Review of climate screening approaches and tools for agricultural investment

Areas for action and opportunities to add value

Working Paper No. 214

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

Douglas R. Brown

CGIAR

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Abstract

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) Climate Risk Management Flagship aims to enable the transition towards more climate-smart agricultural systems and climate-resilient rural livelihoods in high-risk environments. It does this in part by supporting the availability and effective use of relevant climate information by farmers and by the institutions that support them. As an initial step towards assessing whether and how CCAFS and its partners might contribute to improvements in the ways these funds are screened and used, CCAFS commissioned this selective review of current climate screening approaches and tools that several major development investors have put in place in recent years, focusing on their approach to screening investments in agriculture and food security. This selective review of donor agencies was undertaken in order to understand their various approaches to climate screening, identify current issues that they are facing, look for common threads and themes among them and suggest ways in which CCAFS might add value to their screening processes and that of other donors.

In general, climate screening tools and approaches appear to be fairly well-developed and integrated in donor strategy and proposal development processes. Donors recognize their limitations and are seeking to modify them accordingly. There is certainly room for improvement, whether that be in facilitating the incorporation of relevant climate data into screening tools (to reduce the human effort required), ensuring that users are well-trained and oriented into climate screening for agriculture in order to reduce the impact of subjectivity on screening outcomes, and so on. That being said, informants were clear that there is not a need for more tools – but guidance and resources to support users in making more effective use of what exists. There is a need to generate additional evidence for the synergies to be derived from doing adaptation, mitigation and development together as well as to proactively communicate the importance of the paradigm shift embodied by this approach to agriculture. Additionally, there is an opportunity to assist donors through the development of guidance resources related to agriculture, to the appropriate and realistic use of climate information as well as more general information about no-regrets approaches to rehabilitating degraded lands

and working with farmers in the context of climate variability and change when information is limited and the future is uncertain.

Keywords

Climate screening; agriculture investment; risk management; food security; funding agency approaches.

About the author

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Contents

Acronyms

A&FS	Agriculture and Food Security
ACDI	African Climate and Development Initiative
AEs	Accredited Entities
AfDB	African Development Bank
AREP	Adaptation Review and Evaluation Procedures
ASRA	Agricultural Sector Risk Assessment
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CCAP	Climate Change Action Plan
CCD	Climate Compatible Development
CCKP	Climate Change Knowledge Portal
CEDRIG	Climate, Environment and Disaster Risk Reduction Integration Guidance
CRM	Climate Risk Management
CSA	Climate Smart Agriculture
CSS	Climate Safeguards System
DfID	Department for International Development
DRR	Disaster Risk Reduction
ESMS	Environmental and Social Management System
F&LS	Food and Livelihood Security
GCF	Green Climate Fund
GPFS	Global Programme Food Security

IFC	International Finance Corporation
NDA	National Designated Authority
NRM	Natural Resource Management
RFAs	Requests for Applications
SDC	Swiss Agency for Development and Cooperation
SWC	Soil and Water Conservation
USAID	United States Agency for International Development

Introduction

Background

The Climate Change, Agriculture and Food Security (CCAFS) Climate Risk Management Flagship aims to enable the transition towards more climate-smart agricultural systems and climate-resilient rural livelihoods in high-risk environments. It does this in part by supporting the availability and effective use of relevant climate information by farmers and by the institutions that support them.

With potentially billions of dollars of annual investment in agriculture and food security subject to some form of climate screening, development donors represent an important user of climate information. As an initial step towards assessing whether and how CCAFS and its partners might contribute to improvements in the ways these funds are screened and used, CCAFS commissioned this selective review of current climate screening approaches and tools that several major development investors have put in place in recent years.

Scope

This review complements the few existing surveys of climate screening methods and tools. It assesses the degree to which innovations in climate science, climate information, and decision-making under climatic uncertainty are already mainstreamed into the processes of a selection of major donors, and where there may be opportunities to improve the way investments in agriculture and food security management are designed. In particular, this review focuses on their approach to screening investments in agriculture and food security, where CCAFS and its partners are best positioned to add value. In addition to the World Bank and the United States Agency for International Development (USAID), four major development and/or adaptation funding organizations were selected for the purpose of this review. These included the UK Department for International Development (DfID), the African Development Bank (AfDB), the Green Climate Fund (GCF), and the Swiss Agency for Development and Cooperation (SDC).

Methodology

This review builds on existing reviews of climate screening approaches and tools (Ecofys and IDS, 2011; Hammill and Tanner, 2011; Klein et al., 2007; Lebel et al., 2012; Olhoff and Schaer, 2010; Tanner et al., 2007) through a desk review of more recent literature and documentation as well as key informant interviews. Over 60 publications, which included refereed journal articles, published reports, internal guidance documents and donor websites outlining their approaches to climate screening, were reviewed – with a particular emphasis on any sector-specific material for agriculture. A total of 12 representatives from eight different donor agencies as well as one consultant to a donor agency were interviewed either individually or in small groups.

All documents reviewed and interview notes were imported into NVIVO, specialized software for qualitative data analysis, where they were coded according to the various themes of the review. The goal of the review was to identify (1) the degree to which innovations in the area of climate science and information are currently mainstreamed into these approaches and tools; (2) opportunities to improve their design; and (3) blind spots, gaps and/or biases that should be addressed.

At the same time, it should be kept in mind that this was not an evaluation of the screening approaches taken by different organizations. It was a purposive, time-limited review of a range of donor agencies undertaken in order (1) to understand their various approaches to climate screening, (2) identify current issues that they are facing, (3) look for common threads and themes among them and (4) suggest ways in which CCAFS might add value to their screening processes and that of other donors. While the people with whom the author spoke freely shared their ideas and opinions, the priority issues identified herein as well as the resulting recommendations are those of the author.

Results

The results of the review of climate screening approaches and tools will be presented briefly for each of the donor organizations considered in the review. For each, the information will be organized around a series of guiding questions as listed in Table 1.

Table 1 Guiding questions

Topic	Description
Why	The purpose for the tool or approach
What	Is there one general screening approach or is there something specific for agriculture and food security (A&FS)?
Where	The place that the tool or approach fits in the process of project/program review and approval.
Who	The persons or departments responsible for ensuring and/or doing the review.
How	The tool or approach is employed and the degree of integration into the project/program design and approval process.
Specific issues of importance to this review	• the use of historical and projected climate change data; • the use of information on climate variability and how uncertainty is accounted for in the process; • identification of synergies and/or trade-offs between adaptation, mitigation and food security (development) goals; • specific treatment of issues related to A&FS;
Summary	• Perceived functionality and effectiveness of the process.

The World Bank[1]

Climate screening at the World Bank takes the form of a Climate Risk Assessment (CRA) whose goal is to "help development practitioners identify whether and where proactive screening and adaptation to climate hazards may be required and to provide them with a first glance of possible location-specific adaptation options" (The World Bank, 2010a) and is part of an ongoing effort to strengthen its ability to meet the challenges and opportunities presented by climate change and outlined in its Climate Change Action Plan (CCAP) (The World Bank, 2016e; World Bank et al., 2016). The online Climate and Disaster Risks Screening Tool (https://climatescreeningtools.worldbank.org/) provides early stage due diligence on climate and disaster risks at the concept stage of project development (The World Bank, 2015) and is one of the three climate change project requirements for the Bank. Additionally, the Agriculture Global Practice has a goal that 100% of agriculture projects undergo a climate risk screening and GHG accounting by 2019. Climate screening is undertaken by field staff at the proposal development stage under the assumption that it will

1 In addition to reviewing a number of World Bank documents (The World Bank, 2010a, b, 2014, 2015, 2016a, b, c, d; The World Bank and CIAT, 2015a, b) and selected online resources (Climate and Disaster Risk Screening Tools; the Climate Change Knowledge Portal (CCKP)), a series of four meetings with a total of five Bank staff took place in early December 2016.

feed back into the project design by strengthening the consideration of climate and disaster-related aspects. The online screening tool guides users through a series of steps that require users to outline the degree of exposure to current and future climate and geophysical hazards and rate them as to the degree of exposure to each of the hazards under the current climate regime as well as the projected future regime. Personnel are supported in their use of the tool through in-house training as well as helpdesk support provided by the Climate Team at the Bank.

The Bank also encourages users to access climate data available through The Climate Change Knowledge Portal (CCKP) (http://sdwebx.worldbank.org/climateportal/index.cfm) where there is a user's guide (The World Bank, 2014) as well as in-house and online resources for training in use of the portal together with helpdesk support for those who need it. In addition to global climate data, the portal includes 70 detailed Climate Adaptation Country Profiles as well as Climate Smart Agriculture (CSA) Country Profiles for a number of countries (The World Bank, 2016d). In the coming months, more detailed CSA Country Investment Plans will be developed, including a more thorough treatment of climate risks than in the country profiles.

The Bank's screening tool is closely linked to the CCKP, but the tool does not populate itself from the climate data. The tool guides the thinking process of users, but they are required to go back and forth between the climate data, other resources and the tool itself—entering the data themselves and making subjective evaluations of hazard ratings, etc. The tool encourages users to make reference to historical climate information as well as projected climate change data and reminds them to think about climate variability, the degree of uncertainty in the projections and matching the time horizon appropriately. The CCKP allows users to view historical data as well as climate projections for various time horizons, climate models and variables. There is also a link to a Historical Variability Tool provided by the International Research Institute for Climate and Society (IRI) and additional downscaled data appears to be forthcoming.

