

CCAFS Outcome Synthesis Report: Outcomes Achieved Within the Context of Climate-Smart Village Approach

Working Paper No. 415

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

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RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
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About CCAFS working papers

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

About CCAFS

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Abstract

This working paper aims to assess outcome cases related to the AR4D Climate-Smart Village (CSV) approach. It presents results from a review of annual outcome case studies reported under the CCAFS program between 2012-2020. This review focused on outcomes directly related to the implementation of the CSV approach as well as those that took place within the context of CSV work or were informed by evidence generated in the CSV specifically aimed to address the following key questions:

1. What types of outcomes based on CSV related work were achieved? What changed in the next user?
2. How were these outcomes achieved? What was crucial to the change in next users? What key partners were involved?

Keywords

Climate-smart agriculture; climate-smart villages; investment; scaling

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Acronyms

CCAFS	Climate Change, Agriculture, and Food Security program
CGIAR	Consultative Group on International Agricultural Research
CSA	Climate-smart agriculture
CSV	Climate-smart village
ToC	Theory of change

Introduction

The CCAFS program and Theory of Change

From its onset, CGIAR's research program on Climate Change, Agriculture, and Food Security (CCAFS), a global partnership that unites organizations engaged in research and capacity development for a food secure future aimed to spur immediate and long-term policy actions by working across research disciplines, spatial and temporal levels, and organizational mandates (Vermeulen et al. 2012). Launched in 2011, CCAFS invested approximately USD \$64 million per year on agricultural research for development (AR4D) focused on climate-smart agriculture (CSA) as a solution to the increasing threats of climate change to agriculture and food security (Kristjansson 2020).

Recognizing the need to work across silos, CCAFS aimed to add value to efforts in the climate change, agriculture, and food security intersection through research, policy engagement, and partnership (Vermeulen et al. 2012). In the first few years of the program, CCAFS made investments to transition its research toward a more outcome-driven AR4D approach (Kristjansson 2020) based on theory of change (ToC) and impact pathway thinking. This is among the first examples of a large AR4D program being orientated this way (Thornton et al 2017). An outcome is a "change in knowledge, skills, attitudes and/or relationships, manifested as a change in behavior, to which research outputs and related activities have contributed. An outcome is the use of the research by non-research partners to develop new, or change, policies and practices" (Szilagyi et al. 2020). The outcome cases, which we reviewed in this analysis, report on a particular unit (site, person, project) (Szilagyi et al. 2020).

In 2011, the five regional programs and four thematic areas developed their own ToC, which were then embedded in CCAFS' overall ToC (CCAFS 2016; Thornton et al. 2017; Kristjansson 2020). Later on, ToC for cross-cutting areas such as gender and social inclusion were developed (CCAFS 2016). The CCAFS Phase II proposal (2016) stated that CCAFS' ToC builds on four action areas which were developed by Lipper et al. (2014):

1. Building evidence
2. Developing capacity of institutions and services
3. Coordinating climate and agricultural policies
4. Stable, strategic investment to reach scale

Partnerships and collaboration are a cornerstone of CCAFS' ToC (CCAFS 2016) and since 2017 “scaling CSA” has become an integral part of CCAFS' Phase II strategy and philosophy.

Part of the difficulty with scaling CSA is that it is largely context specific; what works in one location may not find success in another (Koerner et al. 2020). The scaling of CSA also does not occur from single interventions alone—enabling environments and factors such as economic, social, and cultural diversity also play a large role (Koerner et al. 2020). Due to this, it is important to not view the scaling of CSA as taking place within a vacuum of interventions at the farm-level. The scaling of CSA happens through various pathways and with a diverse range of actors across scales (see figure 1). Some stakeholders may not even focus on scaling CSA options directly, but on capacity building, improving enabling environments, and developing tools/evidence that can all aid in the adoption of CSA instead (Koerner et al. 2020).

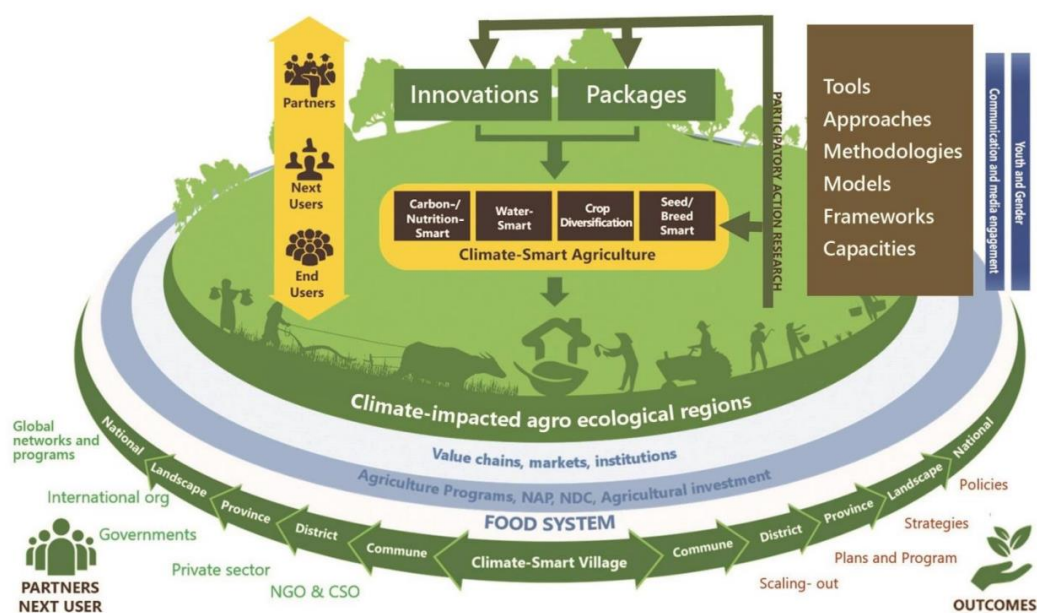


Figure 1. Scaling climate-smart agriculture in food systems, adapted from Sebastian and Bernardo, 2018 (Koerner et al. 2020)

In 2018, the three thirds approach was introduced, which is CCAFS' program theory for science-policy engagement for agriculture research for development (Dinesh et al. 2018). It offered a strategic pathway to improve the credibility, legitimacy, and salience of CCAFS' research through three areas: engagement, evidence, and outreach (figure 2).

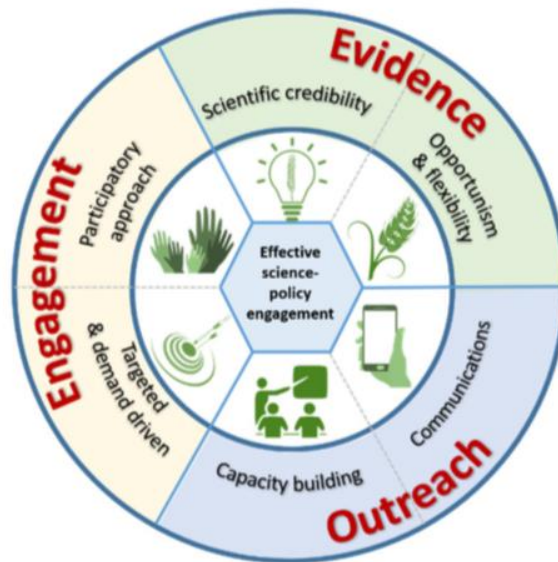


Figure 2. CCAFS Three-Thirds Approach for science-policy engagement (Dinesh et al. 2018)

Engagement with key partners and actors includes supporting researchers in navigating institutional dynamics and stakeholder networks (Dinesh & Szilagyi 2018). It also helps to ensure that CCAFS’ research is demand-driven and co-designed with next users (Dinesh & Szilagyi 2018). Evidence refers to not only generating credible research, but also allowing for flexibility and opportunism along the project cycle in order to respond to changing needs (Dinesh & Szilagyi 2018). Lastly, outreach refers to communicating information so that it is easily understood by next users and supporting capacity building so that next users are able to make use of research outputs, which can also contribute to the sustainability of outcomes (Dinesh & Szilagyi 2018).

Background on the Climate-Smart Village Approach

The climate-smart village (CSV) concept was developed in 2012, a year after the onset of the CCAFS program moved ahead of the traditional benchmark sites used to test and evaluate agricultural practices and technologies. The number of CSV sites evolved throughout the years; initially established in South Asia, West Africa, and East Africa (Förch et al. 2011). Sites chosen for the CSV project were all areas that were at a high-risk to the impacts of climate change (Förch et al 2013). In 2014 sites were expanded to Latin America and Southeast Asia. At the end of 2017, a total of 35 CSVs were established and managed by CCAFS and partners, covering 20 countries across all 5 CCAFS priority regions (see Figure 1). After that, further efforts focused on scaling through external partners (bilateral projects namely in South Asia), the number of CCAFS CSVs went down; there were 11 in 2021. CSVs

are envisioned as “models” of local actions that enhance productivity, increase incomes, achieve climate resilience and enable climate mitigation (CCAFS 2013).

