How CIAT's climate research informs and influences decision making in IFAD and the cocoa and coffee sector globally

An outcomes validation report

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1. Introduction

Programs and projects are implemented to produce results that are beneficial to sustainable societal wellbeing (both human and environmental). These results are used to demonstrate the project's progress and performance and they are varied but their documentation is critical in order to demonstrate progression towards or the extent to which the ultimate goal has been or is being reached. The variation stems from the way the project's logic model or impact pathway is designed but the most fundamental categories are the outputs, outcomes and impacts. The definitions or descriptions of what these mean has been a subject of many discourses but it is now generally agreed that outputs are what a project delivers (from its activities), outcomes are how these outputs are used, and impacts are the long term change in state as a result of the outcomes.

Projects are designed to deliver outcomes that can influence impacts that indicate their goals have been or are being realized. In this case, outcomes are described as 'behavioral changes' in stakeholders that will have an effect on the target impacts. They are usually not in direct control of a project (unlike outputs) but the program has a greater chance of influencing their nature if they are well targeted. Performance evaluation of projects then strives to analyse and document these outcomes.

The International Center for Tropical Agriculture (CIAT) and its partners, under the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) have and are conducting extensive research around four pillars of climate change: Climate Smart Agriculture Practices, Climate Risk Management, Low Emission Agriculture, Policies and Institutions and Gender and Social Inclusion. The information is now being used by next-users of the research. These research results are expected to inform and guide decision-making among key actors that will support the growth of sustainable agriculture adapted to climate change. CIAT has been interested in confirming these outcomes using a detailed validation study of the reported outcomes in key actors.

This is a report validating those outcomes, carried out by Julius Nyangaga of Right Track Africa (RTA) between December 2015 and February 2016.

About Julius Nyangaga

Julius is currently the CEO and a consultant for Right Track Africa, a consortium of professionals in Kenya established in October 2013 to provide services in Strategy Development, Business Development Services, and Monitoring and Evaluation. Between 2011 and 2013, Julius was the Africa Region Monitoring, Evaluation and Learning Manager for the International Institute of Rural Reconstruction (IIRR). Before that he worked for more than 10 years at the International Livestock Research Institute (ILRI), at first as a

Research Associate in the Markets and Innovation Research Themes, then as a Capacity Development Manager.

Julius professional strength is in program planning, monitoring and evaluation (M&E) to enhance group learning through measuring and assessing performance, and integrating lessons into ongoing and future plans. He specializes in incorporating outcome-oriented (outcome mapping) designs in projects and performance analysis (including Outcome Harvesting).

Julius has worked with international research institutions, development organizations, national governments, private sector, academic institutions, community based organizations and communities in Sub-Saharan African. Some of the projects undertaken include baseline surveys, facilitating workshops stakeholder dialogues, training, conducting value chain and end-market analysis, outcome mapping and developing monitoring systems. Julius has applied outcome mapping and harvesting evaluations for organizations such as ILRI (the CCAFS and SFFF programs), the International Institute of Rural Reconstruction (IIRR, the Pastoralists Education System), the MasterCard Foundation (the Youth Empowerment Project in Kenya) and Sikika (a Health Advocacy NGO in Tanzania), among others.

2. Validation methodology

The assignment was to conduct an in-depth validation of two outcome stories reported by the CIAT/CCAFS research team. The objective was to verify the exact nature of these outcomes as evidence of the next-users utilization of CIAT research results.

The assignment was to enrich the understanding of the influence CIAT/CCAFS research had in decision-making of next-users by reviewing relevant documents and conducting interviews with key informants in relevant institutions to obtain their opinion about:

- The evidence of the influence of CIAT/CCAFS science in their decision making as described in the two outcome stories and further influence not yet captured in the outcome stories.
- Their reasoning for taking the actions represented by the two stories.
- The potential they see for further outcomes/changes within their institution in 2016 linked to CIAT/CCAFS science.

The assignment was also to identify any indicators they have or see of changes in the behaviour, relationships, policies or practices of other actors.