The screening tool has an agriculture-specific version, though it follows the same process as that for other sectors. The tool encourages users to think about climate risks as they might affect development projects – and, more specifically, agriculture and natural resource management projects. However, there is no explicit discussion of how to identify adaptation

options and there appear to be no specific questions relating to identification of synergies between adaptation, mitigation and food security goals in the tool's current form. In general, the tool is functional and effective, but it does place considerable demands on the user. That being said, the Bank is in the process of revamping the tool for all sectors and is in the final stages of updating the sectoral guidance notes as well.

Finally, the Bank has developed an Agricultural Sector Risk Assessment (ASRA) methodology (The World Bank, 2016a) that was piloted in Niger (The World Bank, 2013) and has now been used in over 14 countries (The World Bank, 2016a). The Bank's Agricultural Risk Management Team has made these and other resources available on the Forum for Agricultural Risk Management in Development (FARMD) web site (http://www.agriskmanagementforum.org/) (World Bank FARMD, 2014). While this assessment methodology is not required as part of the climate screening process, it provides a very detailed assessment of climate, environment and livelihood issues related to agriculture and often serves as a guide for strategic planning at the country level. In some cases, large-scale projects have evolved as a result of the assessment—for example, CSA projects that were recently approved for Kenya and Niger. That being said, individual projects such as these will go through the normal, mandated climate screening process, but one would obviously expect the results to be very positive and require very little modification given the process by which they were initiated.

US Agency for International Development (USAID)[2]

USAID's Climate Resilient Development Framework (CRDF) provides a "five-stage, systematic process for understanding and prioritizing current and projected climate-related vulnerabilities" (USAID, 2014a) in order to ensure that adaptation considerations are incorporated into development thinking (Olhoff and Schaer, 2010). The goal of Climate Vulnerability Assessment at USAID is to reduce the impact of climate vulnerability and change and to promote climate resilient development (USAID, 2016e). Use of the assessment tool is not mandatory.

2 In addition to reviewing a number of USAID publications (USAID, 2012a, b, c, d, e, 2014a, b, 2015a, b, c, 2016a, e, f) and a review of climate integration in USAID activities (Roeyer, 2015), an early version of the new climate screening resources (USAID, 2016b, c, d) was made available for review. .Five USAID staff made themselves available for a face-to-face meeting in early December 2016.

However, USAID's recently updated Climate Risk Management (CRM) process is mandatory. CRM updated requirements for USAID country and regional strategies in October 2015 and systematized consideration of climate risks for USAID projects and activities in October 2016. Reporting on risks is now required for all USAID programming, with the exception of adaptation funding (because it is assumed that there will be further analysis as part of the adaptation funding planning process) and humanitarian assistance.

USAID provides support for this process through CRM screening and management tools, sector-specific annexes (such as for agriculture) and country-level climate risk profiles. Unlike the CRDF, assessing and addressing risk (and documenting that process in the CRM table) is required under the new CRM process. The CRM process (and that which preceded it) is conducted by staff who are designing strategies, projects and activities. This is most frequently done by field staff but there are projects and activities designed in Washington. CRM is not intended to be a one-off screening, but to be part of an iterative process that is used at various different levels. These include the development of country-level strategies, project design and activity design (which includes the review of Requests for Applications (RFAs) and the development of project proposals). Additionally, screening is a team-based process and is not normally done by one individual acting in isolation. Special training is not required to use the tool, which is meant to be self-explanatory, but USAID recognizes that training will improve staff's ability to perform climate risk management. For this reason, climate integration leads are being identified to support each operating unit. As of March 2017, over 250 USAID staff have been trained in its CRM process as part of a capacity building program that is ongoing. Even so, use of the tool is a subjective process and results are dependent to some extent on people's experience and judgment.

The new CRM process points users to USAID's own climate risk profile(s) that are available on the Climatelinks web site as well as to the World Bank's Climate Change Knowledge Portal (CCKP) mentioned in the section on the World Bank (on page 12) and other sources of climate information, which are not specified. Users are reminded to make use of historical and projected climate change data as well as to consider the relevant time horizon for planning purposes. Issues related to climate variability and accounting for uncertainty are also highlighted.

The CRM process encourages users to think about opportunities for synergies, though this most often focuses on those between adaptation and development or mitigation and development and not so much between adaptation and mitigation. The agriculture annex to the new CRM process (USAID, 2016c) is a considerable improvement over the information that had been available on the Climatelinks web site (Climatelinks, 2016), which has recently been updated to include the entire set of CRM documentation as well as the various annexes (Climatelinks, 2017a). It includes a very helpful series of guiding questions that help to identify important issues as well as options for addressing them.

UK Department for International Development (DfID)[3]

Several years ago, DfID developed a checklist-based screening tool for climate and environment risks and mandated its use by program officers and climate advisors for all programming (with the exception of disaster responses), the goal being to provide a means of rapidly identifying those areas of the portfolio that were more likely to be at risk or with a greater potential for risk reduction measures (Tanner et al., 2007). It was a rigorous, computer-based system that involved a mandatory sign off by a climate advisor who had specific training and authority to do so. Staff were trained extensively in use of the system. However, this was abolished about two years ago as part of their shift to use of a "smart rules" approach (DFID, 2016). While the screening approach was effective for identifying risks, it did not seem to be improving initial project or programme design. For this reason, the revised approach takes a principles-based approach to design so that climate and environment issues are considered earlier on in the process. However, the goal is the same – to help get people out of poverty and to do it in a way that is climate smart – in a way that helps the environment rather than harming it.

There are no specific guidelines as to the type of climate information to use in the screening process. Staff are expected to seek out the relevant data for the subject matter in question and examine the full range of evidence and use it to help them decide what is most appropriate in the circumstances. This would apply to historical and projected climate information as well as

3 Two virtual meetings with one of DfID's key staff on climate and environment issues supplemented the review of some available DfID and related publications (DFID, 2016; Grist, 2015).

information on climate variability and how to cope with uncertainty in the data. DfID is in the process of reviewing this new approach in terms of its effectiveness.

African Development Bank (AfDB)[4]

In 2010, the AfDB began the process of mainstreaming climate change into the environmental review process with the development of their Climate Change Action Plan (African Development Bank Group, 2011a) and their associated Climate Risk Assessment Strategy. The climate screening tool was developed by the Global Climate Adaptation Partnership (Global Climate Adapation Partnership, 2014) in 2011 with support from DfID. The result is the Climate Safeguards System (CSS), a set of decision-making tools and guides "that enable the Bank to screen projects in vulnerable sectors for climate change risks and identify appropriate adaptation measures to reduce vulnerability" (African Development Bank Group, 2011b).

About 70% of projects (those in vulnerable sectors, which include water, agriculture, transport and electricity) are screened using the CSS at the country level by AfDB staff, with the exception of short-term emergency relief assistance. There are web-based and paper-based versions of the CSS, which is used to review projects at the concept stage. Reviewers prepare a "results sheet" that provides expert opinion on the relevant sectors in the concept. Depending on the initial screening category of the project (1, 2 or 3), there is a predefined review process and feedback is taken into consideration at the proposal development stage. This initial climate screening is based on a sector-specific climate vulnerability scorecard that, depending on the total score, is used to assign a screening category. The score determines the specific Adaptation Review and Evaluation Procedures (AREP) to be followed and is used to guide feedback on the project concept.

The AfDB CSS process makes use of the CSS Information Base, which consists of a portal that gives direct access to the climate projections developed for African countries by the University of Cape Town (African Development Bank Group, 2011b). It also contains a database of adaptation activities and links to a wide range of information sources on adaptation climate information produced by the African Climate and Development Initiative

4 An interview with a staff member based at AfDB headquarters who has responsibilities related to the climate screening process and resource development complemented a review of relevant publications (ACDI, 2016a, b; African Development Bank Group, 2011a, b; Global Climate Adapation Partnership, 2014).

(ACDI, 2016a, b). ACDI (http://www.acdi.uct.ac.za/) is also in the process of developing a series of 25 Country Climate Profiles for use by the AfDB. For the most part, the system is functioning well, but it is not perfect. The AfDB is in the process of developing a new strategy that will carry it through to 2020, by which time it intends to have 100% of projects screened by including those which are currently left out (projects in other sectors and regional projects).

The Green Climate Fund (GCF)[5]

The GCF is intended to finance paradigm-shifting, low-emission (mitigation) and climate-resilient (adaptation) investment in projects and programs in developing countries (Green Climate Fund, 2015a), through both the private and public sectors with a combination of concessional and grant funding – achieving a balance between its funding for mitigation and adaptation initiatives (Green Climate Fund, 2015b). According to the Results Management Framework, there are a total of eight strategic impact areas, grouped into two larger components. The goal is to (a) reduce emissions from (1) energy generation and access, (2) transport, (3) buildings, cities, industries and appliances and (4) forests and land use as well as ensure (b) increased resilience of (5) health, food and water security, (6) livelihoods of people and communities (7) ecosystems and ecosystem services, and (8) infrastructure and the built environment.

