



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



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**CCAFS PHASE II PROPOSAL**

**2017-2022**

**SUMMARY**

This document summarizes the vision, goals, and operational details for Phase II (2017-2022) of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), based on a full proposal submitted to the CGIAR Consortium in March 2016. To read the full proposal visit <https://ccafs.cgiar.org/ccafs-phase-ii>



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# CONTENTS

Overview and development context .....	4
Goals, objectives, targets .....	4
Program structure and function .....	6
Research sites .....	8
Impact pathway and Theory of Change .....	9
Partnerships and collaborations .....	10
Program management and governance .....	10
Budget .....	11
Value for money .....	11

## Overview and development context

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Climate change will have far-reaching consequences for agriculture and natural resources – demanding a response that integrates food security, adaptation and mitigation, and puts greatest investment towards poor agriculture-dependent people whose livelihoods are most at risk. For example, a CCAFS meta-analysis of future impacts of climate change finds that 70% of the projections indicate declines in crop yields by the 2030s, with half of the projections indicating yield losses of 10-50%. The meta-analysis finds that incremental adaptation options (e.g. improved varieties and crop management) can reduce but not eliminate losses.<sup>1</sup> Poor farmers may turn to more profound transformative adaptation options, such as livelihood diversification or migration.

Farming in 2030 is likely to be characterized by a higher degree of inequality in farm incomes, sizes, technologies and market linkages. The implication of this 2030 outlook is that CCAFS research will need to distinguish more carefully among farming systems and households to provide policy-relevant outputs including a range of adaptation options that in some cases go beyond agriculture.

<sup>1</sup> Challinor AJ, Watson J, Lobell DB, Howden SM, Smith DR, Chhetri N. 2014. A meta-analysis of crop yield under climate change and adaptation. *Nature Climate Change* 4 (4) pages 287 – 291. <http://dx.doi.org/10.1038/nclimate2153>

## Goals, objectives, targets

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The overall goal of CCAFS is to catalyse positive change towards climate-smart agriculture (CSA)<sup>2</sup>, food systems and landscapes. CCAFS takes its mandate from the CGIAR vision: “a world free of poverty, hunger and environmental degradation”. Impacts are sought in three dimensions (CGIAR System Level Outcomes):

- 1. Reducing poverty**
- 2. Improving food and nutrition security for health**
- 3. Improving natural resource systems and ecosystem services**

These three areas seek to make an impact for different groups.

For **impact on poverty reduction**, CCAFS aims to have 11 million farm households adopt climate-smart agriculture (including improved varieties, breeds or trees, and/or improved management practices) by 2022.

Through this action, and through policy engagement that has benefits for other groups (e.g. the urban poor), CCAFS aims to assist 9 million people, of whom 50% are women, to exit poverty. Overall, 59% of the budget is allocated to achieving this objective.

One of activities that will contribute to this objective will be developing decision-support tools that evaluate cost effectiveness of a range of CSA options, and support decision makers through the process of identifying priorities at a range of scales, from local to national levels. This work will be done in close collaboration with partners including regional bodies involved in CSA implementation (e.g. African Union, New Partnership for Africa's Development (NEPAD), Economic Community of West African States (ECOWAS), Common Market for Eastern and Southern Africa (COMESA), Asia Pacific Adaptation Network (APAN), Central America Agricultural

<sup>2</sup> Climate-smart agriculture (CSA) includes all approaches that develop the technical, policy and investment conditions to achieve three main objectives: sustainably increasing agricultural productivity and food security, adapting to and building resilience to climate change, and reducing and/or removing greenhouse gas emissions, where possible.

Council (CAC), Economic Commission for Latin America and the Caribbean (ECLAC) and the Inter-American Institute for Cooperation on Agriculture (IICA)). Another activity will be developing methods to tailor historic and seasonal climate information to agricultural needs and reshaping climate-informed safety nets in response to increased frequency of extreme events. In West Africa this will be done in partnership with International Research Institute for Climate and Society (IRI) and West African agencies, such as national meteorological services, food security early warning and response, climate institutions (e.g. AGRHYMET) as well as communications partners that work with rural communities (World Vision, CARE), and media and information and communication technologies (Farm Radio International (FRI), Manobi (Senegal), Esoko (Ghana), Union des Radios Associatives et Communautaires du Sénégal (URAC), National Agricultural Information and Communication Network (AGRONET)).