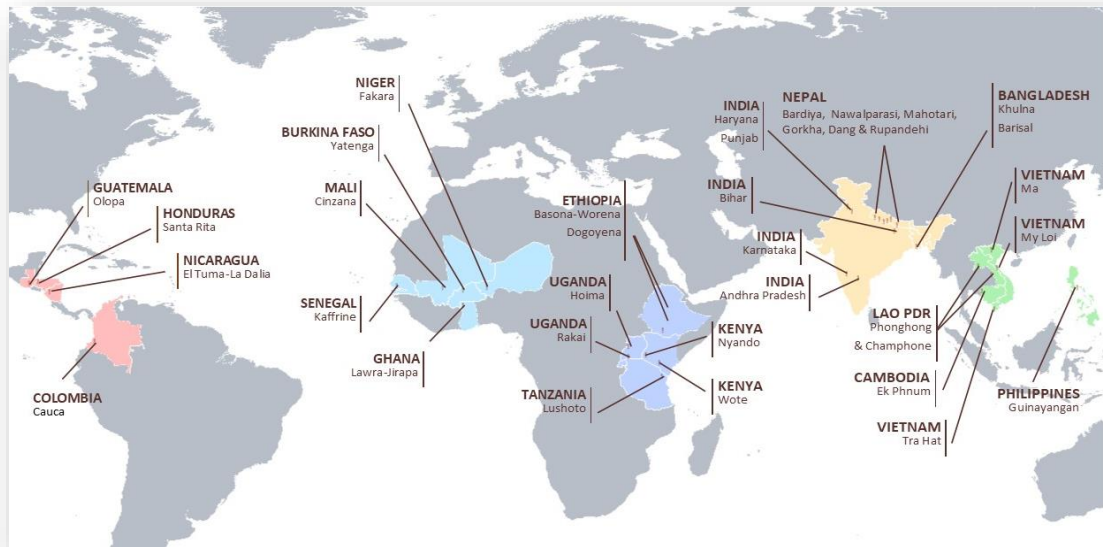


Figure 3. CSV locations across the five CCAFS regions, over the course of the CCAFS program cycle.

The CSV approach is “unique in the sense that it provides an AR4D platform for multi-stakeholder participatory evaluation of CSA options and links global and local knowledge with local and national policies, thus presenting a holistic vision for sustainable agricultural development as well as confronting climate change action in agriculture” (Aggarwal et al. 2018). The approach identifies, tests and promotes packages of climate-smart agriculture (CSA) technologies, practices, and climate-information services that are relevant for the climate-related risks of a given CSV site. The aim of the CSV approach is to:

1. “Understand the effectiveness of a variety of CSA options (practices, technologies, services, programs, and policies) not only to enhance productivity and raise incomes, but also to build climate resilience, increase adaptive capacity, and wherever possible, reduce GHG emissions;
2. Develop (no regrets) solutions in anticipation of future climate change impacts;
3. Understand the socioeconomic, gender, and biophysical constraints and enablers for adoption; and
4. Test and identify successful adoption incentives, finance opportunities, institutional arrangements, and scaling out/ up mechanisms while ensuring alignment with local and national knowledge, institutions, and development plans.”

The approach involves empowering farming communities through six key components, see figure 4.

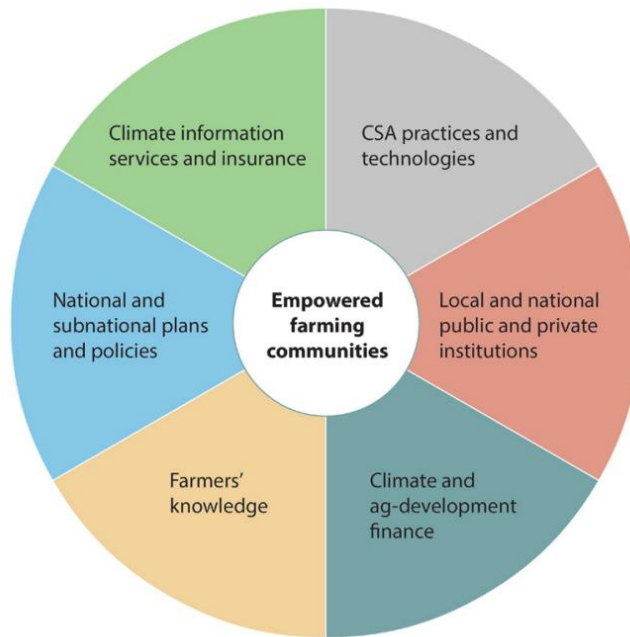


Figure 4. Key components of a CSV AR4D Approach (Aggarwal et al. 2018)

Methodology

This paper aims to assess the types of outcomes related to CSV research (e.g. focused on scaling CSA practices, climate information services, etc.); the changes achieved in the next users (e.g. knowledge, skills, investment decisions to support CSA scaling) and how those changes happened (e.g. key partnerships, government or private sector involvement, years of continued engagement).

This review focused on addressing the following key questions:

1. What types of outcomes were achieved based on CSV related work? What changed in the next user?
2. How were these outcomes achieved, what was crucial to the change in next users and what key partnerships were useful in the process?

This analysis looked at outcomes from the whole CCAFS program and across all five regions. Outcome cases were included in this review if they were directly or indirectly related to CSV work (e.g. build on evidence, knowledge or processes developed in the CSVs). The approach for this synthesis focused on classifying the achieved outcomes according to some of the CGIAR Managing Agricultural Research for Learning and Outcomes (MARLO) reporting system categories, and identifying key elements related to the impact pathways.

Specifically, data was collected on the following:

- **Outcome descriptions**
- **Maturity levels:** ranging from 1-3, based on MARLO categories (table 1).

Table 1. Description of maturity levels

Maturity Level	Description
1	CGIAR research (and related activities) has contributed to changed discourse and/or behavior among next users (related to the theory of change). Examples of evidence: outcome mapping study, media analysis, e-mail correspondence.
2	CGIAR research (and related activities) has contributed to documented policy change and/or a change in practice by end users. This may include changes such as income, nutrient intake etc. in the sphere of influence - usually this will be a development project involved in 'delivery'/scaling up of an innovation. Example of evidence: a study of adoption and effects, commissioned at project level.
3	Policy and/or practice changes influenced by CGIAR research (and related activities) has led to adoption or impacts at scale or beyond the direct CGIAR sphere of influence (i.e. not in a development project). Example of evidence: at scale Adoption Study or ex-post Impact Assessment.

- **Gender relevance:** one of the cross-cutting markers collected in outcome case reporting. These cross-cutting markers reflect CGIAR’s Strategy and Results Framework (2016-2030). Gender relevance is ranked on either 0 - not targeted, 1 - significant, or 2 – principal. Descriptions of these levels can be found in Table 2, as per the GCIAR’s document: “Guidance on scoring CGIAR cross-cutting markers in the Plan of Work and Budget (POWB) and Annual Report.”

Table 2. Definition of gender relevance marker (CGIAR 2018)

Level	Definition
0 - not targeted	Not targeted: The milestone does not target for that objective. This does not mean that it is completely irrelevant– for example you may still disaggregate results by gender.
1 - significant	Gender equality is a significant factor in the activities, outputs and analysis for this milestone; however, it is not the main reason for the work.
2 - principal	The set of activities covered in the milestone are principally aimed at advancing gender equality.

- **Activity type:** based on the three thirds approach (Dinesh et al. 2018), including: engagement, evidence, and outreach.
- **Output type:** informed by CCAFS II Full proposal. Descriptions can be found in table 3, below.

Table 3. Description of output types

Output Type	Description
DST	Decision support tools, toolbox
Data	Data and analyses
Methods	Methodologies
Models	Models and simulations
Partnerships	Partnerships, collaborations and business models
Syntheses	Syntheses, profiles
Guidance	Technical and policy guidance and recommendations
Options	Tested CSA options
Training	Training materials and trainings

- **Outcome theme:** focus of the project/outcome case. These typologies were developed by the CCAFS Priorities and Policies for CSA flagship.

- **Outcome type:** informed by CCAFS II Full proposal (2016). Descriptions below (table 4).

Table 4. Description of outcome types

Outcome Type	Description
Global	Global discussion, decisions, guidelines
Policy	Policy decisions, strategies and plans ('Policy-Plan), investments ('Policy-Inv')
Programming	Development programming, targeting and priority setting
Services	Access to services and capital for farmers
Farm	Farm and landscape-level outcomes

- **Beneficiary type** – typologies of next users that changed their knowledge/skills/behaviors.
- **What changed in the next user?** E.g. knowledge, skills, attitudes, decisions, investment.
- **Key contributor type:** developed by authors (e.g. governments, research institutions, meteorological agencies).
- **Key contributor's role in the impact pathway:** E.g. supporting evidence production, supporting scaling.
- **What was crucial to scaling?** In other words, the 'how' of the outcome case.

A larger CCAFS outcome harvesting (not limited to the CSV based work) was done in parallel by the Priorities and Policies for CSA flagship and largely informed this analysis, as many variables were already extracted as a result of their work.

Results

What Outcomes Occurred Within the context of the CSV Approach?

The current synthesis examined a total of 66 CSV-related outcome cases reported between 2012 and 2020 (figure 5), spanning across the five CCAFS regions: West and East Africa, South and Southeast Asia, and Latin America. Each region reported at least ten outcomes, the majority between 2017-2020. Southeast Asia (16) and South Asia (14) were the regions with the most outcomes, followed by East Africa (12), West Africa (12), and Latin America (10). Two 'global' outcome cases that build on CSV research were also included in this review.