Defining and explaining outcomes and outcome harvesting

For this study the description of **'outcomes'** is based on what is used in the **Outcome Mapping** manual (Earl, Carden, & Smutylo, 2010) which describes them as "*the social and institutional changes a program*

wishes to initiate or establish; changes (or outcomes) that are meant to influence the eventual development of desired impacts".

In their guide, (Wilson-Grau & Britt, 2013) define **Outcome Harvesting** as a method *"that enables evaluators, grant makers, and managers to identify, formulate, verify, and make sense of outcomes. Using the approach, the evaluator or harvester gleans information from reports, personal interviews, and other sources to document how a given program or initiative has contributed to outcomes. These outcomes can be positive or negative, intended or unintended, but the connection between the initiative and the outcomes should be verifiable"*.

For this assignment, the outcomes are observed in a change agent's 'next users'. The CIAT research team that has been working on trends in climate change impacts are the 'change agent'. The 'next-users' are defined in CCAFS' Theory of Change (Schuetz, Förch, & Thornton, 2014) as national and international research and education institutions, private sector, extension services, governments both at local and national scales, and regional organisations. They also include policy-makers and development organizations. In outcome mapping, such partners are labelled as 'boundary partners' and are individuals, groups, organizations or institutions who have the mandate or capacity to deliver impact beyond a change agent.

Data collection from identified next users

The two outcome stories that were to be validated are based on the following outcome statements:

- **Outcome story ONE:** *"CIAT results on climate suitability of cocoa and coffee were used in 2015 to prioritize strategies of private and public sector. World Cocoa Foundation (WCF) references Läderach et al. 2013 in their proposal to USAID to develop a CSA strategy for the cocoa sector. The World Bank's (WB) Ghana agricultural sector risk assessment uses results on projected cocoa production decrease to prioritize risk management; two WB senior scientist presentations include CIAT's findings; World Coffee Research uses findings to guide its global coffee breeding program".*

- **Outcome story TWO:** *"Projects of The Adaptation for Smallholder Agriculture Programme (ASAP) of The International Fund for Agricultural Development (IFAD) increasingly adopts CIAT/CCAFS science in project design and implementation, by funding studies that lead to concrete recommendations for adaptation and prioritization of sites and practices. Comoros: CIAT is conducting climate and environmental assessments that directly inform the design of the project (4 mn USD). Liberia: CIAT science informed the design of the project and participates in the design process (4.5 mn USD). Uganda: PRELNOR project approved by Parliament (71mnUSD) drew on CIAT science for the rural livelihood component. Data on CC impacts on coffee in Nicaragua and recommendations for adaptation were used in the design and implementation of NICADAPTA (24mn USD)".*

The validation study is based on data collected through interviews and relevant literature (provided by CIAT and the key informants). The literature that was used is listed in the references of this report. For each outcome story, a list of the next users was suggested by the CIAT team, which were interviewed via telephone and Skype interviews between December 2015 and January 2016.

The validation questions posed to next-user respondents

The questions used during the key informant interviews were as follows:

- *Question 1: To what extent do you agree that you used CIAT/CCAFS research on climate change? When and how did you use it?*
- *Question 2: What are the reasons to use the information that way?*
- *Question 3: What have been the changes in knowledge, attitude, skills and practice in your organization and others you interact with?* These include changes noted up to the time of the validation, and changes that could you foresee could happen in 2016
- *Question 3: What have been the changes in knowledge, attitude, skills and practice in your organization (and any others you interact with?* What changes have been noted up to the time of the validation, and what change could potentially happen in 2016.
- *Question 4: In what ways did you or your organization (as next users) relate with CIAT/CCAFS to obtain the information?*

In the validation narrative hereafter, Chapter 3 and 4 present the responses for questions 1 to 3 for each outcome story. The response for question 4, which is how CIAT interacted with next-users to share research knowledge and information, is provided in Chapter 5.

