interviews with project leads provided the necessary information.

▪ 8M farm households with improved access to capital, esp. women
▪ 40 institutions or major initiatives use CCAFS research to support farm households' management of climatic risks
▪ $150M climate service investments informed by CCAFS
▪ 20 organizations adapting plans &directing investment to increase

women's access to climate-based advisories and insurance
▪ 15 policy decisions based (in part) on CCAFS engagement and information

Table 1: Vision and target of Flagship 4 for phase II of CCAFS (2017-2022)

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) spans across the 15 research centres. There are four flagships in CCAFS, each focusing on different aspects of agriculture and food security in developing regions. Flagship 4 (FP4) is entitled Climate Information Services and Climate-Informed Safety Nets, with research focusing on Latin America, Asia and Africa, and encompassing climate services design and implementation, insurance and early warning systems. Table 1 above shows the vision and targets for FP4 in phase II of CCAFS. Four years into Phase 2, this review aimed to establish specific facets of challenges and opportunities judged important by FP4 project leads. This analysis describes a framework used to gather insights from project leads and presents the results from the interviews as several central themes, some of which are cross-cutting, that are largely applicable to all climate services efforts in an agricultural context. It should be noted that this synthesis serves to document insights into project implementation, rather than comprehensively catalogue all experiences.

Data and Methods

The approach for gathering data for the FP4 review was two-fold, and was decided on between CCAFS and IRI. The first step involved a desk-top analysis, and the second involved interviewing project leads as a primary source of information on project experiences. The approach for the desk-top analysis used a framework created in Excel, through which to examine MARLO project reports on outcomes, activities, deliverables and innovations. This provided the baseline for the analysis and the interviews. The framework (Appendix A) was structured around the climate services value chain and the institutional strategies, assumptions and scaling methods that allowed for impacts in different regions. Interviews were conducted based on the information gathered in the desk-analysis stage that used the framework.

Each project lead was interviewed with questions tailored from the framework applied to the MARLO reports (a loose structure of the interview is in Appendix A). The semi-structured nature of the interviews allowed for insights and nuances of project experience to surface and resulted in unforeseen themes arising. Relevant themes were included in the results if 2 or more project leads spoke of the theme and highlighted it as a pertinent issue.

Results: what are the lessons learnt from FP4 research?

Key findings from project leads:

- Agricultural research-for-development (AR4D) requires simultaneously building and applying knowledge which can result in tensions. FP4 projects must find a balance between advancing science and creating an impact, while also considering the priorities of partners and CCAFS itself.
- Project impacts can include those that are difficult to measure, particularly when contributing to an enabling environment or impacting farmers livelihoods in non-conventional ways. Project leads must keep this in mind when reporting impacts.
- South-south knowledge exchange is central to the CCAFS program and is evident across all regions, however interviewees mentioned the desire for improved mechanisms to share project experiences.
- Face-to-face meetings are found to be the primary channel of communication through which change can be affected through engaging, discussing and providing feedback with partners.
- Capacity development should take place through engaging with stakeholders to establish their needs, and recognize the constraints on the time and resources that they could commit.
- Projects should include efforts to conduct evaluations on how end-users employ advisories and information in their decision-making. This can take the form of ex-post evaluations that can substantiate project impacts.
- Project leaders should be flexible by adopting an adaptive management approach in climate services projects. This applies from proposal design through to implementation and completion of the project.
- Efforts should be pursued early in project timelines to establish the context in which next-users operate.
- Climate services projects should include efforts to communicate effectively the uncertainty inherent in climate forecasts. Participatory approaches that include end-users in communicating uncertainty could address barriers associated with probabilistic forecasts.

- During proposal writing and project design, efforts should be made to understand the motivation and strategy of different collaborative partners which could contribute towards developing sustainability strategies, as well as streamlining efforts to leverage shared resources.