For **impact on Food and Nutrition Security**, CCAFS aims to have removed nutritional deficiencies of one or more essential micronutrients in 6 million more people, of whom 50% are women, by 2022. This work will be conducted jointly with the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH), with CCAFS providing the climate lens on the actions and interventions and using its climate-smart village (CSV) approach to test options in an integrated manner. Overall, 28% of the budget is allocated to achieving this objective.

Example activity: together with the CGIAR Research Programs on Agriculture for Nutrition and Health (A4NH) and Policies, Institutions and Markets (PIM), CCAFS will develop climate-food security scenarios to guide policymakers through the trade-offs and synergies implicit in the nutritional and environmental challenges posed by “sustainable diets”. Another activity that contributes to this objective is facilitating control over productive resources to women. Women play a key role in achieving household food and nutrition security. CCAFS will support women in adopting CSA interventions and strengthening food security primarily via identifying

key policies governing ownership and control over assets such as land and agricultural inputs, and utilizing gender transformative approaches to empower women. Dissemination of this research and examining whether and how the information is used by decision makers will be key to achieve the Food and Nutrition Security objective.

For **impact on environmental health** there will be both local beneficiaries and benefit for the global public good. By 2022, CCAFS will have contributed to reducing agriculture-related greenhouse gas (GHG) emissions by 160 Mt CO<sub>2</sub>e yr<sup>-1</sup> compared with the ‘business-as-usual’ scenario in 2022 (=0.16 Gt CO<sub>2</sub>e yr<sup>-1</sup>). This will involve close collaboration with the other CGIAR Research Programs where the technical development of mitigation options will take place. The collaboration with the CGIAR Research Program on Forests, Trees and Agroforestry focuses on avoided deforestation, with joint work aiming to conserve 0.8 million ha of forest. The collaboration with the CGIAR Research Program on Water, Land and Ecosystems focuses on soil carbon sequestration. Overall, 13% of the budget is allocated to achieving this objective.

Example activity: CCAFS will work with Wageningen University and Research Centre (Netherlands), Lancaster University (UK) and other partners to identify global hot spots for emissions and mitigation opportunities across all subsectors in developing countries, especially among smallholders, and work with the Climate and Clean Air coalition to develop regional strategies for scaling up, while working with national and regional partners to ensure locally relevant technical packages. The research design will involve participatory evaluation and comparison of different technologies using trials with smallholders in regions with expected high potential for mitigation and planning tools at national levels. CCAFS will work with the United Nations Food and Agriculture Organization (FAO) to develop a policy scenario tool to simulate the impact of low emission strategies at the level of a region or a value chain, based on GHG coefficients per ha or per ton.

## Program structure and function

CCAFS' role is to ensure integration on climate change across the CGIAR portfolio by providing the tools and advice on priorities in different contexts, making the links to the climate science community, and representing CGIAR in climate-related policy processes.

CCAFS' Phase II activities are clustered around four Flagship Programs:

Flagship Program 1: Priorities and Policies for CSA

Flagship Program 2: Climate-Smart Technologies and Practices

Flagship Program 3: Low Emissions Development

Flagship Program 4: Climate Services and Safety Nets

Each Flagship Program incorporates a Learning Platform to facilitate knowledge sharing, coordination and integration across CGIAR Research Programs (CRPs). Two Learning Platforms run independently, cutting across all Flagship Programs (see Figure 1).

CCAFS operates from farm to global levels. A particular focus will be on the various partnerships and alliances on CSA, the United Nations Framework Convention on Climate Change (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC) and the Green Climate Fund (GCF). (see Figure 2).

