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Report No: PAD4061

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED GRANT

IN THE AMOUNT OF SDR 42.6 MILLION
(US$60.0 MILLION EQUIVALENT)

TO THE

INTERNATIONAL CENTER FOR TROPICAL AGRICULTURE

FOR THE

ACCELERATING IMPACTS OF CGIAR CLIMATE RESEARCH FOR AFRICA PROJECT

NOVEMBER 17, 2020

Agriculture and Food Global Practice
Western and Central Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 31, 2020)

Currency Unit = US Dollar (US$)

US$1 = SDR 0.70839591

FISCAL YEAR
January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

ACRESAL	Agro-Climate Resilience in Semi-Arid Landscapes
AEZ	Agroecological Zone
AfDB	African Development Bank
AfricaRice	Africa Rice Center
AFSLD	Africa Food Security Leadership Dialogue
AGHRYMET Center	*Centre Régional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle* / Regional Training and Application Center in Agrometeorology and Operational Hydrology
AICCRA	Accelerating Impacts of CGIAR Climate Research for Africa Project
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AU	African Union
AUC	African Union Commission
BCR	Benefit : Cost Ratio
Bioversity	Bioversity International
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CCAFS-PMU	CCAFS Project Management Unit
CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
CIAT	*Centro Internacional de Agricultura Tropical* / International Center for Tropical Agriculture
CILSS	*Conseil Interministériel pour la Lutte contre la Sècheresse au Sahel* / Permanent Interstate Committee on Drought Control in the Sahel
CIMMYT	*Centro Internacional de Mejoramiento de Maíz y Trigo* / International Maize and Wheat Improvement Center
CIS	Climate Information Services
CORAF	West and Central Africa Council for Agriculture Research and Development
COVID-19	Coronavirus Disease-2019
CRP	CGIAR Research Program
CSA	Climate Smart Agriculture
CSAIP	Climate Smart Agriculture Investment Plan
CSVs	Climate-Smart Villages
CV	Coefficient of Variation
DFIL	Disbursement and Financial Information Letter
DST	Decision Support Tools
ECOWAS	Economic Community of West African States
EFA	Economic and Financial Analysis
ERP	Enterprise Resource Planning
ESF	Environmental and Social Framework

ABBREVIATIONS AND ACRONYMS

ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESRM	Environmental and Social Risk Management
ESSs	Environmental and Social Standards
FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
FAO	Food and Agriculture Organization
FM	Financial Management
FRSP	Food System Resilience Program
FSRP	West Africa Food System Resilience Program
GDP	Gross Domestic Product
GGW	Great Green Wall Initiative
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
GRS	Grievance Redress System
IBRD	International Bank for Reconstruction and Development
ICARDA	International Center for Agriculture Research in the Dry Areas
ICPAC	IGAD Climate Prediction and Applications Centre
ICRAF	International Center for Research on Agroforestry
ICRISAT	International Center for Research on the Semi-Arid Tropics
ICTs	Information and Communication Technologies
IDA	International Development Association
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IFR	Interim Financial Reports
IGAD	Intergovernmental Authority on Development
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IPF	Investment Project Financing
IRI	International Research Institute for Climate and Society
IRR	Internal Rate of Return
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
LGP	Length of Growing Period
LMP	Labor Management Procedures
M&E	Monitoring and Evaluation
MDAs	Ministries, Departments and Agencies
MIA	Mixed Crop-Livestock Systems, Irrigated, Arid and Semi-arid
MIH	Mixed Crop-Livestock System, Irrigated, Humid and Sub-humid

ABBREVIATIONS AND ACRONYMS

MIS	Management Information System
MIT	Mixed Crop-Livestock System, Irrigated, Tropical Highland
MoA	Ministry of Agriculture
MRA	Mixed Crop-Livestock System, Rainfed, Arid and Semi-arid
MRH	Mixed Crop-Livestock System, Rainfed, Humid and Sub-humid
MRT	Mixed Crop-Livestock System, Rainfed, Tropical Highland
NARES	National Agricultural Research and Extension Service
NARS	National Agricultural Research Service
NDC	National Determined Contributions
NEPAD	New Partnership for Africa's Development
NFCS	National Frameworks for Climate Service
NGO	Non-governmental Organizations
NMS	National Meteorological Services
NPV	Net Present Value
OHS	Occupational Health and Safety
PDO	Project Development Objective
PIM	Project Implementation Manual
PMP	Pest Management Plan
PPA	Partnership Performance Agreement
PPSD	Project Procurement Strategy for Development
RCAP	Regional Economic Communities Agriculture Policies
RCE	Regional Center of Excellence
REC	Regional Economic Community
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SADC-CSC	Southern African Development Community – Climate Service Centre
SDR	Special Drawing Rights
SEP	Stakeholder Engagement Plan
SIIP	Sahel Irrigation Initiative Support Project
TRA	Trans-Regional Audit
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
US$	US Dollar
VOP	Value of Production
WAAPP	West Africa Agricultural Productivity Program
WB	World Bank
WMO	World Meteorological Organization

TABLE OF CONTENTS

DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Africa	Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P173398	Investment Project Financing	Moderate

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	[ ] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
10-Dec-2020	31-Jul-2024

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objective is to strengthen the capacity of targeted CCAFS (CGIAR Research Program on Climate Change, Agriculture and Food Security) partners and stakeholders, and to enhance access to climate information services and validated climate-smart agriculture technologies in IDA-eligible countries in Africa.

Components

Component Name	Cost (US$, millions)
Knowledge Generation and Sharing	17.40
Strengthening Partnerships for Delivery	13.20
Validating Climate-Smart Agriculture Innovations through Piloting	23.70
Project Management	5.70

Organizations

Borrower:	International Center for Tropical Agriculture (CIAT)
Implementing Agency:	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) International Livestock Research Institute (ILRI)

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	60.00
Total Financing	60.00
of which IBRD/IDA	60.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	60.00
IDA Grant	60.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Africa	0.00	60.00	0.00	60.00
Regional	0.00	60.00	0.00	60.00

Total	**0.00**	**60.00**	**0.00**	**60.00**

INSTITUTIONAL DATA

Practice Area (Lead)

Agriculture and Food

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Low
6. Fiduciary	Moderate
7. Environment and Social	Moderate
8. Stakeholders	Moderate
9. Other	Moderate
10. Overall	Moderate

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[✓] Yes [ ] No

Have these been approved by Bank management?

[✓] Yes [ ] No

Is approval for any policy waiver sought from the Board?

[✓] Yes [ ] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Not Currently Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Not Currently Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Not Currently Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

Section I.B.2(a) of Schedule 2 of the Financing Agreement: The Recipient shall prepare and furnish to the Association not later than: (i) December 31, 2020, for Fiscal Year 2021; and (ii) November 30 of each subsequent Fiscal Year thereafter, during the implementation of the Project, a work plan and budget containing all activities proposed to be included in the Project (including environmental and social instruments applicable to said activities in accordance with the provisions of Section I.C of this Schedule 2) during the following Fiscal Year, and a proposed financing plan for expenditures required for such activities, setting forth the proposed amounts and proposed percentages and sources of financing.

Sections and Description

Section I.C.3 of Schedule 2 of the Financing Agreement: Without limitation upon the provisions listed in Section I.C.2 of Schedule 2 of the Financing Agreement, if 60 days prior to the Closing Date, the Association determines that there are measures and actions specified in the ESCP which will not be completed by the Closing Date, the Recipient shall: (a) not later than 30 days before the Closing Date, prepare and present to the Association, an action plan satisfactory to the Association on the outstanding measures and actions, including a timetable and budget allocation for such measures and actions (which action plan shall deemed to be considered an amendment of the ESCP); and (b) thereafter, carry out said action plan in accordance with its terms and in a manner acceptable to the Association.

Sections and Description

Section II.C of Schedule 2 of the Financing Agreement: The Recipient shall, not later than four (4) months after the Effective Date, appoint an external auditor with terms of reference acceptable to the Association, and in accordance with the Procurement Regulations.

Conditions

Type	Description
Effectiveness	The Recipient has adopted the Project Implementation Manual in accordance with the provisions of Section I.B.1 of Schedule 2 to the Financing Agreement.
Type	Description
Effectiveness	The Recipient has executed a minimum of 5 Partnership Performance Agreements with CGIAR partners, each in form and substance satisfactory to the Association.

I. STRATEGIC CONTEXT

A. Regional Context

1. **Agriculture remains central to the livelihoods of millions of Africans, yet far too many agriculture-dependent Africans remain food insecure and malnourished.** After a period of moderate improvement, food security throughout the region has recently deteriorated. The number of undernourished people in Africa rose from 195 million in 2006 to 256 million in 2018, and by the end of that period more than 65 million people across 33 African countries faced "crisis" levels of acute food insecurity or worse. The slowdown in productivity growth, combined with increasingly frequent food production failures, point to the need to significantly raise the bar when it comes to increasing the productive capacity and strengthening the resilience of rural households throughout the region. The economic hardship and supply disruptions resulting from the ongoing Coronavirus disease (COVID-19) crisis are expected to further worsen food insecurity in the region, making resilience-building an even more urgent task.

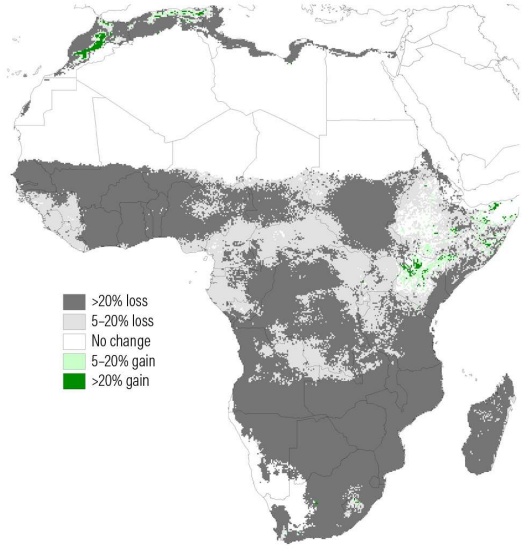
2. **Agriculture is an important livelihood source for women throughout sub-Saharan Africa, and women make up a large share of total agricultural employment.** Women perform many roles in agri-food systems, and while their contribution varies, tasks related to the production, processing, storage, and preparation of food nearly everywhere take up a significant share of their time. Worldwide in developing countries, nearly four out of five women (79 percent) who are economically active report agriculture as their primary source of livelihood.[1] Consistent with this reality, much of the work in agri-food systems is performed by women. A landmark study on the role of women in African agriculture found that in six countries (Ethiopia, Malawi, Niger, Nigeria, Tanzania and Uganda) the female share of labor input into primary agriculture averaged 40 percent.[2] When other post-harvest agricultural activities such as processing and marketing are included, this number increases, sometimes significantly.[3] Time-use surveys that cover all agricultural activities show that women's participation in agriculture in the region is as high as 80 percent in some countries.

3. **In most parts of sub-Saharan Africa, productivity of women farmers consistently lags that of men farmers.** The cost of the gender productivity gap is high: for example, the value of production foregone every year has been estimated at about US$100 million in Malawi, US$105 million in Tanzania, and US$67 million in Uganda.[4, 5] The causes of the gender productivity gap have been amply documented and almost everywhere stem from the fact that women tend to have more limited knowledge than men and less access to land, improved production technologies, inputs such as improved seeds and fertilizer, credit, insurance, and advisory services. Women farmers and livestock keepers in Africa are thus generally less well-informed and less well-resourced, which makes them more vulnerable to shocks that negatively impact farming and livestock keeping activities.

4. **The livelihoods of African farmers and livestock keepers, long known to be vulnerable to the vicissitudes of weather, are being severely impacted by climate change.** Climate impacts have already played a significant role in the declining trend in per capita food production in Africa. Over the 25-year period from 1982 to 2006, annual per capita food production in Africa declined by more than 2.5 percent only twice (1983 and 1992), both times because of El Niño-induced droughts. Since then, production declines of that magnitude have occurred four times (2007, 2009, 2011, 2016), with floods and drought playing a significant role. Climate-related shocks to food production thus have increased in frequency from occurring once every 12.5 years to occurring once every 2.5 years. The increased frequency of climate-induced production shocks has made it increasingly difficult to maintain positive growth in per capita food production over the longer term.

5. **Climate change is projected to increase the number of drought days in Africa and shorten growing seasons.** Droughts, floods, and tropical storms are the climatic events that most affect food production. In Africa, droughts cause more than 80 percent of all damage and losses in agriculture. While there is some uncertainty about the nature of future climate change effects and their impacts on food production systems, current projections should raise significant concern. By 2100, growing seasons in much of Africa could decline by more than 20 percent (Figure 1). In 2018, researchers reported significant increases in periods of prolonged dryness in Africa, including in the Sahelian zone where the frequency of such periods increased by up to 50 percent compared to long-term trends. Substantial increase in drought risk—a major driver of crop and livestock production shortfalls—is projected for large parts of Africa. This at a time when the number of people to feed will almost double by 2050 to over 2 billion.

Figure 1: Length of growing seasons could decline by more than 20 percent in many parts of Africa by 2100.



Source: Thornton et al. (2011)

6. **Climate change poses a serious threat to crop productivity in sub-regions within Africa that are already food insecure**. Significant productivity losses are projected as a result of climate change across Africa, hitting West Africa most severely and affecting the most significant crops for smallholders. While crop yield response to climate warming varies considerably, yield reductions of 8 percent on average are projected for all of Africa by 2050, including yield reductions of 11 to 15 percent on average for West, Central and Southern Africa. The impact is projected to be highest in maize, millet, sorghum, and wheat. Maize, the most widely consumed staple across the region, will be particularly vulnerable. Climate change will also affect productivity in Africa's livestock sector. Depending on the location and prevailing production systems, water scarcity will lower the productivity of pastures, reduce yields of milk and meat, and increase the incidence of diseases. All this will translate into a significant deterioration in food security, if no action is taken.

7. **Climate change impacts differ for women and men.** Women and men are exposed to different climate shocks and experience different impacts related to their gender-differentiated roles, rights, and opportunities.[6] Rural women are at high risk of being negatively affected by climate change, particularly in relation to fetching water and/or collecting fuel for household needs, agricultural activities, and male out-migration for employment. These impacts increase women's workloads and affect family nutrition, as well as children's care and education.[7, 8] Women's nutrition levels are also affected: for example, when climate shocks reduce food access, women tend to eat less to reserve food for the rest of the family.[9] In many cases, women appear to be less able to adapt to climate change. Gender inequalities in access to and control over resources, technology, and information restrict women's ability to act on and implement climate adaptation practices in agriculture.[10, 11, 12, 13, 14]

8. **Climate-smart agriculture (CSA) options can provide important benefits for farmers, especially women**. Most obviously these benefits come in the form of increased production and incomes from the adoption of improved varieties, labor-reducing technologies and climate-smart production practices.[15, 16, 17, 18] The gender gap in agriculture is magnified as a result of climate change: women take on more agricultural

work as men migrate for labor, they have less access to agricultural resources such as land, climate information services (CIS), extension services and inputs with which to adapt to variability and change, gendered social norms and roles inhibit their adaptive capacity, and they are absent from decision making at community, national and global levels.[19, 20, 21, 22] When they do have access to information and the resources to implement CSA, they are often just as likely as men to adopt and can experience increased empowerment in the process.[23, 24, 25]

9. **CIS can be a critical means of resilience-building for farmers, including women.** However, women and men can face different challenges and may not have the same opportunities when seeking to access climate-related information, use it to improve farm management, and benefit from those improved management decisions.[26] Efforts to improve the provision of CIS therefore must include actions designed to meet women's special climate information needs. Ensuring that CIS are gender-responsive requires inclusion of women's groups and networks in communication channels and in the development of information and communication technologies (ICTs) that respond to women's preferences and needs. Attention must be focused as well on working with civil society organizations and local groups to address norms that may be constraining women's access to CIS.

10. **The ambition of many African governments to improve food security, nationally and at household level, is in danger of not being met.** The 2014 Malabo Declaration, signed by African Union (AU) member states, set ambitious 2025 targets to end hunger, double agricultural productivity, halve post-harvest losses, and sustain agricultural GDP growth of at least 6 percent per year. The region is not on track to meet these targets, and it will be difficult to make sustained progress in the face of large periodic climate-induced production shocks.

11. **Strengthening the productivity and resilience of African agriculture will depend critically on the ability of governments and their partners to bring science and innovation to the forefront of the development agenda.** Urgent action is needed to improve climate adaptation of Africa's food systems. Incentives, knowledge, science, and finance will all need to play a role, together with increased co-ordination among development partners, to improve the climate resilience of production systems, build efficient value chains, facilitate internal and external trade, and boost the purchasing power of the most vulnerable households. As countries contemplate a shift towards climate-smart investments, investing in agricultural research is more critical than ever. The high returns to investment in agricultural research and innovation are well documented, and a large body of robust empirical evidence shows that such investment is very effective at reducing poverty and hunger.

12. **The urgent need to mobilize science and innovation for the benefit of agricultural development efforts is strongly emphasized under the Africa Food Security Leadership Dialogue (AFSLD),** a multi-partner initiative formed to deal with the problem of hunger and vulnerability to climate change on the African Continent. Launched in Kigali in August 2019 by the World Bank in partnership with the African Union Commission (AUC) and other development partners including Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD) and African Development Bank (AfDB), AFSLD seeks to galvanize action and mobilize financing to address Africa's food security challenges. The consensus view that emerged from AFSLD—articulated in the Kigali Communique on joint action against hunger in the face of climate change—stresses the importance of implementing policies to promote climate-smart agriculture, supported by investments, and backed by high-quality research. Signatories to the Communique confirmed their commitment to leveraging science in service of a more productive and climate-resilient agriculture and to creating incentives for the private sector to invest in climate-smart agriculture and food systems that meet the dietary needs of the region's growing population.

13. **In recognition of the critical role played by science and innovation in enabling the adaptation of African agriculture to climate change, the World Bank recently announced an increase in support to CGIAR.**[a] At the Climate Action Summit that took place during the United Nations (UN) General Assembly held in September 2019, President Malpass announced an increase in support to CGIAR. While the CGIAR system has in the past received direct grants from the World Bank, the unprecedented decision to use IDA financing to support CGIAR reflects the World Bank's strong commitment to step up support to CGIAR despite a constrained budget environment. The incremental financing presents a unique opportunity to support a critical component of the CGIAR program for the benefit of millions of poor households in IDA countries whose livelihoods depend on agriculture.

14. **The World Bank's increased support for CGIAR comes at a critical time, when the COVID-19 pandemic is further threatening food security throughout the region and undermining the livelihoods of millions of agriculture-dependent households.** In Africa as elsewhere, the impacts of COVID-19 are being felt both on the demand side (for example, in terms of reduced incomes and eroded food security) as well as on the supply side (for example, in terms of higher input costs, reduced labor supplies, and disrupted value chains). The direct impacts of the COVID-19 pandemic on African agri-food systems are being compounded by gathering macro-level forces. These forces will manifest differently depending on a country's net trade position. For net food importers, increases in international food prices or global supply disruptions will mean rising costs and could lead to food shortages. For net food exporters, currency devaluations and rising international food prices could boost export earnings, but only if foreign demand is sustained and logistics disruptions do not impede trade flows. Significantly, these effects do not occur in a vacuum; they interact with many other forces, including declining oil prices, plummeting demand for commodities, pronounced exchange rate movements, rising liquidity constraints, sporadic droughts and floods, and persistent political challenges. Going forward, efforts will be needed to increase domestic food production throughout the region and make food supply chains more resilient to the threat of pandemics, by promoting innovation at all levels and building additional capacity to manage pests and diseases while monitoring the health and safety of food. CGIAR will be at the forefront of these efforts.

15. **Increased support for CGIAR presents an opportunity to tackle another important gender gap, namely, the fact that women are underrepresented in agricultural research, including research targeting climate change.** The potential of women to contribute to climate change solutions and influence policy extends to the organizations devoted to the generation and diffusion of climate-relevant innovations. While generally the participation of women in agricultural sciences is increasing in most regions of the world,[27] women remain the minority in many international and national organizations devoted to agricultural research, including CGIAR Centers, regional and national research institutes, and universities. Furthermore, gender is not well integrated into climate change policy at national or global levels.[28, 29, 30] Driving and supporting women's participation in higher levels of research and in positions to influence and drive policy are key to sustaining gender-sensitive agricultural and climate policies nationally and globally.

[a] CGIAR, formerly the Consultative Group for International Agricultural Research, is a global partnership that unites international organizations engaged in research for development to reduce rural poverty, increase food security, improve human health and nutrition, and promote sustainable management of natural resources. The term CGIAR remains in use, but it is no longer an acronym because the longer name has officially been dropped.

B. Sectoral and Institutional Context

16. **The CGIAR Research Program (CRP) on Climate Change, Agriculture, and Food Security (CCAFS) is at the forefront of fostering climate adaptation in agriculture and food systems.** The over-arching objectives of CCAFS are: (i) to identify and test pro-poor climate change adaptation and mitigation practices, technologies and policies for food systems, adaptive capacity and rural livelihoods; and (ii) to provide diagnosis and analysis that will ensure cost effective investments, the inclusion of agriculture in climate change policies, and the inclusion of climate issues in agricultural policies, from the sub-national to the global level in a way that brings benefits to the rural poor. CCAFS has been approved for funding by the CGIAR System Council based on its relevance to CGIAR system-wide objectives, its compelling theory of change, its clearly articulated results framework, and its robust monitoring systems. CCAFS is being implemented by a consortium of CGIAR and non-CGIAR partners, under the leadership of the International Center for Tropical Agriculture (CIAT).[b]

17. **CCAFS activities in Africa are focused on enhancing climate resilience, but the level of funding is inadequate.** During 2017-2019, nearly one-half (48 percent) of the total CCAFS budget of US$160 million went to support work in Africa, including 26 percent allocated to CCAFS programs in West Africa and 22 percent allocated to CCAFS programs in East Africa. CCAFS has an approved expenditure framework, but shortfalls in expected donor financing have resulted in significant funding gaps that threaten the achievement of some critical results. Moreover, since CCAFS was approved in 2018, new evidence has emerged (for example, IPCC's 2018 report *Global Warming of 1.5°C*) which makes clear that the level of ambition to promote climate adaptation must increase dramatically.

18. **The Accelerating Impacts of CGIAR Climate Research for Africa Project (AICCRA), working through CCAFS, will help make the products of cutting-edge CGIAR-led science available throughout Africa.** The Project will support strategic CCAFS programs and activities that are targeted specifically to Africa, promoting resilience to climate change and improved food security in the region (Figure 2). It will support critical knowledge creation and capacity building activities and enhance the ability of regional and national-level stakeholders to improve access to CIS and effectively promote uptake of CSA innovations. It will foster CCAFS-mediated partnerships among and between CGIAR Centers and African research institutions, universities, extension agencies, civil society organizations, farmer organizations, and the private sector. Targeting sub-regions within Africa that are extremely vulnerable to climate change, the Project will also support on-the-ground activities in selected countries in Western, Eastern and Southern Africa where CGIAR-led science has the greatest chance of success in delivering catalytic results, which can be adopted by other countries in the region.