Primary themes from interviews and MARLO review

Time

The role of time is fundamental in agricultural development projects on several fronts. This is perhaps most obvious when we consider the length of projects, as proposals and funding provide the first time-based restriction. Projects have a defined time period in which outcomes and ensuing impacts are expected. However, many impacts and their associated enabling environments take time to build. For example, establishing and testing effective business models that make use of the private sector to sustain climate services efforts is a time intensive process. Similarly, validating forecasts is a process that takes time. The Bangladesh Meteorological Department (BMD) through a collaboration with IRI and CSRD have recently begun producing an operational seasonal forecast, although it has yet to be applied because it has not been validated. The process of validating a forecast can take years.

Engaging with partners requires consideration of their time and how much of it they can dedicate to collaboration. Government staff are particularly time-constrained, thus collaboration requires navigating their demanding schedules. Further, influencing policy takes time in the order of years. Trust is key here as well, as the process of engagement may become less time intensive if a good working relationship has already been established. Building trust and relationships with partners as well as farmers requires time and patience. Lining up project deadlines and goals with processes that take years to build may not be linear.

In addition to the role of time in achieving project impacts, it is also important to consider the time scale in which different processes relevant to climate services occur. Projects have to be cognizant not only of the local environment but of regional and global ones too. At the macro-scale we have national and global environments that encompass the policies and investments relevant to climate services, such as governmental mandates, investment landscapes and international aid. On an international level, this includes global organising frameworks such as the WMO's Global Framework for Climate Services and its in-country implementation, the NFCS. At the meso-scale is the institutional support and infrastructure that allows for the flow of information to farmers, including, amongst others, national meteorological services, media, telecom companies, boundary organisations, and extension agencies. Some decision-making by farmers will take place at the meso-scale, for example, making crop choices with the use of seasonal forecasts. Other decisions take place on the microscale, such as when to fertilize with the use of daily weather forecasts. It is essential for projects to consider processes at each scale that will enable impacts. Changes in the meso and macro levels are slower to take effect, but they are key to ensuring the impacts can be scaled.

South-south knowledge exchange

South-south cooperation in the form of knowledge and skills exchange is a central tenet of CCAFS activities. CCAFS operates in many different countries and contexts in the global south, and the exchange of knowledge and experience provides vital opportunities to learn and inspire. Figure 1 below shows the project linkages between CCAFS projects, and tools and approaches implemented with partners. Several of these tools are internal to CCAFS, including CSVs, CRAFT, PICSA and LTACs. Climate Smart Villages (CSVs) began as a pilot in Africa and South Asia in 2012, with further scaling out to Latin America and Southeast Asia in 2014. CSVs provide opportunities for comparison, learning and extrapolation across a range of agro-ecological zones (CCAFS, 2016) and offer sites where AR4D can generate evidence for the effectiveness of interventions. CSVs also offer an opportunity to understand gender implications of interventions, as seen in Agroclimas in Guatemala where women farmers were found to be receiving and applying agro-climatic advisories from LTACs.

CSVs were crucial to project implementation in several sites across West Africa, Southeast Asia, South Asia and Latin America. One project lead, however, highlighted the lack of sharing around evidence produced in CSVs, describing that in some cases, it "felt like starting from scratch" despite years of implementation in said CSV. While south-south exchange efforts have been numerous throughout the years, one recurring theme in interviews was the interest in more formal channels to share CCAFS work internally. In addition to offering a way to leverage our shared resources, an increased effort to share experiences could increase CCAFS visibility in the region and show local partners our previous triumphs, as suggested by project leads in Southeast Asia.

PICSA is one of the most prevalent examples of south-south exchange in CCAFS. Originally implemented in two countries in Africa, PICSA has since been adapted and implemented in every region in which CCAFS works. ACIS, a climate services project in Southeast Asia, is one of many projects to adapt and modify the PICSA approach to involve farmers in the co-production of climate services. PICSA in West Africa is currently being adapted to include a market analysis model to supply farmers with relevant market information. The Local Technical Agro-Climatic Committees (LTACs) have more of an institutional focus than PICSA, although both aim to improve understanding of the demand-side of climate services. LTACs (called MTAs in Spanish) were the product of south-south exchange between Africa (Senegal) and Latin America (Colombia). There are currently 23 LTACs in operation in Latin America. Last year there was a workshop in Asia to showcase the MTA approach, with the result that four countries in Southeast Asia are currently working on implementing it.