Additionally, the GCF has identified several cross-cutting investment priorities that have the potential to develop a more integrated approach to mitigation and adaptation impact by contributing to each of the result areas (Green Climate Fund, 2015a, b). These include (1) sustainable low-emission, climate-resilient agriculture, (2) forests and climate change, and (3) resilience. Finally, the GCF will "actively promote synergies across areas of adaptation and mitigation wherever possible, and promote environmental, social, economic and development co-benefits, and take a gender-sensitive approach"(Green Climate Fund, 2015a).

Of more importance for this review, however, is the approach to climate screening and assessment that appears to be embedded in the GCF approach (Green Climate Fund, 2015a).

5 Attempts to contact the Green Climate Fund (GCF) itself were unsuccessful. Additionally, an interview with one of the GCF Accredited Entities (AEs) fell through. However, a number of publicly available GCF resources (Green Climate Fund, 2015a, b; World Resources Institute, 2015), the International Finance Corporation (IFC) Standards on Environmental and Social Sustainability referenced by the GCF (IFC, 2012a, b, c, d) were very useful, especially when supplemented by insights gained from an extensive interview with a consultant who frequently reviews proposals and concepts on their behalf.

Countries are encouraged to establish and maintain a National Designated Authority (NDA) or focal point to guide in-country actions. Funding itself is to be directed through Accredited Entities (AEs), with some form of oversight by the NDA or focal point. AEs may be "sub-national, national, regional or international; they can be public, private or non-governmental institutions as long as they meet the standards of the Fund" (Green Climate Fund, 2015a). To date, there are at least 20 AEs, including UN agencies, multilateral development banks, national and international NGOs, and social investment funds.

The accreditation process ensures that AEs have the ability to manage funds according to best-practice financial management standards as well as the technical capacity to manage environmental and social risks at the project level. That is, AEs must be able to demonstrate that they have an appropriate Environmental and Social Management System (ESMS) and that an appropriate ESMS is included in any funding proposals. In the absence of its own set of environmental and social safeguards, the GCF "adopted the International Finance Corporation (IFC) Performance Standards as its safeguard standards on an interim basis until 2017" (World Resources Institute, 2015). AEs need to demonstrate that they have environmental safeguards in place that meet or exceed the IFC's performance standards (IFC, 2012a, b, c, d). There are no specific guidelines as to the type of climate information to use in the screening process. AEs and the GCF internal approval process rely on the IFC performance standards.

Secondly, information available to this review suggests that the Secretariat of the GCF will assign a risk category based on these same standards to all proposals submitted by AEs – there being different requirements for environmental and social safeguards for projects of different risk levels (see Table 3 on page 8 in WRI (2015)).

The IFC performance standards regarding the management of environmental and social risks are very thorough and are clearly targeted for the management of risks associated with large investments in infrastructure and related programs undertaken by the multilateral banks, etc. Their primary focus is not on climate change per se, but they do spell out the importance of climate considerations in the section on the identification of risks and impacts (Performance

Standard 1)[6] (IFC, 2012b, d) as well as in the subsection on Ecosystem Services[7] in the section on community health, safety and security (Performance Standard 4) (IFC, 2012d). While the IFC recognizes that climate change is a serious global challenge (IFC, 2012a, c), no specific guidance as to the climate risk assessment process is given apart from stating that it should include:

> *"any changes anticipated to occur in the foreseeable future (including projected variability in climatic and environmental conditions due to potentially significant climate change or that would require adaptation measures that could occur over the life of the project)"* (GN 19, page 9, IFC, 2012b)

and that

> *"Specific identification of risks associated with climate change should be conducted for projects located in recognized climate sensitive areas (i.e., those potentially affected by impacts of climate-related stimuli, including extreme weather events, such as floods and droughts, extended periods of warm temperatures, variability in precipitation, windstorms, cold spells and freeze-thaw cycles, coastal erosion, and coastal flooding due to sea-level rise). The identification process should (i) identify potential direct and indirect climate-related adverse effects that may affect the project during its life-cycle, (ii) identify potential direct and indirect climate-related adverse effects that may be exacerbated by the project, and (iii) define monitoring program and mitigation and adaptation measures, as appropriate."* (GN 35, page 13, IFC, 2012b)

However, the IFC performance standards do not give specific guidance as to the use of climate information or projected climate change data. Nor do they give guidance about how to consider climate variability, the degree of uncertainty in climate projections, or how to match the time horizon appropriately. Perhaps the assumption is that those making use of the standards will draw on the tools available through the World Bank's CCKP and its Climate Screening process, but that is not explicit.

6 "The process will consider all relevant environmental and social risks and impacts of the project, including the issues identified in Performance Standards 2 through 8, and those who are likely to be affected by such risks and impacts. The risks and impacts identification process will consider the emissions of greenhouse gases, the relevant risks associated with a changing climate and the adaptation opportunities, and potential transboundary effects, such as pollution of air, or use or pollution of international waterways."

7 "The diminution or degradation of natural resources, such as adverse impacts on the quality, quantity, and availability of freshwater, may result in health-related risks and impacts. Where appropriate and feasible, the client will identify those risks and potential ecosystem services that may be exacerbated by climate change. Adverse impacts should be avoided, and if accordance with paragraphs 24 and 25 of Performance Standard 6."

There is a clear desire to fund activities that combine adaptation and mitigation considerations in unique, paradigm-shifting ways. On the other hand, there is not a lot of clear guidance as to what this means in the area of agriculture and food security. To a large extent, the type of proposals put forward and the screening process used to prioritize what is included in them is dependent upon the internal processes of the various AEs. For agriculture and land-related proposals, the extent to which they are either "business as usual"[8] or "paradigm shifting"[9] will depend upon the capacity of AEs to differentiate as clearly as possible, the 'development' from the 'adaptation' components. The AEs knowledge of regional climate change impact scenarios should influence the conceptual and design considerations about climate change mitigation and adaptation. That being said, proposals are frequently reviewed by technical experts with experience in the relevant sectors who, presumably, will judge their suitability according to various criteria related to climate change and development goals.

Swiss Agency for Development and Cooperation (SDC)[10]

About eight years ago, SDC developed the CEDRIG (Climate, Environment and Disaster Risk Reduction Integration Guidance) tool (SDC, 2016d). Prior to this, there were separate tools for climate change, environment and disaster risk reduction (DRR). CEDRIG is an online tool, which can also be used in hard copy form. The tool was recently updated and consists of three independent modules, the first being used for a rapid assessment (SDC, 2016a), which determines whether either of the other two modules need to be used (SDC, 2016b, c). The tool is the same for all sectors and is designed to be used by field office staff during the program or project planning process. SDC takes a long-term view when planning projects in priority countries, where a 10 to 15 year time horizon is common for projects that tackle institutional issues that need long-term action. It is common for it to take 1 ½ years to investigate and do the research needed in preparation for one of these projects. Programming

8 In this context, "business as usual" refers to proposals that are really more of the same (i.e. agriculture projects that focus narrowly on seed varieties, access to inputs and commercialization rather than integrated approaches the promote the widespread adoption of good agronomic practices that include SWC, NRM, Conservation Agriculture and agroforestry) and don't show creative thinking or evidence of a paradigm shift.

9 The idea of "paradigm shifting" approaches refers to those that actively look for synergies between the adaptation, mitigation and development aspects of projects – not a variety of activities some of which address each but activities that each address all 3 aspects.

10 An interview with a staff member of the Global Programme Food Security (GPFS) at the Swiss Agency for Development and Cooperation (SDC) provided helpful insights and was supplemented by a review of their screening tool (SDC, 2016a, b, c, d) and related resources (Global Programme Food Security, 2016)

in the agriculture and food security sector is more often shorter in duration (6-10 years), but can be for much longer as well (10-12 or 15-16 years).

CEDRIG Light, the initial rapid appraisal, can be done without access to detailed data or information (SDC, 2016a), but it does point users towards relevant sources of climate and related information such as The World Bank's Climate Portal (CCKP). It is designed to be completed by one person in a couple of hours. On the other hand, CEDRIG Strategic (SDC, 2016c) and CEDRIG Operational (SDC, 2016b) do require the user to gather background information and data for an in-depth context analysis in preparation for a stakeholder workshop where the assessment is done in a participatory manner over one or two days. The tools guide the thinking process of users, but they are required to draw on external climate data, other resources and include it in the tool itself – entering the data themselves and making subjective evaluations of hazard ratings, etc. At the same time, the tool encourages users to make reference to historical climate information as well as projected climate change data and reminds them to think about climate variability, the degree of uncertainty in the projections and matching the time horizon appropriately.

While the process is not perfect, tools such as this are useful because they remind people of things that could easily be forgotten during the planning and/or review process – whether it relates to climate change, gender, conflict, or even partner risk assessment.

Discussion

Each of the donor approaches to climate screening (with the exception of the GCF) is well-established, takes a somewhat unique approach, is adapted to their needs and is evolving over time as circumstances change and in response to their own experience with the process. At the outset of the review process, several themes were identified for consideration. These themes are summarized in Table 2.