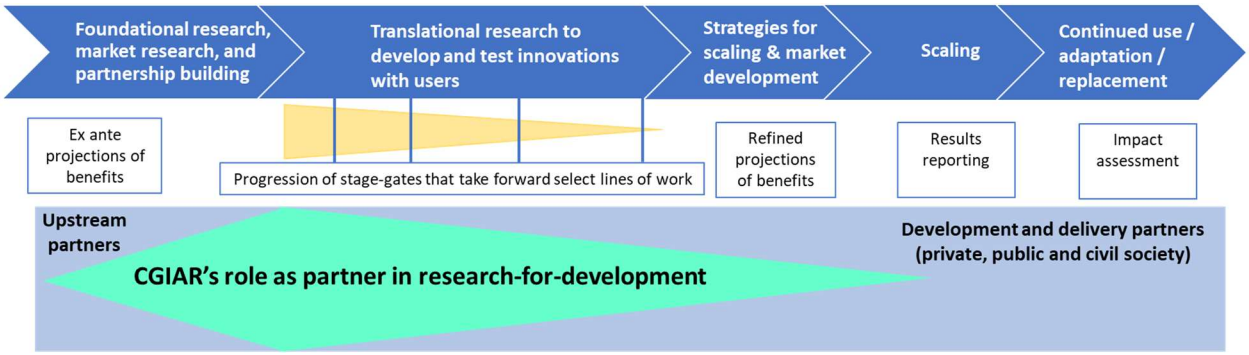
19. **AICCRA can play a vital catalytic role in strengthening the agriculture research architecture in Africa.** CGIAR-led innovations with proven capacity to improve productivity and enhance resilience sometimes

[b] CIAT is part of the Alliance Bioversity CIAT through the Partnership Agreement between the two international Centers, in force since January 1, 2020, having a director general and a common board of trustees as part of its governance structure. The Alliance delivers research-based solutions that harness agricultural biodiversity and sustainably transform food systems to improve people's lives. Alliance solutions address the global crises of malnutrition, climate change, biodiversity loss, and environmental degradation. The Alliance is part of CGIAR, a global research partnership for a food-secure future.

fail to make their way to end users because of breakdowns in the transmission pipeline. Before innovations resulting from research done by CGIAR and partners can be taken up by farmers and livestock keepers, they must be field tested under local conditions and sometimes further adapted to fit local circumstances. Because this stage in the transmission process has traditionally been underfunded, many promising CGIAR-led innovations continue to languish on the shelf.

20. **AICCRA is ideally placed to fill the "missing middle" between upstream research partners and downstream development and delivery partners**. At present, regional and national programs in Africa have difficulty engaging with CGIAR in a systematic way, and what is happening now is done in an ad hoc manner. A major obstacle is the absence of resources to support interactions between CGIAR Centers on the one hand (funded mainly by international donors) and regional and national programs on the other hand (funded mainly by African governments). New sources of flexible funding are needed to facilitate the engagement between CGIAR and regional and national programs in Africa, to ensure that cutting edge science produced by CGIAR researchers working with their partners can reach the intended beneficiaries—mainly farmers and livestock keepers.

Figure 2. Role of CGIAR in research-to-development continuum



21. **CIAT as the Lead Center responsible for implementing CCAFS will be the Recipient of a regional IDA grant.** CIAT operates as an international agricultural research center within the CGIAR system with the mandate to carry out research on problems of tropical agriculture for the benefit of developing countries. Since CIAT is an international organization and not a regional organization, a Board waiver is required under the IDA Regional Window. In the case of non-CGIAR partners, such as universities, national agricultural research organizations, private firms and non-governmental organizations (NGOs), due diligence will be exercised to ascertain that they are working for the benefit of IDA eligible countries.

22. **Activities financed under AICCRA will be implemented by a broad coalition of CCAFS partners working at regional, sub-regional, and national level.** CGIAR partners are expected to include the Africa Rice Center (AfricaRice), the International Maize and Wheat Improvement Center (*Centro Internacional de Mejoramiento de Maíz y Trigo,* CIMMYT), the International Center for Agriculture Research in the Dry Areas (ICARDA), the International Center for Research on Agro-Forestry (ICRAF), the International Center for Research on the Semi-Arid Tropics (ICRISAT), the International Food Policy Research Institute (IFPRI), the International Institute for Tropical Agriculture (IITA), the International Livestock Research Institute (ILRI), the International Water Management Institute (IWMI), and WorldFish. Non-CGIAR partners involved in the implementation of AICCRA are expected to include, inter alia, the International Research Institute for Climate and Society (IRI), the West and Central Africa Council for Agricultural Research and Development (CORAF), the Association for Strengthening Agricultural Research in Eastern and Central

Africa (ASARECA), the AGRHYMET Regional Center (*Centre Régional d'Agro-Hydro-Météorologie*, AGRHYMET), and the Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Center (ICPAC).

23. **AICCRA will support CCAFS programs in three agro-ecological zones in Africa that are among the most vulnerable in the world to the impacts of climate change**: the Western Africa and Sahelian drylands, the Eastern Africa dry(low)lands to highlands, and the Southern Africa drylands. Focusing initially on a set of anchor countries (Ethiopia, Ghana, Kenya, Mali, Senegal, and Zambia), the Project will strengthen systemic capacity to promote climate adaptation in agriculture and promote dissemination of the results of CGIAR climate research throughout those three zones. The anchor countries were selected by CCAFS, based on the existence of strong established links between CGIAR institutions and local counterparts and demonstrated successful collaboration through ongoing programs of CCAFS.

24. **AICCRA investments will be concentrated in six anchor countries: Ethiopia, Ghana, Kenya, Mali, Senegal, and Zambia.** In all six countries, agriculture employs a majority of the population and generates one-third or more of GDP. Increasing agricultural productivity can be a key driver to create employment, reduce poverty and malnutrition, and promote agricultural growth. All six countries are vulnerable to climate change, as manifested in increasing unpredictability in the timing and amount of seasonal rainfall, increasing variability in temperature, and rising incidence of severe outbreaks of pests and diseases. These factors can precipitate sharp declines in agricultural productivity and production, with subsequent negative impacts on food and nutrition security, human and animal health, and rural employment. In extreme cases, these effects can precipitate conflict over resources, force migration, contribute to economic decline, and spark political turmoil. All six anchor countries recognize the grave threats posed by climate change and have committed to helping farmers and livestock keepers build resilience and adapt through the use of CIS tools and CSA technologies and practices.

25. **Concentrating AICCRA investments in the six anchor countries is strategic, for at least four reasons.** First, based on their recognition of the threats posed by climate change, all six countries have made strong political commitments to adapting their agricultural systems to thrive in the face of climate change, and they have backed their political commitments with financial commitments. Second, all six counties have relatively strong institutional capacity, although further strengthening is needed to meet the challenges posed by climate change. Third, all six countries have mainstreamed CCAFS and CGIAR science into their national agricultural plans and programs, and all have expressed interest in continuing their already strong collaboration with CCAFS to further leverage CGIAR science. Fourth, national organizations in all six countries are active members of regional networks and institutions critical for harmonized regional planning and implementation.

26. **AICCRA-supported activities will generate benefits in the six anchor countries and beyond.** Because AICCRA investments will be concentrated primarily in the six anchor countries, IDA resources will flow to CCAFS national program partners in those countries, allowing them to strengthen their capacity and expand their work programs. But the benefits generated by AICCRA will not stop there. To varying degrees the agro-ecologies in the six anchor countries are shared by neighboring countries, so innovations resulting from AICCRA investments made in the six anchor countries are likely to generate spillover benefits in other countries—this in fact is a major reason for adopting a regional approach. To ensure compliance with IDA policies, AICCRA will not finance activities in countries that do not qualify for IDA funding (either IBRD countries or countries in arrears with respect to IDA repayment).

27. **AICCRA will strengthen the national and regional institutions in Africa responsible for facilitating the scale up of climate-smart innovations in agriculture.** The CCAFS work program was developed following

extensive consultations between CGIAR Centers and African institutions involved in promoting innovation at regional and national level, as documented in AICCRA's Stakeholder Engagement Plan (SEP). Ongoing CCAFS programs to which AICCRA will add value thus reflect the needs and priorities of national authorities as well as local stakeholders. AICCRA will capitalize on the strong research partnerships that have been created under CCAFS with agriculture research institutes, extension services, meteorology organizations and universities at the regional and national levels in Africa. AICCRA will take advantage of these existing research partnerships to support the generation of new knowledge and increase access to information, decision-making tools, and CSA technologies within those local institutions.

28. **AICCRA will build local capacity to promote innovation in agriculture by engaging with Africa's regional economic communities (RECs) and their associated regional agricultural research networks.** The RECs with which CCAFS will closely engage include Economic Community of West African States (ECOWAS) (West Africa), IGAD (Horn of Africa), Eastern and Southern Africa (COMESA), and Southern Africa Development Community (SADC). Their associated regional agricultural research networks are CORAF (West Africa), ASARECA (East Africa), and Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) (Southern Africa). In West Africa, ECOWAS has worked for more than 20 years to harmonize the region's approach to agricultural development, most recently by enacting the 2016-2025 Regional Economic Policy of West Africa (ECOWAP), which includes the West African Alliance for Climate-smart Agriculture (WAACSA). CORAF collaborates with 23 countries in West and Central Africa including the Sahel. It has established nine research hubs (Regional Centers of Excellence - RCEs), each focused on a major crop, and it is implementing a major integrated program, the West Africa Agricultural Productivity Program (WAAPP), aimed at accelerating the uptake of improved technologies in participating countries. In the Horn of Africa, IGAD has established the IGAD ICPAC, with the goal of providing climate monitoring and prediction services to mitigate the impact of extreme events in member countries. In eastern Africa, ASARECA is seeking to deliver targeted high priority inclusive and sustainable agricultural transformation and development outcomes and impacts, while CCARDSA has a similar goal in southern Africa.

29. **Ensuring that women can benefit from CSA technologies and CIS will be a focus of AICCRA's gender strategy.** Strategies and approaches can include gender analysis of CSA-related value chains targeted under the Project, as well as technologies targeted to women's agricultural tasks and workloads, participatory methods and diagnostic studies to select practices, technologies and services that meet women's priorities; and women-targeted capacity development workshops.[31, 32] The CSA Rapid Appraisal is a situational analysis tool that integrates gender and youth in a mixed participatory approach.[33, 34, 35] The Project will place strong emphasis on promoting women's access to and benefits from climate finance to support their adoption of CIS and CSA technologies.

C. Relevance to Higher Level Objectives

30. **AICCRA is well aligned with World Bank regional strategies.** AICCRA will directly support *Pillar 2: Competitiveness and productivity* and *Pillar 4: Resilience to shocks* of the Africa Regional Integration and Cooperation Assistance Strategy (2018-2023) (Report No. 121912-AFR). It will contribute to the World Bank Group Strategy for Fragility, Conflict and Violence 2020–2025 (Report No. 146551), specifically under pillars of engagement *#1 Prevention* and *#3 Transition Out of* Fragility, as well as to the World Bank Group Adaptation and Resilience Action Plan (2018) and the World Bank Africa Climate Business Plan (2018) and New Generation Africa Climate Business Plan (2020). In addition, it will contribute to the activities proposed under World Bank Country Partnership Frameworks for many countries being served in Africa by CCAFS.

31. **AICCRA will build upon the achievements of past and current engagements by the World Bank in Africa.** The design of AICCRA incorporates lessons learned from other World Bank initiatives in the region, including the WAAPPs, the East Africa Agricultural Productivity Program (EAAPP), the Great Green Wall initiative (GGW), and the Sahel Irrigation Initiative Support Project (SIIP), all of which offer important learnings on development, local adaptation, and dissemination of innovations in a wide range of African contexts. AICCRA will benefit as well from the experiences of the Regional Sahel Pastoralism Support Project (PRAPS), which is working to enhance the resilience of pastoralists within the same broader food systems being targeted under AICCRA.

32. **AICCRA will complement and add value to future World Bank lending operations in Africa.** As a follow-up to the commitments made under the AFSLD, the World Bank is preparing a series of lending operations to mobilize cutting-edge science in addressing food security needs in the face of the global climate crisis by promoting the successful adoption of proven technologies on a massive scale. Noteworthy among these are the West Africa Food System Resilience Program (FSRP, P172769) and the Nigeria Agro-Climatic Resilience in Semi-Arid Landscapes (ACRSAL, P175237) Project. FSRP, ACRESAL, and other projects to follow will allow African governments to put in place the policies, programs, and financing needed to promote uptake of transformative innovations at a massive scale, but their success will depend critically on the ability of the participating entities to access the newest and most effective CSA technologies available, especially those generated by CGIAR. AICCRA will complement the next generation of transformational projects and amplify their impacts by filling the missing middle and strengthening the conduit through which the international science generated by CGIAR Centers will reach the regional and national actors who will be poised to support the uptake of innovations at local level.

33. **As a regional project, AICCRA is strategically positioned to fill an important niche in the Word Bank's Africa portfolio and help to advance the regional integration agenda.** By supporting activities that will be implemented in multiple countries through multi-actor networks, AICCRA will be able to leverage and add value to the results of other World Bank-supported activities being pursued at country level, leading to outcomes that cannot be achieved easily, if at all, by engaging with individual partners at country level. On the research supply side, working at regional level justifies investment in infrastructure and personnel at levels that surpass minimum critical mass and allow economies of scale to be captured. On the research demand side, working at regional level facilitates the flow of innovations across national borders and enhances learning effects, increasing the number of adopters and amplifying the benefits.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

34. The Project Development Objective (PDO) is to strengthen the capacity of targeted CCAFS (CGIAR Research Program on Climate Change, Agriculture and Food Security) partners and stakeholders, and to enhance access to climate information services and validated climate-smart agriculture technologies in IDA-eligible countries in Africa.

35. Achievements by the Project will be measured using the following PDO level indicators:[c]

    i. CCAFS partners and stakeholders in the project area are increasingly accessing enhanced CISs and/or validated climate-smart agriculture technologies. (number)

    ii. CCAFS beneficiaries in the project area are increasingly accessing enhanced CISs and/or validated climate-smart agriculture technologies. (number) (disaggregated by gender percent)

    iii. Enhanced CISs and/or validated climate-smart agriculture technologies originating in one SSA country are increasingly being made accessible in other SSA countries. (number)

B. Project Components

36. **AICCRA will focus on filling the "missing middle" by bridging the gap** between the organizations that generate and make available climate knowledge and CSA technologies and the organizations and individuals that take up, re-transmit, or otherwise make use of the climate knowledge and CSA technologies, for the purpose of enhancing the resilience of Africa's agriculture and food systems in the face of climate change. Through support to CCAFS, AICCRA will strengthen the technical, institutional, and human capacity needed to move CGIAR innovations off the shelf, so that with the help of other partners they can achieve impacts at scale in IDA-eligible countries in Africa.

37. **AICCRA will strengthen systemic capacity to monitor climate change in Africa, project the likely impacts of climate change on local agri-food systems, identify improved technologies** that can strengthen the resilience of those systems in the face of climate change, and transfer knowledge about the improved technologies to agri-food system actors. The knowledge, technologies, and decision making tools promoted under AICCRA will be of value not only to productive agents (e.g., farmers, livestock keepers, assemblers, processors, and distributors), but also to the public, private, and civil society organizations that play critical roles in delivering improved technologies to productive agents.

38. **Climate advisories generated through monitoring networks and early warning systems work much better when they flow rapidly and easily into decision support systems and are integrated with input provision.** For that reason, there is a need not only to strengthen monitoring and analytical capacity to make sure systems are in place that can generate timely and relevant climate advisories and early warnings, but also a need to implement policies and reinforce institutions to ensure that those climate advisories and early warnings can be translated into effective preventive actions, for example through changes in the types and amounts of inputs being used, or adjustments in management practices. In addition, decision support systems must be capable of channelling information from service users back to service providers, so that research can become more demand-driven and responsive to local needs.

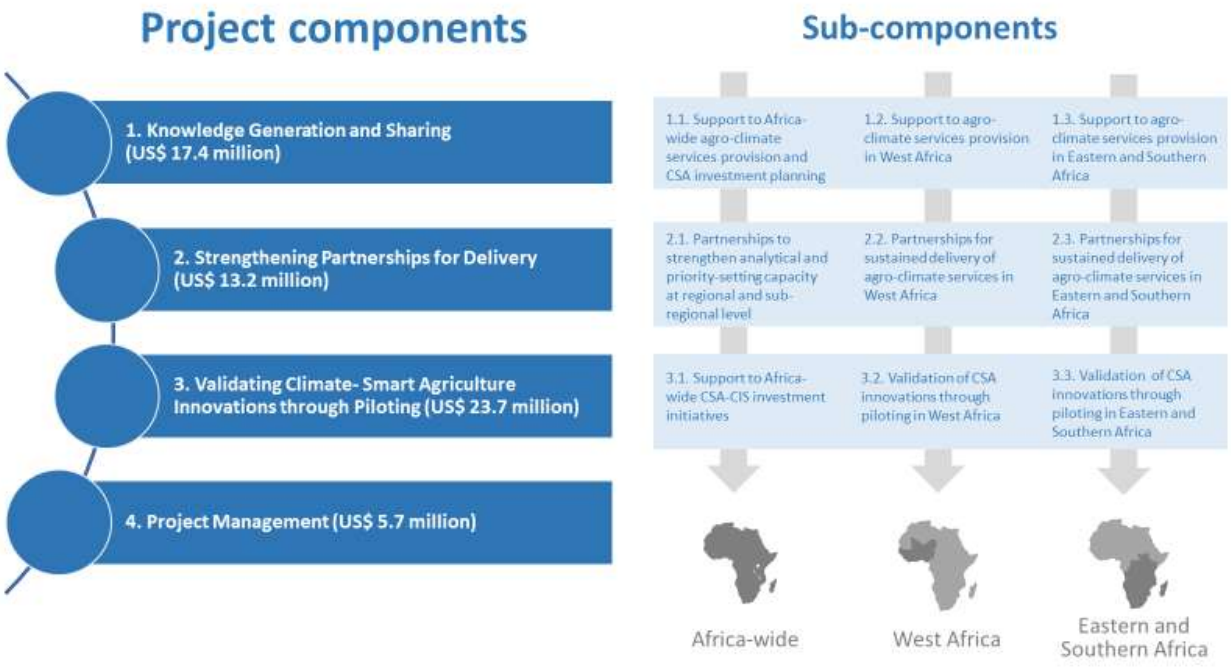
39. **AICCRA will consist of four components—three technical and one for project management.** All activities will be undertaken for the benefit of IDA-eligible countries in Africa. Because implementation arrangements will rely on existing partnerships that have been established under CCAFS, and because different organizations are responsible for providing oversight on CCAFS activities in different geographical areas, each of the technical components is divided into three geographically focused sub-components: (1) Africa-wide (oversight provided by CIAT); (2) West Africa (oversight provided by ICRISAT);

[c] The PIM will contain a detailed methodology of how to track progress on the indicators.

and (3) Eastern and Southern Africa (oversight provided by ILRI). Figure 3 illustrates the various components and their geographical coverage.

40. **Reflecting the partnership model being used for CCAFS, AICCRA-supported activities will be implemented by multiple entities.** The activities to be supported under the Project form part of or are aligned with the larger CCAFS work program that is being implemented by CCAFS Partners under the leadership of CIAT. These will be implemented by the CCAFS Partner that is leading the implementation of the corresponding activity in the larger CCAFS work program to which the AICCRA activity is contributing. Under the shared accountability approach described below, the CCAFS Partners will be accountable to CIAT, the CCAFS Lead Center, and CIAT as the IDA grant recipient in turn will be accountable to the World Bank.

Figure 3. AICCRA Project Design



41. Annex 1 provides a detailed description of the project components and activities, as well as the lead agencies managing the implementation of each cluster of activities. These are shown in Figure 3 and summarized below.

Component 1: Knowledge Generation and Sharing (US$17.4 million)

42. Supporting generation and sharing of knowledge products and tools designed to address critical gaps in the design and provision of agricultural climate services, enable climate-informed investment planning, and contribute to the design of policies to promote uptake of climate smart agriculture (CSA) practices at the regional, sub-regional and national levels, in particular:

- Strengthening provision of Africa-wide agro-climatic services by national agricultural and meteorological agencies and CSA investment planning by national Ministries, Departments and

Agencies (MDAs) and private firms, through: (i) development and participatory assessment of CIS packages; (ii) development of decision support tools (DSTs) for tailoring adaptation of interventions and innovations; (iii) planning, implementation and monitoring of investments in agricultural adaptation to climate change; (iv) carrying out of regionally coordinated economic analyses of CSA options under different climate and socio-economic scenarios and rolling out of public and private sector driven pilots with a view to prioritizing best-bet CSA options for uptake at scale; (v) development of financing models for rollout of prototype CSA and CIS solutions for farmers with private sector engagement (including, inter alia, identification of commercially viable business models, design of appropriate financing mechanisms and delivery channels for accelerating deployment of private capital in low-carbon and climate resilient food systems; and (vi) carrying out of Africa-wide climate, agricultural, environmental, gender and social inclusion policy coherence analyses for regional level CIS and CSA promotion, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

- Supporting provision of agro-climate services in West Africa through: (i) development of agricultural data hubs and decision support systems (such as visualization tools, dissemination systems, partnerships for delivery of early warnings and climate services and climate-informed digital agro-advisories among others); and (ii) strengthening digital climate advisory services through integration of tailored CIS and digital agro-advisories into national extension systems that include weather/climate monitoring, forecast information, and pest/disease risk assessments among others, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

- Supporting provision of agro-climate services in Eastern and Southern Africa through: (i) development of agricultural data hubs and decision support systems (such as visualization tools, dissemination systems, partnerships for delivery of early warnings and climate services and climate-informed digital agro-advisories among others); and (ii) strengthening digital climate advisory services through integration of tailored CIS and digital agro-advisories into national extension systems that include weather/climate monitoring, forecast information, and pest/disease risk assessments among others, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

Component 2: Strengthening Partnerships for Delivery (US$13.2 million)

43. Strengthening the capacities of key regional and national institutions in Sub-Saharan Africa along the research-to-development continuum for anticipating climate effects and accelerating identification, prioritization, and uptake of best-bet adaptive measures, through:

- Strengthening analytical, priority setting and stakeholder engagement capacities of regional and sub-regional institutions through enhancing collaboration among Africa-wide and regional institutions, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

- Strengthening partnerships for sustained delivery and use of agro-climatic services in West Africa, through: (i) strengthening of national meteorological real-time services such as weather monitoring and forecasting, data generation and archiving systems, provision of online high-resolution historical data analyses, downscaling seasonal forecasts and community of early warnings, all with a view to

improving reliability of sub-seasonal and seasonal climate predictions and delivery of real-time information; (ii) strengthening of public institutions and private firms in the three West Africa anchor countries (Ghana, Mali, Senegal) for development of delivery models for climate services; (iii) strengthening of public and private sector next users (such as extension officers, input providers, private sector and the media, among others) for effective adoption and implementation of CSA technologies and practices at scale in various value chains; and (iv) strengthening of existing or development of new national frameworks for climate services (such as national early warning, climate service and agro-advisory delivery models, among others) in the anchor countries, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

- Strengthening partnerships for sustained delivery and use of agro-climatic services in Eastern and Southern Africa, through: (i) strengthening of national meteorological real-time services such as weather monitoring and forecasting, data generation and archiving systems, provision of online high-resolution historical data analyses, downscaling seasonal forecasts and community of early warnings, all with a view to improving reliability of sub-seasonal and seasonal climate predictions and delivery of real-time information; (ii) strengthening of public institutions and private firms in the three Eastern and Southern Africa anchor countries (Ethiopia, Kenya, Zambia) for development of delivery models for climate services; (iii) strengthening of public and private sector next users (such as extension officers, input providers, private sector and the media, among others) for effective adoption and implementation of CSA technologies and practices at scale in various value chains; and (iv) strengthening of existing or development of new national frameworks for climate services (such as national early warning, climate service and agro-advisory delivery models, among others) in respective anchor countries, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

Component 3: Validating Climate-Smart Agriculture Innovations through Piloting (US$23.7 million)

44. Supporting testing and validation (including gender and social inclusion) of CSA technologies in research stations and in farmers' fields; linking of validated CSA technology packages to technology transfer systems; and improving access by farmers and other value chain actors to climate-informed agricultural advisory services so as to inform decision-making about choice of technology and enterprise management, in particular:

- Supporting scaling up of validated CSA-CIS investment initiatives Africa-wide, through: (i) facilitating the identification and leveraging of existing CIS and CSA scalable initiatives (such as climate modeling and early warning systems among others) in the region and continent; (ii) promoting dialogue among stakeholders to secure agreement on common standards and protocols for delivery of climate advisory services at scale; (iii) promoting dissemination of climate research results across the region; and (iv) development of approaches to ensure sustainability of regional and continental initiatives, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.
- Supporting the updating of CSA packages in the three anchor countries in West Africa, through: (i) carrying out assessments of gender, social inclusion and climate-smartness of existing and proposed CSA packages through dialogues with various stakeholders with a view to informing new investments and identifying scaling mechanisms; (ii) dissemination of information on CSA packages and identification of inclusive scaling mechanisms for adoption of best-bet CSA options; (iii) integration of

climate-smart options and tailored CIS advisory systems for specific value chains (such as cereals, legumes, livestock and fish value chains) into tailored climate-informed agro-advisory systems for specific smallholder profiles; and (iv) development and promotion of climate-smart agricultural investment plans including identification of financing options to support scaling of CSA, CIS and agro-advisories, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

- Supporting the updating of CSA packages in the three anchor countries in Eastern and Southern Africa, through: (i) carrying out assessments of gender, social inclusion and climate-smartness of existing and proposed CSA packages through dialogues with various stakeholders with a view to informing new investments and identifying scaling mechanisms; (ii) dissemination of information on CSA packages and identification of inclusive scaling mechanisms for adoption of best-bet CSA options; (iii) integration of climate-smart options and tailored CIS advisory systems for specific value chains (such as cereals, legumes, livestock and fish value chains) into tailored climate-informed agro-advisory systems for specific smallholder profiles; and (iv) development and promotion of climate-smart agricultural investment plans including identification of financing options to support scaling of CSA, CIS and agro-advisories, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose.