Limitation to validation study

The validation only uses the evidence based on the outputs produced and shared by CIAT and the identified respondents. The first question seeks to establish the actual use but not the extent to which the next-users have utilized the CIAT research and only gives descriptive narratives from the users.

3. Study Case 1:

3.1. The outcome statement

"CIAT results on climate suitability of cocoa and coffee were used in 2015 to prioritize strategies of private and public sector. World Cocoa Foundation (WCF) references Läderach et al. 2013 in their proposal to USAID to develop a CSA strategy for the cocoa sector. The World Bank's (WB) Ghana agricultural sector risk assessment uses results on projected cocoa production decrease to prioritize risk management; two WB senior scientist presentations include CIAT's findings; World Coffee Research uses findings to guide its global coffee breeding program".

The respondents interviewed to validate Outcome Story One include the following:

Institution ***(or affiliation)***	**Informant**
World Cocoa Foundation	Ethan Budiansky, Deputy Director, WCF Cocoa Livelihoods Program
World Bank	Vikas Choudhary, lead author of the WB's Ghana Agricultural Sector Risk Assessment report
	Tobias Baedeker, an Agriculture Economist in the World Bank's Agriculture Global Practice focusing on Climate-Smart Agriculture. He was respondent on behalf of Marc Sadler, an adviser on Risk and Markets of World Bank's Agriculture Global Practice.
World Coffee Research (WCR)	Timothy Schilling, Executive Director of WCR
Penn State University	David W Titley, Professor of Meteorology

3.2. How next users have used CIAT research on climate change impacts on coffee and cocoa

Following the publications of CIAT/CCAFS research (Läderach P. E., 2011), Ethan Budiansky invited Dr. Peter Läderach (of CIAT) to the World Cocoa Foundation (WCF) Annual Partnership Meeting in Accra, Ghana in 2012. Out of that interest, WCF developed a relationship with CIAT (primarily through Dr. Läderach) and had permission to share and use the research as a reference. Following this interaction, WCF commissioned a study for specific impacts of climate change on cocoa production in Ghana and Costa Rica (Hutchins, Tamargo, & Bailey, 2015). In 2015 WCF developed three *"agriculture climate smart proposals"* to USAID, where CIAT research was used as part of the background information, describing the predicted impact of climate change on the cocoa sector.

CIAT/CCAFS work on climate change impacts on cocoa was also used by Prof David Titley from Penn State University in a talk/presentation on cocoa and climate change given to the Cocoa Merchants Association of America[1] in March 2015 in Miami.

[1] An American cocoa traders' whose mission entails *"fostering trade and welfare of cocoa beans and cocoa products industry in the United States; to obtain for its membership the benefits to be secured by friendly intercourse among those engaged in importing and trading in cocoa beans and cocoa products and, by mutual cooperation and joint action, to promote and advance such interests"* http://www.cocoamerchants.com/.

WB scientists have also used CIAT/CCAFS research the following ways. Vikas Choudhary, lead author of the Agricultural Sector Risk Assessment report for Ghana (Choudary, Christienson, Josserand, & D'Alessandra, 2015), used CIAT climate change model results to show potential risks faced by the sector. According to Baedeker, Marc Sadler (the team leader for the World Bank's agricultural finance and risk management unit) made a presentation, titled *The Role of Resilient Supply Chains in the Face of Climate Change,* (Sadler, 2015) at a stakeholder dialogue in London in October 2015 using CIAT maps that compare current and future areas suitable for cocoa production in Ghana and Ivory Coast. Sadler is also reported to have used this information for other presentations – one in Indonesia and the other in Canada *(Ottawa, May, 2015)*.