Table 2 Primary organizing themes for the review

Theme
The way in which adaptation, mitigation and food security (development) synergies and/or trade-offs are considered together with the alignment with other standards (for example, CSA, Agroecology, Sustainable Intensification).
Application of the tools and processes within the organization.

Suitability for screening A&FS projects/programs/policies.
Degree of use of climate data and alignment with project time horizons.
Degree of use of information on climate variability and how uncertainty is dealt with – in particular, do the approaches or tools use this data? And do they recommend adaptation options that build resilience in the face of climate variability and uncertainty?

- Additionally, Table 3 identifies themes that emerged from the process itself.

Table 3 Themes emerging from the review process

Theme
The role of organizational leadership in making sure that climate considerations are integrated into all levels of the organization – strategy, planning and programming.
The importance of behaviour change to the sustained adoption of appropriate agricultural practices.
The challenges presented by a "handyman mentality" in relation to the use of screening tools.
The challenge presented by maladaptation and the importance of "no regrets" approaches to adaption and mitigation.
The use of a risk minimization approach in contrast to livelihood and/or environmental restoration and resilience building.
The need for guidelines regarding principles that underlie climate-resilient agricultural practices and livelihoods.
The focus of agriculture and the importance of world view.

Each of these themes will be discussed.

Consideration of adaptation, mitigation and food security (development) synergies and/or trade-offs including maladaptation

For the most part, the approaches to screening reviewed here put the focus on some form of mainstreaming of climate and environmental considerations in the review process for the programming and projects that they fund in order to minimize the risk of negative impacts from climate variability and change on development programming. This is particularly true in the agricultural sector. Some clearly spell out the desire to pursue multiple goals (African Development Bank Group, 2011a; Global Programme Food Security, 2016; Green Climate Fund, 2015a; Grist, 2015; Roeyer, 2015), yet more often than not the climate screening tools or approach really only look at the adaptation side of the equation—usually focusing on issues related to minimizing climate risks by mainstreaming adaptation in development programming.

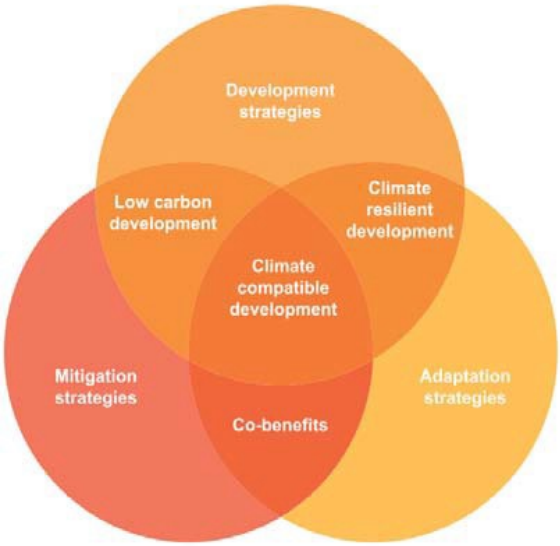

Figure 1: Climate compatible development (CCD) diagram (Ecofys and IDS, 2011)

Frequently the climate screening process seems to assume that addressing adaptation concerns will necessitate trade-offs in the achievement of development goals, even if the strategy suggests that they are looking for win-win opportunities. There is essentially no discussion of adaptation-mitigation synergies. Rather, the focus tends to be towards devoting a certain percentage of funding towards either adaptation or mitigation goals under the assumption that they need to be treated separately with different activities whereas, in agriculture at least, there are many opportunities for synergies between the two (Harvey et al., 2014).

The sweet spot where there are synergies between development, adaptation and mitigation strategies has been referred to by some as Climate Compatible Development (CCD) (Ecofys and IDS, 2011) and can be illustrated as shown in Figure 1. In the area of agriculture, a similar illustration of the interlinked concepts is used and is referred to as Climate Smart Agriculture (CSA) (FAO, 2013). CSA is the triple-win area in the middle of the Venn diagram (Figure 2) where there are synergies between adaptation, mitigation and food security goals (Neufeldt et al., 2015).

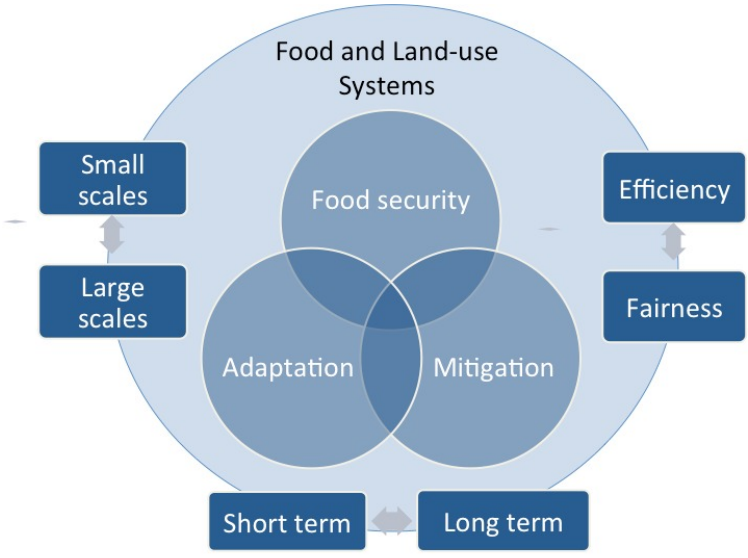

Figure 2: Schematic of climate-smart agriculture (Neufeldt et al., 2015)

One of the key challenges to promoting synergies among adaptation, mitigation and food security benefits is the lack of quantitative evidence on how different management practices and landscape configurations impact each of the three dimensions (Harvey et al., 2014).[11] Neufeldt et al. (2015) report some evidence of this from research in Kenya (Thorlakson and Neufeldt, 2012), and there is ongoing research by another CCAFS flagship (Flagship 2: Climate-Smart Technologies and Practices). However, more research is needed in order to validate what has been observed anecdotally in a number of places. Harvey et al. (2014) give some illustrative examples of the synergies to be gained between adaptation and mitigation for various agricultural production systems (Figure 3).[12] Quantifying the benefits in these two

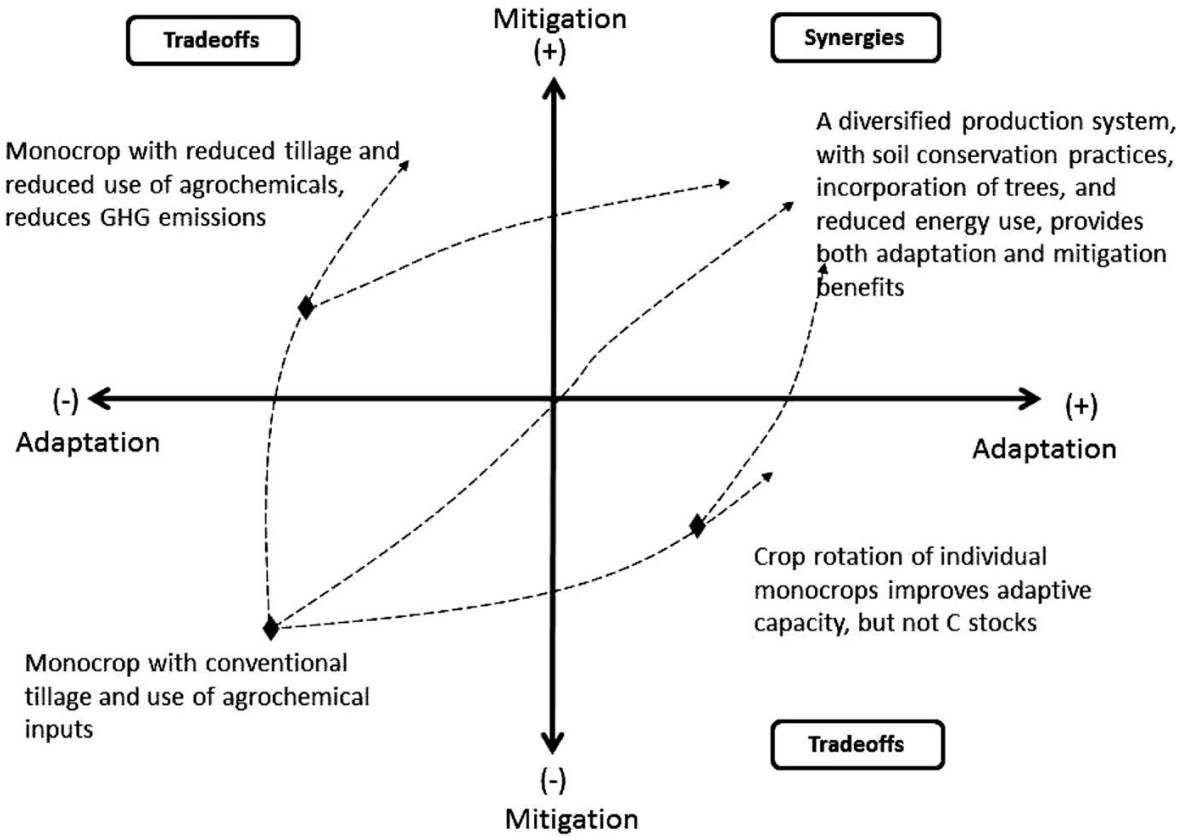

Figure 3: Diagram showing how an annual crop production system can be managed to achieve synergies between adaptation and mitigation outcomes (Harvey et al., 2014)

[11] This is important because many assume that these three dimensions are at odds and that progress in one area is at the expense of the other.