Component 4: Project Management (US$5.7 million)

45. Supporting day-to-day implementation, coordination, supervision and overall communication and management (including, procurement, financial management (FM), monitoring and evaluation (M&E), carrying out of audits and reporting) of Project activities and results, all through the provision of goods, consulting services, non-consulting services, Training and Workshops, Operating Costs and payment of Staff Salaries for the purpose of implementing the Project.

Box 1. What will success look like? Illustrative Project results
The AICCRA Results Framework contains a detailed description of expected outputs and outcomes, along with indicators and quantitative targets at regional and national level. To help ground the necessarily concise description of activities presented above, it may be useful to consider some illustrative examples of the types of results that are envisioned.
Forecasting capacity strengthened and well-functioning climate advisory services in place: Awareness is growing of the importance of accurate short-term weather forecasts and timely climate information advisories.[d] Accurate forecasts and timely advisories can help food system actors anticipate and better manage climate risks. CCAFS has been particularly successful at developing tools to facilitate the development of short-term climate forecasts, along with ways of using the forecasts to generate CIS advisories. While the scientific capability to carry out this work exists in a few institutions, it needs to be made available more broadly to the relevant regional and national-

[d] As an example, in West Africa and the Sahel, CORAF's climate change strategy highlights the need for local level analysis that would make it possible to draw up forecast charts that are better adapted to local conditions. Among the activities currently undertaken on climate forecasting, the African Centre of Meteorological Applications for Development (ACMAD), the AGRHYMET and its partners have established seasonal forecasting facilities for the rainy season at the regional level.

Box 1. What will success look like? Illustrative Project results
level entities in Africa. AICCRA will fill this gap, working in coordination with other initiatives and projects, such as FSRP, to take these innovations to scale. By Project closing, accurate and timely advisories will be accessible to large numbers of farmers, livestock keepers, and other food system participants. • *Technical staff at regional institutions (e.g. Centre Régional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle* (Regional Training and Application Center in Agrometeorology and Operational Hydrology, *AGHRYMET and ICPAC) and in national institutions (e.g.,* National Meteorological Services (NMS)) will have access and know how to use state-of-the-art climate forecasting models and DST*s* • *Innovative partnerships will be in place involving collaboration between national partners (e.g. NMS, National Agricultural Research and Extension Service (NARES), National Frameworks for Climate Services (NFCS), private firms (e.g., input providers, ICT companies, media), development agencies, and others, that will support complementary dissemination channels for sustained delivery of climate services* • *Farmer organizations and public and private value chain actors in the selected 6 countries will be trained in the use of climate services and advisories*
Climate-informed knowledge and tools accessible for policy making and program design: AICCRA will support the development and downscaling of agri-meteorological and socio-economic models to the appropriate level and customization for the local context, so that general models developed by CGIAR researchers and partners can be used to address regional, sub-regional and country needs. AICCRA will also support capacity strengthening of policy makers and program administrators in regional organizations (e.g. CORAF, ASARECA) and in national agencies (e.g. NARES, Ministries of Agriculture, other line ministries) involved in the provision of agriculture advisory and extension services. By Project closing, policy makers and program administrators in the targeted countries will have access to climate-informed knowledge and tools needed to inform policy decisions and program design. • *Africa-wide and country-specific maps of areas exposed to risk to climate-change-related hazards* • *Validated adaptation interventions to reduce the risk of high losses in the event of those hazards* • *Quantitative / qualitative analytical methods at relevant scales, for use in priority setting*
Climate-smart agriculture (CSA) technologies validated and available for scaling-up: CGIAR and partners have developed a large repository of CSA options (e.g., drought tolerant crop varieties, improved livestock breeds, crop and livestock management practices, natural resource management practices) that are available for scaling-up, if certain provisions are met, including analysis of cost-effectiveness in local circumstances, fit with socio-economic and cultural settings, reliability of delivery channels, etc. AICCRA will support work to identify and resolve constraints to eventual successful upscaling by customizing the menu of potential solutions to the local context. By Project closing, CSA technologies available on the shelf will be accessible to large numbers of farmers and Livestock keepers in the target area. • CGIAR-developed CSA options will be available for scaling-up after having been tested and assessed for climate-smartness in field trials, as well as having been screened using participatory methods. • Scaling mechanisms for the validated CSA options will be available to policy makers and investors. • Extension officers, input providers, development agents, private sector and media, among other actors, will be trained in the effective use and implementation of prioritized climate-informed CSA options.

C. Project Beneficiaries

46. **Direct Project Beneficiaries** are expected to include two types:

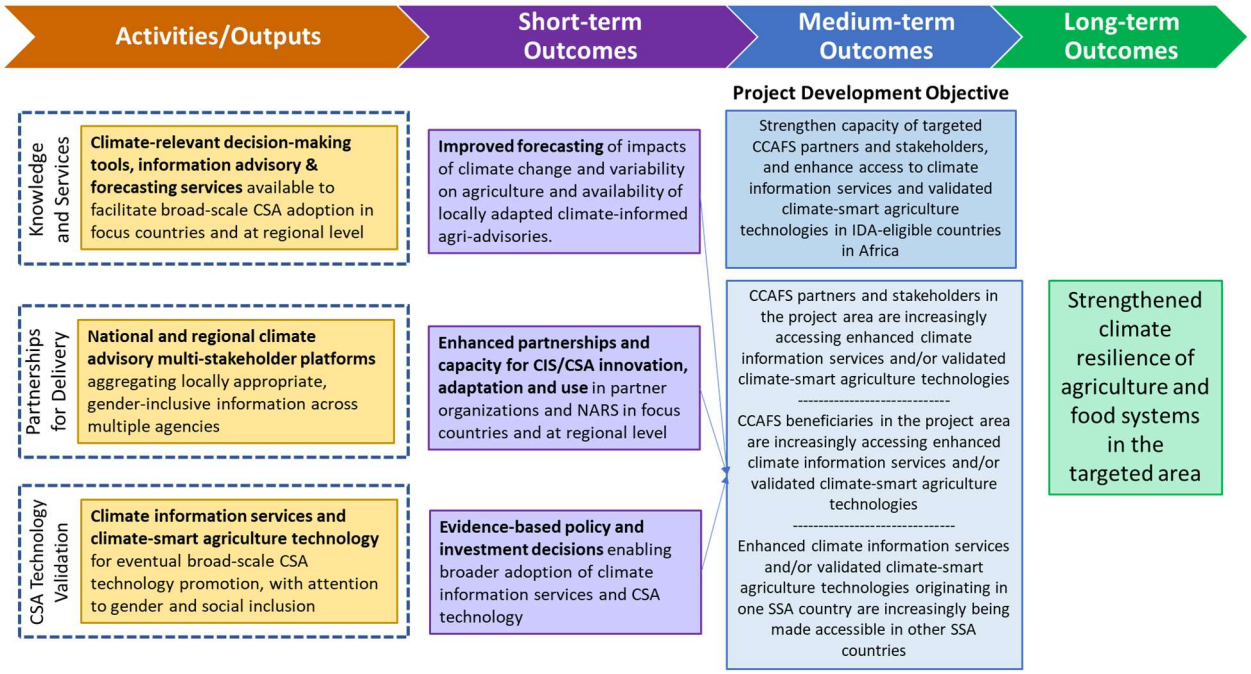
(i) ***CCAFS partners and stakeholders,*** defined as the meteorological services, research institutes, extension agencies, and other organizations supporting innovation that will gain improved capacity to generate and transfer knowledge, decision-making tools, and validated CSA technologies. CCAFS partners and stakeholders targeted by the Project will be located in IDA eligible countries in Africa. They include inter alia:

- CGIAR Centers
- Regional Agricultural Research and Extension Organizations and Partnerships
- Sub-regional Agricultural Research and Extension Organizations and Partnerships
- National Agricultural Research and Extension Organizations and Partnerships

(ii) ***CCAFS beneficiaries***, defined as the universe of organizations and individuals that make use of the knowledge, decision-making tools, and CSA technologies generated and/or transmitted by the Project. CCAFS Beneficiaries will likely be located in AICCRA target countries, as well as in other countries in Africa or beyond that experience spillover benefits.

47. **Indirect Project Beneficiaries** reached during the project implementation period and beyond are expected to include all those benefiting from climate change mitigation effects that can be attributed to AICCRA, which ultimately includes the entire population of the planet.

Figure 4. AICCRA Theory of Change



D. Results Chain / Theory of Change

48. The AICCRA Theory of Change is shown in Figure 4. Activities under Components 1, 2, and 3 will generate Outputs and Short-term Outcomes, which are expected to be measurable by Project closing. The Short-term Outcomes in turn will give rise to Medium-term Outcomes reflected in the PDO, which are also expected to be measurable by Project closing. These Medium-term Outcomes are expected to contribute to Long-term Outcomes that are expected to occur in the years following Project closing, including strengthening the climate resilience of agriculture and food systems in IDA-eligible countries in Africa.

E. Rationale for World Bank Involvement and Role of Partners

49. **Public financing of agricultural research for development is needed to overcome suboptimal levels of private investment.** Profit-motivated private firms have incentives to invest in agricultural research only to the extent that they will be able to capture the benefits flowing from the investment. Their ability to capture the benefits depends mainly on two characteristics of the research products: rivalry and excludability. Rivalry refers to the degree to which consumption by one person of a good or service "uses it up" and therefore precludes use by another person. Excludability refers to the degree of difficulty in preventing consumers who have not paid for a good or service from having access to it. Some products of agricultural research, such as commercial seed and crop chemicals and machinery, have characteristics of rivalry and excludability, and the private sector will be willing to pay for their production (although the public sector often still has some role to play, for example in supporting upstream research having few direct commercial applications, or in establishing the legal and regulatory frameworks needed to allow movement of innovations and protection of intellectual property rights). But other products of agricultural research, such as efficient fertilizer application methods or improved water management practices, have characteristics of non-rivalry and non-excludability, and the private sector will have little incentive to invest in their production. Public financing of the CGIAR Centers, along with regional organizations and national programs, is needed to support production of the second type of goods and services, which attract little interest from the private sector.

50. **Public financing of agricultural research for development is also needed to overcome suboptimal levels of investment at national level.** In Africa as elsewhere, agricultural research funding decisions taken at national level result in chronic underinvestment, because policy makers in individual countries and often also private firms are unlikely to value benefits that are realized in neighboring countries through technology spillovers. Yet the potential for technology spillovers within the region is enormous. Sub-Saharan Africa is characterized by extensive variability in agricultural conditions, but groups of countries within the region share similar agro-ecological zones and production systems, which suggests that there is potential for shared solutions to common problems. Major agro-ecological zones expected to be most affected by climate change include the Sahelian zone of Western Africa, the semi-arid highlands of Eastern Africa, and the semi-arid plateau of Southern Africa. Public financing of the CGIAR Centers, along with regional organizations and national programs, is needed to raise investment to the optimal level factoring in the benefits of technology spillovers.

51. **By delivering on the commitment made by President Malpass at the UN Climate Summit to increase financing to CGIAR, the World Bank will send an important signal that is expected to build confidence among the donor community and lead to increased financial support to CGIAR at a critical time in its history.** Thanks to its historical leadership in advocating on behalf of CGIAR, its long record of financial support, and its unequalled convening power, the World Bank plays an influential role in shaping the

ongoing One CGIAR reform process. In addition, due to its decades of experience promoting agricultural research for development initiatives throughout the region, from a technical point of view the World Bank is well-placed to coordinate the Project's planned activities with existing interventions from development partners, which will lead to synergies and thus enhance the Project's impact.

F. Lessons Learned and Reflected in the Project Design

52. **The project design has benefited from the World Bank Group's extensive experience supporting agricultural research for development efforts, in Africa and worldwide.** An especially important source of information has been the experience gleaned during the past 15 years during the implementation of a series of regional IDA-funded African Agricultural Productivity Programs in Western, Eastern, and Southern Africa. Additional learning has come from lending operations in which IDA grants were directed to regional organizations, rather than sovereign governments, which have been the source of important insights about the special challenges of working with non-sovereign recipients. Finally, design of the implementation arrangements has benefited from lessons learned by CIAT during the time that it has served as Lead Center for CCAFS responsible for overseeing the activities of CCAFS partners.

53. **Lessons learned that have influenced the project design** include the following:

- **CGIAR-led innovations with proven capacity to improve productivity and enhance resilience sometimes fail to make their way to end users because of breakdowns in the transmission pipeline.** Before innovations resulting from research done by CGIAR and partners can be taken up by farmers and livestock keepers, they must be field tested under local conditions and sometimes further adapted to fit local circumstances. Because this stage in the transmission process has traditionally been underfunded, many promising CGIAR-led innovations continue to languish on the shelf. Numerous World Bank-supported projects have demonstrated that targeting investments at the "missing middle" can help fill the gap and greatly enhance the supply of validated innovations made accessible to final users.

- **Digital technologies have the potential to revolutionize the delivery of agricultural advisory services in Africa, but investments in the infrastructure needed to transmit information must be accompanied by investments in knowledge generation needed to ensure meaningful content.** Throughout much of Africa, public agricultural extension services have atrophied, due to their high cost and limited effectiveness. Digital technologies including mobile phones and internet devices have dramatically lowered the cost and increased the reach of advisory services, but agri-food system participants will benefit only if the information and decision-making tools that are available can add value to their agricultural enterprises.

- **Technology generation and technology transfer activities can benefit enormously from regional approaches in Africa.** The relatively small size of many African countries prevents them from capturing economies of scale in agricultural research, and because improved agricultural technologies do not flow easily across national borders, the potential payoffs to research and therefore also the incentives to invest in research are reduced. Using a regional approach to build multi-country partnerships and strengthen regional coordination mechanisms facilitates the mobilization of critical masses of resources while expanding the benefits that can be generated by successful innovations, lowering the costs of innovation and increasing the returns.

- **Building regional partnerships takes time, money, and sustained effort, so it is often advantageous to leverage existing partnerships rather than start from scratch.** CCAFS is being implemented by a

large and diverse consortium of partners that bring together an impressive constellation of skills and experience. Over the course of several years, CCAFS has been able to put in place coordination mechanisms, supported by robust management systems and accountability mechanisms, that allow the partners to collaborate effectively and efficiently. By working through CCAFS existing partnerships and leveraging the successful collaborations already taking place, AICCRA will be able to achieve much greater impact than would have been possible engaging bilaterally with multiple CGIAR Centers.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

54. **The project design and implementation arrangements are intended to address the unique nature of AICCRA as a mechanism to deliver incremental support to CGIAR to accelerate the impacts of its research in Africa.** Neither CGIAR nor CCAFS have legal personalities empowered to receive IDA funding directly, so the IDA funding will be directed to CIAT, which serves as Lead Center for CCAFS. CIAT will act as an apex organization that will on-grant IDA funds via Partnership Performance Agreements (PPAs) to other organizations that are partners in CCAFS, including ICRISAT hosting the regional CCAFS program in Western Africa, and ILRI hosting the regional CCAFS program in Eastern and Southern Africa. Other participating CGIAR Centers are expected to include AfricaRice, CIMMYT, ICRAF, IFPRI, IITA, IWMI, and WorldFish.[e] Figure A1.1 in Annex 1 illustrates AICCRA's institutional and implementation arrangements.

55. **In view of this context, AICCRA is designed as an Investment Project Financing (IPF) for which the fiduciary and safeguards policies will be applied using a 'shared accountability' approach.** CIAT as the IDA grant recipient and Lead Center for CCAFS will be accountable to the World Bank for legal, fiduciary (procurement, FM, and disbursements) and safeguards compliance, with responsibility for fiduciary management and reporting, and safeguards implementation and monitoring delegated to the CGIAR Partners. This will require the CGIAR Partners to strengthen their existing fiduciary and safeguards systems, which in and of itself will be an important outcome of the operation.

56. **The shared accountability approach is justified given the low level of risk posed by AICCRA.** AICCRA is expected to be a low risk project, since the CCAFS activities to be supported by AICCRA are predominantly "soft activities" such as knowledge generation and transfer, capacity building, and technical assistance. A negative list will be used to preclude investment of IDA funds in large-scale works or other activities that could generate significant adverse social or environmental impacts. The overall risk rating for the Project is Moderate.

57. **Under the shared accountability approach, CIAT and the other participating CGIAR Partners will contract with non-CGIAR Partners working at sub-regional or national level to ensure successful implementation of Project-supported activities.** It is expected that Project-supported activities will form part of or be

[e] CCAFS highly values the importance of working with partners to achieve impact. Historically, CCAFS has allocated around 25 percent of its total budget to partners and has learned important lessons from those interactions. Building on this experience, in AICCRA, it is envisioned that around 16 percent of the total budget will be allocated to either regional and national partners through PPAs, service contracts, and in-kind collaboration mostly focused on capacity development, so that knowledge is embedded into these institutions and continuity of activities can be achieved.

aligned with the CCAFS work program that has been reviewed by the CGIAR System Management Office and endorsed by the CGIAR System Council. Many of the non-CGIAR Partners are already known, as they are currently participating in CCAFS. The IDA funds will be used to fill financing gaps in the approved CCAFS work program, as well as scale up CCAFS by extending the scale and coverage of approved activities. As one of the FM eligibility criteria, CCAFS Partners will be required to have in place an FM system that accurately records project transactions and supporting documents. CIAT will reimburse against these records and documents, so the risk of double dipping will be mitigated. A framework will be developed to facilitate the establishment of service contracts with non-CGIAR Partners, which are expected to involve procurement primarily of consultant services, operational costs, and minor quantities of goods and services. Because these contracts will support research partnerships that are already in place, use of direct contracting is justified.

B. Results Monitoring and Evaluation Arrangements

58. **AICCRA will use a robust monitoring, evaluation and learning system that supports evidence-based decision-making, strengthens the culture of results-based project M&E, and encourages social learning.** To further strengthen existing capacity and avoid duplication of effort, AICCRA M&E activities will as much as possible take advantage of and build on the CCAFS M&E system that is already in place. CCAFS currently has an online M&E system that is linked to the overall CCAFS Management Information System (MIS). AICCRA M&E activities will take advantage of the CCAFS MIS, which will be adjusted to guide the processes around M&E, including data and information collection, quality assurance, and harvesting for decision-making and learning. Data and information will be collected along the entire impact pathway, i.e. on inputs, activities, outputs, outcomes, and impacts. The objective will be not only to track achievements against targets, but also to capture unanticipated changes and ensure effective learning and adaptive management, as well as successful implementation overall. Through this approach, a large body of evidence will be compiled and made available for rigorous quantitative and qualitative outcome and impact evaluations to be undertaken to measure outcomes (transformational impacts) at the mid-term review and project closing. The quantitative outcome and impact evaluations will be complemented with qualitative narratives. For details, see Section VII.

59. **CIAT as the CCAFS Lead Center will be responsible for monitoring and reporting on Project indicators and outcomes as defined in the Results Framework.** Overall oversight of the M&E function will be provided by the CCAFS Director who will validate and enrich the M&E process by (i) verifying that the agreed procedures are being followed, and (ii) supporting cross-country learning and knowledge sharing. The CCAFS Regional Coordinating Centers (ILRI and ICRISAT) will designate an M&E focal point in each AICCRA anchor country to support a decentralized M&E process and ensure data are collected closest to the source to assure their quality. ILRI will designate the focal points in Ethiopia, Kenya, and Zambia, and ICRISAT will designate the M&E focal points in Ghana, Mali, and Senegal.

60. **To ensure that gender receives the appropriate level of attention during Project implementation, the performance indicators will be disaggregated where possible using social inclusion criteria,** so that Project outputs and outcomes can be tagged with publicly accepted markers (e.g. World Bank gender tags). In line with the Gender Tag, the Project (i) has identified gaps relevant to the four pillars of the World Bank Group Gender Strategy; (ii) will address these gaps through specific actions supported by the Project; and (iii) will link these actions to indicators included in the Results Framework (RF). Gender expertise is established in the Lead Center and selected partners, to ensure the quality of embedding, documenting and tagging of gender and social inclusion dimensions. Many of the indicators selected for

the Project identify gender and social inclusion dimensions in design, packaging and targeting; and/or are disaggregated by sex. Considered in their entirety, the data collected will provide a picture of transformative change in the way that women use and access CSA and CIS, through CSA value chains, scaling mechanisms, policies that address gender in the context of climate and agriculture, and innovative and inclusive finance approaches.

C. Sustainability

61. **The initiatives being supported by AICCRA are expected to be sustainable because of the growing awareness of the threat posed by climate change and the increasing willingness of the global community including African governments to invest in climate adaptation and mitigation measures.** For more than 50 years, the global community of nations through their development agencies and philanthropical foundations have supported the work of CGIAR, in recognition of its unique ability to mobilize cutting-edge science in service of tackling major food and nutrition challenges. Addressing climate change is currently the leading priority for CGIAR, and CCAFS is the flagship program in the CGIAR's portfolio. Ongoing efforts being led by the World Bank and other partners to reform the CGIAR are expected to further strengthen confidence of funders and lead to increased financial support that will extend for many years the already long record of success.