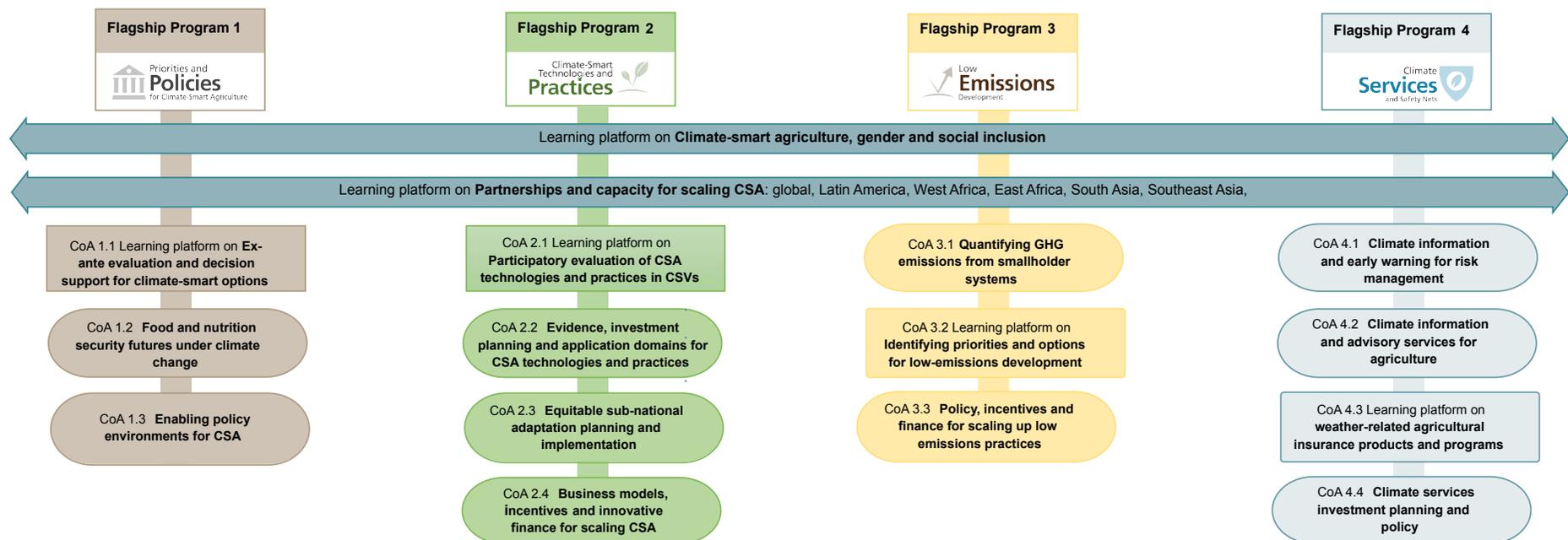