CIAT/CCAFS research has also been used by the World Coffee Research (WCR), an institution whose mission is to grow, protect, and enhance supplies of quality coffee while improving the livelihoods of the grower families (World Coffee Research, 2015). According to Tim Schilling (the Director of WCR, they have been interacting with CIAT through Dr. Läderach following his team's research that predicts Arabica coffee suitability based on climate and crop models, which showed that certain regions globally would not be able to support the crop's production in 2050 (Bunn, Läderach, Jimenez, Montagnon, & Schilling, 2015), (Ovalle-Rivera, Läderach, Bunn, Obersteiner, & Schroth, 2014) , (Bunn, Läderach, Ovalle-Rivera, & Kirsche, 2015). WCR then became interested in conducting research within their program that would guide breeding decisions based on likely impacts of climate change on coffee varieties. The predictions are also being used to demonstrate how coffee growing zones will be like in the future, and hence inform variety distribution decisions. This led to a contract with CIAT to help WCR determine climatically diverse locations best suited for its International Multi-location Variety Trial (World Coffee Research, 2014), identifying the best locations to place its multi-trials breeding sites, and more importantly, select locations that have a climate similar to predicted future climates.

3.3. The reasons for taking the decision to use the information that way

The next-users of this information point out that CIAT/CCAFS research was useful as background to the subjects they were working on – either as organizational strategies or developing reports and presentations. Budiansky (WCF), Baedeker (WB) and Titley (Penn State) were aware of CIAT's research from previous and on-going interactions and how relevant the information was to their work. It is for this reason that they invited Läderach to work with them and contracted CIAT to deliver specific information.

Choudhary, Sadler and Professor Titley find that CIAT research gives valuable background information that they used to enrich their reports and presentations. Prof Titley describes the value of CIAT/CCAFS research work as *'credible science from peer-reviewed sources'*.

3.4. Reported changes in knowledge, attitude, skills and practices

1. Knowledge:

According to the next-users interviewed, CIAT/CCAFS research has enhanced knowledge of potential climate change impacts among various stakeholders. Ethan (from the WCF) states that CIAT research on climate change impacts on cocoa continues to be mentioned or referred to within WCF circles, saying that *"it is the first time that someone has put on paper the impacts of climate change on cocoa using mapping techniques. It is also the first time that the audience within the cocoa sector has really come to understand the significance of the problem"*.

Professor Titley reported that the audience to which he presented CIAT results indicated they had not quite given much thought to the impacts of climate change on the sector and industry and CIAT's work was useful to raise this awareness. Choudhary (WB) reports that the publication is now being quoted by a number of other people e.g. the country's ministry of agriculture. Tobias also reports that other researchers are showing the results reported in Sadler's presentation, e.g. Mark Rooney from ICRAF in December 2015.

Tim Schilling reports that the WCR partnership with CIAT has brought on (their) board a capacity to incorporate climate modeling in their plans that is highly acknowledged ("*it was a great marriage of the two institutions*"). The paper was very well received because it actually "*broke climate change implications into zonal categories"* that the plant breeders could work with. He indicated that this was important to the coffee production work.

2. Attitude

The information by CIAT has influenced crucial attitude changes among some of the next-users. For example, interest in his presentation led to Professor Titley being invited to give a similar talk to the annual meeting of the World Cocoa Foundation in Washington DC, in June 2015. According to Budiansky, CIAT research has contributed to the interest of private and public sectors of Ghana and Côte d'Ivoire recognizing the importance of climate change and how it will affect cocoa production. The dialogue within (WCF) membership has changed and companies want to focus on climate change more. Ethan states that one of WCF Board of Directors had recently said "*that climate change needs to be a priority moving forward*".

CIAT's research has contributed to WCR engagement in climate change research so that they are able to show the coffee industry the possible effect (and importance) of climate on coffee production and supply chain (in the future), developments that are contained in their annual reports.

3. Skills

This may not have been specifically followed up but the respondents indicated that they had not built any specific skills for climate change impact modelling using CIAT's work. The working arrangement leans towards contracting CIAT, who has a high level technical capacity, to continue providing necessary research findings for decision-making.

Practice (Which way has CIAT/CCAFS work been used by next-users and others?)

Several next-user organizations (and institutions) have used CIAT climate change research. Notable examples are the WCF USAID proposal and the WCR International multi-location variety trials.