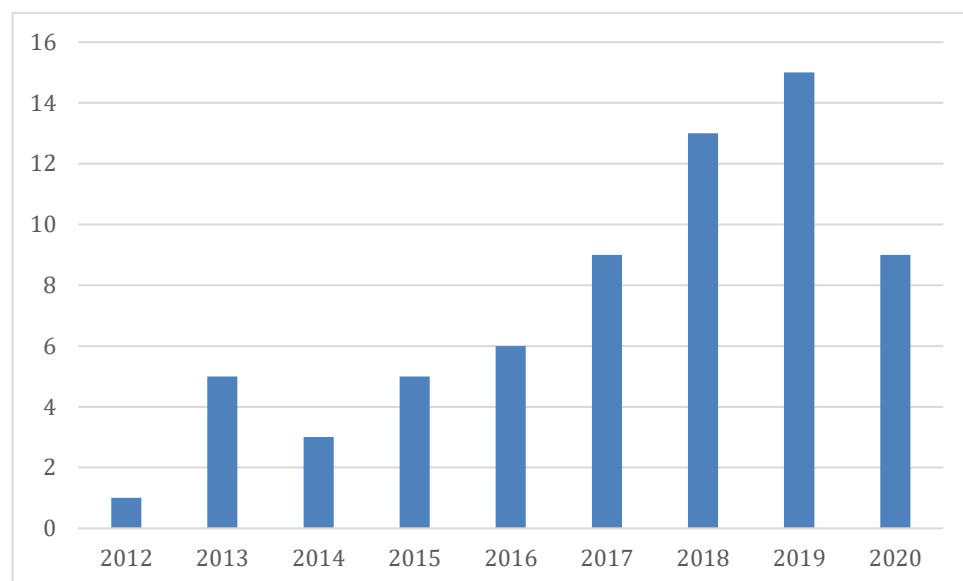


Figure 5. Number of reviewed outcome cases per year

Maturity levels are based off of MARLO categories. A description of these levels can be found in table 1. The vast majority of outcome cases reviewed in this analysis were levels 1 and 2, with very few falling into maturity level 3 (figure 6). Meaning that most cases either contributed to changed discourse and/or behavior among next users (level 1) or contributed to documented policy change and/or changes in practices by next users (level 2). However, maturity levels were not documented for 21 outcome cases, as this metric was not implemented in reporting until 2017.

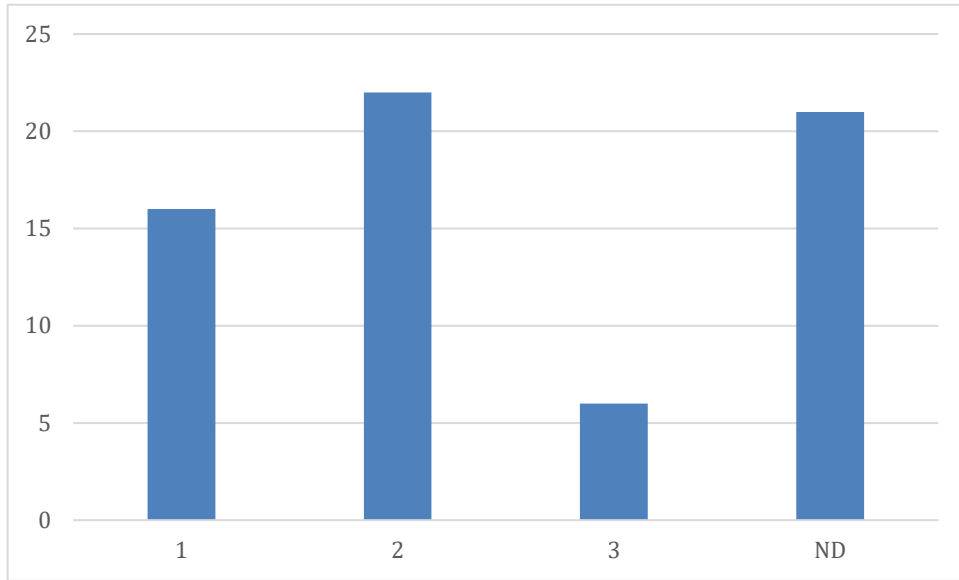


Figure 6. Maturity levels of reviewed outcome cases. ND = not documented. A description of these levels can be found in table 1.

In Latin America, South Asia, and West Africa, trends in maturity levels were similar, with all three regions having majority level 1 (figure 7). However, in East Africa and Southeast Asia, there are significantly more level 2 maturity level cases.

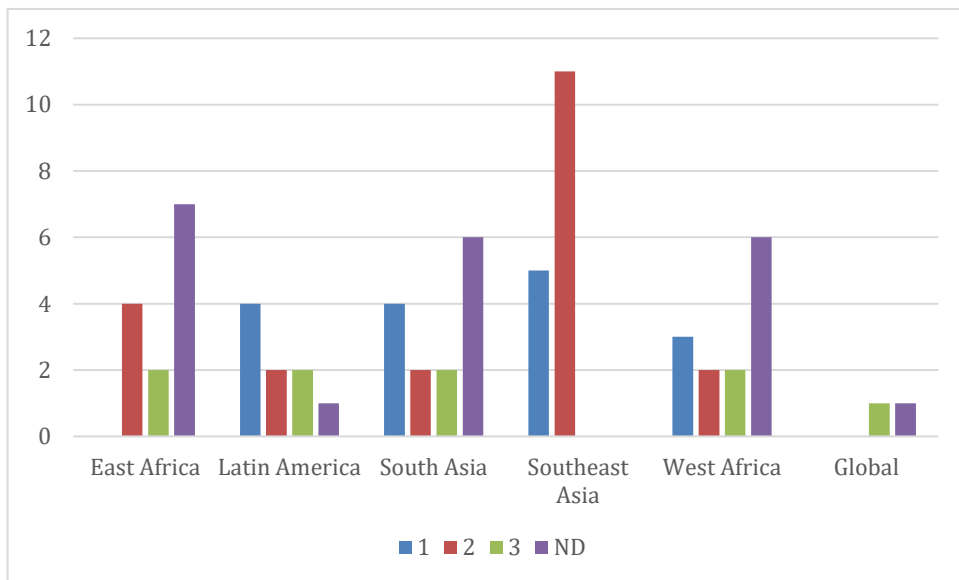


Figure 7. Maturity levels disaggregated by region. ND = not documented. A description of these levels can be found in table 1.

Gender relevance is one of the cross-cutting markers collected in outcome case reporting. These cross-cutting markers reflect CGIAR's Strategy and Results Framework (2016-2030).

Gender relevance is also ranked on three levels: 0 - not targeted, 1 - significant, or 2 - principal. Descriptions of these levels can be found in table 2. The majority of outcome cases fell into level 0 or level 1, with few reaching level 2 (figure 8). This means that for most of the cases that did target gender, gender equality was a significant factor in the activities, outputs and analysis of the outcome, but it was not the main reason for the work (level 1). Gender relevance was not documented for 15 outcome cases given that the gender relevance indicator was not implemented in reporting until 2017.

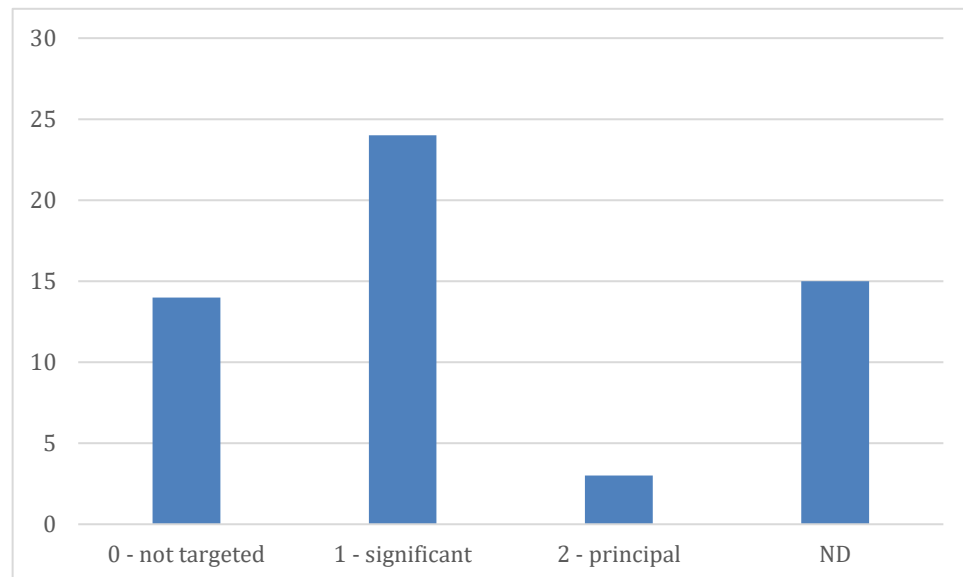


Figure 8. Gender relevance of reviewed outcome cases. ND = not documented. A description of these levels can be found in table 2.