[12] The diagram is somewhat simplistic, but serves to illustrate an important point. On the other hand, tt should be noted that 'monocropping' per se is not the major challenge for smallholder farmers operating in Africa and Asia. As such, the more important issues in moving from the negative to the positive relate to the use of locally adapted crop varieties and the agroecological potential of the landscape and its restoration in the case of a degraded landscape.

dimensions as well as the third dimension (food security) would help to build the case for those who do not intuitively understand the opportunities presented by CSA approaches. Many of the most appropriate practices, from an adaptation/resilience-building perspective, (such as good agronomic, soil and water conservation (SWC) and agroforestry practices that build soil carbon and restore degraded soils, for example) are those which are also of high priority from the perspective of improving food and livelihood security (F&LS). Additionally, because they increase carbon in the landscape, they also (without separate activities and funding) serve a mitigating function. By considering food security, adaptation and mitigation issues separately, many of these opportunities are missed.

There is a need to deal with this compartmentalization, perhaps by tweaking the tools or by providing some guidance resources to help users of the tools by outlining principles and practices that encourage synergies. Additionally, there needs to be some consideration of maladaptation and the importance of ex ante screening or assessment. There are practices that might have positive impacts on food and livelihood security in the short run, but actually decrease resilience to climate variability and change and, by extension, compromise food and livelihood security in the longer run. The classic example is a narrow focus on inorganic fertilizer and improved seed for monoculture production in the absence of good agronomic practices, including soil and water conservation, leaving soils lower in soil organic matter and less able to accept and store precipitation. Ex ante screening using the principles of CSA to evaluate practices along the food security, adaptation and mitigation dimensions can avoid costly (from a human and ecological perspective) maladaptive choices.

Application of the tools and processes within the organization

Apart from the GCF, which is relatively new, all of the donors reviewed have well-established approaches to screening and tools to facilitate the process. Some clearly differentiate the process according to scale (strategic, country- or regional-level vs programmatic or project sub-national scale). Others, while they might not differentiate the process, implicitly recognise that information needs and approaches to screening differ according to context, scale and purpose. In the absence of its own screening approach, the GCF relies on the IFC performance standards, though there does not appear to be a "tool" per se to guide people through various aspects of the standards. DfID and USAID have recently modified their approaches based on their experience to date, while SDC has clearly done so, though not as

recently. The approach taken by AfDB is clearly evolving as well, while the GCF will be developing their own screening standards and process and The World Bank is currently reviewing their approach and that of others as well as revising their tools.

That the tools are clearly being used and that the approach being taken is evolving is an indication that they are (1) useful yet (2) imperfect. They are useful because they help people to think systematically about climate-related issues and avoid overlooking important considerations. That they are not yet perfected is indicated by some of the changes being undertaken and the challenges to their use reported by interviewees and in the literature.

While some felt that the tools were not used enough or, alternatively, late in the process and then only once, it is clear that this is not uniformly the case. For example, DfID has responded by moving it up earlier into the strategic planning phase in order to build buy-in amongst leadership and create better proposals to start with. On the other hand, USAID encourages an iterative process of climate screening that starts early on in the strategic planning phase and continues through the different steps. In contrast to the others, SDC engages in a 1 ½ year long process of developing their programs, which typically extend to 10-15 years or more in duration. One implication of each of the above is that early and ongoing consideration of climate-related issues is important if application of screening approaches is to have the greatest benefit in the development of strategy and programmes to realize the goals related to climate-resilient development.

With respect to the various climate screening tools and approaches themselves, they all focus on a series of screening questions for which responses are largely subjective. The exception to this is, perhaps, that of the AfDB where the initial screening questions are used as a checklist which results in a score and assigns a project concept to one of three categories. There is no clear way to judge the quality of analysis that is being used to arrive at the particular score or choice being made—whether the selection is made based on personal opinion, the opinion of experts/informed judgment or based on evidence from climate data or some other objective source of information. Where this work is outsourced to a consultant, this process may be less transparent and there may be fewer opportunities for the results to feed back into project design.

For this reason, application of the screening process—particularly in the area of agriculture—in terms of the risks and their relative importance as well as what to do about the risks

identified, will depend upon the training, experience and worldview (values) of the reviewer(s). Tools that are used by a team or in an iterative setting, or whose users go through a rigorous training process, would be less subject to this potential bias or weakness.

For the most part, these climate screening approaches and tools adopt a risk minimizing/avoiding approach in that they focus on potential problems (i.e., what could go wrong) and how to avoid them. This is not inappropriate, but it does mean that the approaches typically ignore the present state of the environment—something very important for agriculture, where there is usually an environmental stewardship deficit and considerable existing vulnerability. In many cases, existing environmental degradation and the resulting vulnerability and food insecurity need to be addressed before one can move forward on climate change adaptation and mitigation issues—or at least it needs to be dealt with concurrently. Restoring degraded ecosystems and re-establishing extremely vulnerable household livelihoods is essential to laying the foundation for CSA approaches. The ongoing work of the Bank's Agriculture Global Practice to develop a more robust guidance note on what is needed for resilience in agriculture may address some of these limitations.

In addition to the typical risk screening questions, it is also important to consider existing problems (i.e., what is already wrong) and how they should be dealt with. Questions like these are helpful when thinking about how to build resilience to climate variability and change and how to improve livelihoods (and food security) in the context of climate variability and change. In some ways, the risk minimizing approach is perhaps better suited to physical/infrastructure investments than it is to biological or social ecological systems such as those on which agriculture depends. In agriculture at least, the ultimate result is a function of the collective impact of individual livelihood choices of many smallholder farming households. It is important to understand their decision-making contexts and constraints.

Perhaps this also contributes to the presence of what one informant referred to as a preponderance of "business as usual" proposals. Restricting oneself to looking at future risks might lead one to propose minor changes to agricultural technology (for example, new seed varieties, different inputs) when what is really needed to effectively deal with climate variability and change is to begin by reversing existing environmental degradation and vulnerability. This business-as-usual approach to agriculture, combined with screening late in the concept/proposal development process, means that screening shows up lots of issues for

adaptation that are identified too late in the proposal development process or the necessary adjustments are too costly to implement because of the nature of the proposal itself. Additionally, this narrower perspective and delayed consideration of climate issues may mean that potential synergies in any or all of the dimensions (food security, adaptation and mitigation) are missed. More holistic screening processes that also move the thought process earlier on – to the strategy level or that take an *ex ante* approach—are more likely to result in, as the GCF desires, "paradigm shifting proposals." The result should be better proposals and plans from the outset.

Suitability for screening A&FS projects/programs/policies

While the donor tools and approaches reviewed pay less attention to sector-level guidance (Hammill and Tanner, 2011), some donors have developed sector-specific guidance resources even if the screening tool or approach is generic for all sectors. The World Bank has a series of guidance notes that are targeted at the agriculture and natural resource management sectors (The World Bank, 2010a, b). They are intended to assist users of their generic tool when assessing projects in those sectors. Importantly, these guidance notes also highlight the importance of understanding the degree of uncertainty associated with information about climate variability and change and how various adaptation measures might hold up. They encourage consideration of "no regrets" options—especially because "no regrets" and "low regret" options can be "win-win" when they "enhance adaptive capacity (i.e., they reduce climate vulnerability and exploit positive opportunities), while also contributing to the achievement of other social, environmental or economic outcomes" (The World Bank, 2010b). They also note that "synergies between mitigation and adaptation—in particular, soil management measures that increase carbon sequestration, while leading to improved resilience to droughts, lower soil erosion and higher yields—should be encouraged ("win-win-win" adaptation)" (The World Bank, 2010b). The Agriculture Global Practice at the Bank is also in the process of developing an updated and more robust set of guidance resources.

The World Bank's CCKP (The World Bank, 2016d) also points users to a series of CSA Country Profiles developed by CCAFS (CIAT and BFS/USAID, 2016; The World Bank and CIAT, 2015a, b). Though these are not yet available for all countries, they can provide useful summaries of key climate and environment trends and issues as well as examples of the options available that meet the triple criteria of CSA. Additionally, more detailed CSA

Country Investment Plans are being developed and will include a more thorough treatment of climate risks than in the country profiles.

USAID has recently revised their climate risk screening and management tool (USAID, 2016b, c, d) to include separate versions for the design of strategy, projects and activities. The tools also include a set of annexes that include a section on agriculture. The tool also references a series of country-specific factsheets. These include the older Climate Change Adaptation and/or Climate Vulnerability profiles and the newer Climate Risk Profiles that have been designed with the USAID CRM process in mind (Climatelinks, 2017b). While the older profiles summarized helpful information about climate trends and adaptation issues, they were fairly generic. This is especially important when it comes to agriculture since many of the countries comprise several very distinct agro-ecological zones. Additionally, they do not discuss CSA or even the basic principles that underlie it (i.e. identification and promotion of approaches that concurrently address food security, resilience/adaptation and mitigation issues).