62. **The strong commitment of the global development community to support work on climate change is mirrored at regional level in Sub-Saharan Africa as well as within the many African countries.** All of the African RECs and the vast majority of African governments in recent years have recognized the enormity of the threat posed by climate change and responded by introducing policy measures and making supporting investments designed to enhance resilience. Their strong political commitment, backed in many cases by resources, builds confidence that the activities to be supported under AICCRA—generation of knowledge, provision of advisory services, and promotion of CSA technologies—will continue to receive support at regional and national level throughout the region after the Project closes.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic, and Financial Analysis

63. **The benefits of AICCRA need to be considered in the context of the enormous threat posed by climate change to agriculture and food security in Africa**. The three agro-ecological zones on which AICCRA will focus are projected to experience significant temperature increases over the long term. In addition to rising average temperatures, a major source of uncertainty for the region's farmers and pastoralists will be increased variability in rainfall, which will amplify risk throughout the growing season (see Annex 4). Regional-level meteorological and agricultural research organizations in Africa and national-level institutions are aware of the urgent need for relevant short-term forecasts and climate information advisories, in the absence of which productivity in the agriculture sector will be adversely affected, with severe consequences for the millions of people in Africa who depend on agriculture as an important livelihood source.

64. **AICCRA is expected to generate a diverse set of benefits**. By building systemic capacity at continental, regional, and national level to anticipate the impacts of climate change on agriculture and livestock systems, identify CSA technologies developed by CGIAR and partners to mitigate those impacts, and provide advisory services to potential beneficiaries of those CSA technologies, AICCRA will help bridge the

gap between CGIAR-spearheaded scientific innovation and technology and the extension services, with the goal of promoting faster, more widespread adoption of better targeted CSA practices. Over the longer term, when combined with an enabling policy environment and supporting investments, this will contribute to the emergence of more productive and more resilient farming systems in Sub-Saharan Africa. AICCRA is expected to deliver especially positive outcomes for women involved in agricultural research and agriculture sector activities that are vulnerable to the impacts of climate change.

65. **Adoption of CSA technologies has been shown to be profitable at different scales**. At *household level,* a systematic review of the scientific literature showed that many CSA technologies can reduce production risks by up to 48 percent compared with business-as-usual approaches, as well as increasing the economic benefits to farmers by up to 40 percent.[36] The farm-level profitability of adopting CSA practices can vary, however, depending on local context and factors such as the distance to markets and local income inequalities. But a consistent finding is that few farm-level activities produce large benefits when practiced in isolation. There is extensive evidence that combinations of practices out-perform single practices across a variety of regions, agro-ecologies and socio-economic conditions.[37, 38] At *national level*, substantial benefits have been demonstrated as well. Adopting CSA on 25 percent of the area planted to maize and wheat in Ethiopia would increase annual gross domestic product (GDP) by 0.18 percent (US$49.8 million) and reduce the national poverty rate by 0.15 percentage points. Moreover, CSA would be more effective than doubling fertilizer use on the same area.[39]

66. **Benefits from farmers' use of CIS are generally positive, although the evidence is less conclusive**.[40] Evidence on the benefits of using CIS comes in the form of productivity or income benefits elicited through surveys or workshops, willingness to pay studies, field trials, and model-based decision analysis. One economy-wide equilibrium modeling study estimated the GDP gain from widespread adoption of seasonal forecasts across Kenya, Malawi, Mozambique, Tanzania, and Zambia would average US$113 million per year, with a disproportionate benefit going to poorer households.[41] A more recent analysis has estimated a 5 percent gain in GDP resulting from widespread adoption of weather and climate services in Ethiopia. Recent CCAFS work in Rwanda has enabled more than 100,000 farmers to gain access to CISs, through a combination of participatory processes (extension based, and radio listener programs). Relative to control population, the farmers that adopted climate services demonstrated productivity gains of 24 percent or higher, and income gains of 30 percent or higher.[42] In Senegal, CCAFS has implemented CIS through advisory services supported by operational climate information, including seasonal forecasts. Relative to control population, the farmers participating in the climate service have realized up to 20 percent gains in income, deriving from improvements in land preparation, crop choice, planting and harvesting dates, and conservation decisions.[43]

67. **Evaluations documenting impact pathways from agricultural research to poverty reduction, improved nutrition and resilience use a variety of data sources and methodologies**. The evaluation of social and economic benefits of adoption of locally adapted CSA technologies, and the benefits of agro-advisory systems through AICCRA will likely involve statistical analysis of farm household data for the households engaged in Component 3 of the Project. It is realistic to establish a baseline through AICCRA and design the indicators and a monitoring framework for assessing the benefits of improved CSA/CIS technologies. However, technology adoption may occur beyond the 3-year time frame of this project, and it would not be possible to evaluate project performance based on household data that can be collected within the implementation time frame.

68. **Statistical analysis of household data on the adoption of specific CSA innovations** and their correlation with measured outcomes such as farm production, household income, child nutrition and resilience are

common in the literature on evaluation of impacts of agricultural research. These methods can identify linkages between adoption and household-level outcomes and may be particularly relevant for evaluating the economic benefits of AICCRA's Component 3 on promoting CSA technology. Monitoring of the short-term benefits of technology adoption will be built into the AICCRA program (and it is already built into the CCAFS program monitoring).

B. Fiduciary

69. **Under the 'shared accountability' approach, CIAT will serve as the grant recipient and implementing agency, with primary accountability for fiduciary aspects.** FM and procurement arrangements are intended to strengthen capacity among the partners for fiduciary supervision and reporting functions, while leaving final accountability with CIAT.

(i) Financial Management

70. CIAT will have overall responsibility for FM of the Project. The FM arrangements at CIAT are adequate to comply with the minimum requirements under World Bank Policy, Procedure and Directives for IPF operations. Funds will flow from the World Bank to CIAT, which will use a well-defined mechanism to direct funds to CCAFS partner organizations deemed eligible based on specified FM-related criteria. For disbursement purposes, the CCAFS partner organizations will report back their actual expenditures to CIAT for reimbursement. CIAT will have a fiduciary monitoring and enforcement role vis a vis grant recipient. CIAT has experience managing donor funding and already has in place robust FM systems, but CIAT will need an efficient monitoring and enforcement mechanism. The current audits of individual CGIAR Centers will be complemented by an audit of the overall AICCRA program. Enforcement provisions will be described clearly in the project documentation and enshrined in the grant agreement. Recourse mechanisms will include not only the ability to cut off funding, but also the right to conduct audits and carry out fraud investigations in accordance with the World Bank's anti-corruption policy. A Project Implementation Manual (PIM) will be prepared, before project effectiveness, to ensure a common understanding among all CCAFS partners under AICCRA. An FM assessment of CIAT has been undertaken to determine the key risks and mitigation measures to ensure satisfactory FM arrangements.

(ii) Procurement

71. CCAFS is an ongoing program with many established partners, most of whom are uniquely positioned to continue work under the AICCRA framework. Transfers of funds from CIAT to other participating CGIAR Centers are being managed using PPAs that spell out in detail the activities to be supported, procedures to be used for spending funds and ensuring accountability, and other conditions.[f] CIAT and other CGIAR Centers work with other partners at regional and national level; these other partners are contracted as service providers.[g] Because both sets of partners are already engaged and successfully implementing CCAFS activities, CCAFS management anticipates the need for a large number of PPAs and direct contracts, unusual for a regular World Bank-financed IPF project.[h] The proposed approach involving extensive use

[f] The template for the PPAs is included in the PIM.

[g] The arrangements among CCAFS CGIAR partners and CCAFS non-CGIAR partners will be described in the PIM.

[h] Note that contracting under World Bank IPF is subject to procurement regulations which means, for purposes of paragraph 87 of the Appendix to the General Conditions, the "World Bank Procurement Regulations for IPF Borrowers", dated July 2016, revised November 2017 and August 2018.

of direct contracts is acceptable from the standpoint of Procurement. Given the purpose of AICCRA and the existence of established relationships among the CCAFS partners, it is essential that resources flow to specified partners.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

72. The Project is rated Moderate for environmental and social risks and impacts, given that it will support mainly technical assistance-type investments to strengthen the capacity of CGIAR and partners in African countries to develop and implement innovative technical solutions and institutional reform to improve the resilience of agriculture in the face of climate change. Some of the activities to be supported will include agricultural research carried out in research institutions and on farms. The relevant Environmental and Social Standards (ESSs) are: ESS1 (Assessment and Management of Environmental and Social Risks and Impacts); ESS2 (Labor and Working Conditions); ESS3 (Resource Efficiency and Pollution Prevention and Management; ESS4 (Community Health and Safety); and ESS10 (Stakeholder Engagement and Information Disclosure). Among a number of exclusions,[9] the Project will not finance infrastructure works or other activities involving land acquisition leading to economic and physical displacement, adverse impacts on biodiversity and living natural resources, and impacts on cultural heritage. The Project activities will not take place in areas where Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities (IP/SSAHUTLCs) are present. The Project includes an Environmental and Social Risk Management (ESRM) Guide, which provides guidance to CIAT and the other recipients of Grant proceeds for managing environmental and social risks and impacts. Once sites and activities have been finalized, Environmental and Social Management Plans (ESMPs) and Pest Management Plans (PMPs) will be prepared, consulted upon and disclosed. The Project has prepared a SEP (disclosed on October 27, 2020) and Labor Management Procedures (LMP), a draft of which has been prepared and will be disclosed by November 30, 2020; each recipient of Grant proceeds will prepare and implement SEPs and LMPs for their institution.

V. GRIEVANCE REDRESS SERVICES

73. Communities and individuals who believe that they are adversely affected by a World Bank-supported project may submit complaints to existing project-level grievance redress mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Inspection Panel which determines whether harm

[9] See Annex 4 for the list of excluded activities.

occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and World Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit *http://www.worldbank.org/en/projects-operations/ products-and-services/grievance-redress-service*. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

74. **The initial risk ratings for the Project are summarized in datasheet.** Overall Project risk is rated Moderate. The risk ratings assigned during project preparation will be revisited during project implementation to take into account any changes in the context and implementation record.

- **Political and Governance Risk** is rated Moderate, due to the political turmoil and periodic episodes of insecurity that plague several of the target countries. These risks are real, but their incidence is relatively limited considering the regional scope of the Project, which limits their potential to impede achievement of the overall PDO.
- **Macroeconomic Risk** is rated Moderate, due to policy weaknesses in several target countries that are constraining growth, creating fiscal pressures, and inflating debt levels—effects that are likely to be exacerbated by the impacts of the COVID-19 pandemic. These macroeconomic risks are unlikely to impact the Project to any great extent, since the Project will be financed entirely through an IDA grant, with no counterpart funding, and it will support mostly "soft" activities the implementation of which does not depend directly on circumstances in the larger surrounding economy.
- **Sector Strategies and Policies Risk** is rated Moderate due to the continuing underinvestment in agriculture in several of the focus countries, as reflected by the failure to meet the Maputo and Malabo investment targets to which many of the countries committed.
- **Technical Design of Project Risk** is rated Low, because the Project will be part of with the long established and well-performing CCAFS program, which has an established track record of delivering technical results on time and to a high standard of quality.
- **Institutional Capacity for Implementation and Sustainability Risk** is rated Low, because the Project will benefit from many existing partnerships that have already been established under CCAFS, with most activities being carried out by entities with strong implementation capacity. It is recognized that AICCRA will extend beyond the current phase of CCAFS, which is scheduled to end in December 2021 with the completion of the current phase of CGIAR programs and business plans. While this raises the prospect of discontinuity of programmatic focus and management structure, this risk is considered negligible given the strong priority placed by the CGIAR System and its donors on climate change, especially in sub-Saharan Africa. This risk is mitigated by the agreed process to be employed for introducing new CGIAR program modalities based on CRP performance and learning over the past 10 years, which make nearly inconceivable that the next of CGIAR programs and business plans would not include CCAFS-type activities relevant to AICCRA.
- **Fiduciary Risk** is rated Moderate. Risks are arising primarily due to: (i) CIAT's lack of familiarity with World Bank procedures for reporting, disbursement arrangements, and auditing; and (ii) large

amounts of funds disbursed to other CGIAR Centers that are partners in CCAFS. In order to mitigate these risk to the extent possible, the following actions will be implemented: (i) disbursement to participating CGIAR Centers based on reimbursement method where reports/expenditure statements are subject to scrutiny by CIAT before disbursements; (ii) description in the PIM of FM procedures for the Project to be shared with for the participating CGIAR Centers, (iii) inclusion of an FM assessment for the participating CGIAR Centers into the financial evaluation already undertaken by CIAT; (v) inclusion in the internal audit program of CIAT of visits to participating CGIAR Centers; (iv) recruitment of an independent auditor to prepare a single audit report for the Project, including visits to participating CGIAR Centers; (v) leveraging of CIAT's FM systems already in place and CIAT's experience working with donor funding; and (vi) embedding of adequate clauses in the partner grant agreements including clauses relating to indemnity, return of funds, audit rights.

- **Environmental and Social Risks** are rated Moderate. Key risks are related to: waste management, pest management, resource use (including water, soil, energy), Occupational Health and Safety (OHS) and labor issues. The Project has a number of exclusions, including activities that involve land acquisition, restrictions on land use and involuntary resettlement, or adversely affect biodiversity conservation, sustainable management of living resources and cultural heritage. The Project will be implemented mainly in established agricultural research stations and nearby farms. Project activities are not taking place in areas in which Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities are present or have collective attachment to a proposed project area.
- **Stakeholder Risk** is rated Moderate. CCAFS was prepared with the help of an extensive stakeholder consultation process and continues to engage with stakeholders, including by involving them in participatory priority setting, research, and extension activities. Nevertheless, because the number of stakeholders is so large, and because the stakeholders represent many different interests, there is a risk that it will not always be possible to forge a consensus about the relative importance of activities to be financed under AICCRA, which could lead to conflict between stakeholder constituencies that could adversely affect implementation.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Africa
Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

Project Development Objectives(s)

The Project Development Objective is to strengthen the capacity of targeted CCAFS (CGIAR Research Program on Climate Change, Agriculture and Food Security) partners and stakeholders, and to enhance access to climate information services and validated climate-smart agriculture technologies in IDA-eligible countries in Africa.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
Access increased to climate-relevant knowledge, technologies, and decision-making tools						
PDO 1: CCAFS partners and stakeholders in the Project area are increasingly accessing enhanced climate information services and/or validated climate-smart agriculture technologies. (Number)		0.00	10.00	30.00	60.00	60.00
PDO 2: CCAFS beneficiaries in the project area are increasingly accessing enhanced climate information services and/or validated climate-smart agriculture technologies. (Number)		0.00	250,000.00	750,000.00	1,500,000.00	1,500,000.00

Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
PDO 3: Enhanced climate information services and/or validated climate-smart agriculture technologies originating in one SSA country are increasingly being made accessible in other SSA countries. (Number)		0.00	1.00	3.00	6.00	6.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
1. Knowledge Generation and Sharing						
IPI 1.1: Climate-relevant knowledge products, decision-making tools and advisory services created or enhanced including a proportion targeting gender and social inclusion dimensions (Number)		0.00	15.00	45.00	90.00	90.00
IPI 1.2: AICCRA-funded peer-reviewed research papers made available in open access format (Number)		0.00	5.00	16.00	32.00	32.00
IPI 1.3: Satisfaction with the quality and usefulness of climate–relevant knowledge products, decision-making tools and services received under AICCRA expressed by surveyed partners and stakeholders (Percentage)		0.00	75.00	75.00	75.00	75.00

Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
2. Strengthening Partnerships for Delivery						
IPI 2.1: Climate advisory platforms/hubs launched/ strengthened, including their focus on gender and social inclusion (Number)		0.00	1.00	4.00	8.00	8.00
IPI 2.2: Partnerships launched/ strengthened between AICCRA-funded CGIAR and NARS scientists, universities, public sector stakeholders, farmer organizations, NGOs and private sector (Number)		0.00	5.00	18.00	35.00	35.00
IPI 2.3: People engaged in AICCRA-funded capacity development activities (Number)		0.00	500.00	2,000.00	4,000.00	4,000.00
IPI 2.4: Satisfaction with the effectiveness of the partnerships under AICCRA expressed by surveyed partners and stakeholders (Percentage)		0.00	75.00	75.00	75.00	75.00
3. Validating Climate- Smart Agriculture Innovations through Piloting						
IPI 3.1: Validated climate information services and climate-smart agriculture technologies disseminated / made accessible (Number)		0.00	3.00	9.00	18.00	18.00
IPI 3.2: Climate information services and climate-smart agriculture technologies reaching women through customized programs targeting their interests (Number)		0.00	5.00	18.00	36.00	36.00

Indicator Name	PBC	Baseline	Intermediate Targets			End Target
			1	2	3	
IPI 3.3: Use or adaptation of AICCRA-funded climate-relevant knowledge products, decision-making tools and services stated and confirmed by surveyed partners and stakeholders (Percentage)		0.00	2.50	12.50	25.00	25.00
IPI 3.4: Discussions in Africa-wide and regional events informed by AICCRA funded project outputs (Number)		0.00	3.00	10.00	20.00	20.00
IPI 3.5: Policy and investment decisions influenced by engagement and information dissemination by AICCRA funded partnerships and capacity building activities (Number)		0.00	3.00	8.00	15.00	15.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
PDO 1: CCAFS partners and stakeholders in the Project area are increasingly accessing enhanced climate information services and/or validated climate-smart agriculture technologies.	PDO Indicator 1 will monitor the effect of strengthened systemic capacity for different value chains by looking at accessing of CIS and CSA technology	Continuously collected, annually compiled	Website, cell phone, or similar statistics	Statistical analysis of available access data from the different dissemination channels used	CCAFS Partner Centers will report national and regional level data. CIAT Central M&E Unit will aggregate.

	packages by CCAFS partners and stakeholders. CCAFS partners and stakeholders are defined as the meteorological services, research institutes, extension agencies, and other organizations supporting innovation that will gain improved capacity to generate and transfer knowledge, decision-making tools, and validated CSA technologies. CCAFS partners and stakeholders targeted by the Project will be located in IDA eligible countries in SSA. They include inter alia: CGIAR Centers, Regional Agricultural Research and Extension Organizations and Partnerships, Sub-regional Agricultural Research and Extension Organizations and Partnerships, National Agricultural Research and Extension Organizations and Partnerships, Civil Society Organizations, and Private Firms.				

PDO 2: CCAFS beneficiaries in the project area are increasingly accessing enhanced climate information services and/or validated climate-smart agriculture technologies.	CCAFS beneficiaries are defined as the universe of organizations and individuals that access the knowledge, decision-making tools, and CSA technologies generated and/or transmitted by the Project. CCAFS Beneficiaries will likely be located in AICCRA anchor countries, as well as in other countries in Africa or beyond that experience spillover benefits. Access means that there is evidence that the end users were reached and had access to CSA technologies and climate advisories, for example through one of the following: (i) enhanced observatory platform (KAOP) in Kenya; (ii) digital agro-climate advisory system (EDACaS) for Ethiopia; (iii) Esoko Platform in Ghana; (iv) enhanced and downscaled CIS of NMA of	Continuously collected, annually compiled.	Website, cell phone or similar statistics.	Statistical analysis of available access data from the different dissemination channels used.	CCAFS Partner Centers will report national and regional level data. CIAT Central M&E Unit will aggregate.

	Senegal; (v) climate and water storage information services of Zambia; and (vi) climate information products in Mali.				
PDO 3: Enhanced climate information services and/or validated climate-smart agriculture technologies originating in one SSA country are increasingly being made accessible in other SSA countries.	CSA technologies and climate services including aspects of various value chains include, inter alia: (i) Best-bet water-smart and low-carbon CSA technologies that increase water use efficiency while reducing GHG emissions; (ii) Climate-smart crop management technologies with heat, drought or salinity-tolerant varieties to reduce the risk of crop yield reduction or failure; (iii) Climate-smart livestock management systems with improved pasture, grazing land and manure management; (iv) Integrated agroforestry systems involve multipurpose trees and crops that improve soil quality, achieve high rates food production and carbon	Continuously collected, annually compiled.	AICCRA team.	Reported in the form of an outcome impact case report [1] validated through key informant interviews [1] Part of the CGIAR corporate reporting, see https://www.cgiar.org/impact/results-dashboard/	CCAFS Partner Centers will report national and regional level data. CIAT Central M&E Unit will aggregate.

	sequestration; (v) Climate-smart soil management that increase soil organic matter and carbon, fertility, water holding capacity and health, as well as reduce fertilizer loss and GHG emissions; (vi) Downscaled seasonal and sub-seasonal forecasts; (vii) Water storage information services; (viii) Crop loss assessment and early warning systems; (ix) Climate-informed digital agro-advisory systems. Reported in the form of an outcome impact case report validated through key informant interviews.(Outcome impact case reports are part of the CGIAR corporate reporting, see https://www.cgiar.org/impact/results-dashboard/'), complemented where possible by surveys of organizations that make CSA technologies and climate services accessible in SSA countries other than the				

	countries in which they originated. Organizations that can help with this and can be surveyed include the following inter alia: (i) Continental level organizations (e.g., AUC, ACPC, AUDA-NEPAD); (ii) WMO Regional office for Africa; (iii) Regional economic forums (e.g., IGAD, SADC, ECOWAS, COMESA); (iv) Regional climate prediction centers (ICPAC, SADC-CSC, AGRHYMET); (v) Regional agricultural research networks (e.g., ASARECA, CCARDESA, CORAF); (vi) Regional climate forums (e.g., GHACOF, SARCOF, PRESASS); (vii) Regional universities forums for capacity building (e.g., RUFORUM, WASCAL, IWRM); (viii) African Academy of Sciences (AAS); (ix) Regional Centers of Excellence (RCE) in Higher Education; (x) Regional multi-stakeholder platforms and taskforces (e.g. CSA,				

	agro-meteorology); (xi) Donor-funded regional CSA and resilience building projects.				