Across regions, there is some variation in the gender relevance trends (figure 9). In East Africa, South Asia, and Southeast Asia, the number of cases that were level 0 and level 1 are equal or very close to equal. However, in Latin America and West Africa, we see there are more cases that were ranked at level 1 compared to level 0. Meaning that more CSV-related outcome cases in these regions had gender outcomes.

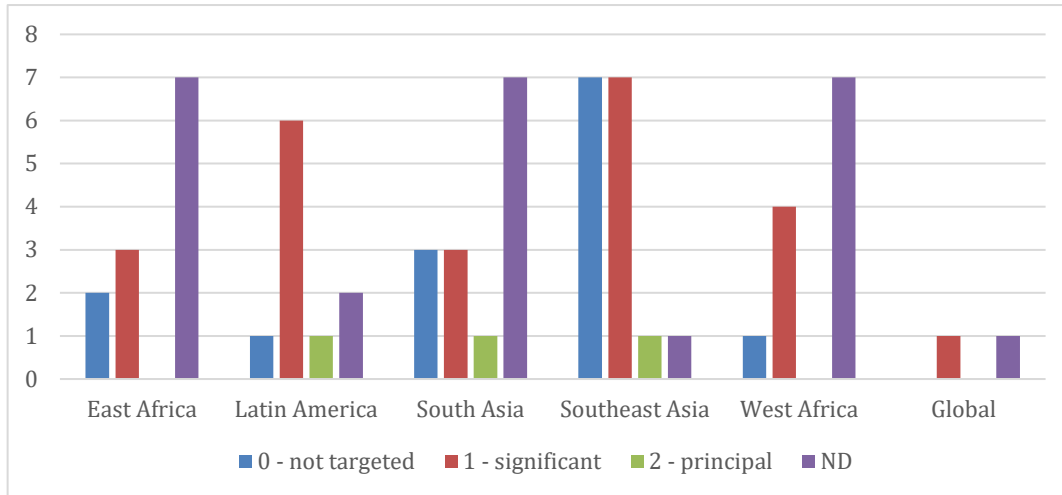


Figure 9. Gender relevance disaggregated by region. ND = not documented. A description of these levels can be found in table 2.

As discussed in the introduction, data was collected on the areas in the three thirds approach: engagement, evidence and outreach (Dinesh et al. 2018). Evidence activities refer to the generation of credible, scientific research; engagement activities refer to engaging partners in targeted and demand-driven research and the use of participatory research approaches; and outreach activities refer to capacity building and communications

The majority of outcome cases, as expected, were a mix of these activity types, with a combination of the three being the most frequently documented in outcome cases included in this review (figure 10). However, this was not documented in 11 outcome cases.

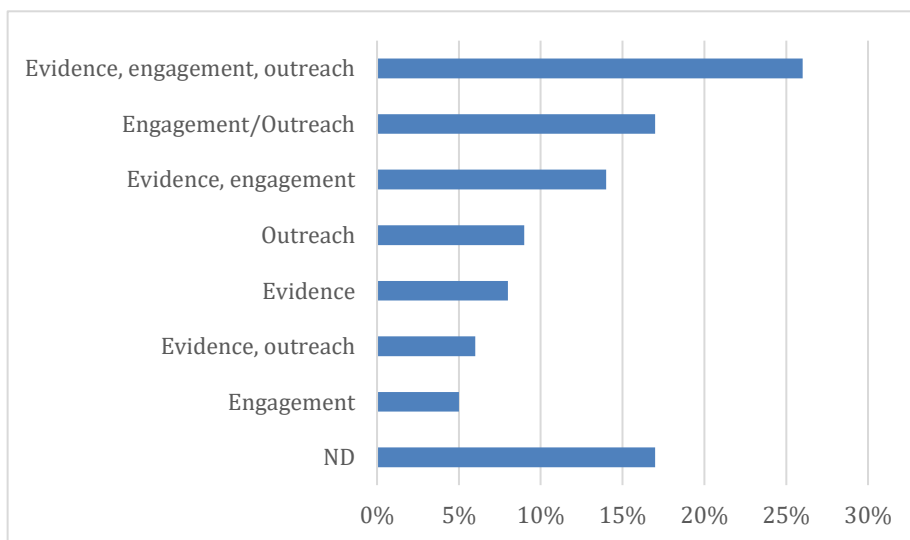


Figure 10. Activity types of outcome cases reviewed. ND = not documented

In four regions, a combination of evidence, outreach, and engagement activities was the most frequently used in outcome cases (figure 11). However, in South Asia, a broader range of combinations of evidence, engagement opportunities and outreach were used.

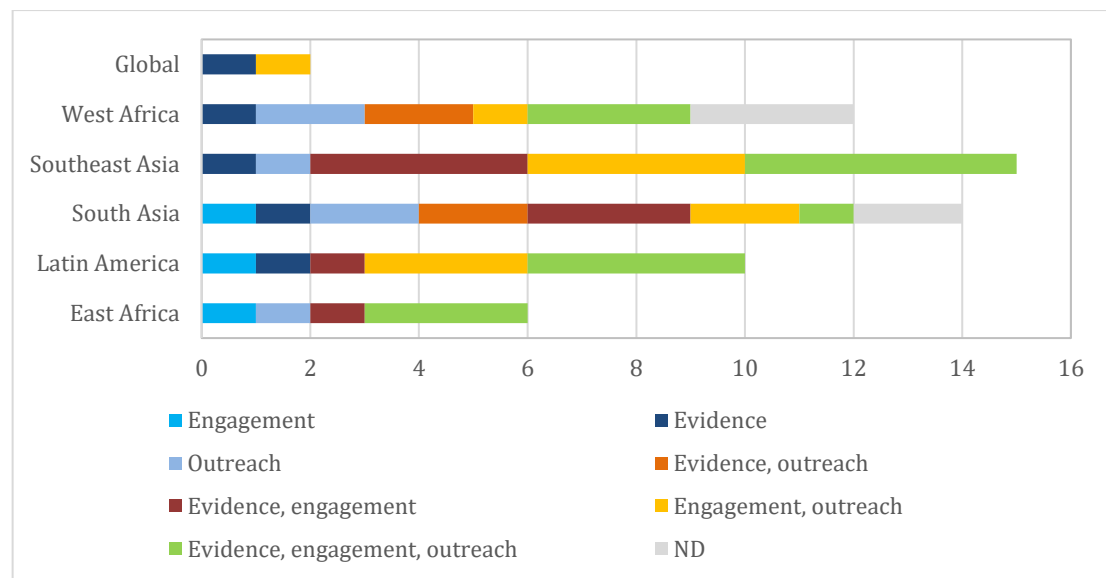


Figure 11. Activity type disaggregated by region. ND = not documented

Research outputs that contributed to achieving outcomes (e.g. technologies, trainings, publications) were also examined. Output typologies used were informed by the CCAFS Phase II proposal (2016). A description of these can be found in table 3. In total, there were 49 different output type combinations in the outcome cases reviewed for this synthesis. For the purpose of this analysis, we've shorted it to the output types that occurred in more than one outcome case.

The most frequently occurring output type was a combination of synthesis (e.g. a synthesis of CSA options) and guidance (e.g. a manual for implementing initiatives), see figure 12. A combination of guidance, methodologies (e.g. interdisciplinary and participatory approaches), and training (e.g. training materials to strengthen the capacity of farmers) appeared in four outcome cases.

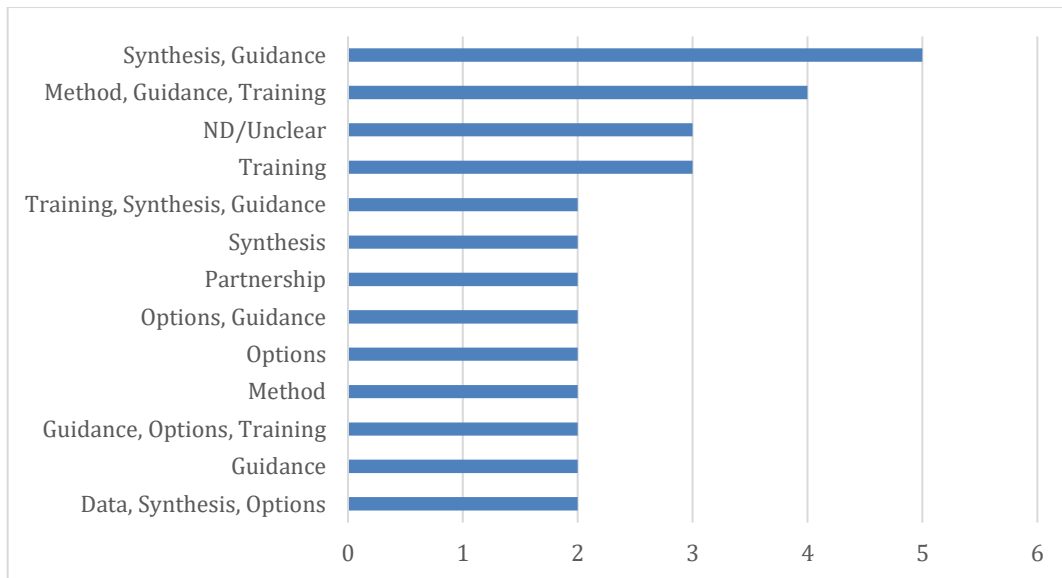


Table 12. Output types across all regions. Descriptions on outputs types can be found in table 3.