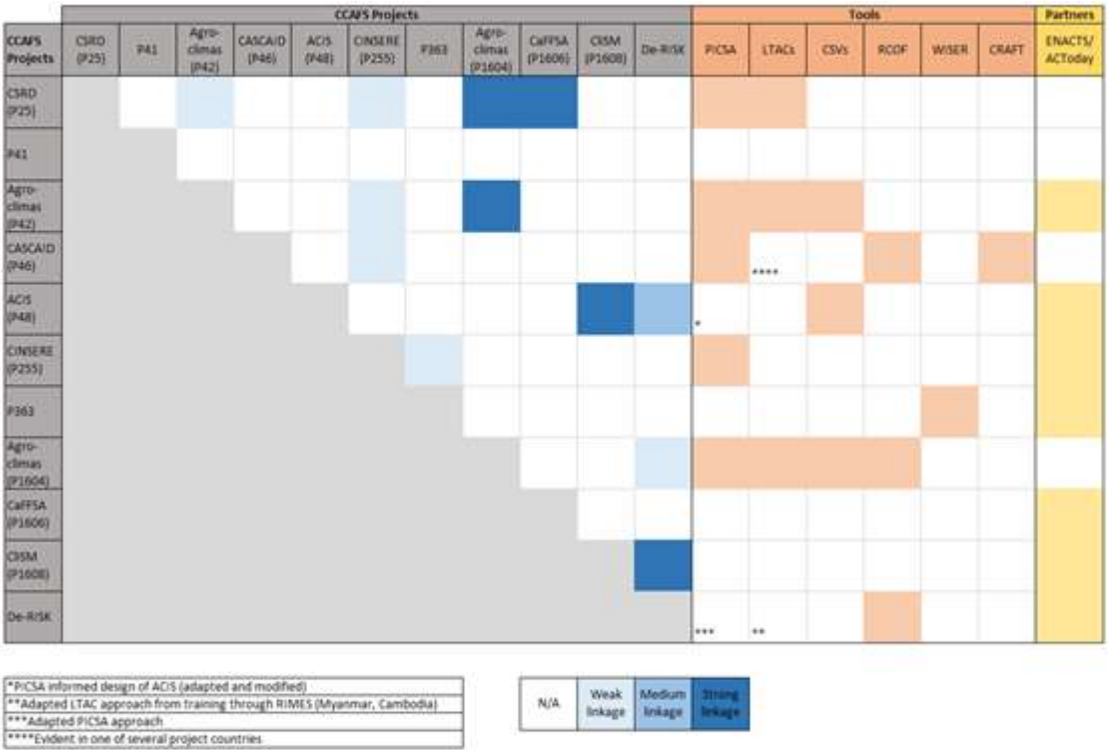

Figure 1. Project linkages between CCAFS projects, defined as a weak, medium or strong linkage; the tools used in the projects; and use of IRI's ENACTS approach. CCAFS Regional Agricultural Forecasting Tool (CRAFT), Regional Climate Outlook Forums (RCOF), Weather and Climate Information Services for Africa (WISER).

Impacts that are difficult to measure

While the overall goal of CCAFS projects is to impact rural livelihoods, some outcomes are less quantifiable and more difficult to document than others. The vision of CCAFS Phase II provides a guide for where efforts may be most efficiently targeted, the pursuit of which involves building an enabling environment and potentially impacting farmers in ways that are difficult to measure. For example, the lead of an index-based flood insurance project in South Asia identified school attendance by farmers' children and diversification of farmer incomes as non-traditional measurements of project impact. Another lead identified the sharing of household work and farmers more efficient use of resources as impacts on farming communities in Southeast Asia. Additionally, there is suggestive evidence that farmers involved in the PICSA process are likely to produce a 'multiplier effect' where (climate) information is spread informally through peer-to-peer communication. These project contributions, while valuable, often prove difficult to report. One project lead highlighted the difficulty of reporting on outcomes for mixed farming systems as opposed to commodity crops. Adjustments to metrics used to measure climate services impacts could aid in addressing this barrier to reporting impacts.