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
IPI 1.1: Climate-relevant knowledge products, decision-making tools and advisory services created or enhanced including a proportion targeting gender and social inclusion dimensions	Knowledge products are research findings that have been packaged for use by specific identified groups of users. Examples of knowledge products include: (i) Policy briefs discussing opportunities and challenges for CSA in Africa; (ii) CSA national strategy documents, implementation frameworks, and guidelines; (iii) Curricula for training extension professionals and farmer in CIS and CSA; and (iv) Contextualized climate information services that include seasonal and sub-seasonal weather forecasts. Knowledge products may be	Continuously collected, annually compiled	Management Information System	Outputs covering a wide range of different categories including the category of knowledge products are recorded in CGIAR standard repository spaces library systems which are harvestable and linked through an interoperable online web service with the MIS that CCAFS has built and is using.	CIAT Central M&E for aggregation; Lead Centers to report at national and regional level.

	disaggregated to reflect whether or not they address gender and social inclusion dimensions. For example: (i) Policy briefs on CSA in Africa that refer to inclusiveness, and (ii) CSA national strategy documents, frameworks, and guidelines that refer to inclusion of women and other vulerable groups. Decision-making tools bring together different research findings to provide criteria that can be used to make recommendations or take decisions in a given context and value system. Examples of decision-making tools include: (i) Climate-informed digital decision-making tools; (ii) ICT-based dissemination tools including IVR/SMS and Apps; (iii) Integrated ag-data decision support tool development and innovation hubs; (iv) Crop loss assessment and early warning tools; and (v) Real-				

	time emerging disease and pest assessment tools. Decision-making tools may be disaggregated to reflect whether or not they address gender and social inclusion dimensions. For example: (i) Inclusive ICT-based dissemination tools including IVR/SMS and Apps, and (ii) Inclusive iCow ICT-tools for smallholder animal keepers. Advisory services including forecasting systems include: (i) Climate-informed digital ag-advisory tools; and (ii) Tailored climate services and advisory information via iCow ICT-platform; (iii) Downscaled geospatial digital fertilizer application tools to increase fertilizer use efficiency; and (iv) Real-time emerging disease and pest detection tools. Advisory services may be disaggregated to reflect whether or not they address				

	gender and social inclusion dimensions. For example: (i) Inclusive CIS and climate-informed digital ag-advisory tools, and (ii) Gender information integrated in ag-data hubs.				
IPI 1.2: AICCRA-funded peer-reviewed research papers made available in open access format	Number of peer reviewed journal articles published in a calendar year, disaggregated by gender and social inclusion, Open Access status, ISI status.	Collected continually, compiled annuallly	Management Information System	Outputs covering a wide range of different categories including peer reviewed papers are to be recorded in CGIAR standard repository spaces and library systems which are harvestable and linked through an interoperable online web service with the MIS that CCAFS has built and is using.	CIAT Central M&E for aggregation; Lead Centers to report national and regional level.
IPI 1.3: Satisfaction with the quality and usefulness of climate–relevant knowledge products, decision-making tools and services received under AICCRA expressed by surveyed partners and stakeholders	Looking at the quality and usefulness of products, tools and services. This will be done through a survey to capture the level of satisfaction of CCAFS partners and stakeholders. Partners and stakeholders to be surveyed will include	Collected continually, compiled annually.	Partners and engaged stakeholders	Standardized perception survey across the AICCRA focus countries and regions with a mix of quantitative ratings and qualitative open feedback, which allow for national and	CIAT Central M&E for aggregation; Lead Centers to report at national and regional level.

	representatives from the full range of formal partners and engaged stakeholders, to ensure comprehensive coverage and robust validation of the perceived quality and usefulness of climate-relevant knowledge products, decision-making tools, and advisory services generated and made available by AICCRA.			regional specifications with keeping comparability across in sight.	
IPI 2.1: Climate advisory platforms/hubs launched/ strengthened, including their focus on gender and social inclusion	New platforms and hubs launched under AICCRA will be counted. Existing platforms and hubs will be counted when it can be shown they have been strengthened and/or expanded through AICCRA-funded activities. Examples of existing platforms that will likely be the focus of strengthening are: (i) Enhanced and inclusive digital agricultural observatory and iCow ICT-platform (KAOP) in Kenya; (ii) Inclusive national digital agro-climate advisory system (EDACaS) in Ethiopia;	Collected continually, compiled a nnually.	Management Information System		CIAT Central M&E for aggregation; Lead Centers to report at national and regional level.

	(iii) Climate, agriculture and water management platform in Zambia; (iv) Gender mainstreamed Esoko Platform for web-managed, real-time CIS dissemination and feedback using ICTs in Ghana; (v) Climate information and digital ag-advisory hub that integrated gender in Senegal; (vi) Integrated and inclusive climate information and climate-informed ag-advisory platform in Mali; and (vii) Regional early warning and climate information systems.				
IPI 2.2: Partnerships launched/ strengthened between AICCRA-funded CGIAR and NARS scientists, universities, public sector stakeholders, farmer organizations, NGOs and private sector	Partnerships to be counted include formally documented partnerships, as evidenced for example through Memoranda of Understanding (MoUs), Letters of Agreement (LoAs), or contracts, or other documentation of agreed partnership and collaboration efforts.	Collected continually, compiled annually	Management Information System	Evidence and documents of formalization of partnerships are asked for in contracting systems of the Lead Centers, collected and aggregated through the MIS in place	CIAT Central M&E for aggregation; Lead Centers to report at national and regional level.

	Examples include: (i) Letter of agreement between WMO Regional office for Africa and country program lead to enhance and align NFCS with GFCS; (ii) Letters of collaboration with regional climate prediction centers and agricultural research networks, national partners, NGOs, private sector to contextualize and enhance CIS and Ag-advisories in Ethiopia; (iii) CGIAR, SADC-CSC, IRI, NMS, MoA partnership for enhanced NFCS in Zambia; (iv) CGIAR, MoA, NARES, CORAF, private sector partnership on CSAIP in Mali; (v) CGIAR, NMS, ESOKO for scaling CIS via private sector ICT platform in Ghana; (vi) CGIAR RUFORUM, ACE partnership to build capacity on CSA in Ethiopia; (vii) CGIAR, WMO, ICPAC, AGN in Kenya for articulating Africa's position in at COP; (viii) CGIAR, ICPAC, SADC-CSC, AGRHYMET regional				

	partnership for cross-region spill over and south-south knowledge exchange on CIS; (ix) CGIAR, Green Dream Technology, Safaricom partnership to increase awareness about and to enhance the effectiveness and reach of the iCow ICT-platform for disseminating climate services and advisories to livestock keepers in Kenya.				
IPI 2.3: People engaged in AICCRA-funded capacity development activities	People participating are those who come into direct contact with the AICCRA-funded activities, including activities carried out by formal partners (see IPI 2.2). This includes individuals who receive technical assistance or participate in training events (one-off, long-term training courses, placement, training visits, knowledge exchange, co-creation events). Disaggregated by gender, type of person (e.g., researcher advisory service provider), and type of	Collected continually ; compiled annually	Participants	Using a set of standards for capacity building activities, like a training needs analysis, knowledge, attitude, skills and practice (KASP) survey before and after, or end-of-activity/ 6-months after follow-up evaluation	CIAT Central M&E for aggregation; Lead Centers to report national and regional level.

	capacity development activity (e.g. research position, post-docs, graduates program, workshop targeted at women), Types of participants to be counted may include the following: (i) Administrators (includes CGIAR and non-CGIAR administrative staff, non-research support staff, board members, directors); (ii) Policy Makers (includes politicians, government representatives, representatives from institutions with policy-making capacity); (iii) Researchers (includes both CGIAR and non-CGIAR researchers, including partner researchers and visiting researchers such as interns, MScs, PhDs, or researchers on sabbatical); (iv) Consumers (includes those of goods and services at the final point of consumption), (v) Funders (includes funders of all				

	types, including government representatives participating in activities as funders); (vi) Visitors/ Students (includes those visiting in a non-research capacity. For example student tour groups, alumni, community members); and (vii) Farmers/ Producers (includes farmers, processors, agri-business people, and smallholder community members).				
IPI 2.4: Satisfaction with the effectiveness of the partnerships under AICCRA expressed by surveyed partners and stakeholders	CCAFS partners will be surveyed to assess their perceptions of the effectiveness of AICCRA-funded partnerships (see IPI 2.2) along multiple dimensions: (i) partnership vision; (ii) institutional leadership; (iii) joint ownership and accountability for results; (iv) communication and collaboration; (v) system alignment, integration, and sustainability; and (vi) response to local context, and some defined criteria	Annuallly	Partners and engaged stakeholders	Standardized perception survey across the partners, engaged stakeholders, countries and regions with a mix of quantitative ratings and qualitative open feedback, which allow for national and regional specifications with keeping comparability across in sight. https://www.wallacefoundation.org/knowledge-	CIAT Central M&E for aggregation; Lead Centers to conduct at national and regional level.

	for each dimension. Partnerships will be placed along a Partnership Effectiveness Continuum (PEC) depending on whether they meet all, most, some, or few of the identified criteria.			center/Documents/Quality-Measures-Partnership-Effectiveness-Continuum.pd	
IPI 3.1: Validated climate information services and climate-smart agriculture technologies disseminated / made accessible	Validated climate information services and climate-smart agriculture technologies (see PDO 2) are proactively shared and made accessible following Findable, Accessible, Interoperable and Reusable (FAIR) principles. Examples include: (i) Integrated CSA technologies accessed by national and sub-national public and private sector extension service provider in Ghana; (ii) CIS accessed by NARES researchers and MoA development agents in Ethiopia; (iii) Water storage information services accessed by both crop and livestock NARES researchers	Collected continuously; compiled annually	Project teams	Continuous reporting into the management information system (MIS)	CIAT Central M&E for aggregation; Lead Centers to report national and regional level.

	and MoA extension agents in Zambia; (iv) Early warning system accessed by NARES researchers and MoA extension agents in Kenya; (v) Climate-informed agro-advisory system accessed NARES researchers in Mali; and (vi) Best-bet CSA packages accessed by NARES researchers and MoA extension agents in Senegal.				
IPI 3.2: Climate information services and climate-smart agriculture technologies reaching women through customized programs targeting their interests	Examples of what would be counted as CIS and CSA technologies include: (i) CSA technology package developed or enhanced for major crop value chains for Ethiopia; (ii) Enhanced digital agricultural observatory platform (KAOP) for Kenya; (iii) National digital agro-climate advisory system (EDACaS) for Ethiopia; (iv) Climate smart livestock systems mainstreamed via large-scale investment projects in Kenya; (v) Real-time weather monitoring system put in place for Ghana; (vi)	Collected continuously, compiled annually	Project teams	Continuous reporting into the management information system (MIS)	CIAT Central M&E for aggregation; Lead Centers to report at national and regional level.

	NextGen weather forecasting system installed for Zambia; (vii) PICSA effectively implementation in Mali; (viii) Climate smart water management system put in place for Zambia; (ix) Enhanced national meteorological services data archiving and generation systems for Senegal; and (x) Web-managed, real-time CIS dissemination and feedback gathering system using ICTs (Esoko Platform) for Ghana.				
IPI 3.3: Use or adaptation of AICCRA-funded climate-relevant knowledge products, decision-making tools and services stated and confirmed by surveyed partners and stakeholders	Evidencing use or adaptation of AICCRA funded climate-relevant knowledge products, decision-making tools and services	Annually	Partners and involved stakeholders	Standardized survey across the partners, engaged stakeholders, countries and regions with a mix of quantitative ratings and qualitative open feedback, which allow for national and regional specifications with keeping comparability across in sight.	CIAT Central M&E for aggregation; Lead Centers to report national and regional level.
IPI 3.4: Discussions in Africa-wide and	AICCRA-funded attributable	Collected	Project team	Continuous reporting	CIAT Central M&E for

regional events informed by AICCRA funded project outputs	contributions to Africa-wide and regional events. Examples might include: (i) Awareness creation and discussion with continental level organizations (e.g., AUC, ACPC, AUDA-NEPAD); (ii) Awareness creation and discussion with WMO Regional office for Africa; (iii) Awareness creation and discussion with regional economic forums (e.g., IGAD, SADC, ECOWAS, COMESA); (iv) Awareness creation and discussion with regional climate prediction centers (ICPAC, SADC-CSC, AGRHYMET); (v) Awareness creation and discussion with regional agricultural research networks (e.g., ASARECA, CCARDESA, CORAF); (vi) Awareness creation and discussion with Regional climate forums (e.g., GHACOF, SARCOF, PRESASS); (vii) Awareness creation and discussion with regional universities forums for capacity building (e.g.,	continually, compiled annually		into the management information system (MIS)	aggregation; Lead Centers to report at national and regional level.

	RUFORUM, WASCAL, IWRM), African Academy of Sciences (AAS) and Regional Centers of Excellence (RCE) in Higher Education; (viii) Awareness creation and discussion with regional and national multi-stakeholder platforms and taskforces (e.g. CSA, agro-meteorology); (ix) Government institutions (MoA, MoECC, MoF,), national meteorological services (NMS), national agricultural research services (NARES), private sector input providers, ICT startups, telecom and insurance (e.g., Esoko, Safaricom, Echnoserve, AICRE Africa); (x) Presentation and discussions at AGRF, ACW, and at other Africa focused global, continental, and national events including COP; and (xi) Presentation and discussions at the AGN/AGNES meetings.				
IPI 3.5: Policy and investment decisions	Number of policies/	Collected	Project team	Continuous reporting	CIAT Central M&E for

influenced by engagement and information dissemination by AICCRA funded partnerships and capacity building activities	strategies/ laws/ regulations/ budgets/ investments/ curricula (and similar) at different scales (international to local) that were modified in design or implementation, with evidence that the change was informed by CGIAR research. Examples: (i) Policy or Strategy: Could be a written decision or commitment to a particular course of action by an institution (policy); or a (government, NGO, private sector) high level plan outlining how a particular course of action will be carried out (strategy); (ii) Legal Instrument: Legal instruments include laws, defined as a Bill passed into law by highest elected body; or regulations, defined as a rule or norm adopted by government and backed up by some threat of consequences; (iii) Budget or Investment: A budget or	continuously, compiled annually		into the management information system (MIS) Reported policies and investment decisions are reported and evidenced through outcome impact case reports that ask for increasingly rigorous evidence as they grow in the level of maturity.	aggregation; Lead Centers to report at national and regional level.

	investment is an estimate of funds allocated for development; (iv) Curriculum: Curriculum refers to the planned means and materials with which students will interact for the purpose of achieving identified educational outcomes. This can be at any level of education and target group, ranging from university degree course to farmer-field school; and (v) Policies on and investment in Climate Information Services, Climate-smart Agriculture, EW: Agri-food systems resilience in partnership with MoA, NMS, NARES universities, private sector/chamber of commerce, major NGOs).				

ANNEX 1: Detailed Project Description

COUNTRY: Africa
Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

Component 1. Knowledge Generation and Sharing (US$17.4 million)

1. Component 1 will support the generation and sharing of knowledge products and tools that will address critical gaps in the design and provision of agricultural climate services, enable climate-informed investment planning, and support the design of policies to promote uptake of CSA practices. Component 1 directly supports the work planned under Components 2 and 3, as well as drawing on results of that work.

Sub-component 1.1. Support to Africa-wide Agro-climate Services Provision and CSA Investment Planning

2. This sub-component will generate new knowledge and delivery platforms relevant throughout Africa to improve targeting of agro-climate services to farmers by national agricultural and meteorological agencies, as well as planning of CSA investments by national ministries and private firms. Activities to be financed include:

   (i) **Development of DSTs to tailor adaptation interventions and innovations.** Identification of adaptation interventions targeted to agricultural land-use categories, farmer groups and associated climate hazards will be led by ILRI but involve other CGIAR Centers. It will focus on new climate risk analyses and typologies for targeting. Outputs will include online targeted interactive adaptation interventions for different small-scale farmer types.

   (ii) **Development and participatory assessment of CIS packages.** These will accompany CSA interventions based on needs assessments and qualitative-quantitative cost-benefit analyses. To be led by IRI, this activity consists of stakeholder consultations and analyses of CIS models with respect to their costs and benefits in different contexts. Primary outputs will include digital climate service prototypes and plans for roll-out at scale. The work will be done in close collaboration with the regional climate centers, NMS, Ministry of Agriculture (MoA), NARES, private firms, and Regional Universities Forum for Capacity Building in Agriculture (RUFORUM).

   (iii) **Support to planning and monitoring of investments in agricultural adaptation to climate change.** Building on accumulated experience with CSA metrics and NAP and National Determined Contributions (NDC) analysis, ICRAF and CIAT will lead the development of DSTs and develop or refine indicators for evidence-based planning, implementation and reporting through NAPs and NDCs. This will be done in close collaboration with sub-regional research organizations and regional economic commissions (RECs), as well as Africa-wide institutions.

   (iv) **Support to prioritization of best-bet CSA options for uptake at scale.** Regionally coordinated economic analyses of CSA options under different climate and socio-economic scenarios using available models and tools will be led by CIAT and IWMI, working with other CGIAR centers, to estimate potential social (gender and youth), economic, and environmental benefits. AICCRA will

link the research results with accelerators and incubators to roll out public and private sector-driven pilots of promising CSA options. Outputs will include evidence-based prioritization and economic analyses that identify best-bet CSA options for value chains: a portfolio of big-ticket investment opportunities on CSA and CIS bundling for key crop, fish, agroforestry and livestock value chains; and water management options.

(v) **Development of financing models for the roll-out of prototype CSA and CIS solutions for farmers with private sector engagement.** CIAT and IWMI, in collaboration with other CGIAR centers and private sector partners, will co-develop innovative investment solutions to reorient and leverage public and private capital flows towards sustainable food systems. This work draws on multiple activities in AICCRA. It will include identification of commercially attractive business models and design of financial mechanisms and delivery channels that can accelerate deployment of larger pools of private capital in low-carbon and climate resilient food systems. This activity will seek to increase access to the capital required to foster innovation and catalyze adoption of relevant CSA and CIS bundling options that address the challenges of gender, youth and social inclusion.

(vi) **Policy consistency analysis for regional CIS and CSA promotion.** In conjunction with the regional research networks, ILRI will coordinate Africa-wide climate, agricultural, environmental, gender, and social inclusion policy coherence analyses to identify policy gaps, overlaps and alignment. This will draw on input from across CGIAR and incorporate models, lessons, and activities emerging from the West Africa and Eastern and Southern Africa work under AICCRA and other relevant initiatives.

3. Table A1.1 provides further detail on the types of activities that will be undertaken, as well as the lead agency managing the implementation of each cluster of activities. All activities will be conducted in close collaboration across the CGIAR institutions participating in the CCAFS program.

Sub-component 1.2. Support to Agro-climate Services Provision in West Africa

4. Regional elements of this work (see below) will be led by ICRISAT, while work in focus countries will be led by IITA (Ghana), ICRISAT (Senegal) and AfricaRice (Mali), involving multiple CGIAR Centers, RECS, NMS, MoA and NARES.

(i) **Development of ag-data hubs and decision support systems.** Activities to be financed include the development of ag-data hubs, design of climate service and visualization tools and dissemination systems, and strengthening of partnerships for the delivery of early warnings, climate services, and climate-informed digital agro-advisories. CGIAR, IRI, national and regional partners and private sector partners will establish the necessary institutional linkages to deliver early warning, climate services and climate-informed digital agro-advisories for decision making across major value chains.

(ii) **Strengthening digital climate advisory services.** This work will identify tailored CIS and digital agro-advisory packages that include needs assessment and targeting of services to different subgroups, for use in building new extension systems or strengthening existing systems and reaching under-reached groups. AICCRA will integrate tailored CIS and digital agro-advisories into national digital extension systems that include weather/climate monitoring and forecast information, as well as pest/disease risk assessments. The Project will work with CGIAR, national and regional partners, Regional Centers of Excellence, and private firms to develop web interfaces, apps and other contextualized DSTs that allow wider accessibility and inclusive information flow.

Sub-component 1.3. Support to Agro-climate Services Provision in Eastern and Southern Africa

5. Regional elements of this work (see below) will be led by ILRI, while work in focus countries will be led by IWMI (Zambia) and ILRI (Kenya and Ethiopia). Multiple CGIAR Centers, RECS, NMS, MoA and NARES will participate as collaborators.

   (i) **Development of ag-data hubs and decision support systems.** Activities to be financed include the development of ag-data hubs, design of climate service and visualization tools and dissemination systems, and strengthening of partnerships for the delivery of early warnings, climate services, and climate-informed digital agro-advisories to support agricultural decision-making. AICCRA will co-develop or strengthen integrated national ag-data hubs, CIS and agro-advisory DSTs with contextualized language and visualization tools for regional and national policy makers, practitioners, private firms and farmers.

   (ii) **Strengthening digital climate advisory services in Eastern and Southern Africa.** This work will identify tailored CIS and digital agro-advisory packages that include needs assessment and targeting of services to different sub-groups, for use in building new extension systems or strengthening existing systems and reaching underserved groups. AICCRA will develop or strengthen, refine and customize CIS and digital agro-advisories to support national agricultural digital extension systems. The Project will work with CGIAR, national and regional partners, Regional Centers of Excellence, and private firms to develop web interfaces, apps and other contextualized DSTs that allow wider accessibility and inclusive information flow.

Component 2. Strengthening Partnerships for Delivery (US$13.2 million)

6. Component 2 will support building partnerships and networks to strengthen actors' abilities along the research-to-development continuum to anticipate climate effects and accelerate the identification, prioritization, and uptake of best-bet adaptive measures. A particular focus will be on planning and implementing appropriate delivery channels to promote the flow of innovative knowledge generated under Component 1, via regional and national partners.

Sub-component 2.1. Partnerships to Strengthen Analytical and Priority-setting Capacity at Regional and Sub-regional Level

7. This sub-component will support capacity development activities designed to strengthen the ability of regional multi-stakeholder platforms to conduct participatory visioning and priority setting.

   (i) **Enhancing collaboration among Africa-wide and regional institutions.** AICCRA will facilitate engagement with Africa-wide and regional institutions to share knowledge and scale up national climate services within and across regions. This work will be led by IRI in conjunction with the CGIAR Centers leading the regional and country activities. Activities to be financed include: (i) formal and informal training; (ii) workshops; (iii) study tours; and (iv) technical assistance. AICCRA will work with national and regional agricultural research networks and regional climate forums to enhance their capacity to use DSTs for participatory priority setting, ex ante analysis and stakeholder

engagement. Where needed, AICCRA will also backstop national, regional and continental groups of negotiators and UNFCCC focal points.

Sub-component 2.2. Partnerships for Sustained Delivery of Agro-climate Services in West Africa

8. This sub-component will support diverse organizations to form innovative partnerships for sustained delivery and use of climate services. Activities to be financed include:

(i) **Support to strengthening of national meteorological real-time services.** IRI in partnership with the lead Centers (IITA, ICRISAT, AfricaRice) for the three focus countries (Ghana, Mali, Senegal) and regional climate prediction centers will strengthen NMS' real-time weather monitoring, NextGen weather forecasting, and data archiving and generation systems, and will strengthen the capacity of NMS to provide online high-resolution historical data analyses, downscaling seasonal forecasts and communication of early warnings, and improve reliability of sub-seasonal and seasonal climate predictions.

(ii) **Enhancing the capacity of public institutions and private firms to provide climate service delivery models.** ICRISAT in partnership with IRI will work with regional climate prediction centers, climate outlook forums, and African scientific and educational networks and centers to enhance the capacity of both public institutions and private agritech firms to develop delivery models for climate services. AICCRA will collaborate with RUFORUM to generate training products and set up agritech innovation platforms. AICCRA will encourage the participation of women scientists and researchers in partner institutions.

(iii) **Building capacity in three focus countries of public and private sector next users to support implementation of CSA technology packages.** In Ghana, Mali, and Senegal, the respective lead CGIAR Centers will train CSA next users (extension officers, input providers, private sector and media) on CSA knowledge, approaches and tools to support effective adoption and implementation of CSA technologies and practices at scale in various value chains. AICCRA will strengthen linkages of national partners with regional and international knowledge partners and will encourage significant participation of women in capacity building events.

(iv) **Strengthening of existing or development of new National Frameworks for Climate Services.** ICRISAT, IITA, AfricaRice and IRI will work with national institutions in the three focus countries, regional climate prediction centers and climate outlook forums to develop or strengthen NFCS. AICCRA will support strengthening national stakeholders' and private firms' capacities for sustained co-production and implementation of national early warning, climate service and agro-advisory delivery models streamlined through NFCSs

Sub-component 2.3. Partnerships for Sustained Delivery of Agro-climate Services in Eastern and Southern Africa

9. This sub-component will support diverse organizations to form innovative partnerships for sustained delivery and use of climate services. Activities to be financed include:

(i) **Support to strengthening of national meteorological real-time services.** ILRI, IWMI and IRI in collaboration with other partners will strengthen NMS real-time weather monitoring and forecasting, NextGen climate prediction, and data archiving and generation systems in Ethiopia, Kenya and Zambia. AICCRA will strengthen NMS capacities and tools for high-resolution historical data analyses,

downscaling of seasonal forecasts and communication of early warnings, and improving the reliability of sub-seasonal and seasonal climate predictions.

(ii) **Enhancing the capacity of public institutions and private firms to provide climate service delivery models.** ILRI, IWMI and IRI will work with regional climate prediction centers, climate outlook forums, and African scientific and educational networks and centers to enhance the capacity of both public institutions and private agritech firms to develop delivery models for climate services. AICCRA will collaborate with RUFORUM to generate training products and set up agritech innovation platforms. AICCRA will also strengthen linkages of national partners with regional and international knowledge partners and will encourage significant participation of women in capacity building events.