For example, in the note on Climate Change Adaptation in Kenya (USAID, 2012a), the climate change adaptation measures for food security do not discuss agronomy, agroecology, CSA or NRM. The sole emphasis seems to be on early warning, credit and seeds. While the new Climate Risk Profiles, such as those for Ghana and the Sahel (USAID, 2017a, b), contain much more detail on climate-related risks, there is no discussion of adaptation options. On the other hand, the agricultural Annex in the tools (USAID, 2016c) contains a lot more suitable, up to date information than the previous process, which consisted of a list of practices on USAID's Climatelinks web site that could be adaptive and/or mitigating in nature for agriculture – but without guidance as to the circumstances under which each might be appropriate. The new Agriculture Annex that accompanies the CRM process has a more fully developed and up-to-date set of "Climate Risk Management Options for Agriculture" (Climatelinks, 2017a). Since USAID personnel designing agriculture projects are experienced in agriculture, users are assumed to bring that knowledge with them when making use of the tool. Someone without an agriculture background working through the CRM tool would need support from someone experienced in agriculture to help them choose which practices are most appropriate under which circumstances – and which ones might be synergistic for some combination of development, adaptation and mitigation outcomes.

Missing from these and most climate screening tools is any mention of the current state of the natural environment and associated vulnerabilities to climate variability and change. It would seem to be important to understand the current state of vulnerability associated with the natural environment and agriculture since highly degraded environments will likely be more vulnerable to climate variability and change. Instead, the focus tends to be on agricultural productivity and not the reliability of agricultural production. Even when discussing adaptive capacity related to agriculture, it is rare to discuss environmental factors. This is unfortunate since resilience in the natural environment is critical and often overlooked. When one fails to understand the current state of environmental degradation and take it into account, one risks thinking of adaptation as "avoiding further environmental degradation/vulnerability to climate change in an already degraded environment" rather than "restoring a degraded environment to a state where it is better adapted to climate variability and change".

To some extent, the risk screening thought process may be less adapted to agriculture than other sectors. It certainly serves to identify risks presented by practices that leave farmers exposed to climate variability and change, but it seems to lack a means to assess the current level of degradation and vulnerability and seek out agro-ecologically sound and climate smart combinations of practices to respond to that. Because of the subjective nature of the screening process, user training is particularly important as the types of options considered will be affected by one's agricultural worldview, training and experience.

Ex ante analysis for design/strategy is particularly important for agriculture since it will help with the identification of no regrets options and strategies – particularly those that help farmers to deal with uncertainty and variability in climate realizations. However, to help with this there is a need for conceptual guidance for decisions around options as opposed to simply thinking about risks.

The idea would be to develop some basic conceptual guidance around principles and practices for CSA together with some concrete examples of how those principles and practices look in various settings. The existing CSA Country Profiles provide useful examples, but there is a need for a clear understanding of the underlying principles being applied and some of the core agronomic "no regrets" practices that help to realize the principles in application. These would be particularly helpful for settings where detailed quantitative results are not available. For example, for crop production these would include building soil organic matter and water

holding capacity, respect for the agricultural calendar, and keeping trees in the landscape (i.e. Evergreen Agriculture, the principles of Conservation Agriculture). The same could be done for livestock production systems, restoration of degraded landscape mosaics and/or forests and so on. Accompanying this sort of guidance, there is also a need for guidance related to how to facilitate climate change adaptation decisions among farming households as, according to Thorlakson and Neufeldt (2012), individual autonomy alone does not necessarily lead to the most effective decisions. While there is a body of "best practice" knowledge around behaviour change communication and participatory approaches to help farming households get to the place where they can bring about positive changes in their livelihood strategies, these are too often overlooked by researchers and practitioners.

Degree of use of climate data and alignment with project time horizons

All the tools and approaches reviewed encourage the use of climate information (both historical and projected) but left it up to users to track it down—though they do provide guidance on where they can find it (Hammill and Tanner, 2011). In the case of the World Bank, they link users with their own climate change portal (CCKP), where much of the relevant information is found. Similarly, the AfDB's CSS is designed to link users of the tool with ACDI data and other country-specific resources such as country climate profiles or adaptation fact sheets (ACDI, 2016a; African Development Bank Group, 2011b). In either case, however, users need to populate the screening tool with the relevant data themselves, which can require considerable time and effort. Other agencies do not directly link users with climate information, but they do advise them where to look for it. In each case, the degree to which climate information is actually considered is somewhat idiosyncratic since it is left up to the specific user(s) at a point in time.

That being said, the guidance that each organization provides prompts users to consider both historical and projected climate information as well as relevant time horizons. The USAID guidance goes further by explicitly prompting users to consider historical and current climate conditions because if a project is already sensitive to climate variability, it will likely remain so with climate change (Hammill and Tanner, 2011). Similarly, The World Bank guidance states that "a climate risk assessment should analyse climate risks resulting from current climate conditions and trends, as well as future, long-term climate projections" (The World

Bank, 2010a). However, Hammill and Tanner (2011) suggest that guidance on how to deal with gaps in data and with uncertainty is less well-developed.

Some informants did mention that data availability can be an issue—certainly at the scale needed for project planning at the subnational scale. Low resolution data presents challenges because it is less relevant for projects in the field—especially for agriculture. However, it appears that the CCKP is addressing some of these issues as there is new downscaled data coming on stream and there appears to be more data available on the site than some informants seemed to think (The World Bank, 2014).

All the same, most of the data and the country profiles prepared from it tend to focus on the mean and trend of primary climate variables (temperature and rainfall) and some extreme events. There is relatively little data and guidance on how to interpret climate and vulnerability data (Hammill and Tanner, 2011). Informants did seem to be aware of the importance of aligning the time horizon of climate data with project time horizons and, in fact, some had a fairly nuanced view of this issue. On the other hand, there may be a place for discussing this more explicitly. Some informants mentioned that some screening tool users have unrealistic ideas about climate information and its utility as well as some misconceptions that need to be addressed.

Finally, the World Bank (2010b) notes that the process of identifying adaptation options, especially in the case of no-regret adaptation, can be initiated in practice even in the absence of local capacity for climate data generation and analysis. While there are approaches that can be used in the absence of detailed climate projections, there is a need for clear guidance as to the nature of these options for agriculture. As one informant said, it is important to focus on certain interventions that are needed irrespective of the climate draw for a particular year. These might include decision-making information that is needed regardless of the specifics of the climate for a year or information on soil and nutrient management. The idea being to ensure whatever investment is made will work under a range of conditions—focusing on those that one will need any which way the climate goes.

The CSA Country Profiles, as well as other fact sheets, summarize some of this data. However, a clearer connection could be made between these and the specific principles to consider in evaluating practices according to their degree of "smartness." To some extent, the

highest scoring CSA practices fulfil these criteria, but clear guidance and hard data are needed to support this.[13]

Degree of use of information on climate variability and approach to uncertainty in climate information

For the most part, informants seemed to be well aware of issues related to climate variability as well as dealing with uncertainty related to climate projections. Similarly, the guidance notes for most tools remind users to think about the conditions, assumptions and uncertainties underlying the results of climate models (The World Bank, 2010a; USAID, 2016e). On the other hand, there seems to be a tendency to focus on precipitation and temperature—both means and trends—in the climate information presented on various websites rather than on other aspects of these variables (such as variation around the mean, the probability of one extreme or another, and changes to the timing and distribution of precipitation). Some new work on The World Bank CCKP is addressing issues related to variability and uncertainty with data (The World Bank, 2014), but this is only part of it. Informants also noted that there is a need to think about, for example, how to minimize downside risk in agriculture in contrast to focusing on how to increase mean yields.

An important way to deal with uncertainty in climate information is by looking for "no regrets" strategies. This is important since agricultural development activities need to be adapted to changes in climate extremes rather than average conditions (Lebel et al., 2012). Given that a certain amount of uncertainty will always exist, it needs to be considered explicitly in the design phase—or, for that matter, the strategic planning phase. The alternative is short-sighted action that could produce potentially greater problems in the longer run (Magnan et al., 2016). Olhoff and Schaer (2010) note that exact projections of climate change are not necessary to validate a large number of diverse adaptation efforts, such as those shown in Figure 4. There are many vulnerability-focused activities that are equally important and valid even in the absence of climate change itself. In part, this is because they reduce vulnerability more generally.

13 The author recognizes that another CCAFS flagship program (the Climate-Smart Technologies and Practices Flagship) may be working on this issue, but a review of their work was outside of the scope of this review.

While Olhoff and Schaer (2010) do not make this point, the most vulnerability-reducing activities are probably also targeted at existing climate variability—certainly this should be the case in agriculture if it is not. Adoption of good agronomic practices that reverse environmental degradation and restore degraded soils help farmers thrive in a context of existing climate variability—which is important for coping with anything that is coming due to climate change. These are no regrets options—principles that have widespread relevance regardless of the specific climate change realization. This is important because no regrets adaptation is not affected by uncertainties in climate models (The World Bank, 2010b). Additionally, these practices help to close the "adaptation deficit" (The World Bank, 2010b), which is another way of saying reversing the existing environmental degradation that is often at the root of vulnerability to existing climate variability. It should be noted that a number of these practices or approaches to agriculture are those that score the highest in all three dimensions of the climate-smartness scale itself (see Table 8.3 in the FAO Sourcebook, for example (FAO, 2013), as shown in Figure 5).