Institutional examples of project contributions include stronger institutional collaboration and an improved understanding amongst stakeholders of the limits of forecasts and their agricultural relevance. De-RISK in Southeast Asia reported that after two and a half years of project implementation, ministries started to push for activities that the project had introduced and furthered, which was considered a sign of success. A positive change in the awareness of climate risk amongst government partners indicated that CCAFS collaboration was affecting change on a national/meso scale. A further sign of contributing to the enabling environment is the replication or proliferation of project approaches and interventions in other organisations in the region. Several project leads, all in Asia, reported observing similarities in other initiatives which they considered a positive sign that awareness was being raised around climate risk management and the potential for climate services. These influences of CCAFS projects are anecdotal, however, and require a more thorough investigation to establish their exact nature and extent.

This also speaks to the potential disconnect between influencing policy and creating an impact. While it is important to involve government actors in climate services interventions, influencing policy is not a guarantee that farmers will benefit from scaling. There remains the need to continually engage, discuss and provide feedback through face-to-face meetings, which was found to be the "game-changing communication" for the ACIS project. Anecdotal evidence from a climate risk management project in South Asia suggests exposure to trainings on CSA and climate adaptation influenced strategies and approaches of partner institutions. One of the primary rural development financial institutions of India began to consider climate in their investments after an ICRISAT training of their senior officials.

Agricultural research-for-development

CCAFS is an agricultural research-for-development (AR4D) organisation, where science and quantitative research findings are used to feed into development interventions that impact farmer, pastoralist, and fisher livelihoods. CCAFS has the primary goal of improving the livelihoods of vulnerable and poor people in countries in Asia, Africa and Latin America. The program creates demand-driven science products that aim to impact livelihoods. Impact pathways are central to results-based management, and require a theory of change approach to the design, implementation and evaluation of research programs (Schuetz et al., 2017). Where users are the focus of impact pathways, the gap between knowledge generation and development outcomes can be more easily bridged. The inherent differences in science and development further complicates an already complex landscape. As suggested by a project lead, scientists in development must accept that development is a far less linear process than science and that it requires a more flexible approach. Development outcomes are often slow to materialize, particularly when millions of farmers and several organisations are involved.

CCAFS Phase II and MARLO stress the importance of engaging stakeholders and developing their capacity (Schuetz et al., 2017), two principles that are key to each CS project included in this analysis. Transforming credible scientific evidence in the form of research results into development outcomes is required in AR4D projects within a relatively short time period. It is a challenge to produce outcomes that lead to impacts while ensuring that impacts on the ground are thoroughly evaluated, all within a defined project timeframe. Rigorous quantification of impacts is an essential part of the science side of AR4D projects, but this requires time – often more than is permitted. To quote a CCAFS project lead, “development outcomes don’t just happen over 1 or 2 years”. Documenting development outcomes is a time-intensive process that can experience setbacks. Projects need to allow enough time and effort focused on both the scaling of approaches/interventions but also on rigorously documenting the evidence. An example prevalent in several interviews is the evaluation of climate information use in agricultural and livelihood decision-making. Rarely is enough time and resources allocated in projects to systematically evaluating how next-users employ advisories and information in decision-making.

Forecast skill and relevance is one example of an effort that simultaneously builds and applies scientific research. Climate services projects tend to focus, to varying degrees, on advancing the science of forecasting towards the goal of equipping Met Services and government agencies with the tools to produce skilful and relevant forecasts. CCAFS climate services projects frequently collaborate with science partners to employ state-of-the-art tools for the generation of forecasts. Led by the International Research Institute of Climate and Society (IRI) of Columbia University, ENACTS (Enhancing National Climate Services) is an initiative that aims to deliver climate data, information products and trainings in Africa. In Rwanda, ENACTS used combined station data with satellite rainfall estimates to reconstruct rainfall data. Advanced forecasting techniques allows for the production of relevant and salient forecasts for farmers when paired with context-establishing initiatives like PICSA.