According to Baedeker, WB used CIAT research results in December 2015 to improve a project design in *Honduras on cocoa and coffee (the Honduras Rural Competitiveness project)*, though he did not specify how they used exactly the information[2]. WB has also worked with CIAT to develop climate smart agriculture profiles for several countries in Latin America and Africa (CIAT, 2014).

It is expected that the Ghana risk assessment report would guide World Bank programs for cocoa production in the country. The WCR coffee breeding program has been underway since 2014, with breeding sites selected based on CIAT's climate impact models.

3.5. In summary

The use of CIAT/CCAFS climate change research by private and public actors, and especially the prediction of impacts on specific agricultural sectors (cocoa and coffee, in particular) has been validated in this study. This has been done through enquiries with the actual users of the research (representatives from World Cocoa Foundation, World Bank and World Coffee Research), who clearly indicated that they have used CIAT/CCAFS research and so that their knowledge could influence key decisions (the Ghana Agriculture Risk Assessment Report, the World Bank presentations) or contribute to the design of strategic programs (the USAID proposals and the World Coffee research (WCR) International multi-location variety trials. The validation study has not enquired on how Ghana's Risk Assessment report and the World Bank presentations have been used, but the USAID proposals and Coffee breeding programs are a definite indication that knowledge generated by the CIAT research has been put into practical use. The programs are either underway (the breeding programs) or are expected to be in operation (in 2016).

[2] The project design can be found in the project write-up on World Bank website

4. Study Case 2

4.1. The outcome statement

Projects of The Adaptation for Smallholder Agriculture Programme (ASAP) of The International Fund for Agricultural Development (IFAD) increasingly adopts CIAT/CCAFS science in project design and implementation, by funding studies that lead to concrete recommendations for adaptation and prioritization of sites and practices.
Comoros: CIAT is conducting climate and environmental assessments that directly inform the design of the project (4 mn USD).
Liberia: CIAT science informed the design of the project and participates in the design process (4.5 mn USD). Uganda: PRELNOR project approved by Parliament (71mnUSD) drew on CIAT science for the rural livelihood component.
Data on CC impacts on coffee in Nicaragua and recommendations for adaptation were used in the design and implementation of NICADAPTA (24mn USD)

Respondents

Institution *(or affiliation)*	**Informant**
IFAD-funded ASAP Program	Bertrand Reysset. Climate change specialist IFAD
	Marie Ndaya Beltchika, ASAP country manager, Liberia
PRELNOR (*Information from respondents obtained via the CIAT team*)	Steve Tomlow, IFAD Climate and Environment regional director for East and Southern Africa.
	Pontian Muhwezi, Country programme officer, IFAD
IFAD-funded NICADAPTA Program	Estibalitz Morras Dimas, Portfolio Officer Environment and Climate Division

4.2. How next user has used CIAT research on climate change impacts

IFAD has and is funding several livelihood and resilience programs that leveraged in part on CIAT/CCAFS research. IFAD has developed what Reysset described as *"an institutional collaboration"* with CIAT where these specific information needs are expressed by IFAD and CIAT/CCAFS research outputs help the program guide its investments.

This is reported by the next-users of an ASAP (Adaptation for Smallholder Agriculture Programme[3]) project in Liberia, where CIAT was contracted to develop specific information on climate change impacts in the cocoa value chains that would be used in designing project. CIAT/CCAFS studies were commissioned by IFAD with very specific requirements in terms of climate and environment assessment. These specific

[3] The Adaptation for Smallholder Agriculture Programme (ASAP) was launched by the International Fund for Agricultural Development (IFAD) in 2012 to make climate and environmental finance work for smallholder farmers. For more details: http://www.ifad.org/climate/asap/

requests were contained in the ToR developed for CIAT, which collaborated in the program's design mission.