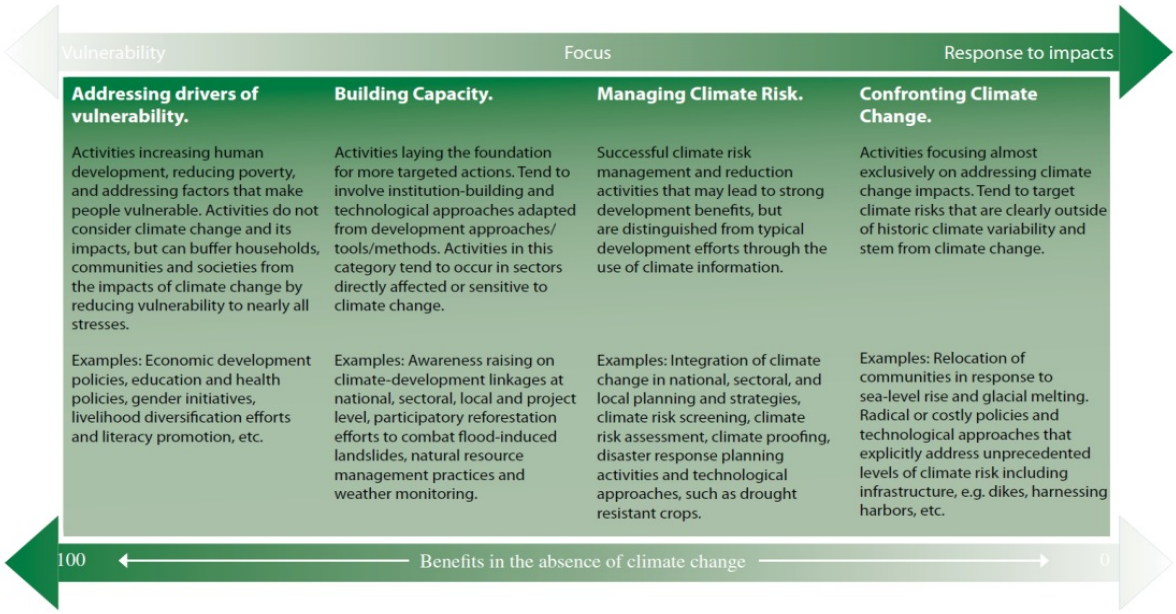

Figure 4: Adaptation and Mainstreaming: A Continuum of Activities from Development to Climate Change (Olhoff and Schaer, 2010).

	Management objective	Practices/technologies	Impact on food security	Effectiveness as an adaptation strategy	Effectiveness as an mitigation strategy	Main constraints to adoption
Crop and grazing land management	Improved crop varieties	conventional breeding (e.g. dual purpose crops, high yielding crops)	+++	+++	Uncertain	High investment costs; high prices of improved varieties, high input costs (e.g. fertilizer)
		Modern biotechnology and genetic engineering (e.g. genetically modified stress tolerant crops)	++	++	Uncertain	High investment costs, concerns with long-term potential impacts (e.g. loss of crop biodiversity, health concerns, limited enabling environment to support transfer of technology)
	Crop residue management	No-till/minimum tillage; cover cropping; mulching	+++	+++	++	Competing demands for crop residue biomass
	Nutrient management	Composting; appropriate fertilizer and manure use; precision farming	+++	++	++	Cost, limited access to technology and information
	Soil management	Crop rotations, fallowing (green manures), intercropping with leguminous plants, conservation tillage	+++	+++	++	Minimal gains over short term (e.g. short term decreases in production due to reduced cropping intensity)
	Grazing management	Adjust stocking densities to feed availability	+++	+++	+++	Risk aversion of farmers
		Rotational grazing	++	+++	+++	
Water management	Water use efficiency and management	Supplemental irrigation/water harvesting	++	++		Requires investment in infrastructure, extension, capacity building
		Irrigation techniques to maximize water use (amount, timing, technology)	++	++		
		Modification of cropping calendar	++	++		Lack of information on seasonal climatic forecast trends, scenarios

Figure 5: Summary of CSA practices and technologies for mixed farming systems (FAO, 2013) – selected items.

Certainly, the various climate risk profiles could talk more about uncertainty. It would also be helpful to offer some guidance resources on using climate information to help overcome some of the unrealistic expectations people have about climate information and what can be done with it. This would include providing guidance as to how to choose agricultural priorities (practices) that will result in positive improvements in a variety of conditions—things that are needed irrespective of the climate draw in a particular year.

Given the above, there is probably room for developing a guidance note on climate information, its utility and common misconceptions about its use. Understanding which aspects of climate information are most important and how to build resilience to those aspects is important if effective strategies and programming designs are to be developed. After all, effectively responding to climate variability and change in the agriculture sector is more than just looking for seed varieties that are adapted to higher temperatures, for example. This resource or combination of resources should probably discuss uncertainty and variability in

climate data and what to do about it, climate data and what it does and does not tell you, as well as principles related to determining no regrets options for agriculture.

Other Gaps or Issues

In addition to the above, a number of other issues emerged during the review process. They are grouped according to the contents of Table 3 on page 23.

The role of organizational leadership

Critical to the effective, appropriate and timely use of climate screening tools and approaches is support from leaders in the organization (Roeyer, 2015). As one informant stated, it is important that the leadership of the organization is sending out the right signals. To do this, they need good analysis of why climate matters compared to anything else that might matter (e.g., conflict, and gender, etc.) and this needs to be articulated at the strategic level. If appropriate thinking about climate and agriculture is included at this stage, when one is in the process of deciding what is needed in a country over the next ten years or so, then one will create a demand for appropriate programs. If not, no amount of screening will get it into the program.

The importance of behaviour change

Existing climate screening tools and approaches (and associated guidance documents) focus on technical aspects of agricultural practice (generally listing some of them) and make no mention of either (1) the need for behaviour change for adoption of CSA practices and (2) that there are best practice approaches to community engagement. Several informants mentioned the importance of best practice for the promotion of adoption of good agronomic practices as well as the importance of understanding the socioeconomic context for behaviour change. They made the point that the social sciences side needs attention too.

The results of technical assessments are too often transferred into possible solutions by turning around the technical issue and working that into activities in project or programme proposals. While this is important, it is also important to look more carefully at the social science side of how the response to climate change is taken up—i.e., what is needed from the point of view of human behaviour and what would work to help people get to the place where they adopt the changes that are necessary. There has been good research in this area in the past (Barrett et al., 2002a; Barrett et al., 2002b) but perhaps it needs to be synthesized for this

context. It would be good to summarize and reiterate best practice principles in terms of community/farmer engagement as applied to climate resilient agriculture—there exists a lot of good practice in the NGO/development sector as well as among researchers.

Tools and the "handyman mentality"

While this was not directly expressed in either the documents reviewed or conversations with key informants, there is an important challenge presented by those who would approach the use of screening tools with, what could be referred to as, a "handyman mentality."[14] More than one informant observed that we have more than enough tools. However, good tools work best in the hands of an experienced, trained user who knows when to get help. Most screening tools guide a process but they still require some quality control regarding how they are used, together with appropriate training in their use.

Those who would approach the subject of screening thinking that all they need is the right tool and good analysis will result are seriously misled. This is not so much of an issue for the major donors who employ such tools as part of an institutionally mandated screening process—particularly for major projects where the focus is explicitly on building climate resilience. However, other uses of these donor tools, which are for the most part publicly available for all to use, may not have the same institutional setting to support them. Unskilled users, or those who approach the problem with a mind-set that looks for a technological "quick fix" to the "problem," could suggest approaches that are maladaptive and actually serve to increase vulnerability to climate variability and change. This means that it is important to think about staff learning and institutional memory. Since use of the tools involves a subjective process based in part on people's experience and judgment, attention to training and learning is important.

Maladaptation and the importance of "no regrets" approaches

While issues related to both (1) the potential for programming that leads to maladaptive choices and (2) the importance of finding "no regrets" approaches when faced with

14 The term "handyman" or "handyperson" refers to someone who does odd jobs or who is competent in a variety of small skills and repairing things. A person who approaches a task as a handyman is one who assumes that they can figure out how to do the job with the tools at hand and the skills that they have. This is fine for some tasks, but there are others that are suited for a qualified repair technician because they require extensive training and knowledge to ensure that the job is done properly, safely and efficiently. However, there are some handymen who figure that if they just have the professional tool they can to a professional job regardless of the job-specific knowledge that it might require. This is what is meant by a "handyman mentality".

uncertainty are touched on briefly in earlier sections, the key points are summarized here. Given that there will always be uncertainty about future climate and that one of the important features of climate change in many areas in the developing world is that variability is also increasing, it is important to consider what to do in the design or strategy phase when the actual change is uncertain and climate realizations are highly variable. If not, the risk of maladaptive responses is even greater than it might otherwise be—and it is the poor, vulnerable, smallholder farmer who is most at risk from maladaptation. Thinking related to maladaptation and "no regrets" approaches will help users of climate screening tools and approaches to get beyond the limitations of a risk minimization approach to screening and foster more holistic thinking about livelihood and/or environmental restoration and resilience building.