Outcome themes were also collected by the larger CCAFS outcome harvesting analysis. The themes refer to the focus of the projects in the outcomes. As this analysis was focused on CSV work, it was expected that ‘CSV’ would be the most frequent theme among outcome cases reviewed (figure 13). However, as this assessment was also looking at work that took place within the context of CSV work, other outcome themes were present in the cases reviewed. Unsurprisingly, ‘climate information services (CIS) & advisory’ and ‘scaling CSA’ made up the majority of cases, in addition to those just focusing on CSV work. A handful of other cases focused on community seed banks, greenhouse gases, investments, and gender.

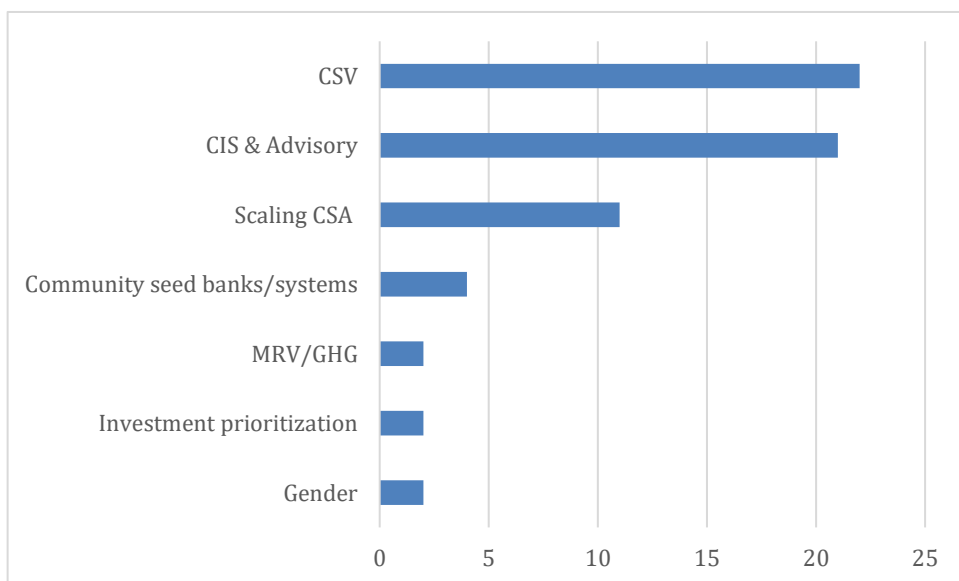


Figure 13. Outcome themes

Figure 14, below, shows which outcome themes were most prevalent for each region. Notably, a lot of CIS work took place in West Africa, while the majority of direct CSV outcomes were from South and Southeast Asia. Outcomes on scaling CSA largely happened in East Africa and South and Southeast Asia.

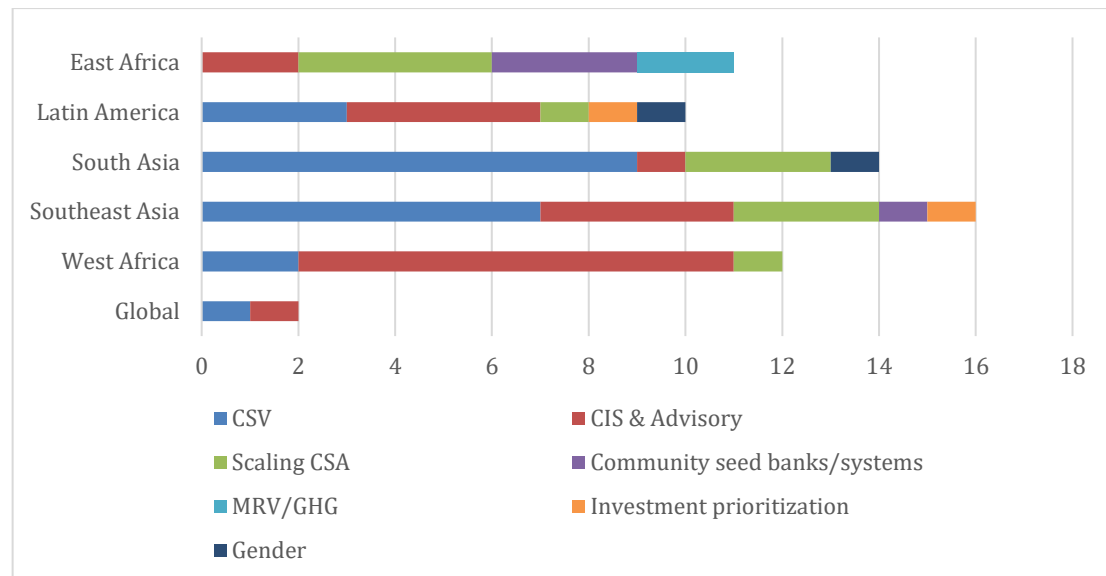


Figure 14. Outcome themes by region

Outcome typologies were developed by the larger CCAFS outcome harvesting analysis being done by Priorities and Policies for CSA Flagship. These typologies were also informed by the CCAFS II Full proposal (2016). Descriptions of these can be found in table 4. The most frequently occurring outcome type was policy-investments (Policy-Inv), meaning outcomes that influenced policy investment decisions (figure 15). There were 18 outcome cases that fell into the Policy-Inv typology.

The combination of Services & Farm typologies, or outcomes that influenced 1) access to services and capital for farmers, and 2) farm landscape-level outcomes was also a frequently occurring outcome type, with ten outcome cases falling into this typology. Also with ten outcome cases was the Policy-Plan typology, meaning outcomes that influenced policy decision, strategies, and plans.

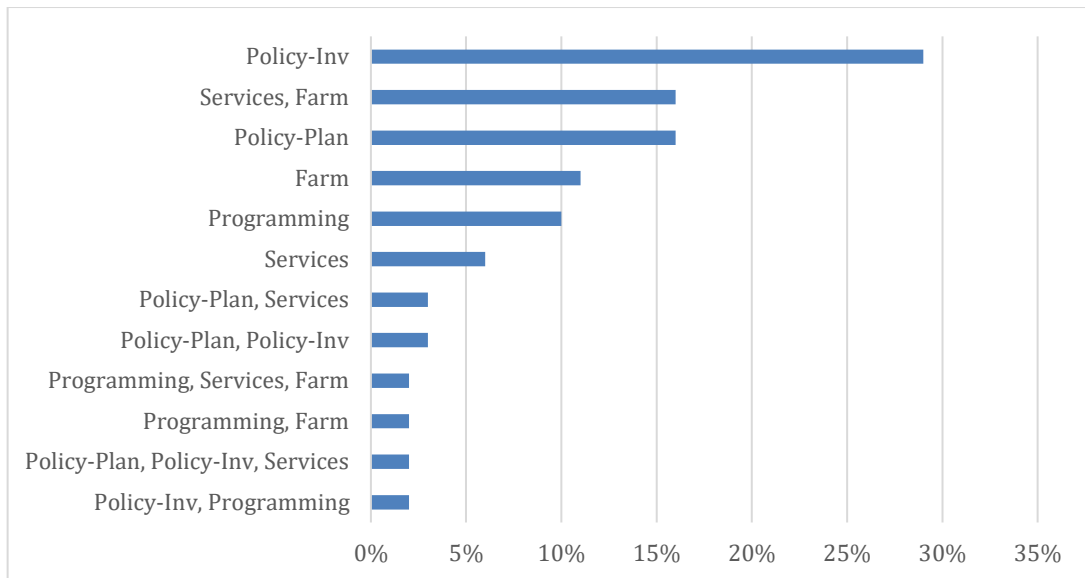


Figure 15. Outcome types. See table 4 for descriptions of each typology.

Taking a zoomed in look at just the outcome types that occurred most frequently (in five or more outcome cases), there are differences in how these played out across the regions (figure 16). South Asia had the most policy-related outcomes (both investments and plans), followed by Southeast Asia. East Africa and West Africa had the most Services & Farm occurrences.