For the Liberia project, a discussion between IFAD and CIAT in July 2014 (via Skype), was used to draft the terms of reference for the CIAT-CCAFS work. CIAT's input for the for a USD 4.5 million project that ASAP/IFAD negotiated with the government of Liberia in November 2015, is to provide an analysis on the implications of climate change for the production of the cocoa value chain in Liberia. IFAD has thus focused the investment in technological options of a cocoa value chain "that will not be affected *much by climate change"* (Schroth, Läderach, Martinez-Valle, Bunn, & Jassogne, 2015)*,* (Schroth G. , Läderach, Martinez-Valle, & Bunn, 2015). CIAT research explored likely climate change in 30 years and resulted in the project adopting interventions such as improved varieties and agricultural practices to make the country's sector resilient to climate change (CCAFS, 2015).

The ASAP Liberia Country Manager reported that the ASAP team is also considering using application of CIAT research to guide programs aimed at strengthening climate resilience in Sierra Leon.

In Uganda, CIAT has implemented the CIAT developed Climate Smart agriculture Rapid Appraisals (CSA-RA) in four districts. The study – conducted in 2014 – provided baseline and context information on the farming systems, prevailing challenges and adaptation strategies and the gaps, opportunities and what needs to be done to exploit them (CCAFS, 2014), (CCAFS, 2015), (Mwongera, et al., 2014). This information has been used, among other information, by IFAD to design the PRELNOR project (Project for the Restoration of Livelihoods in the Northern Region (of Uganda)) which is scheduled to be implemented in six districts in 2016. CIAT's role in providing this background information and a framework for implementation (understanding of farming system, define interventions for scaling out based on what CIAT was doing as pilots) to the PRELNOR team, has been confirmed by Steve Twomlow (by Skype) and Pontian Muhwezi (by email). Muhwezi wrote: *"CIAT assisted us in conducting a rapid rural appraisal of Northern Uganda. We used the Rapid Rural Appraisal RRA report to inform the design of the project (the component on Rural Livelihoods). In this regard, I would consider the PRELNOR project document as one of the outcomes for the RRA exercise as it provided vital information on the farming systems.''*

The IFAD-funded NICADAPTA program in Nicaragua (Adapting to Markets and Climate Change Project) became interested in CIAT's work following a study by CIAT/CCAFS on cocoa, coffee, maize and beans (later published as Baca, Laderach, Haggar, Schroth, & Ovalle, An Integrated Framework for Assessing Vulnerability to Climate Change and Developing Adaptation Strategies for Coffee Growing Families in Mesoamerica, 2014). According to the Portfolio Officer (Ms Morras Dimas) between the end of 2013 to mid-2014, the NICADAPTA project that supports the coffee and cocoa value chain contracted CIAT (through scientists from the Nicaragua station) to '*guide'* its design when they realized CIAT's climate

modeling maps were relevant in justifying specific climatic resilience activities for coffee and cocoa value chains (IFAD, 2013). This was during a program's scoping mission in November 2013 when NICADAPTA's country program manager and team collaborated with CIAT. The program management team used the agro ecological/climatic models for coffee and cocoa in Nicaragua that CIAT created during the scoping phase and later when they hired/contracted CIAT to provide information specific to their needs.

The ASAP program in Comoros is to be developed (and implemented early 2016) and IFAD contracted CIAT to carry out climate and environmental assessments that would inform choice of interventions and activities. The report was provided in the project design as a product of its SECAP (a Social, Environmental and Climate Assessment Procedure) carried out to provide a better understanding of the environmental, social and climate change risks that might potentially affect a proposed IFAD program (IFAD, 2014).

4.3. The reasons for taking the decision to use the information that way

The Climate change specialist at IFAD (Reysset) reported use of CIAT/CCAFS research by the ASAP program in Nicaragua as IFAD was interested in developing a cocoa and coffee value chain in Western and Central African "*to ensure that the good lessons from "NICADAPTA"* can be included to improve and design these two projects".

According to Reysset, CIAT research had been very important for the design in the Latin America region enabling IFAD *"to see that there can be an impact of climate change on the value chain and what kind of technical option was feasible"*.