The dynamic and context-specific nature of AR4D projects requires an adaptive management approach. Numerous projects leads emphasized that it is necessary, at some point, to have to change or fix elements that might even be out of the scope of the project, or to change course slightly to move things forward. To some extent, all of the projects in this analysis required some level of reassessment, redesign or change of course. For example, De-RISK required some adjustment due to the lack of local partners in the beginning and little freedom in the budget to accommodate including more partners. Theories of change can be adjusted if the original impact pathway no longer serves the project, which would allow for a modified impact pathway and adjusted activities to be implemented (Thornton et al., 2018). Other projects in Southeast Asia also experienced a change in partners, due mostly to budgetary constraints. Partners joining or leaving projects are a common occurrence, which requires flexibility on the part of project leaders and institutions.

Sustainability of climate services efforts

The sustainability of climate services efforts beyond the timeframe of the project ensures that development impacts are long-lasting and that next-users continue to realize benefits. However, this is a challenge that requires collaboration between the private and public sectors, as well as boundary organisations like NGOs and farmer cooperatives. For the most part, the climate services landscape lends itself well to collaboration between different partners. There are some exceptions, one of which was evident in West Africa, where private sector providers of climate information are viewed by the National Meteorological Service as a competitor, hindering the development of public-private partnerships. It is beneficial if institutions share a vision for how climate services may impact next-users, while recognizing that each institution has its own strategy. Collaborative partners should be explicit about responsibilities and there should be a concerted effort to understand each other's missions or visions, and co-create a shared goal for the project.

A topic that came up several times in interviews is the different capacities of government bodies and that willingness to engage at times does not correlate with institutional readiness. In countries with weak NMS and government agencies, or with a high dependence on international aid, there is typically a low capacity to include or sustain technical activities implemented by CCAFS. Even in instances where policy has been influenced, laws passed and buy-in secured, if capacities are too low then project approaches and results will not be meaningfully integrated into met services and government agencies' work. In smaller countries, for example, engaging with staff in government agencies often results in engaging with the minister themselves. This creates the advantage of navigating the political system with less bureaucracy, and potentially influencing policy on a much shorter timescale. While this is an inherent property of government agencies, project leaders can cater their approach towards the environment of the public sector, accounting for time and relationships.

Local contexts

Integral to CCAFS projects is the need to establish the context of a region as a part of implementation. Many of the projects in this analysis dedicated several months in the beginning of implementation to establish where which types of effort would be the most impactful. For example, De-RISK created climate services profiles of four countries in Southeast Asia which involved conducting climate risk workshops and collecting a database in each country. Characterizing the demand for climate services in each country allowed for targeted discussions to be held with government partners around tailoring delivery. CSRD created farmer typologies across different farming systems to allow for targeted interventions.

Establishing the lay of the land can reveal shortcomings of interventions. For example, a climate services project in West Africa aimed at farmers, pastoralists and fishers has yet to find its footing with pastoralists. The utility of climate services was high for farmers and fishers, but pastoralists relied on their own system of indigenous knowledge and scouts to guide their livestock management activities. That is to say, climate services may be useful in the future if tailored to the livelihoods of pastoralists but currently they have a low utility. Efforts to understand the context of end-users are invaluable, particularly when pursued early in project timelines. It is likely that context-establishing activities have been conducted in the region, which should be aligned with to avoid duplication of efforts.

Climate services communications strategies provide an example of an approach that is distinctly different across countries. A project leader in West Africa pointed to the high levels of illiteracy amongst farmers as a reason for a preference for voice-based communication, including IVR, TV and radio. Meanwhile in Southeast Asia, loudspeakers have gained recognition as a viable method of climate services delivery. Crop insurance offers another example of the importance of context in the form of a recent exchange of knowledge and skills between CCAFS sites. CCAFS index insurance templates developed in India were brought across to West Africa with the intention of applying them to local cropping systems, however, the template proved to be poorly suited to the region. Despite similarities in crops and farming systems, the difference in local context of the two regions were significant enough to render an exchange ineffective.