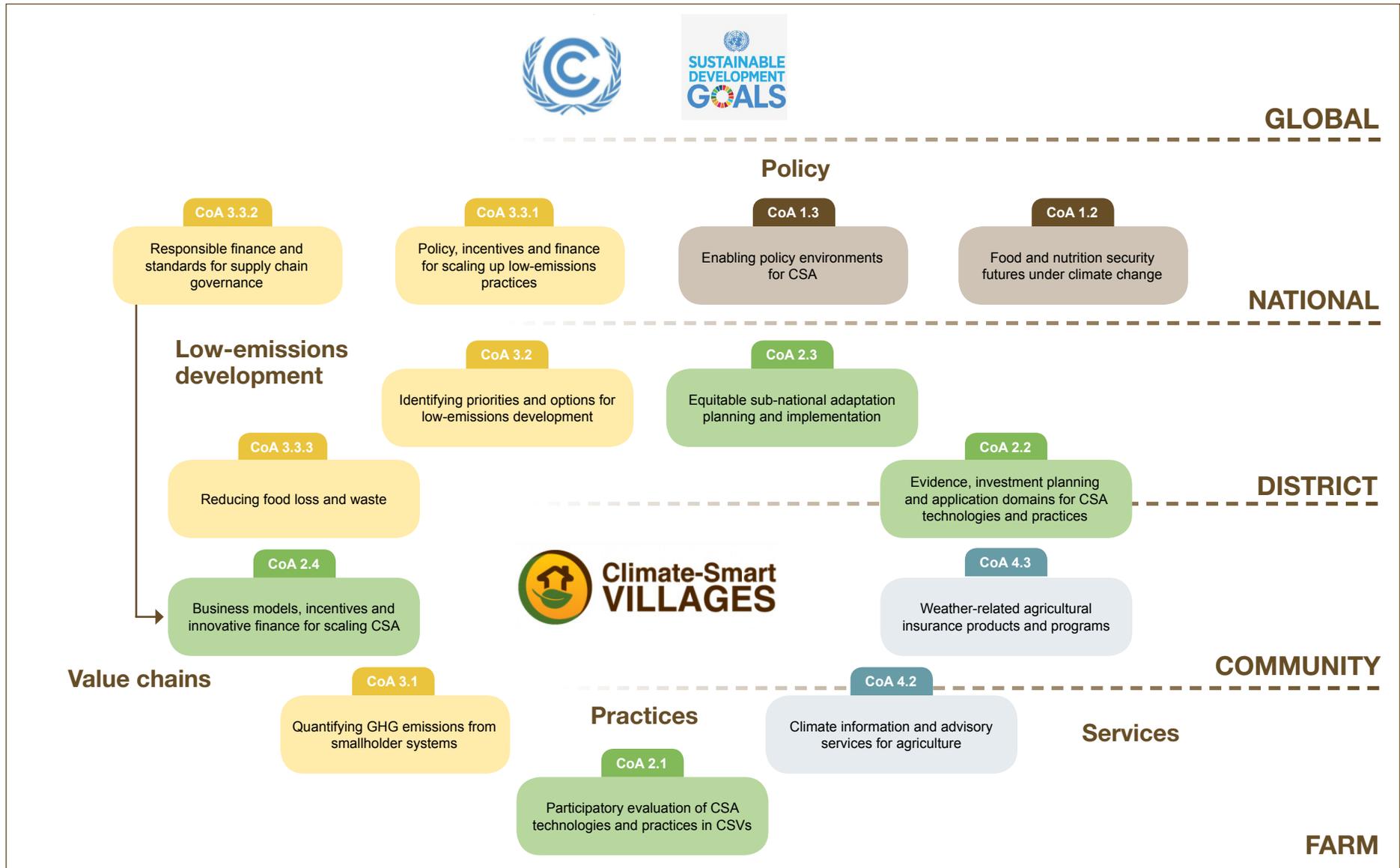