(iii) **Building capacity in the three focus countries of public and private sector next users to support implementation of CSA technology packages.** In the three focus countries, the respective lead CGIAR Centers will train CSA next users (extension officers, input providers, private sector and media) on CSA knowledge, approaches and tools to support effective adoption and implementation of CSA technologies and practices at scale in various value chains. AICCRA will encourage significant participation of women in capacity building events.

(iv) **Strengthening existing or developing new National Frameworks for Climate Services.** ILRI, IWMI and IRI will work with national institutions in the three focus countries, regional climate prediction centers and climate outlook forums to develop or strengthen NFCSs. AICCRA will support strengthening national stakeholders' and private sector firms' capacities for sustained co-production and implementation of national early warning, climate service and agro-advisory delivery models streamlined through NFCSs.

Component 3. Validating Climate-Smart Agriculture Innovations through Piloting (US$23.7 million)

10. Component 3 will facilitate the uptake of CSA packages among small-scale farmers and intermediaries in selected value chains by supporting their validation in the field, including validation for gender and social inclusion, linking validated CSA technology packages to technology transfer systems, and improving access to climate-informed agricultural advisory services that will help farmers and other value chain actors to make better decisions about CSA technologies and practices.

Sub-component 3.1. Support to Africa-wide CSA-CIS Investment Initiatives

11. This sub-component will support regional and continental efforts to scale out validated CSA and CIS bundling by developing large-scale African-led investments and other initiatives. It will seek to inform the planning and implementation mechanisms of regional bodies, financing and implementation agencies (e.g. WFP, AU-NEPAD (New Partnership for Africa's Development), World Bank, African Development Bank), and African arms of major private sector initiatives.

(i) **Identifying and leveraging continental and regional CIS and CSA scaling opportunities.** CIAT and IRI will work with other CGIAR centers and regional and national institutions. In close collaboration with multiple international agencies, AICCRA will leverage continental and regional big-ticket opportunities on CSA and CIS and facilitate scaling through regional bodies and implementation agencies. Activities to be financed include: (i) identification of existing scalable initiatives around climate modeling, early warning systems, and CSA; (ii) promoting dialogue among participants with the goal of securing agreement on common standards and protocols for delivery of climate advisory services at scale;

(iii) working with regional and continental networks to promote dissemination of climate research results across Africa; and (iv) development of approaches to ensure sustainability of regional and continental initiatives.

Sub-component 3.2. Validation of CSA Innovations through Piloting in West Africa

12. This sub-component will support the uptake of CSA packages in the three focus countries in West Africa and promote regional spillover. Leadership is as per sub-component 1.2, with contributions from multiple CGIAR Centers and partners.

(i) **Identifying and prioritizing climate- and gender and social inclusion-smartness of CSA packages.** In the three focus countries, AICCRA together with regional agricultural research networks and national public and private sector partners will assess the climate- and gender and social inclusion-smartness of current and proposed CSA packages to inform new investments and identify scaling mechanisms. The national partners will include public sector institutions, private firms, NGOs, farmer groups, cooperatives, and unions, including women and youth organizations. AICCRA will prioritize best-bet and promising CSA options for key value chains. Activities will include dialogues with multiple actors including policy makers, implementation managers, and field workers.

(ii) **Creating awareness and identifying scaling mechanisms for best-bet CSA options.** AICCRA, with national partners and in co-ordination with the Regional Centers of Excellence established under WAAPP, will create national stakeholder awareness and engagement on CSA packages, identify inclusive scaling mechanisms and frameworks especially for women and youth, and mobilize implementation stakeholders for CSA adoption and upscaling for key value chains. Activities will include dissemination of information through multiple media, evaluation of experiences with scaling out agricultural technologies to identify what works, and workshops to share experiences and obtain stakeholders' buy-in.

(iii) **Integrating climate-smart options and tailored CIS advisory systems for specific value chains.** AICCRA will formulate and/or identify suitable climate-smart options for cereals, legumes, livestock, and fish value chains to be integrated into tailored climate-informed agro-advisory systems for distinct smallholder profiles.

(iv) **Developing and promoting climate-smart agricultural investment plans.** CIAT and IWMI with other CGIAR centers and partners (including incubators and accelerators), will develop or refine existing national climate-smart agriculture investment plans (CSAIPs). Activities will include stakeholder mapping and public-private dialogues to identify potential investors, development of investment prospectuses, identification of opportunities for including farmers, women and youth, and identification of specific financiers and financing instruments to support scaling of CSA innovations, CIS services, and agro-advisories.

Sub-component 3.3. Validation of CSA Innovations through Piloting in Eastern and Southern Africa

13. This sub-component will support the uptake of CSA innovations at national level in the three focus countries in Eastern and Southern Africa and will promote regional spillover. Leadership is as per sub-component 1.3.

(i) **Identifying and prioritizing climate- and gender and social inclusion-smartness of CSA packages.** AICCRA together with regional agricultural research networks and national public and private sector

partners in the three focus countries will identify and assess climate- and gender and social inclusion-smartness, biophysical and socio-economic feasibility, innovative finance modalities for end users, business models and inclusiveness of innovative CSA options, especially for women and youth. The work will also focus on mechanisms to de-risk private sector actors in piloting innovative finance modalities for end users and businesses.

(ii) **Creating awareness and identifying scaling mechanisms for best-bet CSA options and approaches for key value chains.** AICCRA will work with national partners, private firms, and NGOs to establish multi-stakeholder dialogue spaces, and mobilize national and regional key stakeholders including farmer groups, cooperatives, and unions to create stakeholder awareness and engagement on CSA packages, identify inclusive scaling mechanisms and frameworks especially for women and youth, and mobilize implementation stakeholders for CSA adoption and upscaling. for key value chains in the three anchor countries. Activities will include dissemination of information through multiple media, evaluation of experiences with scaling out agricultural technologies to identify what works, and workshops to share experiences and obtain stakeholders' buy in.

(iii) **Integrating climate-smart options and tailored CIS advisory systems for specific value chains.** AICCRA will formulate and/or identify suitable climate-smart options for cereals, legumes, livestock, fish value chains to be integrated into tailored climate-informed agro-advisory systems for distinct smallholder profiles.

(iv) **Developing and promoting climate-smart agricultural investment plans.** CIAT and IWMI with other CGIAR centers and partners (including incubators and accelerators), will develop or refine existing CSAIPs. Activities will include conducting stakeholder mapping and public-private dialogues to identify potential investors, developing investment prospectuses and opportunities including for farmers, women and youth, and identifying specific financiers and financing instruments to support scaling of CSA innovations, CIS, and agro-advisories.

Component 4. Project Management (US$5.7 million)

14. Component 4 will support project management functions. Consistent with the objective of strengthening systemic capacity in CGIAR, project management activities will be distributed among CCAFS partners. CIAT as the Lead Center for CCAFS and recipient of the IDA grant will hold ultimate responsibility for technical, administrative, fiduciary, legal, and safeguards compliance functions. The CCAFS Program Management Committee (PMC) and its CCAFS Program Management Unit (CCAFS-PMU) will provide oversight of the technical work program, ensure coordination among and between the implementation entities, and supervise M&E activities and compile consolidated M&E reports documenting progress achieved. Under the shared accountability approach, the CCAFS implementation entities will be expected to comply with all applicable administrative, fiduciary (procurement and FM), M&E, and safeguards requirements, and they will be responsible for providing information needed by the CCAFS management team and by CIAT to fulfill compliance with the terms of the IDA grant. Component 4 will finance: (i) consultant services, non-consulting services and operating costs for the CCAFS-PMU to carry out project management, including fiduciary and M&E; (ii) annual workshops for implementation entities to ensure integration and quality; and (iii) implementation of the communication action plan.

15. The Project will be implemented by multiple CCAFS partners, including CIAT as the Recipient of the IDA grant, contracted service providers, and collaborating partners bringing their own financing. The relationships are summarized in Figure A1.1.

Figure A1.1. AICCRA institutional arrangements

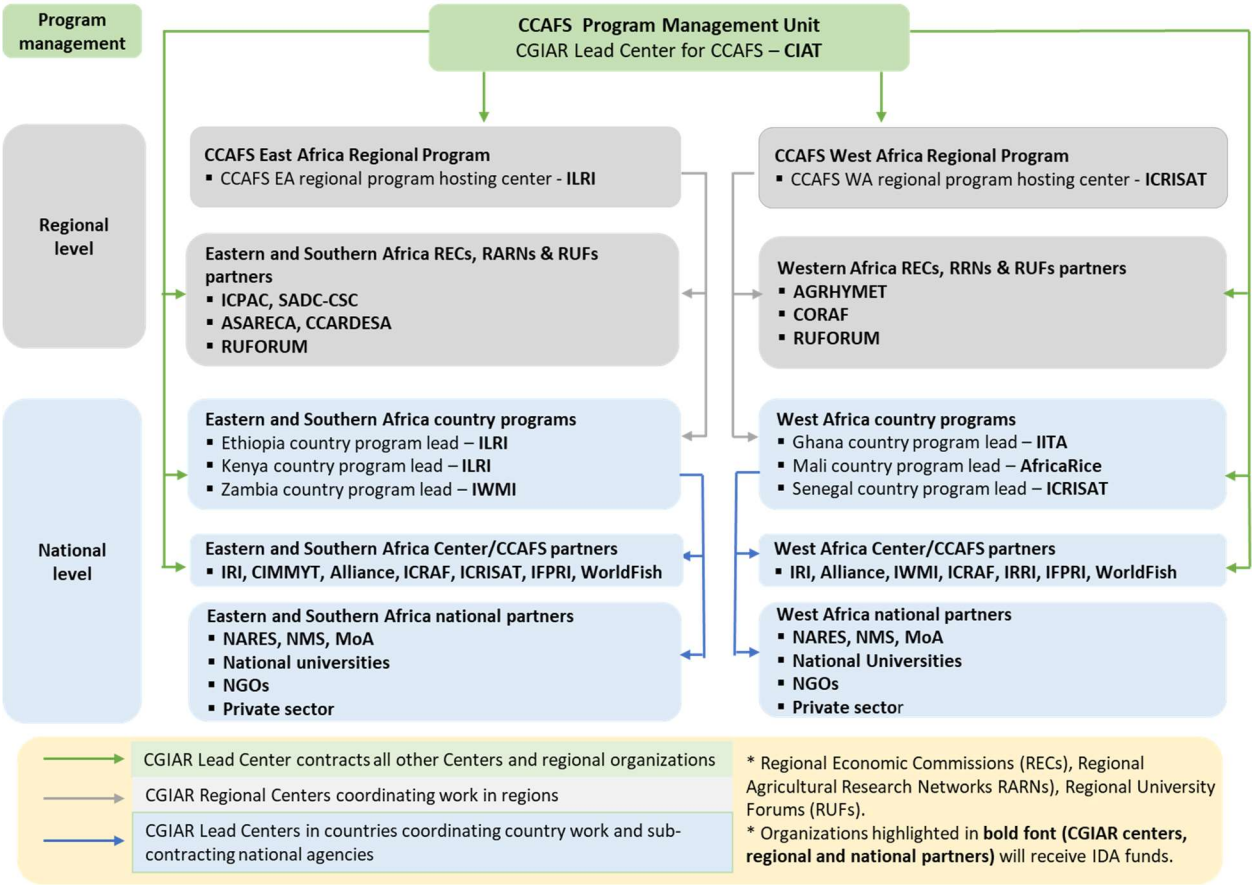


Table A1.1: Project description - Activities, implementing entities, procurement categories

Components / Activities	Lead entity	Procurement[10]
Component 1: Knowledge Generation and Sharing (US$17.4 million)		
Sub-component 1.1: **Support Africa-wide delivery of agro-climate services and CSA investment planning**		
1.1.1 Develop DSTs to tailor adaptation of interventions and innovations		
Indicative sub-activities: • Building data bases • Computer-based modeling • Data analysis to identify best practices • Organize consultations • Design and implement trainings and workshops • Prepare and implement communication materials • Produce scientific papers	ILRI	Goods, non-consulting services, consulting services, training and workshops, operating costs, and PPAs for Components 1, 2 and 3 of the Project implemented by CCAFS partners and by CIAT
1.1.2 Develop and participatory assess CIS packages		
Indicative sub-activities: • Building CIS models • Testing efficacy of models • Consultations with partners on design CIS packages • Design and test training modules • Prepare and implement communication materials • Produce scientific papers	IRI	As above
1.1.3 Support planning and monitoring of investments in agricultural adaptation to climate change		
Indicative sub-activities: • Carry out economic analyses • Develop and test M&E indicators • Design and implement M&E system • Design DSTs for investment • Consultations with partners on application of tools • Prepare and implement communication materials • Produce scientific papers	CIAT	As above
1.1.4 Support prioritization of best-bet CSA options for uptake at scale		
Indicative sub-activities: • Economic and social analysis of CSA options • Link research results to incubators, accelerators • Develop portfolio of best-bet investment opportunities for targeted value chains • Organize workshops	CIAT	As above

[10] CIAT will establish standard expenditure categories for internal reporting, aligned with the current expenditure categories of the CCAFS program.

Components / Activities	Lead entity	Procurement[10]
• Consultations with partners • Develop training modules • Prepare and implement communication materials • Produce scientific papers		
1.1.5 Develop financing models for rollout of prototype CSA and CIS solutions with private sector engagement		
Indicative sub-activities: • Develop innovative investment options integrating CSA and CIS solutions • Identify commercially attractive business models • Identify effective financing mechanisms • Identify effective delivery channels • Organize consultations with investors and clients • Prepare and implement communication materials • Produce scientific papers	CIAT	As above
1.1.6 Policy consistency analysis for regional level CIS and CSA promotion		
Indicative sub-activities: • Analyze current policies and recommend solutions ("good practices") to enhance CIS and CSA investments that are socially inclusive • Consultations with regional institutions on best practice policies • Prepare and implement communication materials • Produce scientific papers	ILRI	As above
Sub-component 1.2: Support to Agro-climate Services Provision in West Africa		
1.2.1 Develop ag-data hubs and decision support systems		
Indicative sub-activities: • Design and develop ag-data hubs • Design climate service visualization tools • Design climate-informed digital agro-advisories • Establish institutional linkages for delivering early warning, climate services and climate-informed digital agro-advisories • Consultations with regional institutions including private sector • Prepare and implement communication materials (French, English) • Produce scientific papers	ICRISAT (regional, Ghana) IITA (Senegal) AfricaRice (Mali)	As above
1.2.2 Strengthen digital climate advisory services		
Indicative sub-activities: • Design and tailor CIS services to specific value chains • Design and tailor CIS services to specific social groups • Develop web interfaces and apps for disseminating CIS	ICRISAT (regional, Ghana) IITA (Senegal)	As above

Components / Activities	Lead entity	Procurement[10]
services • Support integration of CIS tools into extension services • Develop training modules • Provide training on new tools • Consultations with regional and national institutions including private sector • Prepare and implement communication materials (French, English) • Produce scientific papers	AfricaRice (Mali)	
Sub-component 1.3: Support to Agro-climate Services Provision in Eastern and Southern Africa		
1.3.1 Develop ag-data hubs and decision support systems		
Indicative sub-activities: • Design and develop ag-data hubs • Design climate service visualization and dissemination tools • Design climate-informed digital agro-advisories • Establish institutional linkages for delivering early warning, climate services, and climate-informed digital agro-advisories • Consultations with regional institutions including private sector • Prepare and implement communication materials • Produce scientific papers	ILRI (regional, Kenya, Ethiopia) IWMI (Zambia)	As above
1.3.2 Strengthen digital climate advisory services in Eastern and Southern Africa		
Indicative sub-activities: • Design and tailor CIS services to specific value chains • Design and tailor CIS services to specific social groups • Develop web interfaces and apps for disseminating CIS • Support integration of CIS tools into extension services • Develop training modules • Provide training on new tools • Organize consultations with regional and national institutions including private sector • Prepare and implement communication materials • Produce scientific papers	ILRI (regional, Kenya, Ethiopia) IWMI (Zambia)	As above
Component 2. Strengthening Partnerships for Delivery (US$13.2 million)		
Subcomponent 2.1. Partnerships to Strengthen Analytical and Priority-setting Capacity at Regional and Sub-regional Level		
2.1.1 Enhance collaboration among Africa-wide and regional institutions		
Indicative sub-activities: • Provide formal and informal training • Design and implement workshops	CIAT	As above

Components / Activities	Lead entity	Procurement[10]
• Support study tours • Provide technical assistance • Backstop national, regional, and continental climate negotiators and UNFCCC focal points • Prepare and implement communication materials		
Sub-component 2.2. Partnerships for Sustained Delivery of Agro-climate Services in West Africa		
2.2.1 Support strengthening of national meteorological real-time services		
Indicative sub-activities: • Design and implement training modules on real-time weather monitoring, NextGen weather forecasting, and data archiving and generation systems • Support institutional linkages for sharing data, tools, experiences • Prepare and implement communication strategies (French, English) • Produce scientific papers	IRI (regional) ICRISAT (Ghana) IITA (Senegal) AfricaRice (Mali)	As above
2.2.2 Enhance the capacity of public institutions and private firms to provide climate service delivery models		
Indicative sub-activities: • Generate and implement training modules and courses • Set up agri-tech innovation platforms • Facilitate inclusion of women scientists • Prepare and implement communication strategies (French, English)	ICRISAT (Ghana) IITA (Senegal) AfricaRice (Mali)	As above
2.2.3 Build capacity in three focus countries of public and private sector next users to support implementation of CSA technology packages		
Indicative sub-activities: • Develop and implement training modules to enable next-users (e.g. extension officers, private sector, media) to support adoption and use of best-bet CSA packages • Facilitate inclusion of women in training programs • Prepare and implement communication strategies (French, English)	ICRISAT (Ghana) IITA (Senegal) AfricaRice (Mali)	As above
2.2.4 Develop existing or strengthen new National Frameworks for Climate Services (NFCS)		
Indicative sub-activities: • Technical assistance to develop, improve NFCSs • Design and implement training on national early warning, climate service and agro-advisory delivery models streamlined through NFCSs • Facilitate inclusion of women in training programs • Prepare and implement communication strategies (French, English)	ICRISAT (Ghana) IITA (Senegal) AfricaRice (Mali)	As above

Components / Activities	Lead entity	Procurement[10]
Sub-component 2.3. Partnerships for Sustained Delivery of Agro-climate Services in Eastern and Southern Africa		
2.3.1 Support strengthening of national meteorological real-time services		
Indicative sub-activities: • Design and implement training modules on real-time weather monitoring, NextGen weather forecasting, data archiving and generation systems • Support institutional linkages for sharing data, tools, experiences • Prepare and implement communication strategies • Produce scientific papers	IRI (regional) ILRI (Ethiopia, Kenya) IWMI (Zambia)	As above
2.3.2 Enhance the capacity of public institutions and private firms to provide climate service delivery models		
Indicative sub-activities: • Generate and implement training modules and courses • Set up agri-tech innovation platforms • Facilitate inclusion of women scientists • Prepare and implement communication strategies	ILRI (Ethiopia, Kenya) IWMI (Zambia)	As above
2.3.3 Build capacity in three focus countries of public and private sector next users to support implementation of CSA technology packages		
Indicative sub-activities: • Develop and implement training modules to enable next-users (e.g. extension officers, private sector, media) to support adoption of CSA packages • Facilitate inclusion of women next-users in training programs • Prepare and implement communication strategies	ILRI (Kenya, Ethiopia) IWMI (Zambia)	As above
2.3.4 Develop existing or strengthen new National Frameworks for Climate Services (NFCS)		
Indicative sub-activities: • Technical assistance to develop, improve NFCSs • Design and implement training on national early warning, climate service and agro-advisory delivery models streamlined through NFCSs • Facilitate inclusion of women next-users in training programs • Prepare and implement communication strategies (French, English)	ILRI (Kenya, Ethiopia) IWMI (Zambia)	As above

Components / Activities	Lead entity	Procurement[10]
Component 3. Validating Climate-Smart Agriculture Innovations through Piloting (US$23.7 million)		
Subcomponent 3.1. Support to Africa-wide CSA-CIS Investment Initiatives		
3.1.1-3 Identify and leverage continental and regional CIS and CSA scaling opportunities		
Indicative sub-activities: • Identify existing scalable initiatives around climate modeling, early warning systems, and CSA • Promote dialogue among participants to secure agreement on common climate advisory standards and protocols for delivery at scale • Promote dissemination of climate research results across Africa • Develop approaches to ensure sustainability of regional and continental initiatives	CIAT	As above
Sub-component 3.2. Validation of CSA Innovations through Piloting in West Africa		
3.2.1 Identify and prioritize climate, gender, and social inclusion-smartness of CSA packages		
Indicative sub-activities: • Assess existing CSA practices for gender and social inclusiveness • Propose new inclusive CSA packages for various value chains • Dialogues with multiple regional and national partners • Develop and implement training modules • Facilitate inclusion of women in training programs • Prepare and implement communication strategies (French, English)	ICRISAT (Ghana) IITA (Senegal) AfricaRice (Mali)	As above
3.2.2 Create awareness and identify scaling mechanisms for best-bet CSA options		
Indicative sub-activities: • Disseminate information through multiple media • Evaluate experiences with scaling out agricultural technologies to identify what works • Identify inclusive scaling mechanisms and frameworks • Implement workshops to share experiences and obtain stakeholder buy-in • Prepare and implement communication strategies (French, English)	ICRISAT (Ghana) IITA (Senegal) AfricaRice (Mali)	As above
3.2.3 Integrate climate-smart options and tailored CIS advisory systems for specific value chains		
Indicative sub-activities: • Identify suitable climate-smart options for regionally important value chains • Integrate options into tailored climate-informed agro-advisory systems for distinct smallholder profiles	ICRISAT (Ghana) IITA (Senegal) AfricaRice (Mali)	As above

Components / Activities	Lead entity	Procurement[10]
• Develop and implement training modules • Prepare and implement communication strategies (French, English)		
3.2.4 Develop and promote climate-smart agricultural investment plans		
Indicative sub-activities: • Develop/ refine existing national climate-smart agriculture investment plans (CSAIPs) • Integrating pest & disease innovations into CSAPIs • Conduct stakeholder mapping and public-private dialogues to identify potential investees • Develop investment prospectus and opportunities • Identify financiers and financing instruments to support scaling • Organize workshops and consultations • Prepare and implement communication strategies (French, English)	CIAT	As above
Sub-component 3.3. Validation of CSA Innovations through Piloting in Eastern and Southern Africa		
3.3.1 Identify climate- and gender and social inclusion-smartness of CSA packages		
Indicative sub-activities: • Assess existing CSA practices for gender and social inclusiveness • Propose new inclusive CSA packages for various value chains • Dialogues with multiple regional and national partners • Develop and implement training modules • Facilitate inclusion of women in training programs • Prepare and implement communication strategies	ILRI (Ethiopia, Kenya) IWMI (Zambia)	As above
3.3.2 Prioritize and increase awareness of best-bet CSA options and approaches for key value chains		
Indicative sub-activities: • Disseminate information through multiple media • Evaluate experiences with scaling out agricultural technologies to identify what works • Identify inclusive scaling mechanisms and frameworks • Implement workshops to share experiences and obtain stakeholder buy-in • Prepare and implement communication strategies	ILRI (Ethiopia, Kenya) IWMI (Zambia)	As above
3.3.3 Integrate climate-smart options and tailored CIS advisory systems for specific value chains		
Indicative sub-activities: • Identify suitable climate-smart options for regionally important value chains • Integrate options into tailored climate-informed agro-advisory systems for distinct smallholder profiles	ILRI (Ethiopia, Kenya) IWMI (Zambia)	As above