Cross-cutting challenges

There is a complex dynamic at play in the early stages of projects and it is related to forecast skill. An asymmetrical level of risk can be seen where projects that accurately forecast weather events in the beginning of implementation tend to see high levels of trust whereas early "incorrect" weather forecasts can jeopardise a project's chance of success. Accurately forecasting climate conditions early in the project is a quickfire way to build trust in the product and the process. Two examples are Agroclimas (P42, P1604) and ACIS (P48) which both experienced some good fortune early on in the project, both predicting fairly accurately the El Niño year of 2014/15 and leading to a high level of trust in the project from the start.

Besides benefitting from the good fortune of predictable weather, communicating uncertainty is another key factor that could contribute to the success of projects. Climate forecasts are inherently uncertain, due to various factors, primary of which are the chaotic nature of the atmosphere and the inaccuracy of forecasting models in representing interactions in the atmosphere. Further uncertainty occurs based on the different timescales on which forecasts are provided to end-users (Kniveton et al., 2015). Stakeholders all along the climate services value chain, from generation through to use, should have an idea of the limitations of forecasts. Uncertainty of forecasts occurs across timescales for farmers, from seasonal decisions such as crop choice and insurance purchases to daily decisions such as fertilizer application and harvest date. The tercile nature of seasonal forecasts that is often presented in agro-climate advisories is suggested to be a potential barrier to use (Haigh et al., 2015; Sivakumar and Hansen, 2007; Soares et al., 2018), as found by a participatory study in Rwanda (Hansen and Kagabo, 2016). A probability-of-exceedance format for forecasts has been found to be more useful, and clearer in communicating uncertainty for end-users (Hansen and Kagabo, 2016; Barnston et al., 2000; Klemm and McPherson, 2017). Beyond the presentation of probability in forecasts, participatory approaches that include end-users in communicating uncertainty could address this barrier.

When used in a portfolio of climate risk management strategies, climate services have the potential to maximize farmers' return on investments (ROI) in farming. Farmers can decide how to include climate information in their decision-making based on their priorities, such as yield stabilization, sustainability or flexibility of practices, productivity and profitability (McConnell and Dillon, 1997). It is important to understand farmers' objectives in their decision-making in order to help maximize ROI. Fostering buy-in amongst farmers and institutions for forecasts involves building trust in the communities where CCAFS operates. Efforts that build social capital and encourage farmer learning such as PICSA and CSVs are essential to climate services implementation.

CCAFS requires more initiatives that aim to improve systematic ways to document and understand ROI for farmers who use climate services. There is a persistent lack of ex-post evaluations on climate services projects to substantiate impacts with studies on farmer decision-making. This can be chalked up to a number of reasons, including a trust that extension agencies involved in the projects have done the evaluations to some extent, a lack of time and/or budget, a lack of prioritization, and a focus on cost-benefit analyses as the tool of choice.

Modernizing the climate services value chain is further cross-cutting challenge in many developing countries which often experience similar problems around generation of climate services. The national meteorological services in many instances lack the capacity to produce relevant and skilful forecasts. Contributing to improving the landscape of climate services often involves upgrading data infrastructure and methods, and the institutional capacity to use them. The WMO recently published a list of minimal infrastructure that allows for adequate data management and climate forecasting (WMO, 2020). These building blocks aimed at improving the capacity of the NMS are essential and should be addressed simultaneously in climate services initiatives. Addressing these foundational problems has the potential to not only vastly improve climate services, but also to ignite a virtuous cycle for increasing the resilience of agriculture, as highlighted by a project lead in West Africa. An effort to fill gaps in observation data involves the scaling of IoT rain gauges for farmers to use across the West Africa. In addition to improving the fragmentation of spatio-temporal rainfall data for Africa, the initiative holds the promise to de-risk smallholder agriculture if the data can be used to decouple climate risk from poor agricultural management. Smallholders will likely begin to access credit far more easily and overcome barriers that severely limit agricultural production.