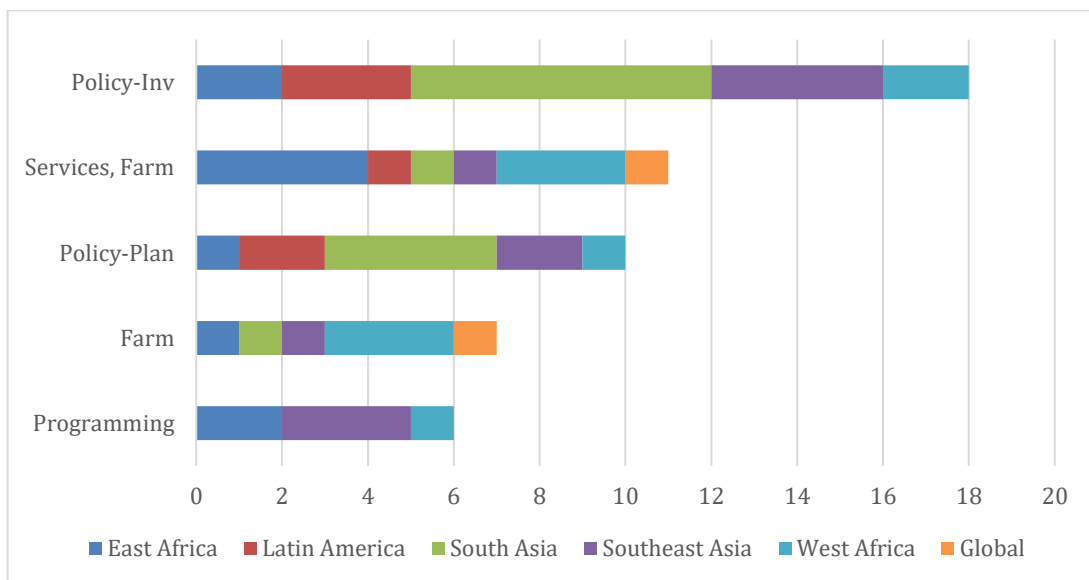


Figure 16. Regional distribution of top five occurring outcome types. See table 4 for descriptions of each typology.

There were many different beneficiary types in the outcome cases reviewed. The vast majority of which were governments and farmers, followed by non-governmental

organizations (NGOs) (figure 17). This finding is in alignment with CCAFS' strategy to not only work at the farm-level, but to do work at multiple scales with an array of stakeholders.

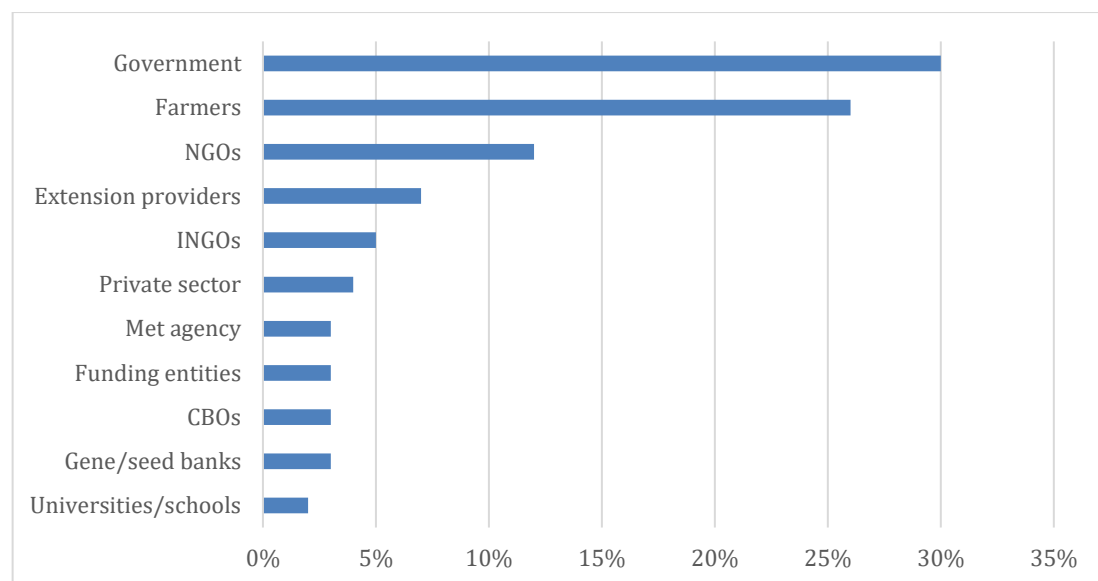


Figure 17. Beneficiary types from reviewed outcome cases

How Were These Outcomes Achieved?

The results will now discuss how those CSV-related outcomes were achieved. In other words, what was crucial to success along the impact pathway in order to achieve CSV and CSA scaling?

What changed in the next user was assessed and sorted into the following typologies: decisions, knowledge, investment, and capacity/skills. Many cases had a combination of these changes taking place. The most frequently occurring typology was a combination of decisions & knowledge, followed by knowledge & capacity/skills, followed by investment (figure 18).

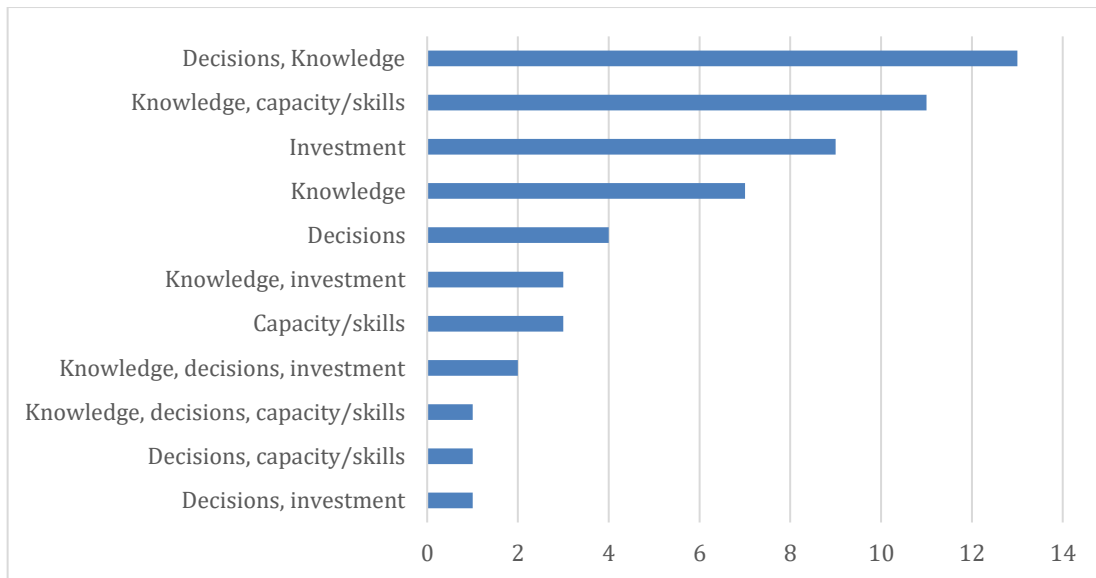


Figure 18. Typologies of what changed in the next user/beneficiary

Figure 19 (below) displays what changes in the next user contributed to each outcome type. For outcomes related to policy, various changes had to occur in order to achieve those outcomes. For example, while Policy-Inv specifically refers to investments, other changes had to occur in order to reach the investment. Similarly, for Policy-Plan, it is evident that a lot of knowledge exchange contributes to this type of outcome. For outcomes relating to Farms and Services, it is also clear that knowledge exchange played a large role.

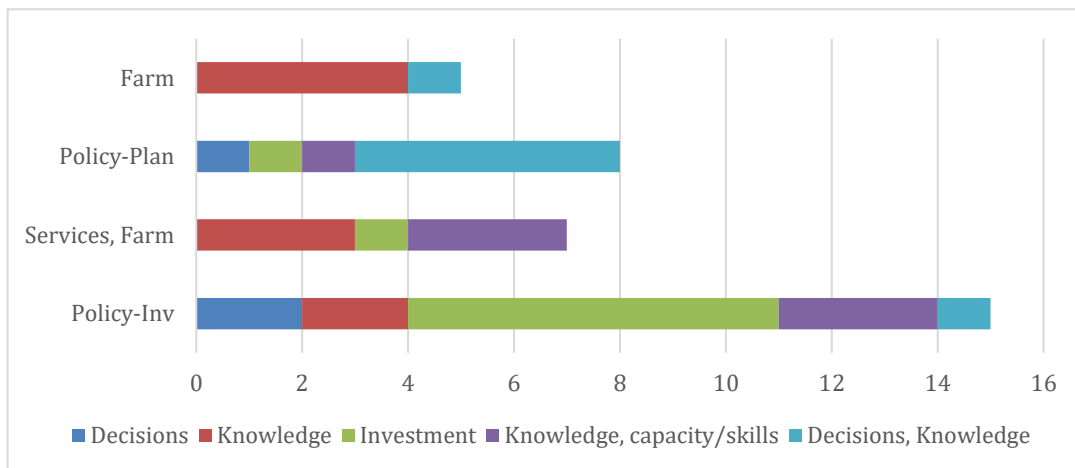


Figure 19. Relationship between what changed in the next user/beneficiary and most frequently occurring outcome types

CCAFS' outcomes were, of course, not achieved alone. Many partners contributed to the success of the program and thus the outcome cases reviewed for this paper. The largest contributor type was state governments, followed by research institutes, international non-governmental institutes (INGOs), and non-governmental institutes (NGOs) (figure 20).