FIGURE 1. CCAFS programmatic structure (CoAs indicate Clusters of Activity; square boxes show CoAs that function as Learning Platforms).



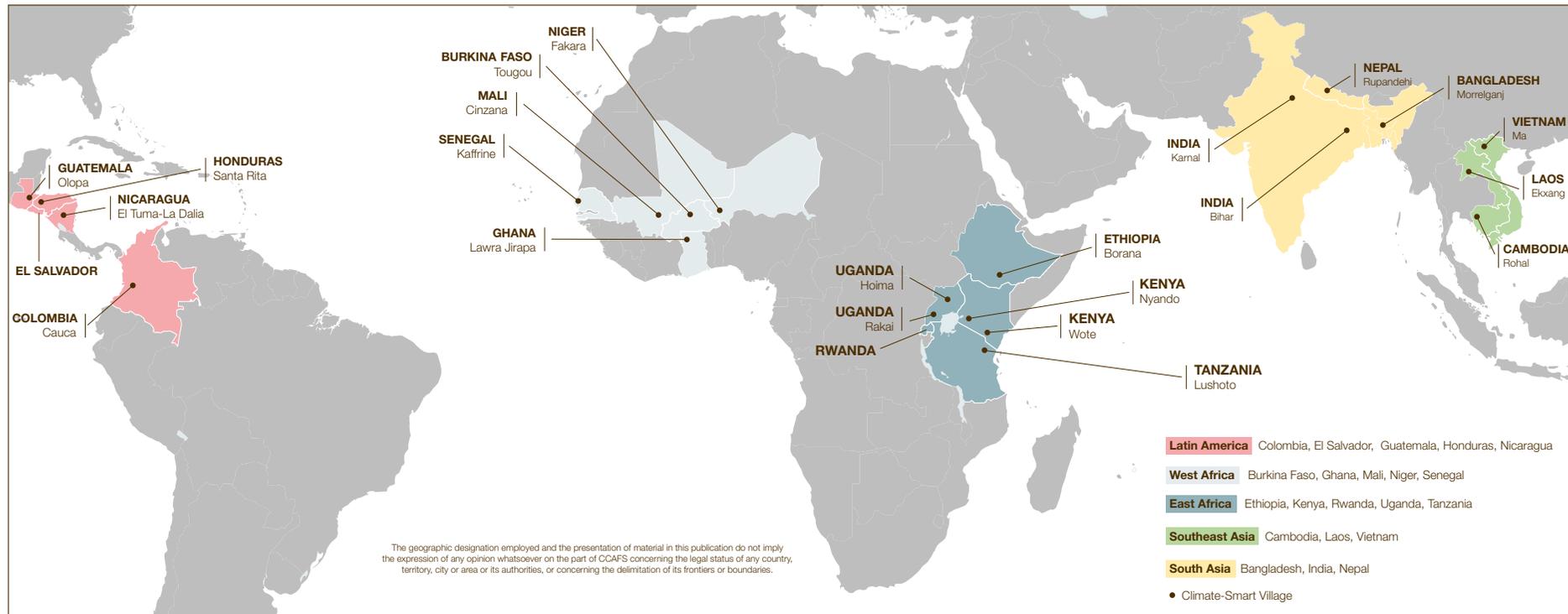
**FIGURE 2. CCAFS works across scales from farm to global levels.**  
 Examples of Clusters of Activity (CoAs) contributing at different levels are shown, but a number of those CoAs span more than one level.

## Research sites

CCAFS research sites align with CGIAR's overall strategy, with around 42% of investments focused on Africa, 39% on Asia and 19% on poverty hotspots in Latin America. The bulk of CCAFS' work will be carried out in 21 countries (Figure 3), and will take a dynamic approach to building comparative advantage: as progress is made on outcomes, several countries will be phased out in years 3-6, and others phased in.

**FIGURE 3. CCAFS target countries and locations of Climate-Smart Villages.**

The map shows the CCAFS-facilitated Climate-Smart Villages; there are also partner-facilitated Climate-Smart Villages, numbering in their hundreds, where partners bring together various climate-change solutions.



Climate-Smart Villages (CSVs) will become key sites for testing, developing and adopting climate smart agriculture (Figure 3). The Climate-Smart Village is a model developed by CCAFS to improve the adaptive capacity of communities and engage community members in the testing and evaluating interventions. All the villages are in high-risk areas, which will likely suffer most from a changing climate. Villages are also locations where partners and CGIAR centers have already established vital links with local communities; some Climate-Smart Villages are already test-beds for up to five Centers. The 2015 External Evaluation of CCAFS validated the Climate-Smart Villages approach as an effective means of testing and evaluating climate smart agriculture technologies and practices and in building an evidence base for scaling-out climate smart agriculture.

## Impact pathway and Theory of Change

Fundamental to CCAFS is a series of impact pathways that link research activities and outputs to desired outcomes and impacts on people's well-being, up to the global level of the Sustainable Development Goals. Our Theory of Change for how large-scale CSA adoption might occur builds on the theory of Lipper et al. (2014), which proposes four areas for action:<sup>3</sup>

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

A cornerstone of the Theory of Change is partnerships – CCAFS will closely collaborate with development partners, including the major organizations that set the agenda for rural development globally and nationally, and with small-scale farmers and their representative organizations. Internal learning over four years of CCAFS implementation suggest ten principles about how CGIAR Research Programs can enhance the likelihood and quality of outcomes when working with partners.<sup>4</sup> One of these principles is “Allocate resources in three thirds – needs, research, capacity”. CCAFS intends to apply the ten principles during Phase II. They will be discussed and refined with implementing partners and form the basis of developing the capacity of research partners, including ourselves.