Within the context of agriculture, one approach might be to develop a set of guidelines that would help to minimize the risk of maladaptation, particularly in light of uncertainty and extreme variability around climate realizations in the future. Principles for agriculture might include the idea of building up carbon in the landscape—in the soil and above ground. Because this will increase soil water holding capacity, improve groundwater recharge, decrease soil erosion, decrease flooding and decrease drought, agriculture would be in a better position to cope with uncertainty in future climate and variability around the mean precipitation values.

Loss minimization and reliable agricultural livelihoods

As one informant noted, the focus for evaluation of agricultural practices tends to be on productivity and increasing the yield rather than on the reduction of yield variability and/or loss minimization. Given the nature of climate variability and change in much of the developing world and the importance of minimizing downside risk to farmers (when downside risk translates to food insecurity and malnutrition), would it not make sense to evaluate agricultural practices and innovations in terms of the reliability or stability of yields and/or the minimization of loss in the face of a climate shock? From a research perspective, this might mean looking closely at various types of agricultural practices (soil and water conservation [SWC] and natural resource management [NRM] practices, agroforestry practices, seed varieties, other inputs) and asking which ones are loss minimizing and which ones are more reliable/stable from season to season.

Conceptual guidance around principles

Several informants mentioned the challenge of getting from the stage of identification of risks to making decisions about what to do. In part, this can be addressed by taking a more holistic approach to climate screening as mentioned earlier. On the other hand, several donors have recognized the need for guidance specific to agriculture. The most well-developed of these resources are the CSA Country Profiles developed by CCAFS in partnership with donors (CIAT and BFS/USAID, 2016; The World Bank and CIAT, 2015a, b). However, USAID is in the process of developing a new set of profiles to accompany their updated CRM Tool (Climatelinks, 2017a, b). These Climate Change Risk Profiles (Climatelinks, 2017b), together with even more detailed Climate Risk Screening for Food Security documents, such as the one for the Karamoja Region of Uganda (USAID, 2017c), promise to be quite helpful as they provide much more detail on climate risks—and in particular in relation to agriculture and food security. However, they do not discuss the range of options that farmers might use to adapt and their varying degrees of "climate smartness." Secondly, these country-specific guidance resources are not available for all contexts—whether that be different countries or regions within countries. Similar to the advice in the section entitled "Maladaptation and the importance of "no regrets" approaches" on page 38, a brief set of guidelines that highlight the principles embodied in the smartest practices may help users to better understand the choices made in the existing CSA Country Profiles and, by extension, how they might prioritize appropriate practices for other contexts.

Analysis of climate, identification of agricultural alternatives and the importance of world view

It is also important to think about the role that one's world view/prior knowledge, whether of generalists or sector specialists, plays in the screening process and the results/recommendations/actions that result. One might ask how it will colour screening conclusions, guidance toward adaptation actions and options and the development of strategy—each of which ultimately leads to proposals or concepts for screening and eventually funding. This is particularly important because each of screening tools and approaches reviewed involves a subjective process based in part on people's experience and judgment.

Recommendations for action

Based on the above, this section will outline some specific areas for action on the part of CCAFS and other researchers. In general, climate screening tools and approaches appear to be fairly well-developed and integrated in strategy and proposal development processes. Donors recognize their limitations and are seeking to modify them accordingly. There is certainly room for improvement, whether that be in facilitating the incorporation of relevant climate data into screening tools (to reduce the human effort required), ensuring that users are well trained and oriented into climate screening for agriculture in order to reduce the impact of subjectivity on screening outcomes, and so on. That being said, informants were clear that there is not a need for more tools—but guidance and resources to support users in making more effective use of what exists. With that in mind, there are several areas where CCAFS and other researchers might add value to the work that donors and program planners already do to screen for climate-related issues.

While the documentation from several donors as well as comments from informants and in the literature reviewed highlight the importance of finding synergies between adaptation, mitigation and food security goals, the screening tools and approaches themselves do not lend themselves well to doing this. Many/most of the climate smart practices that provide these synergies are well known, but need to be more widely adopted (Harvey et al., 2014). However, there is a need to build the quantitative evidence base (as well as qualitative evidence) regarding the food security and livelihood resilience benefits of them. As one informant said, there is the need for better analysis of "why climate matters" compared to anything else—and the likely consequences of inaction. In order to have climate-related issues treated as more important than competing priorities, we need to justify this based on evidence.[15]

There is an opportunity here for CCAFS to help build the case for paradigm shifting approaches. Many people may not understand the paradigm shift that is inherent in doing climate-smart or climate-resilient, agro-ecologically sound agriculture (for example, people

15 The author recognizes that another CCAFS flagship program (the Climate-Smart Technologies and Practices Flagship) may be working on this issue, but a review of their work was outside of the scope of this review.

who have been brought up in parts of the world where they have absorbed the idea of an industrial model of agriculture and do not intuitively understand the inter-relationships between agriculture and the environment for good or for bad). A certain amount of guidance is needed to help people understand both (1) the vulnerable state of agriculture and the environment on which it depends and (2) that there are also very concrete and reliable agricultural or agronomic practices that can help reduce this vulnerability, reverse this degradation and, in fact, do this while benefiting people and the environment on both the adaptation and mitigation side. Packaging some of the messaging of CCAFS research proactively in ways that will reach these constituencies (decision-makers who need to understand this paradigm shift and others who do not share this world view) and then leading a proactive engagement with them could go a long way in achieving the goal of agricultural transformation for improved and more resilient livelihoods and achievement of the relevant sustainable development goals (SDGs). While much of this may naturally fall to another CCAFS Flagship, an important part of the underlying reasons for the synergies that result come from the uncertainty around climate projections and the need to cope with variability and uncertainty in a proactive way, which is an important element of the Climate Services and Safety Nets Flagship.

Since it is much more difficult to change concepts or proposals after the fact in light of a negative risk screening, it is important to ensure that climate-resilient thinking is part of the strategy development, RFA elaboration and concept/proposal development process. Conceptual guidance related to some combination of the following topics could provide considerable value added to existing climate screening tools and approaches. Table 4 lists a number of possible subjects identified by this review. Such resources would provide important background guidance and support to those being trained in the use of existing screening tools or those wishing to further adapt them. Because it does not yet have its own screening process, the GCF could benefit from guidance in developing resources and tools to reinforce synergistic thinking around paradigm-shifting alternatives. A screening process that identifies/looks for synergies between adaptation, mitigation and development (food security) would be very welcome.

Table 4 Possible subjects for conceptual guidance resources related to agriculture

Subjects on concepts related to agriculture
Early-stage guidance on strategic thinking for agriculture
Ex ante analysis/assessment
No regrets options that account for uncertainty and variability for strategic and programmatic thinking
Qualitative screening questions that lend some objectivity to the initial screening process – perhaps a standard set of questions for community analysis of climate-specific vulnerabilities at the household level
Guidance on appropriate ways to address socioeconomic factors that constrain adoption of alternative agricultural practices – this would include principles related to behaviour change communication and participatory, farmer-centred approaches to trying out and adopting climate-resilient practices
Principles and practices for taking advantage of synergies (CSA) – this would provide necessary background guidance and information to supplement that found in, for example, the CSA Profiles
Guidance on adaptation/mitigation practices and what is appropriate where
Subjects on the use of climate information
Uncertainty and variability in climate data and what to do about it.
Climate data and what it does and doesn't tell you.
How to find climate data and how to interpret it.
What to do when there is not a lot data – or, alternatively, no-regrets options that do not need detailed climate data for decisions to be made.
Additional subjects for consideration
Principles related to no regrets approaches and stewardship/rehabilitation of degraded resources
General guidance
Context specific guidance

While there are limitations related to the availability of and access to relevant climate data, this situation is improving. On the other hand, there does seem to be a need for guidance resources targeted at people's expectations related to climate data and how to use it appropriately. Conceptual guidance related to this could prove beneficial to users of climate screening tools and approaches. Possible topics identified by this review are listed in Table 4.

While CCAFS is already doing this to some extent—such as with the CSA Country Profiles—there is room for more. In addition to the topics mentioned earlier in this section, Table 4 lists some additional ones for consideration.

Since the focus of this review is on the opportunities to add value to existing screening tools and approaches, the recommendations for action have focused on the role of CCAFS and other researchers. The reader would also be able to recognize that there are opportunities for change that are relevant to specific donors themselves. However, a detailed donor-specific evaluation of their work and recommendations for action on their part was beyond the scope of this review.

Appendix 1: Individuals consulted

Organization	Individuals
African Development Bank (AfDB)	Balgis Osman-Elasha
Green Climate Fund (GCF)	Jeff Tschirley - Consultant to GCF
Swiss Agency for Development and Cooperation (SDC)	Simon Zbinden
United Kingdom Department for International Development (DfID)	John Carstensen
United States Agency for International Development (USAID)	Kevin Coffey Rebecca Chako Rebecca Nicodemus John Furlow Jonathan Cook
The World Bank	Vikas Choudhary Friederike Mikulcak Ioannis Vasileiou Tobias Baedeker Mei Xie

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