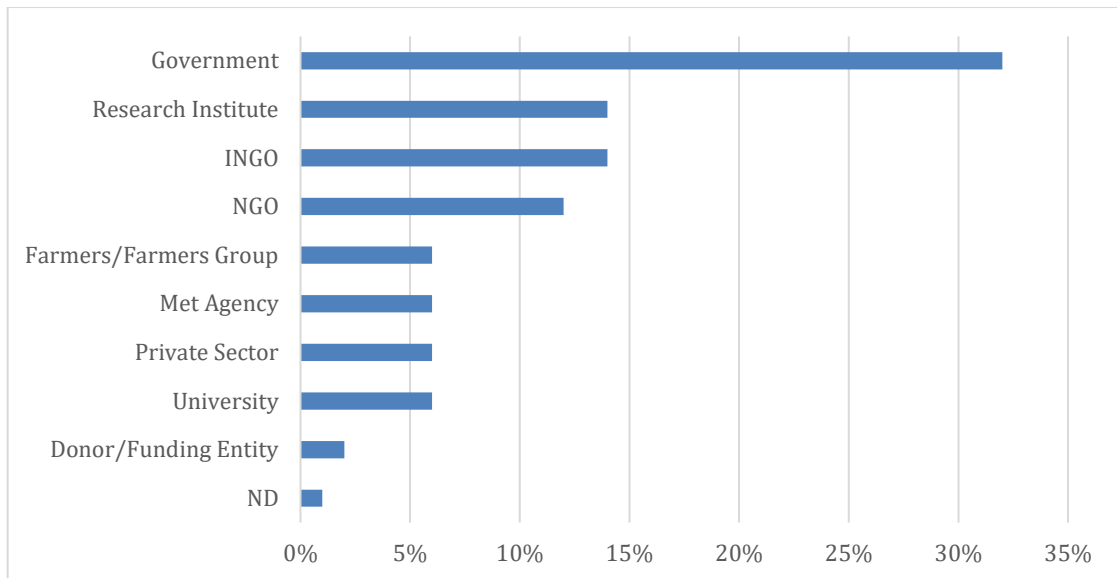


Figure 20. Key Contributor types

The Role of Key Contributors

The role of the key contributors varied project to project. Many partners provided support for overall project implementation through activities like trainings, CSV establishment, or the development of seed banks.

Key partners were also often integral to scaling directly, as some invested in the scaling of CSVs and CSA. For example, the Government of Nepal started to scale out CSA through the CSV approach. ITC Limited and the United States Agency for International Development (USAID) invested to develop over 2,000 CSVs in 6 states in India, and the State Government of Gujarat planned to invest in the development of a large number of Solar Pump Irrigators' Cooperative Enterprises (OICR111, 2016).

The role of many contributors seemed to align with CCAFS' three thirds, approach through collaboration and support in engagement, evidence and outreach activities. Collaboration on evidence production was a major role of partners, as research outputs are often crucial to achieving scaling outcomes. For example, in Southeast Asia, the International institute for Rural Reconstruction (IIRR)-managed Guinayangan (Philippines) CSV was implemented to build evidence for how subnational scaling of CSA practices can be undertaken through community-level interventions (OICR2101, 2017).

Engagement support was also a key role of partners. For example, one outcome case in Guatemala described how engagement and dialogue with the Ministry of Agriculture, Livestock and Food, the Central America Agricultural Council Gender Network and the Council of Ministers of Women resulted in the development of a document that

strengthened the processes of formulation, implementation and monitoring of both climate-smart interventions and related public policy. All while acting as integrative mechanism for joint gender, agriculture, and climate action (OICR3134, 2019).

Regarding outreach, in many of the outcome cases related to CIS & Advisory, CCAFS worked with partners not only develop information but to disseminate it and scale it widely. For example, in Senegal, CCAFS partnered with the National Agency of Civil Aviation and Meteorology (ANACIM). Due to this collaboration, downscaled CIS was developed, the capacity of partners to communicate the CIS to farmers was enhanced, and the transmission of CIS and advisory to farmers improved. It was noted that contextual factors such as enabling policy environment, funding, and international interest contributed to achieving this outcome (OICR3313, 2019).

What was Crucial to Scaling?

As discussed above, partnerships and collaborations are key to scaling CSA and CSVs, as they helped CCAFS reach achievements in engagement, evidence, and outreach activities. In addition to key contributors, many outcome cases noted that the CSV approach itself was important for scaling, as it allowed the research team to understand farmer's perceptions about climate change, its impacts on agriculture, and how they've adapted to it. Additionally, the approach allows for the participatory development of a customized portfolio of CSA options. Overall, the successes in CSVs due to the nature of the approach generated evidence for further scaling of CSVs and CSA.

Evidence generation was noted as being crucial as well, such as the development of communications and training materials, new technologies, and methodologies. Evidence generation is significant because it builds the case for scaling to funders. For example, in East Africa, Heifer International used evidence from CCAFS research to select CSA options for Phase II of the East African Dairy Development (EADD) program. Specifically, EADD adopted the reduction of GHG emissions as a program objective based on CCAFS evidence that better feeding and manure management can not only contribute to GHG reduction, but can also increase farmer's income (*East African Dairy Development program adopts Climate Smart Agriculture*, 2013).

Building capacity is essential to scaling; ongoing trainings with farmers and implementing partners were important factors in numerous outcome cases. The monitoring of CSA is also important, as it allows teams to assess progress and success of projects. Additionally, the use of participatory action research approaches were crucial in building evidence for scaling. In the Philippines, for example, participatory action researches approaches in the CSV context

were recognized by the Department of Agriculture's Systems-Wide Climate Change Office as one of the most relevant aspects for further development and implementation of climate-resilient agriculture at local level (OICR201, 2018).

Ongoing engagement and communication with local, state, and national partners was a key element in many outcome cases. Continued engagement is necessary to facilitate relationships with partners. One outcome case noted that engagement beyond the rural communities is necessary in order to reach key institutions that could leverage learnings, knowledge, and capacities achieved in CSVs. Lastly, exposure to the CSV approach and knowledge exchange are essential so that stakeholders can learn about the approach, the benefits of it, and potential for its future success. Examples of this noted in outcome cases were CSV site visits as well as workshops to communicate research findings.

Conclusion

It is clear that CSVs have had success in scaling up the CSV approach and CSA. Partnerships and collaborations are essential for successful outcomes, as they play various roles that can be crucial for scaling. Additionally, the areas of the three thirds approach (engagement, evidence, and outreach) are critical for scaling. As evidenced in this review, a combination of all activities across all three areas appears to be most effective for scaling.

Appendix: Outcome Cases Included in Review

Region	Outcome #	Project #	Year	Title
EA	CS47	P110	2015	Hundreds of farmers adopting sorghum-legume climate-smart cropping system in semi-arid Kenya
EA	OICR3189	P263	2019	Community-based seed systems increases access/availability of high-quality adapted seeds for 189,000 farmers in East Africa
EA	ND	ND	2014	Scaling up agricultural carbon projects in Kenya and Uganda
EA	OICR3848	P1589	2020	Enhancing capacity for climate change adaptation: upscaling best performing varieties of sorghum, finger millet, bean, wheat and barley in Kenya, Uganda, Tanzania and Ethiopia
EA	OICR3140	P267	2019	37,000 smallholders implementing low emissions agriculture resulting in 1 Mt CO ₂ e verified mitigation in East Africa
EA	OICR3125	P1589	2019	Supportive policy environment on informal seed system led to increased utilization of local climate-resilient varieties in East Africa
EA	OICR3861	P812	2020	Inspired regional government in Ethiopia to fund dam building for drinking water and its watershed management using CSA options
EA	119	P56	2016	CIAT-CCAFS CSA Profiles in Kenya drove national/county plans, informed US\$ 250 million World Bank investment
EA	ND	ND	2014	Shamba Shape Up: An Innovative Communication and Extension Success Story
EA	ND	ND	2013	East African Dairy Development program adopts Climate Smart Agriculture
EA	ND	ND	2013	Promoting use of climate information by smallholder farmers through training and advisories
EA	CS8	P111	2015	Scaling climate-smart dairy practices in Kenya (with P13)
GLO	OICR2583	P266	2018	Participatory Integrated Climate Services for Agriculture (PICSA) methods and materials scale out to 17 countries, reaching 140,850 farmers in Africa, Latin America and Asia
GLO	OICR611	P255, P265, P259, P264, P263, P262	2018	Emerging adoption patterns of Climate-smart agricultural practices and technologies across 8 Climate-Smart Villages in Latin America, Africa and South Asia
LAM	OICR2986	P1604, P262	2020	Two regional organizations and two national governments adopt cross-scale climate risk management approaches
LAM	OICR3134	P265	2019	Guatemalas' Ministry of Agriculture shows the way for a practical incorporation of gender dimensions in the implementation of the CSA regional strategy for Central America
LAM	OICR2681	P262	2018	More institutions in Cauca adopt climate-smart village tools for policy implementation
LAM	OICR3148	P771	2019	Institutional capacity in Honduras is strengthened to address climate change and variability challenges by using CCAFS-CIAT science.
LAM	OICR121	P42	2018	Implementation of novel agro-climatic services help more than 500,000 farmers in Colombia, Honduras, Guatemala and Nicaragua better plan their crops
LAM	OICR3104	P262	2019	Investments on climate-smart agriculture have reached USD5.4 million in Latin America supported by CCAFS science.
LAM	OICR2163	P262	2017	Cauca leads climate smartness for agriculture in Colombia