Components / Activities	Lead entity	Procurement[10]
• Develop and implement training modules • Prepare and implement communication strategies		
3.3.4 Develop and promote climate-smart agricultural investment plans		
Indicative sub-activities: • Develop/ refine existing national climate-smart agriculture investment plans (CSAIPs) • Integrate pest and disease innovations into CSAPIs • Conduct stakeholder mapping and public-private dialogues to identify potential investees • Develop investment prospectus and opportunities • Identify financiers and financing instruments to support scaling • Organize workshops and consultations • Prepare and implement communication strategies (French, English)	CIAT & IWMI	As above
Component 4. Project Management (US$5.7 million)		
Indicative sub-activities: • Receive, allocate, and monitor use of IDA funds • Establish FM arrangements • Develop and approve budgets and work plans • Issue and provide oversight for PPAs • Issue and provide oversight for service contracts • Ensure compliance with all applicable World Bank requirements • Provide oversight of the technical work program • Ensure coordination among and between the implementation entities • Supervise M&E activities • Compile consolidated M&E reports documenting progress achieved • Oversee internal and external audits • Hold annual workshops for implementation entities to ensure integration and quality • Implement the communication action plan • Participate in World Bank supervision missions • Provide all required reports and information on project implementation to the World Bank	CIAT	Goods, works, non-consulting services, consulting services, training and workshops, and Operating Costs for Component 4 of the Project

ANNEX 2: Implementation Arrangements and Support Plan

COUNTRY: Africa
Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

A. Project Institutional Arrangements

1. *Recipient:* The Recipient of the IDA Regional Grant will be the International Center for Tropical Agriculture (*Centro Internacional de Agricultura Tropical* – CIAT). CIAT was established as a private nonprofit organization registered under Public Deed No. 4717, dated October 18, 1967, at the Third Notary Public's office in Bogota, and was recognized as a legal corporation by Resolution No. 4939 of the Ministry of Justice dated December 4, 1967. Through a memorandum signed on October 12, 1983, the Government of Colombia and CIAT's co-sponsors expressed an interest in CIAT continuing to carry out its activities satisfactorily and for CIAT to have the status and characteristics appropriate to its international mandate, to its international sources of financing and to the international character of its staff. Consequently, CIAT was re-established by an Act of Constitution (Agreement) signed in Washington, D.C. on May 28, 1986, between the United Nations Development Programme (UNDP) and the International Bank for Reconstruction and Development (IBRD), with legal capacity and international status and with its headquarters in Colombia. Serving as the Implementing Entity, CIAT will be responsible for the implementation of all Project activities, internal and external communications, FM, procurement, and compliance with safeguards policies.
2. *Project Implementation:* For the purpose of implementing the Project, CIAT will ensure the presence of staff assigned to carry out the following main duties and responsibilities: (i) developing and approving budgets and annual operational plans; (ii) ensuring the successful execution of other Project-supported activities; (iii) performing the processes of procurement; (iv) approving contracts and agreements; (v) establishing FM arrangements (budget, disbursements, accounting systems, fund management, internal control, financial reporting and audit) to ensure proper management of resources and allocation of funds according to project objectives; (vi) carrying out M&E activities; and (vii) ensuring compliance with the contractual conditions of the Project. The PIM will provide specific details related to the Project's institutional set-up, fiduciary arrangements, M&E procedures, safeguards compliance arrangements, and governance arrangements.
3. *Key staff:* CIAT through CCAFS will ensure the presence of the following key staff: CCAFS Director, CCAFS Regional Program Leaders (one for Western Africa and one for Eastern/Southern Africa); AICCRA Activity and AICCRA Country Leaders (Ghana, Mali, Senegal, Ethiopia, Kenya and Zambia); CCAFS Finance Officer; CCAFS Gender and Social Inclusion Leader, Social Specialist; Environmental Specialist; and CIAT and CCAFS administrative staff (CCAFS Finance Analyst, CCAFS Admin Analyst, CIAT Finance Contact Point for CCAFS, CIAT Accounting Specialist, CIAT Treasurer, CIAT Procurement Specialist and CIAT Donor Contracts Analyst). The key staff will be assigned by effectiveness of the Project.
4. The CCAFS Director will provide overall leadership to the Project. The duties and responsibilities of the CCAFS Director will include, among others:

- Provide scientific leadership for planning, implementing, monitoring and reporting of the Project's research agenda including designing research and the continual improvement of collaborative mechanisms for implementation.
- Catalyze and coordinate the Project's program activities among Program Participants and the Independent Steering Committee, and their respective partners to further the implementation of strategies and priorities.
- Provide oversight of the Project's activity portfolio, including annual work plans, budgets and fund distribution, project implementation, and ensuring that reporting requirements are met.
- Develop and implement a communications strategy for the Project.
- Facilitate and promote communications and linkages across Program Participants and the Project's Independent Steering Committee as well with the donor's designated control committee to support the implementation of activities and delivery of outcomes and impacts.
- Any other task derived from the above or that naturally belongs to them.

5. The CCAFS Regional Program Leaders will provide day-to-day coordination to the Project at regional level. The duties and responsibilities of the Regional Coordinators will include, among others:
    - Provide strategic directions and coordinate actions at regional level in collaboration with Activity and Country Leaders as well as with the Program Management Unit, communicating them clearly to country programs for coherent implementation of activities across countries including internal communication.
    - Lead the regional and national stakeholder engagement processes, to ensure their buy-in and contribution to the project design, implementation and scaling-up of project outputs and outcomes.
    - Build on the strong strategic partnership developed by CCAFS East and West Africa Regional programs to facilitate effective key partnerships that are crucial for successful project implementation and delivery at regional (e.g. CORAF, ASARECA, CARDESA, AGHRYMET, ICPAC, RUFORUM) and national levels (e.g. NARS, Regional Centers of Excellence, national meteorological agencies, private sector).
    - Support country teams implementing AICCRA in a coordinated manner and with the relevant Africa-wide and regional partnerships, including facilitating synergies and learning across the country programs to achieve expected outcomes and impacts.
    - Contribute and support the development of project work plans and budgets, including synthesis of project outputs and communication products

6. *Planning, Budget, and Monitoring.* CIAT through CCAFS will be responsible for planning the work program of the Project, developing associated budgets, and monitoring implementation paying attention to both technical and fiduciary aspects. Principal duties will include: (i) review and approval of institutional policy guidelines; (ii) planning, budget, M&E; (iii) coordinating the preparation of annual work plans; (iv) assessing physical progress and financial performance of the Project; and (v) developing and proposing amendments to the Project.

7. *Administration.* CIAT through CCAFS will be responsible for carrying out administrative functions and coordinating the implementation of activities related to finance, treasury, accounting, human resources and procurement in accordance with World Bank standards and national standards. Principal duties will include: (i) monitoring all administrative, financial, and procurement aspects of contracts financed partly or wholly through external borrowing; and (ii) coordinating with external auditors required under the terms of the Grant Agreement and providing any documentation that they may request.

8. *Legal.* CIAT through CCAFS will be responsible for ensuring that the Project operates within the framework of World Bank operational policies. Principal duties will include: (i) analyzing and following up on the legal aspects of all PPAs and contracts; (ii) informing CCAFS partner organizations participating in AICCRA about existing legal provisions having direct implications for the implementation of the Project; and (iii) providing training to CCAFS staff on legal issues relevant to the performance of their duties.

B. Governance and Oversight Arrangements

9. *Steering Committee:* By effectiveness, CIAT will appoint the current Independent Steering Committee of the CCAFS Program as the Steering Committee for the Project. The Steering Committee will be the highest governing body of the Project. It will provide general strategic guidance and ensure implementation oversight. The Steering Committee will comprise seven (7) members appointed by the Board of Trustees of CIAT, and acceptable to the World Bank. The PIM will describe the process of selection of Steering Committee members. The Steering Committee will meet regularly (at least twice per year) to review implementation progress, provide guidance on implementation issues, and coordinate actions needed to resolve problems that may be adversely affecting the performance of the Project. More specifically, the main functions of the Steering Committee are to: (i) provide guidance and approve the Project's programmatic strategies; (ii) follow-up on the implementation of the activities and take any corrective action to achieve the goals of the Project; (iii) approve the Annual Operating Plan and the Annual Budget, (iv) approve annual reports, and other documents as needed; and (v) participate in the selection of the CCAFS Director. The operating procedures of the Steering Committee will be approved during its first session. The CCAFS Director will act as the Technical Secretary of the Steering Committee. In addition to the previous functions, the CCAFS Independent Steering Committee will also perform the following scientific advisory tasks: (i) providing information about global scientific advances in climate research; (ii) identifying national, regional and international institutions and organizations engaged climate research with which the Project could develop partnerships; (iii) identifying national, regional and international scientists who could participate in innovation activities being supported by the Project; and (iv) assist the CCAFS Director in the annual assessment of activities financed by the Project.

C. Financial Management, Disbursements and Procurement

Financial Management

10. Overall FM responsibility of the Project rests with the International Center for Tropical Agriculture (CIAT). A FM Assessment was carried out in accordance with the FM manual (World Bank Directive effective March 1, 2010; last revised on February 10, 2017) to determine the adequacy of the FM arrangements currently being used by CIAT.

11. CIAT will assess and ensure that minimum FM requirements such as a favorable audit opinion on entity financial statements and FM staffing are in place before on-granting funds to participating CGIAR centers. PPAs will govern the FM requirements for CGIAR centers to be eligible for funding.

12. A process is already in place for CIAT to assess partners against a set of criteria, before enrolling them to implement programs and annually reviewed for the life of the Project. This includes an assessment of financial stability and risks. The criteria will be extended to include FM requirements. FM assessment procedures of CGIAR Centers will be detailed out in the PIM, which will be adopted before project effectiveness.

13. CIAT and the participating CGIAR Centers will contract with partners for their services. These partners will be contracted based on the World Bank procurement procedures and will form part of the Project's procurement plan. Such partners will not be subjected to an FM assessment as payments will be made for their contractual services based on the payment terms in the contract.

14. *Staffing and organizational arrangements:* CIAT is currently adequately staffed in FM with FM staff overseeing the global FM of the CIAT program, project financial planning and monitoring; institutional budgeting, institutional accounting and reporting, treasury operations, and taxes and recoveries. The same staff will provide support to the CCAFS Finance Officer (hosted by CIAT) to manage the FM aspects of the Project. The CCAFS Finance Officer has communicated during project appraisal the main staff responsible for day-to-day FM activities of the Project and the main interlocutors for the World Bank regarding the FM aspects of the Project.

15. *Programming and budget:* Participating CGIAR Centers receiving funds from the program will prepare and submit their annual budgets and work plans to CIAT for consolidation. In turn, CIAT will then submit the duly approved consolidated annual budget and work plans to the World Bank before the beginning of the fiscal year. CIAT will monitor project budget execution in accordance with the FM procedures specified in the PIM and report on variances in the interim financial report (IFRs).

16. *Accounting and information systems:* CIAT uses the Agresso Enterprise Resource Planning (ERP) systems. Information is maintained by research area, project, agreement, and region. This allows project specific disaggregated budget execution reports to be generated via Agresso. CGIAR Centers have their own ERP systems but the information is fed into Agresso to generate required reports. Agresso is programmed to provide automatic reminders to partners on reporting, if there are delays.

17. *Internal controls:* CIAT has policies and procedures that lay out the control environment and framework. While there are no specific Field Office Implementation Manuals, field related procedures are included in CIAT's policy directives. For greater clarity on roles, responsibilities and procedures applicable to AICCRA, a PIM which also includes FM procedures will be in place for the Project by the Project Effectiveness Date which will lay out the internal control responsibilities of CIAT as well as the CGIAR centers.

18. *Internal audit:* The Trans-Regional Audit (TRA) Group[11] will deliver internal audit services for the Project. This agreement remains in force until December 31, 2022. Before the scheduled expiration date, this agreement may be extended for a period to be mutually determined by the parties. If not, alternative

[11] A shared internal audit service set up based on an agreement that was entered into by CIAT, CIP, IFPRI, ICARDA and Bioversity (effective January 2020).

arrangements will be made by CIAT to continue the project internal audit. The TRA prepares an annual audit workplan and budget and the participating Centers provide sufficient resources on an annual basis for it to function effectively. The project internal audit will form part of the annual plan. As needed, TRA field based internal auditors will visit the project sites to carry out on-site audits. TRA follows Institute of Internal Auditors, Inc. ("IIA") standards and the Code of Ethics.

19. *Financial reporting:* CIAT will prepare semi-annual unaudited IFRs in form and content satisfactory to the World Bank, which will be submitted to the World Bank within 70 days after the end of the period to which they relate to take into account the time necessary for PPA signatories to submit their information to CIAT for consolidation. The format and contents of the IFR were agreed between the World Bank and CIAT during project appraisal. The contents of the IFR should include, inter alia, the following information to account for project funds:

    - Statement of Sources and Uses of Funds;
    - Statement of Uses of Funds by Project Activity/Component;
    - Designated Account Activity Statement;
    - Bank statements for both the Designated and any applicable Project Accounts and related bank reconciliation statements;
    - Summary statement of Designated Account expenditures for contracts subject to prior review; and
    - Summary statement of Designated Account expenditures not subject to prior review.

20. CGIAR Centers will furnish quarterly reports to CIAT by economic classification, component, activity, country, regions within 30 days of the end of the quarter.

21. CIAT's annual financial statements are prepared in line with International Financial Reporting Standards (IFRSs). The last four audit reports have an unqualified opinion on the financial statements of CIAT. Project-specific annual financial statements will be prepared following IFRSs.

22. *Audit:* CIAT will use a private audit firm acceptable to the World Bank to conduct the project-specific audit. The cost of hiring a private audit firm will be met by the Project. All audits should be carried out in accordance with International Standards on Auditing. Terms of Reference for the audit have been agreed with the World Bank. The external auditors should be appointed within four (4) months after effectiveness. Audit reports together with management letters should be submitted to the World Bank within six (6) months after the end of the entity's fiscal year (December 31). The audit reports will be publicly disclosed by the World Bank Group in accordance with the World Bank's disclosure policy. The audit will include in its scope, a review of CGIAR centers. As such, financial records of CGIAR centers must be available for inspection for formal audits at any time and embedded in the PPAs. On an annual basis, all participating CGIAR enters will submit a transaction listing which will be used by auditors to select the audit samples.

23. *World Bank supervision:* FM implementation support missions will be carried out at least once a year based on the moderate FM residual risk rating. Implementation Support will also include desk reviews such as the review of the IFRs and audit reports. In-depth reviews and forensic reviews may be done were

deemed necessary. The FM implementation support will be an integrated part of the Project's implementation reviews.

24. *Flow of funds and disbursement arrangements:* A Designated Account (DA) will be opened in a commercial bank acceptable to the Association and managed by CIAT, which will receive advances from the World Bank. Following existing fund flow practices at CIAT, CIAT will reimburse the CGIAR Centers for project expenditures based on the approved budget and the approval of financial reports/statements of expenditures Participating CGIAR Centers will deposit project funds in their regular bank accounts. For disbursement and financial reporting purposes, the Association will recognize eligible expenditures based on the reported and recognized (by CIAT) actual expenditures of CCAFS partner organizations. Additional information will be provided in the Disbursement and Financial Information Letter (DFIL).

25. *Salaries:* For eligible salaries financed using project funds, withdrawal applications should be submitted only for amounts attributable to the IDA financed AICCRA project, such as determined by the CIAT tracking system/mechanism. Audit Terms of References will also include specific diligences to ensure the compliance with regard to this provision.

26. CIAT will access funds from the World Bank using the disbursement methods as described in the World Bank Disbursement Handbook, i.e., advance, direct payment, reimbursement, and special commitments. Detailed disbursement procedures will be documented in the PIM. Upon grant effectiveness, CIAT will be required to submit a withdrawal application (WA) for an initial deposit to the Designated Account (DA), drawn from the IDA grant, in an amount to be agreed to in the DFIL. Further deposit of funds from IDA to the Designated Account will be made upon evidence of satisfactory utilization of the advance and the six-monthly cash forecast, reflected in the unaudited IFRs. Withdrawal applications would be required to be submitted regularly. The DA will be documented on a semiannual basis. The currency of the DA will be US dollars.

27. The withdrawal categories for the Project will include three categories, as shown in Table A2.1 below. All disbursements will be made inclusive of taxes, and PPA holders will be encouraged to seek tax exemptions in the cases where PPA partners are eligible to receive them.

Table A2.1. Disbursement Categories

Category	Amount of the Grant Allocated (expressed in SDR)[12]	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, non-consulting services, consulting services, Training and Workshops, Operating Costs and PPAs for Components 1, 2 and 3 of the Project implemented by CCAFS Partners	32,423,570	100%

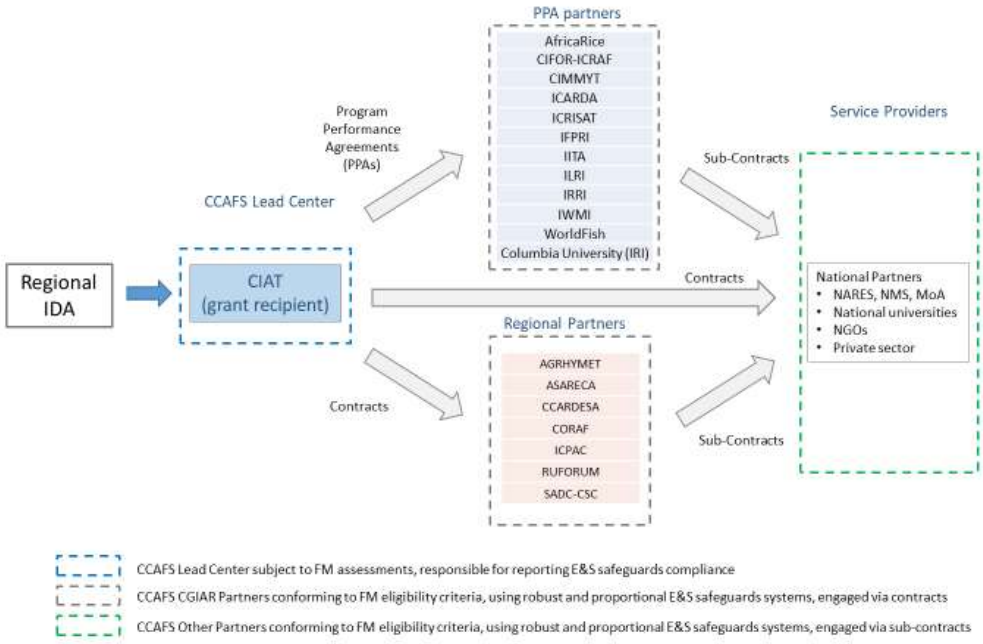
[12] SDR equivalents determined during negotiations on October 31, 2020.

Category	Amount of the Grant Allocated (expressed in SDR)[12]	Percentage of Expenditures to be Financed (inclusive of Taxes)
(2) Goods, non-consulting services, consulting services, Training and Workshops, Operating Costs and Staff Salaries for Components 1, 2 and 3 of the Project implemented by CIAT	6,129,430	100%
(3) Goods, non-consulting services, consulting services, Training and Workshops and Operating Costs for Component 4 of the Project	4,047,000	100%
TOTAL AMOUNT	42,600,000	100%

28. If ineligible expenditures are found to have been made from the Designated and/or Project Accounts, the Recipient will be obligated to refund the same. The World Bank will have the right, as reflected in the terms of the Financing Agreement, to suspend disbursement of the funds if significant conditions, including reporting requirements, are not complied with. Additional details regarding disbursement will be provided in the Financial Information Letter (DFIL).

29. The flow of funds is depicted in Figure A2.1 below. AICCRA project funds, upon availability, will flow from CIAT to CCAFS Partners under the terms of the PPAs. Subsequently, CCAFS Partners will flow funds to direct partners via procurement in the form of service provision contracts.

Figure A2.1. AICCRA Flow of Funds



30. *CCAFS Partners:* The current list of CCAFS Partners that are expected to sign PPAs or Direct Contracts with CIAT appear in Table A2.2 below.

Table A2.2. CCAFS Partners

Partner Type	Number	Acronym	Name
CGIAR Centers and IRI-Columbia University (contracted via PPAs)	1	AfricaRice	AfricaRice
	2	CIMMYT	International Maize and Wheat Improvement Center
	3	ICARDA	International Center for Agriculture Research in the Dry Areas
	4	ICRAF	World Agroforestry Centre
	5	ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
	6	IFPRI	International Food Policy Research Institute
	7	IITA	International Institute of Tropical Agriculture
	8	ILRI	International Livestock Research Institute
	9	IRRI	International Rice Research Institute
	10	IWMI	International Water Management Institute
	11	WorldFish	WorldFish
	12	IRI-Columbia University	International Research Institute for Climate and Society
Regional Organizations (contracted via direct contracts)	13	AGRHYMET	Agrhymet Regional Centre
	14	ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
	15	CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
	16	CORAF	West and Central Africa Council for Agriculture Research and Development
	17	FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
	18	ICPAC	IGAD Climate Prediction and Applications Centre
	19	RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
	20	SADC-CSC	Southern African Development Community - Climate Service Centre

31. *Restriction on sub-contracting:* To avoid cascading overheads, CCAFS Partners will not be allowed to sub-contract one another. Instead, CIAT will set a procedure whereby CCAFS Partners can request re-allocations between their budgets, which will not occur any type of transactional cost. Subsequently, CCAFS partners will be required to update their activity plans to reflect the budget re-allocations.

Procurement

32. Procurement under the Project will be carried out in accordance with the World Bank's Procurement Framework. Procurement will follow the World Bank's Procurement Regulations for IPF Borrowers for Goods, Works, Non-Consulting and Consulting Services, dated July 1, 2016 (revised in November 2017 and August 2018). The Project will be subject to the World Bank's Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006 and revised in January 2011 and as of July 1, 2016. The Project will use the Systematic Tracking of Exchanges in Procurement (STEP) to plan, record and track procurement transactions of the Project Procurement Strategy for Development (PPSD).

33. CIAT has finalized preparation of the PPSD including the Project Procurement Plan. The PPSD describes the strategic choices in terms of procurement. Since AICCRA will be implemented through CCAFS, which features many existing and well-established partnerships, an uncommon feature of the Project is the large number of contracts to be procured by direct contracting. The PPSD describes the reasons and motivations which justify the use of direct contracting. The direct contracting method will also be used in the case of PPAs, while the implementation modality of PPAs will be described in the FM and Economic and Social Framework (ESF) procedures included as part the PPA.

34. *Procurement of Works.* No major civil works are envisaged. If there were to be any works, they would be limited to small rehabilitation or improvements of existing buildings. In such cases, the works would be carried out by request for quotations using procedures as described in the PIM approved by the World Bank.
35. *Procurement of Goods.* Goods procured under the Project are expected to include hardware and software, peripheral equipment, Information technology (IT) systems, furniture, vehicles, and videoconference and/or communications equipment. No contract is expected to exceed the equivalent of US$500,000, and therefore goods will be procured using the client procedure as described in the PIM.
36. *Selection of Consultants*. Almost all the procurement activities of the Project will consist of contracts for services, technical assistance, research, and analytical studies aimed strengthening and improving the quality of information and agriculture services. The Project will provide additional resources to a network of institutions that have a long and productive history of collaboration in their sector and regions. For the reasons indicated in the PPSD, most of the contracts will be concluded by direct agreements
37. *Procurement of Non-Consulting Services.* Procurement of non-consulting services is expected to consist of printing, materials reproduction, publication and dissemination, as included in the Procurement Plan. No contract is expected to exceed the equivalent of US$500,000 and therefore non-consulting services will be procured using the client procedure as described in the PIM.
38. *Training.* The Project will finance costs associated with training and workshops related to the implementation of the Project.
39. *Operational Costs.* Operational costs under the Project will include incremental and reasonable expenditures that would not have been incurred by the grant Recipient without the Project, such as: office

supplies, communications (including connectivity), travel expenses, per diems and equipment, operations and maintenance. Operational costs will also include staff costs at CIAT for project management activities.