Morras from the NICADAPTA program in Nicaragua also reported that the CIAT study was useful to justify and include climatic activities specific for coffee and cocoa value chains. For the NICADAPTA next-user team the research was very relevant because it helped to apply *("put in to practice"*) specific research results by identifying hotspots for these two value chains.

Reysset mentions that IFAD wanted to be sure that there was a future in cocoa value chains where they meant to invest. According to Marie Ndaya, the research helped them endorse the relevance of the investment; and helped to identify options that could be used at the early design stages. Marie notes that CIAT's research input was useful in designing specific program interventions. What was instrumental was projected climate vulnerability of cocoa in Liberia by identifying a region (in the country) that had a climate similar to what it would be in the next 3-6 years in the entire country and in the region. The program proposal was then to implement viable options such as improved varieties as well as some improved agricultural practices to increase the resilience of the country to climate change.

For the PRELNOR program in Uganda, Twomlow and Muhwezi reported that that CIAT's research was important because it provided vital information on farming systems useful for the program design, and particularly in defining interventions for scaling out

4.4. Reported changes in knowledge, attitude, skills and practices

1. Knowledge

From an institutional point of view, Reysset indicates that CIAT/CCAFS research findings are being incorporated in IFAD's approach to programs. In IFAD, several projects focus on value chains and are led by economists who are interested in understanding the implication of climate change in the sectors of interest. Ndaya reported that CIAT maps have helped IFAD understand the effects of climate change in a commodity value chain, which are also being used by partners such as country's Ministry of Agriculture.

Ndaya also reported that the ASAP program is hoping to leverage the lessons learnt to the Sierra Leon country program, although they have not done so yet.

2. Attitude

CIAT research has changed the perception of next-users (and their working partners) showing the value of ensuring that predicted climate change impacts are included in program designs and interventions.

This is reported by Ndaya for the ASAP program in Liberia and by Morras for the NICADAPTA program in Nicaragua. Ndaya specifically states that CIAT /CCAFS research report has been extensively quoted as technical reference to justify their investments in the new project, which has been done in partnership with the government of Liberia.

3. Skills

The key informants interviewed indicated that they had not developed any skills but continue to rely on CIAT researchers for their expertise.

4. Practice (*Which way has CIAT/CCAFS work been used by next-users and others?)*

Ndaya, the Liberia's ASAP program reports that the country's ASAP project was to be submitted to the board in January 2016, *(during the time of this validation study*) and so it was not possible to foresee how CIAT research could have *"had inspired others, and specifically other donors"*.

Reysset reports use of climate change impacts is also being used to guide the design of programs in the Latin America division, while Ndaya said that where the ASAP team is also considering using the Liberia research lessons to strengthen climate resilience in Sierra Leon.

According to Morras of the NICADATA program, CIAT's research was now being used by partners such as country's ministries of agriculture (though it was not specific on how). She also added that the project had *also "started an agreement"* with the Swiss Cooperation to support risk management (*where climate change is featured*) in Bolivia (an ASAP loan) where uptake is targeted at the national level with capacity building for "parliamentarians" regarding climate change risks.

4.5. In summary

IFAD is an international donor that has been using and continues to use CIAT/CCAFS climate research in the design and implementation of programs. This study has validated this by interviewing representatives from IFAD or the programs that IFAD supports in Liberia (ASAP), Uganda (PRELNOR) and Nicaragua (NICADAPTA).

5. CIAT/CCAFS' role *(how did the users relate with CIAT/CCAFS to get the information?)*

CIAT has used a combination of ways to support the realization of these outcomes, especially in making the knowledge and expertise available to address questions and knowledge needs of the next users.

CIAT has published its findings and made presentations, shared its knowledge (*"what we know", or "what we can tell"*). This has worked with the institutions and programs interviewed (WCF, WCR, IFAD, WB) as the key informants report that they used CIAT/CCAFS research as part of literature reviews and information describing the possible impacts of climate change on targeted crops and their implications for specific sectors.