LAM	OICR3860	P1604	2020	150 local organizations and 10,000 farmers receive recommendations to manage joint COVID19 and climate risks in LAM
LAM	81	P112	2016	Cauca is becoming a climate-smart department
LAM	OICR3105	P1604	2019	Scaling-up and strengthening of climate services promotes knowledge democratization and practice adoption across Latin America
SA	CS43	P60	2015	FIVE STATE GOVERNMENTS IN INDIA CONSIDER NEW SCHEMES TO SCALE-OUT CLIMATE-SMART VILLAGES
SA	OICR3847	P1606	2020	Enhancing the capacity of fish-farmers and their support agents in understanding and using climate risk information at scale
SA	111	P61, P119	2016	Scaling out climate smart agriculture through CSV approach
SA	OICR3139	P1603	2019	Mainstreaming precision nutrient management practices by national and state governments of India towards global food security and climate change mitigation
SA	OICR2039	P25	2017	CCAFS evidence on scalable CSA business models drove USD 170million national policy investment in India to curb crop residue burning
SA	OICR3863	P259	2020	Scaling of Climate-Smart Village approach reaches next level in India and Nepal.
SA	76	P25, P53	2016	Scaling of Climate Smart Villages across 38 districts of Bihar
SA	OICR3347	P259	2019	The adoption of happy-seeder technology by 0.5 million farm-households on 1.3 million hectares in north-west India contributed to increased yields, profits, water and nutrient saving.
SA	OICR3139	P1603	2020	Mainstreaming precision nutrient management practices by national and state governments of India towards food security and climate change mitigation
SA	OICR2272	P259	2019	Public and private sector takes climate smart village scaling initiatives to next level
SA	CS11	P25	2015	Climate-Smart Villages scaled out in Haryana, India
SA	OICR2041	P269	2017	CCAFS GSI-sponsored gender research informs Kenya Dairy NAMA to increase on-farm dairy productivity through private sector investment in gender-inclusive extension
SA	ND	ND	2013	Climate-smart villages scaled out in Nepal
SA	ND	ND	2014	Climate-Smart Villages scaled out in India
SEA	OICR3788	P264	2020	Philippine government adopts CCAFS outputs and inputs in reviewing, developing, and implementing climate-smart agriculture-related policies and programs
SEA	OICR2617	P28	2018	Climate Risk Vulnerability Assessment (CRVA) framework for the establishment of climate-resilient agri-fisheries livelihoods and communities in the Philippines.
SEA	OICR2362	P264	2019	Vietnam's Ministry of Agriculture and Rural Development adopts CCAFS' outputs and inputs on its major climate-smart agriculture-related policies and programs
SEA	OICR201	P55	2018	DA adapts Guinayangan CSV model in implementing Php100M AMIA phase 2 projects in 10 regions, mainstreams CSVs in DA's 2019-2022 CSA/CRA program.
SEA	OICR631	P264	2018	Mobilizing high school students as climate-smart agriculture information providers in farming communities in the Philippines
SEA	OICR2638	P55	2018	Guinayangan integrates CSA in its Comprehensive Development Plan (2017-2022) and its municipal agriculture development program
SEA	OICR2131	P54	2017	IRRI/CCAFS approach on community-based seed systems is adopted in other projects in Laos

SEA	OICR3856	P1608	2020	Seasonal climate forecasts and weekly agro-advisories disseminated via Laos Climate Services for Agriculture(LaCSA) at provincial and district levels changed farming practices of about 21140 farmers
SEA	OICR2640	P48	2018	Ha Tinh province invests in climate-smart agriculture with potential to benefit over 200.000 farmers
SEA	OICR2109	P55	2017	Guinayangan CSV experience guided design of IDRC-supported project in Myanmar to establish CSVs in 4 distinct agro-ecosystems
SEA	OICR2131	P54	2018	IRRI/CAAFS approach on community-based seed systems is adopted in other projects in Laos
SEA	OICR3124	P1608	2019	Agroclimate information services adopted in provincial Farmers' Union 5 year-plan, directly benefitting over 19000 households designing and implementing homegardens
SEA	OICR2087	P264	2017	Climate smart villages in Southeast Asia as go-to sites for CSA learning
SEA	OICR3083	P264	2019	Climate-Smart Village approach mainstreamed in the Philippines, Vietnam, Myanmar, Laos, and Cambodia
SEA	OICR2101	P55	2017	Guinayangan CSV experience guides Philippine DA's development of AMIA villages, the Philippine adaptation of CSV approach
SEA	OICR2615	P55	2018	Ivisan, Capiz local government incorporates CSA in 2016-2022 Comprehensive Development Plan, allocates Php20M program implementation fund
WA	OICR2651	P255	2018	CGIAR Climate change West Africa Program informs the adoption of a public-private partnership business model for climate information services in Ghana
WA	OICR2123	P255	2017	CAAFS approach for climate information services inspired a rural development program in Burkina Faso
WA	OICR2052	P255	2017	Sub-national level science-policy platforms to be scaled out to all districts for climate-smart agriculture implementation in Ghana
WA	OICR3200	P255	2019	Innovative public-private partnership ensures access to climate information services-(CIS) for 500,000 farmers and fisherfolks in Senegal
WA	ND	ND	2012	Strengthening capacity of farmers and local institutions to reduce climate risk through seasonal forecast communication and evaluation (Kaffrine, Tougou and Segou)
WA	OICR441	P25	2018	Outcome case study of no-burning management solutions for rice crop residues
WA	ND	ND	2013	15 rural radios scaled-up the 2013 seasonal rainfall forecast to their audience farmers in 4 administrative regions of Senegal
WA	90	P90	2016	Climate information services reach Northern Ghana farmers through a market-led ICT approach
WA	OICR3313	P1610	2019	Use of CIS in Senegal led to 10-25% increases in household income, whilst improving action planning of national and local stakeholders
WA	ND	ND	2013	Climate Services for Farmers in Kaffrine, Senegal
WA	CS14	P90	2015	The impact of climate information services in Senegal
WA	108	P87, P34	2016	The CCAFS Climate-Smart Village approach inspired the World Bank funded CSA project in Niger

References

Aggarwal, Pramod K.; Jarvis, Andy; Campbell, Bruce M.; Zougmore, Robert B.; Khatri-Chhetri, Arun; Vermeulen, Sonja J.; Loboguerrero, Ana Maria; Sebastian, Leocadio S.; Kinyangi, James; Bonilla-Findji, Osana; Radeny, Maren; Recha, John; Martinez-Baron, Deissy; Ramirez-Villegas, Julian; Huyer, Sophia; Thornton, Philip; Wollenberg, Eva; Hansen, James; Alvarez-Toro, Patricia; Aguilar-Ariza, Andrés; Arango-Londoño, David; Patiño-Bravo, Victor; Rivera, Ovidio; Ouedraogo, Mathieu; Yen, Bui Tan. 2018. The climate-smart village approach: framework of an integrative strategy for scaling up adaptation options in agriculture . *Ecology and Society* 23(1): 14.

CCAFS. 2016. Full Proposal 2017-2022 for Phase II of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Dinesh, D., Zougmore, R.B., Vervoort, J., Totin, E., Thornton, P.K., Solomon, D., Shirsath, P.B., Pede, V.O., Lopez Noriega, I., Läderach, P. and Körner, J., 2018. Facilitating change for climate-smart agriculture through science-policy engagement. *Sustainability*, 10(8), p.2616.

Dinesh & Szilagyi. 2018. Effective Science-Policy Engagement to Scale Up Climate-Smart Agriculture: Lessons From 6 Years of CCAFS Research.

Förch Wiebke, Kristjanson Patti, Thornton Philip and Jusper Kiplimo. 2011. Initial Sites in the CCAFS Regions: Eastern Africa, West Africa and Indo-Gangetic Plains, Version 2. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.

Förch W, Sijmons K, Mutie I, Kiplimo J, Cramer L, Kristjanson P, Thornton P, Radeny M, Moussa A, Bhatta G. 2013. Core Sites in the CCAFS Regions: East Africa, West Africa and South Asia, Version 3. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Koerner J, Dinesh D, Loboguerrero AM, Campbell B. 2020. Lessons learnt from CCAFS - 10 years scaling climate-smart agriculture: Insights from the review of CCAFS scaling activities, 2019. CCAFS Info Note. Wageningen, Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Kristjanson P. 2020. CCAFS Investment-Oriented Outcome Pathways: Lessons and New Directions. CCAFS Report. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Lipper, L., Thornton, P., Campbell, B.M., Baedeker, T., Braimoh, A., Bwalya, M., Caron, P., Cattaneo, A., Garrity, D., Henry, K. and Hottle, R., 2014. Climate-smart agriculture for food security. *Nature climate change*, 4(12), pp.1068-1072.

Szilagyi L, Schuetz T, Thornton P, Dinesh D, Cramer L. 2020. Lessons from evaluation of CCAFS outcomes to improve outcome delivery and reporting. CCAFS Info Note. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Thornton PK, Schuetz T, Förch W, Cramer L, Abreu D, Vermeulen S, Campbell BM. 2017. Responding to global change: A theory of change approach to making agricultural research for development outcome-based. *Agricultural Systems* 152:145-153.

Vermeulen S, Zougmore R, Wollenberg E, Thornton P, Nelson G, Kristjanson P, Kinyangi J, Jarvis A, Hansen J, Challinor A, et al. 2012. Climate change, agriculture and food security: A global partnership to link research and action for low-income agricultural producers and consumers. *Current Opinion in Environmental Sustainability* 4:128–133.