<sup>3</sup> Lipper L, Thornton P, Campbell BM, Baedeker T, Braimoh A, Bwalya M, Caron P, Cattaneo A, Garrity D, Henry K, Hottle R, Jackson L, Jarvis A, Kossam F, Mann W, McCarthy N, Meybeck A, Neufeldt H, Remington T, Sen PT, Sessa R, Shula R, Tibu A, Torquebiau EF. 2014. Climate-smart agriculture for food security. *Nature Climate Change* 4:1068–1072. <http://dx.doi.org/10.1038/nclimate2437>

<sup>4</sup> Vermeulen SJ, Campbell B. 2015. Ten principles for effective AR4D programs. CCAFS Info Note. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). <http://hdl.handle.net/10568/67897>

Capacity development is pivotal to making progress, and so the program seeks to develop capacity among key actors in the impact pathway.

This includes, for example, developing capacity of research institutes to generate policy-relevant knowledge on CSA and developing institutional capacity among organizations that link science with decision makers and farmers, to put knowledge into effective use.

Gender, youth and social inclusion are integral to the Theory of Change. CCAFS has a Learning Platform on CSA, gender and social inclusion, which integrates gender into the four areas of action, and seeks to test hypotheses on empowerment of women and youth. Our new Gender and Social Inclusion (GSI) Strategy places women at the centre of agriculture in developing countries within a framework of power and inclusion, recognizing their importance in agricultural production, food and nutritional security, and livelihoods.

Monitoring, evaluating and learning are crucial to ensuring the program remains on a pathway to impact. While unintended outcomes have largely been serendipitous and positive under Phase I (e.g. additional partners adding scale to outcomes, or unexpected results on gender differences leading to better tailoring of information and communication technology services), regular evaluation and adjustments of the program's work will be undertaken. The program's hypotheses will be revisited after two years of implementation, based on monitoring change, qualitative research that examines outcomes, processes and stakeholder perceptions, and on the basis of external reviews and impact assessments.

## Partnerships and collaborations

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CCAFS' role is to integrate climate change across CGIAR and across a range of partnerships. In expectation that the national level remains the key route to impact, CCAFS will invest most in working directly with national governments and National Agricultural Research and Extension Systems, facilitating science-policy platforms in target countries. Other key partners will be agencies implementing climate-related food security and agricultural development programs (e.g. national meteorological services, farmers' organizations, NGOs). CCAFS expects to work in this way with several hundred partners at sub-national, national and regional levels, coordinating wherever possible with other CGIAR Research Programs and CGIAR entities under site integration plans.

CCAFS and its partners have comparative advantage in science quality, capacity to deliver outcomes at scale, and integration across disciplines and agricultural sub-sectors. In terms of science quality, CCAFS and CGIAR's strongest comparative advantage lies in the following areas: ex-ante evaluation of CSA options at multiple scales; participatory evaluation of climate-smart portfolios; identifying priorities and options for low-emissions development; weather-related agricultural insurance products and programs; and research on gender and social integration under climate change. This knowledge is made widely available through a range of key papers published by CCAFS during Phase I. Other unique scientific products generated by the CGIAR Research Programs are its tools and databases, such as AgTrials (>35,000 trials with weather data), CCAFS-Climate (portal for downscaled climate model outputs with over 190,000 downloads per annum) and the Mitigation Options Tool.

In terms of delivering outcomes, CCAFS has comparative advantage as a knowledge partner in CSA implementation. This is demonstrated by

invited roles such as the Africa CSA Alliance (convened by NEPAD) and World Bank knowledge partnerships, International Fund for Agricultural Development (IFAD) Learning Alliance, co-leadership with FAO of the Knowledge Action Group of Global Alliance for Climate-Smart Agriculture, and co-chairing the World Business Council on Sustainable Development initiative on CSA. Through these initiatives CCAFS will contribute to improved livelihoods, food security and climate risk management for 500 million farmers by 2030 (Global Alliance for Climate-Smart Agriculture (GACSA) target) and emissions reductions of 30% in agricultural value chains involving multi-national companies (World Business Council for Sustainable Development (WBCSD) target).