This has led to a second way of CIAT making its knowledge available. This was by knowledge co-development (*"what we can learn together"*), especially through contracts to develop research that centered to their interest. Such "knowledge generation" contracts are reported by WCF, WCR and IFAD (working through the programs ASAP, PRELNOR, and NICADAPTA), where the partner institutions have requested research in specific climate change areas to help design projects that would deliver their objectives. The next-users continue to rely on CIAT research to help guide their strategies and investments.

CIAT has established itself as valuable reference point for any enquiries and interests in climate change modeling and mapping. As institutions develop awareness of current and future climate change, the research has placed CIAT in a valuable reference position for partners to turn to when they need scientific support. The client institutions and program representatives mention such relationships, some of them at

a personal level (Budiansky of WCF and the CPM team of ASAP) and others at institutional level (e.g. the collaboration between CIAT and IFAD, WB (to develop climate smart agriculture country profiles, etc.).

The next-users were asked to make suggestions on how CIAT's research and its ways of sharing it can be made more effective. Some suggestions include:

- exploring climate change indicators that could be more easily *"understandable"* to key institutions and projects (Choudhary)
- using models anchored more with area-specific climate implications, not only using data from the global data sets, though this would depend on data available
- making this information available to key actors in the industries, in reflection of the reaction of cocoa traders that Prof Titley received when he presented climate change implication to a traders' association

For decision-making the research should start with the specific needs of users (as Reysset put it: "*once you know exactly what your partners need you would have done 50% of the work because afterwards it's quite complex. They ensure that there is a good understanding of the output than can cover the need*". This means that user needs should be well understood so that the searcher delivers what is required for actual utlization. There was also advice for CIAT/CCAFS to follow up with how the next-users apply the research knowledge, sending updates on the information and further research, so that these research themes stay on the institutions' radar given that institutions easily lapse to a 'usual way of doing work' (Ndaya of ASAP and Morras of NICADAPTA). All these recommendations would work very well with collaborative (and possibly contractual) programs (Schilling, WCR).

6. General Observations, Conclusions and Recommendations

CIAT's research on climate change impacts on agriculture has been used in guiding private sector and donor program designs and intervention. This has been reported by the institutions that are now aware of climate change implications in their production strategies and plans as well as investors looking to fund development programs that may be influenced by climate change dynamics. The examples from WB, WCR, WCF, IFAD and the programs they fund (the coffee multi-variety trial, ASAP, PRELNOR and NICADAPTA) show that.

The information is valued by the users and appears to have informed investment and supported strategic thinking in these institutions. Climate change and its implications for agriculture are increasingly mainstreamed in programmatic thinking, but what this change entails for agriculture such as CIAT/CCAFS research shows, is a highly valued input. The institutions indicate interest in such information: including in project design and institutional strategies the projection models that show likely impacts of climate

change and how it is going to affect agricultural production is reported as an institutional change. CIAT/CCAFS research is likely to be in greater demand.

CIAT has interacted with the next-users in various ways to make its research information available, including publications and contractual outputs through which specific information needs were made. It is only through public sharing that the information first got the users interested but it is through the contractual relationships that users express their exact information needs and create a joint-learning model with CIAT/CCAFS. Both ways of interacting are useful, but the contractual appears more effective since users will only apply information that is relevant to their specific needs. The challenge is the identification and development of the climate-modelling skills by next-users through CIAT/CCAFS in such arrangements. If the needs are onerous, it will require developing that capacity or being available wherever and whenever needed.

The next-users also made observations and recommendations on how CIAT can continue to make its research more relevant and useful, including producing research on climate change impacts for specific geographical areas. Notable recommendations are:

1. The climate change models are valuable and CIAT should continue to the greatest extent possible to develop them.
2. Continue with the contracting models since they generate research information that is demand-driven and applied.
3. The learning should continue beyond provision of information: understanding how it is applied by next-user programs and what needs to be done to make such use more effective.

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