Conclusion

The willingness of project leads to engage in this evaluation process demonstrates the culture of transparency and authenticity in CCAFS. Participants in the analysis were forthright and eager to share their experiences. Interviews with CCAFS FP4 leads offered insights into climate services project implementation for consideration in future endeavours, generally applicable to agricultural development projects worldwide. From the challenges and experiences described by interviewees, several recommendations are suggested. These can be loosely grouped into the stakeholders concerned. With regard to project partners, recommendations include face-to-face communication; establishing strategies of partners and how to create a shared vision relevant to the project; and engaging stakeholders to understand their availability for capacity development. Relevant to end-users of climate services, recommendations include establishing the context of end-users and their environment; and effectively communicating inherent uncertainty in forecasts. Recommendations relevant to project design include conducting ex-poste evaluations of end-users use of climate services; and employing an adaptive management approach in projects.

Appendix A

		Generation	Communication	Use
		1. What information is communicated to farmers?	2. How are climate services communicated to farmers?	3. How is weather and climate information used by farmers (end-users)?
Institutions	Which institutions were involved?			
	What capacity building took place in the project?			
	What is the strategy of each institution? What is the institution's approach to communicating or generating climate services?			
	Cross-cutting			
Assumptions	What were the primary assumptions in the project?			
	How did assumptions change before and after the project?			
	What learning took place to change assumptions?			
	Cross-cutting			
Scaling	What were scaling-friendly approaches that allowed for reaching larger numbers of farmers?			
	What was the balance between scaling out and being relevant to local contexts?			
	What were the different approaches to scaling out in the different regional programs?			
	Cross-cutting			

Table 2: The framework developed through which to examine projects and the lessons learnt throughout implementation.

Name	Project	Project leader / interviewee	Email	Dates
Enhancing benefits of Remote Sensing Data and Flood Hazard Modeling in Index-based Flood Insurance (IBFI) in South Asia	P41	Giriraj Amarnath	a.giriraj@cgiar.org	2015-2018
Tailored Agro-Climate Services and food security information for better decision making in Latin America	P42	Julian Ramirez	d.giraldo@cgiar.org	2015-2018
CASCAID - Capacitating African Smallholders with Climate Advisories and Insurance Development	P46	Sibiry Traore	p.s.traore@cgiar.org	2015-2018
Enhancing adaptive capacity of women and ethnic minority smallholder farmers through improved agro-climate information in South-East Asia	P48	Elisabeth Simelton	E.Simelton@cgiar.org	2015-2018
Climate Services for Agriculture: Empowering Farmers to Manage Risk and Adapt to a Changing Climate in Rwanda	P363	Jim Hansen	jhansen@iri.columbia.edu	2015-2019
CINSERE - Climate Information Services for Increasing Resilience and Productivity in Senegal	P255	Issa Ouedraogo	I.Ouedraogo@cgiar.org	2019-2021

A Climate Services Menu for SEA (CliSM): tackling scaling with a diversity of end users in the climate services value chains	P1608	Pablo Imbach	p.imbach@cgiar.org	
Capacitating Farmers and Fishers to manage climate risks in South Asia (CaFFSA)	P1606	Anthony Whitbread	A.Whitbread@cgiar.org	2019-2021
Bundling flood insurance and post-flood recovery to agriculture in improving smallholder livelihoods in South Asia	P1607	Giriraj Amarnath	a.giriraj@cgiar.org	2019-2021
Digitally integrated approaches for managing climate risk and increasing food security (Latin America)	P1604	Julian Ramirez and Carlos Navarro	J.R.Villegas@cgiar.org C.E.Navarro@cgiar.org	2019-2021
Climate Services for Resilient Development (CSRD) Bangladesh	P25	Tim Krupnik	t.krupnik@cgiar.org	
De Risk (SE Asia)		Pablo Imbach, Angelica Barlis, Leo Kris Palao	p.imbach@cgiar.org a.barlis@cgiar.org l.palao@cgiar.org	

Table 3: CCAFS projects included in this analysis and project leads interviewed.

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