CCAFS' new role as a CGIAR Research Program that integrates across Center specialities can strongly enhance both research and impact. An integrated climate CGIAR Research Program allows CGIAR to speak with one voice on climate change. CCAFS has demonstrated its ability to raise CGIAR's profile, leverage external skills and funding, increase effectiveness of scientific products, e.g. joint submissions to UNFCCC, and deliver integrated products, e.g. standardized CSA metrics.

## Program management and governance

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Led by the International Center for Tropical Agriculture (CIAT), CCAFS is collaboration among all 15 CGIAR Research Centers and Programs. The core team consists of: the CGIAR Research Program Director, 4 Flagship Program Leaders, 5 Regional Program Leaders, and 2 cross-cutting leaders: a Gender and Social Inclusion Research Leader and a Global Research Leader on Scaling CSA. Flagship and Regional Programs will work in a matrix, for delivery of both products and outcomes.

A set of 42 Strategic Partners, largely at global and regional levels, will contribute to the governance of CCAFS. All 15 CGIAR Centers are Strategic Partners, as climate change is regarded as crucial to their mandates. CCAFS also has 27 non-CGIAR Strategic Partners. These are partners that leverage significant resources for work on a CCAFS-partner jointly defined agenda. In addition, there is an on-going commitment to a major international partner, Future Earth.

## Budget

A total budget of USD 388,229,373 will be allocated to CCAFS for the duration of Phase II, starting in 2017 with an annual budget of USD 57 million and followed by a 5% increase in budget per annum. Approximately 1/3 of the budget is drawn from CGIAR Window 1 and Window 2 donors and the rest will be raised/allocated through Window 3 and Bilateral funding.

Of the total budget, USD 120,338,000 quantifies CCAFS' contribution to the achievement of the 2022 CGIAR development targets summarized in Table 1.

## Value for money

Calculations on value for money indicate that over the 6-year period CCAFS will budget USD 12 per farm household to achieve CSA adoption, USD 10 per person for poverty alleviation and USD 19 per person to remove deficiencies of one or more essential micronutrients (System Level Outcome 1 and 2). To improve natural resources systems and ecosystem services (System Level Outcome 3) USD 0.03 is allocated per tonne of carbon dioxide emissions reduced, and USD 20 per ha of forest saved from deforestation (equal to USD 0.03/t CO<sub>2</sub>e).

CCAFS believes that it will reach high targets for investments in CSA with research costs of USD 1 informing over 20 times as much CSA investments (Flagship 1) and over 20 times as much for investments in climate information services and safety nets (Flagship 4).

**TABLE 1. CGIAR Research Program level: contribution to 2022 CGIAR targets**

CGIAR target	CCAFS' contribution	Amount needed (USD)	Window 1 + 2 %	Window 3 %	Bilateral %
<b>SYSTEM LEVEL OUTCOME 1: REDUCED POVERTY</b>					
100 million more farm households have adopted improved varieties breeds or trees and / or improved management practices	11 million farm households	53,823,000	31	0	69
30 million people of which 50% are women assisted to exit poverty	9 million people	35,880,000	31	0	69
<b>SYSTEM LEVEL OUTCOME 2: IMPROVED FOOD AND NUTRITION SECURITY FOR HEALTH</b>					
150 million more people of which 50% are women without deficiencies in one or more of the following essential micronutrients: iron zinc iodine vitamin A folate and vitamin B12	5.5 million people	24,315,000	37	0	63
<b>SYSTEM LEVEL OUTCOME 3: IMPROVED NATURAL RESOURCES SYSTEMS AND ECOSYSTEMS SERVICES</b>					
Reduce agriculturally-related greenhouse gas emissions by 0.2 Gt CO <sub>2</sub> -e yr-1 (5%) compared with business-as-usual scenario in 2022	0.16 Gt CO <sub>2</sub> e/yr.	5,300,000	49	0	51
2.5 million ha of forest saved from deforestation	0.8 millions of ha	1,020,000	49	0	51

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The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic partnership of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT).

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