40. *Salaries and Benefits of Research and Direct Support Staff at CIAT.* The Project will be covering salaries and benefits of research and direct support staff related to the Project, starting with Principal Investigators (they will be shown as Budget Holders in PPAs), followed by Activity coordinators/collaborators and direct support staff such as Communications, Events, and Finance officers. There will be a tracking system/mechanism in place to ensure that only staff salaries attributable to the implementation of AICCRA project activities are eligible. The PIM indicates which specific documentation which will be required to justify the coverage of staff salaries of CIAT scientists and direct support staff by AICCRA.

41. *Assessment of CIAT's capacity to implement procurement.* Procurement will be carried out by CIAT and its partners using CIAT procedures and contracts with minor changes. The most common procurement method will be direct contracting, which will allow continued collaboration between institutions which have worked together for many years with good results. Therefore, as far as procurement and contract management are concerned, the parties are on familiar ground, with few risks of unexpected surprises. For these reasons, procurement risk is considered Moderate.

D. Environmental and Social (including safeguards)

42. The Project is rated Moderate for Environmental and Social risks and impacts, given that it will support mainly technical assistance-type investments to strengthen African countries' capacity to develop and implement green agriculture activities through specific innovative institutional and technical and research and development (R&D) solutions. The relevant ESSs are: ESS1 (Assessment and Management of Environmental and Social Risks and Impacts); ESS2 (Labor and Working Conditions); ESS3 (Resource Efficiency and Pollution Prevention and Management; ESS4 (Community Health and Safety); and ESS10 (Stakeholder Engagement and Information Disclosure). The Project will not finance infrastructure works or other activities involving land acquisition leading to economic and physical displacement; adverse impacts on biodiversity and living natural resources; and impacts on cultural heritage. Project activities are not taking place in areas where Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities (IP/SSAHUTLCs) are present.

43. *Environmental issues.* The Project's environmental impacts are primarily related to the activities under Component 3, which will include some agricultural activities aimed at producing climate-resilient crops, as well as developing technologies to use water and energy more efficiently. Key environmental impacts are linked to solid and liquid waste pollution; use of pesticides and fertilizers, water scarcity/salinity, soil degradation/nutrient loss/erosion; OHS, and cross-fertilization between experimental crops and local crops or other plant species (including natural habitats), which may generate biodiversity loss. Once sites and activities have been finalized, each Grant recipient will prepare an ESMP and PMP, which will be consulted upon and disclosed; the ESMP and PMP prepared in line with the project ESRM Guide will take account of applicable national laws, as well as the requirements of the World Bank's ESF. Capacity building tasks will focus on strengthening integrated agriculture and pest management activities to promote

greener agricultural practices for more productive and resilient agriculture products while reducing environmental degradation and conserving natural resources.

44. *Social issues.* The Project poses few social risks, as its activities will be undertaken within well-established research areas and nearby farms. As stated above, the Project will not finance activities that involve land acquisition, restrictions on land use, or economic or physical displacement. Any land used for agricultural research will be free of any claims. The Project includes measures to address the risks of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH). The Project has prepared LMP for CIAT; each Grant recipient will prepare LMPs that take into account national labor laws and requirements of the ESF and which provide guidance for direct and contracted staff, including: terms and conditions of employment; nondiscrimination and equal opportunity; the establishment of any worker's organizations; OHS measures for employees; restrictions regarding child and forced labor and a grievance mechanism for labor-related complaints.

45. *SEP.* The Project has prepared a SEP which describes mechanisms for engaging with a wide range of stakeholders, including agricultural research institutions, relevant government agencies, civil society organization/non-governmental organizations dealing with climate resilience, food security, climate change and relevant environmental issues, local farmers' organizations, women's farm cooperatives, meteorological institutes and others. The SEP calls for the use of regular consultations, complemented by periodic satisfaction surveys, to assess the roles and interests of key stakeholders, include a record of consultations and describe the function and operations of the project grievance mechanism. It also includes guidance for Grant recipients for preparing local SEPs. The ESMP will also include mitigation measures for social risks and impacts. The Project will include measures to encourage the participation of women and promote citizen engagement. For example, surveys will be carried out to identify the unique technology needs of women farmers and livestock keepers; efforts to design and validate CIS and CSA technologies will take those unique needs into account; some dissemination activities intended to improve access to CIS and CSA technologies will be targeted specifically to women; and impact evaluations will systematically document the impacts on women. Several of the surveys will be undertaken prior to the mid-term review to ensure that there is sufficient time to take into consideration beneficiary feedback in the implementation of the interventions. Similarly, because the success of CCAFS depends critically on the uptake and use of CIS and CSA technologies, mechanisms to solicit feedback from intended beneficiaries are hard-wired into most Project activities, ensuring the ready availability of channels for citizen engagement.

46. Under a 'shared accountability' approach, CIAT will be the granting organization and implementing agency, with primary responsibility for managing the Project's environmental and social risks. CIAT has developed an Environmental and Social Management System (ESMS) that meets the requirements of the World Bank's ESF. Grant recipients will have to agree to implement the environmental and social measures set out in CIAT's ESRM Guide in order to receive grants from CIAT under the Project. CIAT will hire one environmental and one social specialist for Eastern and Southern Africa and one for West Africa, co-located with ICRISAT (Bamako, Mali) and ILRI (Nairobi, Kenya), and supported by consultants. This team will supervise the environmental and social aspects of the Project and provide technical support to the Grant recipients. The ESRM Guide will be part of the PIM, which will be completed prior to the Project Effectiveness Date. The ESRM Guide addresses environmental and social risks and impacts in the Project and provides requirements and tools for CIAT and the institutions receiving grants from CIAT. This includes screening tools; templates for ESMPs, PMPs, LMPs and SEPs that would be prepared by each Grant

recipient; appropriate and proportional mitigation measures, based on the ESF, the World Bank's Environmental Health and Safety Guidelines (EHSGs) and Good International Industry Practice (GIIP) and other applicable guidelines such as FAO; M&E; reporting of incidents and accidents; consultation and disclosure process; and capacity-building.

47. The ESCP (disclosed on November 10, 2020) and SEP (disclosed on October 27, 2020) have been prepared and were disclosed for Appraisal on October 23, 2020. The LMP and ESRM Guide will be disclosed by November 30, 2020. In addition to the ESRM Guide, the Project includes:

    (i) Ex-ante review of the environmental and social risks and impacts of each institution's work program;

    (ii) Ex-post review (annual environmental and social monitoring report), which includes information on sub-projects; and

    (iii) Explicit exclusion of activities on a "negative list" (e.g. economic and physical displacement, adverse impacts on biodiversity and cultural heritage).

E. Monitoring and Evaluation

48. CIAT through CCAFS will be responsible for carrying out M&E functions for the Project. The CCAFS Director, supported by the Head of Strategic Results and Performance Management of CCAFS, will compile, consolidate, and synthesize data and information needed for progress and performance reporting to comply with World Bank requirements. Designated Activity Leaders (staff of CCAFS or of CCAFS partners) will be responsible for monitoring AICCRA-funded activities and reporting progress against plans and targets. The institutional affiliations of the Activity Leaders are shown in Table A2.3 (below).

49. The Activity Leaders will work with M&E Focal Points in each AICCRA anchor country to budget and plan M&E activities at country level. The CCAFS Regional Coordinating Centers (ILRI and ICRISAT) will designate an M&E Focal Point in each AICCRA anchor country to support a decentralized M&E process and ensure that data are collected closest to the source to assure timeliness and quality. ILRI will designate the M&E Focal Points in Ethiopia, Kenya, and Zambia, and ICRISAT will designate the M&E Focal Points in Ghana, Mali, and Senegal. The M&E Focal Points will be staff of CCAFS or of the CGIAR Centers.

50. The M&E Focal Points and Activity Leaders will make use of the MIS that CCAFS has already in place, which will be further refined and strengthened.[13] The MIS will serve as an entry point to guide evaluation work. It will not only support the regular reporting function but also feature a user-friendly interactive online dashboard that will allow Project staff, partners, stakeholders, and external users to access and query the

[13] The MIS system currently being used by CCAFS will be integrated eventually into a CGIAR-wide online interoperable planning and reporting system, which CIAT is developing to provide a common platform for collection of standardized data and information, quality assurance, and consolidation and synthesis of data at national, regional, topical and overall project levels. The system follows the principle that the person closest to an activity will feed data into the system and provide qualitative narrative contextualization to facilitate interpretation of the quantitative progress being made The system allows planning and reporting data to be entered on a continuous basis.

data base. An effort will be made to ensure that the system will be able to show how AICCRA is helping to narrow gender gaps.

Table A2.3. AICCRA - Responsibility for M&E activities

M&E Activity	Responsibility	M&E Reports
Internal M&E	Overall: PCU and CIAT	Compilation, consolidation, quality assurance and synthesis of bi-annual progress reports and Final Impact
	Flagship Program 1: ILRI	Continuous data collection Bi-annual progress reports
	Flagship Program 2: CIAT	
	Flagship Program 4: IRI	
	Eastern Africa: ILRI	
	West Africa: ICRISAT	
	Zambia: IWMI	
	Kenya: ILRI	
	Ethiopia: ILRI	
	Ghana: IITA	
	Senegal: ICRISAT	
	Mali: AfricaRice	
External M&E	World Bank	Implementation Status Reports
	PCU	Mid-Term Review Final Impact Evaluation
Impact Assessment	PCU / External consultant	Impact Assessment Report

51. The M&E function for AICCRA will encompass three types of activity: (i) internal M&E, (ii) external M&E, and (iii) impact assessment. Data and information needed for M&E purposes will be collected continuously and reported twice each year (internal M&E), building the body of evidence needed to support and enrich bi-annual supervision missions, a Mid-Term Review, and a Final Impact Evaluation (external M&E), which in turn will feed into an specifically designed end-of-project Impact Assessment (impact assessment).

52. *Internal M&E:* Data for many activity and output indicators will be collected and entered regularly at short intervals (weekly or monthly), but for a small set of outcome indicators data will be collected only on an annual basis. Twice a year, the Activity Leaders will prepare M&E reports, which will be checked for quality assurance by Project management liaison persons before being consolidated and released by the Project Coordination Unit (PCU).

53. *External M&E:* The internal M&E function will be complemented and enriched by periodic deeper dives, which offer additional project external views and expertise. Implementation support missions will be carried out by the World Bank twice per year on average. During these missions, the World Bank team will review the implementation status of the Project, assess progress achieved with respect to the PDO,

and identify issues requiring attention (administrative, fiduciary, safeguards). A Mid-Term Review will be carried out approximately mid-way through implementation to evaluate the progress achieved by the Project and allow for mid-course adjustments if necessary. A Final Impact Evaluation will be conducted during the last year of implementation to evaluate the overall accomplishments of the Project. The Mid-Term Review and especially the Final Impact Evaluation will be focused on the analysis of the indicators set out in the results framework, and they will assess the relevance, efficiency, efficacy and sustainability of the Project.

54. *Impact Assessment:* An Impact Assessment will be carried out at Project closing. Resources to carry out the Impact Assessment will be budgeted under Component 4 of the Project. The Impact Assessment will be carried out by an externally recruited firm or organization, which will be charged with proposing a rigorous and innovative methodology to explore impact contributions (i.e., explore where increased flow of climate–relevant agriculture technology packages and climate advisory services have contributed to increased productivity and resilience to climatic shocks or gender dimensions).

ANNEX 3: Economic and Financial Analysis

COUNTRY: Africa
Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

1. Introduction

1. AICCRA is expected to generate several types of benefits:

   (a) Primary benefits generated mainly during the Project life:

   (i) Strengthened human and institutional capacity to generate, assess, and make use of CSA technologies and CIS among CGIAR Centers, CCAFS partners, African regional organizations, national agriculture research and extension organizations (NAREs), civil society organizations, and private firms, among others.

   (ii) Bridged gap between CGIAR-led science partnerships on the one hand and technology generation organizations and extension services on the other hand, resulting in faster and more extensive scaling-up of innovative technologies and improved availability of short-term and seasonal climate forecasts to service providers and to end users (e.g., farmers, livestock keepers, other food system actors, policy makers).

   (iii) Enhanced regional integration of research for development activities, paving the way for more extensive dissemination of climate advisory services and more widespread scaling-up of innovative technologies through cross-border spillovers.

   (b) Secondary benefits generated mainly after the Project has ended:

   (iv) Increased productivity and enhanced climate resilience (reduced production variability) at farm-level, including positive outcomes for women.

   (v) More widespread adoption of CSA technologies due to regional spillovers.

   (vi) Climate benefits in the form of reduced greenhouse gas (GHG) emissions.

2. Estimating the economic value of the benefits described under (a) would be difficult (costly, time consuming, and conceptually challenging), and it will not be attempted for purposes of the PAD. Nevertheless, the meta-analyses done by Pardey et al. (2016) and Alston et al. (2020) provide compelling evidence that investments in food and agriculture research and development made in sub-Saharan Africa (SSA) over the last 40-50 years have generated attractive returns.

3. Since the benefits described under (a) are “enablers” of the benefits described under (b), the economic and financial analysis (EFA) focuses on the benefits described under the latter. Caveat: the benefits described under (b) fall under the sphere of influence of the Project, but not under the sphere of control, because they depend in part on factors beyond the control of the Project (e.g., price incentives, availability of purchased inputs, weather conditions, etc.)

4. The EFA is carried out in four stages. In the first stage, the area that could potentially benefit from AICCRA is calculated (including both the target countries and the extrapolation domain). In the second stage, the value is calculated of the benefits that would result from a 1 percent increase in crop and livestock productivity over this entire area. In the third stage, the value of the benefits is adjusted in recognition of the fact that adoption will occur gradually over time and will not reach the entire area.

In the fourth stage, measures of project worth are calculated recognizing that the investments to be made under AICCRA will make up only a very small share of investments to increase uptake of CSA technologies and use of CIS.

2. Literature review: Benefits of CSA and CIS adoption

5. Climate change poses a major threat in the areas being targeted by AICCRA. The Project will operate in several agro-ecological zones (AEZs), all of which are projected to experience significant temperature increases over the long term – up to 2.7 °C by the 2050s, if current greenhouse gas emission trajectories continue (Girvetz et al., 2019). In addition to rising average temperatures, a major source of uncertainty for the region's farmers and pastoralists will be increased variability in rainfall, which will amplify risk throughout the growing season.

6. The following paragraphs provide evidence from the literature of the benefits of adoption of CSA technologies and the benefits of use of CIS.

2.1. Benefits of adoption of CSA technologies

7. A large and robust body of evidence shows that adoption of CSA technologies can be profitable and lead to desirable development outcomes. A recent systematic review of the scientific literature showed that at household level many CSA technologies can reduce production risks by up to 48 percent compared with business-as-usual approaches, as well as increasing the economic benefits to farmers by up to 40 percent.[44] The farm-level profitability of adopting CSA practices can vary, however, depending on local context and factors such as the distance to markets and local income inequalities. But a consistent finding is that few farm-level activities produce large benefits when practiced in isolation.[45] There is extensive evidence that combinations of practices out-perform single practices across a variety of regions, agro-ecologies and socio-economic conditions.[46, 47, 48, 49, 50] reviewed data from 27 peer-reviewed publications and calculated substantial economic benefits of CSA practices at the farm level, in terms of increases in gross margins per ha compared with conventional practices: 58 percent, 132 percent, 210 percent and 337 percent increases for agroforestry, soil management, crop management, and nutrient management practices, respectively. Most of these practices result in lower risks for farmers. Similar analysis for Malawi indicates gross margin changes of +47 percent and +61 percent for soil management and nutrient management practices, respectively, though a small decrease (-3 percent) for agroforestry practices.[51] Adoption of drought tolerant maize varieties increased maize yields by 13 percent and reduced yield variance by 53 percent in Nigeria.[52] and increased yields by 150 percent in northern Ghana.[53] The reasons for adoption and non-adoption of CSA practices at farm level are complex, and may relate to information availability, labor availability, credit availability for purchases of inputs,[54] and other factors such as wealth indicators and tenure security.[55]

8. Beyond the large body of farm-level evidence, substantial benefits have been demonstrated at national level as well. Adopting CSA on 25 percent of the area planted to maize and wheat in Ethiopia would increase annual GDP by 0.18 percent (US$49.8 million) and reduce the national poverty rate by 0.15 percentage points. Moreover, CSA would be more effective than doubling fertilizer use on the same area.[56]

2.2. Benefits of use of CIS

9. Farmers who make use of CIS usually realize benefits, although the evidence is less conclusive.[57] Evidence on the benefits of using CIS comes in the form of productivity or income benefits elicited through surveys or workshops, willingness to pay studies, field trials, and model-based decision analysis. One economy-wide equilibrium modeling study estimated the GDP gain from widespread

adoption of seasonal forecasts across Kenya, Malawi, Mozambique, Tanzania, and Zambia would average US$113 million per year, with a disproportionate share of the amount going to poorer households.[58] A more recent analysis estimated a 5 percent gain in GDP resulting from widespread adoption of weather and climate services in Ethiopia.[59] A CCAFS-led initiative in Rwanda has enabled more than 100,000 farmers to gain access to CISs, through a combination of participatory processes (extension based, and radio listener programs). Relative to a control population, farmers that adopted climate services realized productivity gains of 24 percent or higher, and income gains of 30 percent or higher.[60] In Senegal, CCAFS has promoted uptake of CIS by providing advisory services supported by operational climate information, including seasonal forecasts. Relative to the control population, farmers making use of the climate advisory service have realized up to 20 percent gains in income, deriving from improvements in land preparation, crop choice, planting and harvesting dates, and conservation decisions.[61]

3. Economic analysis

3.1. Methodology and data sources

10. The increased productivity and enhanced climate resilience expected to result from AICCRA activities (i.e., resulting from greater use of CIS and more widespread adoption of CSA technologies) were estimated as follows.

11. The six target countries and the regions in which they are located were stratified based on AEZ and prevailing production system. The classification of Seré and Steinfeld was used,[62] as described in Robinson et al. (2011).

12. Areas, human population numbers,[63] crop areas, production, yields and value of production,[64] and livestock numbers, production, and value of production were calculated for all systems. For both crops and livestock products, the prices used and the updated data sets relate to 2005 international dollars.[65, 66] For crops, combined totals were calculated for all food crops, and separate totals were calculated for maize as a widely grown indicator crop. Maize was used as an indicator crop to provide indicative estimates of CSA benefits, rather than benefits from all food crops. Maize has several characteristics that make it a good indicator crop: it is sensitive to climate, and it is grown across a wide range of smallholder farm types. It is also important for food and nutrition security: in the six AICCRA anchor countries, maize supplies on average 20 percent of daily calorie requirements (in Zambia, 42 percent).[67] Maize was also used as the indicator crop to estimate the benefits of avoided yield losses because of reduced climate variability. Depending on the country, maize accounts for between 8 and 34 percent of the total food-crop value of production (VOP). For livestock, cattle were used as the indicator species, so productivity gains attributable to adoption of CSA technologies were based on productivity gains that have been observed in bovine meat and milk production. These data were all for 2005, nominally.

13. This information was generated for the six target countries and for 20 additional countries in the three regions, to make up the “extrapolation domain” including spillovers. For all three regions, the mixed crop-livestock production system was used for extrapolation. In the Seré and Steinfeld classification,[68] the mixed crop-livestock systems are broken down into rainfed (MR) and irrigated (MI). The rainfed and irrigated categories are each further broken down into three AEZs: arid-semiarid, defined as a length of growing period (LGP) ≤180 days per year (MRA, MIA); humid-sub-humid, with LGP >180 days per year (MRH, MIH); and tropical highland, defined as areas with a daily mean temperature during the growing period of 5-20 °C (MRT, MIT). In West Africa, most of CCAFS’s work with climate-smart villages (CSVs) has been carried out in the drier mixed rainfed systems (MRA), and so for estimating regional spillovers in West Africa, the MRA system (and the small amounts of MIA system) was used

as the extrapolation domain. For Zambia, much of the cropland is located in the MRA and MIA (to a much lesser extent) systems, and so these systems were used for extrapolation purposes in the southern Africa region too. In most countries of both West and southern Africa, there are only small amounts of the MRT system. For East Africa, CCAFS has been active across all mixed system types, so for the extrapolation domain for East Africa, the MRA, MRH and MRT systems were used (along with much smaller areas of MIA, MIH and MIT systems). All spatial variables were standardized to grids of 5 arcminute resolution. The extrapolation domains for each region are mapped in Figures 7, 8 and 9. These domains include the countries with significant areas of the mixed crop-livestock systems in the appropriate AEZs, on the basis that CSA and CIS technologies that have been validated in particular AEZs in the target countries in each region may also have potential for being adopted in similar AEZs in other countries in the same region.

3.1. Direct benefits of CSA practices via increased yields

14. Table A3.1 shows the estimated direct benefits of adoption of CSA practices in the six target countries, expressed as the increase in value of production per year per percentage point increase in crop, meat and milk yield – that is, assuming adoption over all the maize area and all cattle in the target systems of a technology that increased production per ha or per animal by 1 percent.

Table A3.1. Increases in value of production (2005 US$ x 1000) in food crops, maize, bovine meat and bovine milk for a 1 percent increase in yield throughout the mixed crop-livestock systems in AICCRA target countries

	Country and systems included						Total
	Ethiopia	Ghana	Kenya	Mali	Senegal	Zambia	
	MRA, MRH, MRT, MIA, MIH, MIT	MRA, MIA	MRA, MRH, MRT, MIA, MIH, MIT	MRA, MIA	MRA, MIA	MRA, MIA	
Maize	4,834	98	3,521	758	404	691	10,405
Other food crops	32,550	4,638	13,439	7,990	5,474	1,092	65,181
Bovine meat	9,594	119	2,200	792	546	44	13,294
Bovine milk	8,834	32	2,117	194	134	65	11,377
Total	55,813	4,986	21,276	9,734	6,557	1,891	100,258

Systems based on Robinson et al. (2011): MR = mixed rainfed; MI = mixed irrigated; A = arid-semiarid; H = humid-subhumid; T = tropical highland.

15. Table A3.2 converts the benefits in Table A3.1 to a range of plausible adoption rates and productivity increments at scale. The productivity increments in Table A3.2 are well within what has been observed in many situations for a range of single CSA practices as well as combinations (see text above). Regarding adoption rates, there are not many examples of agricultural technology adoption rates at scale in excess of 2 percent per year.[69] The annual adoption rates used in Table A3.2 refer to the total area of crop and number of cattle that have not yet adopted over a ten-year period, so 2 percent adoption in year 8 is not the same number as 2 percent adoption in year 2, for example.

Table A3.2. Marginal increases in value of production per year at year 10 (2005 US$, millions) of maize, bovine meat and bovine milk for different plausible yield benefits and annual adoption rates in the mixed crop-livestock systems in AICCRA target countries (Ethiopia, Ghana, Kenya, Mali, Senegal, Zambia)

	5 % Productivity increment			10% Productivity increment		
Annual adoption rate	**1%**	**2%**	**3%**	**1%**	**2%**	**3%**
Maize	4.71	9.03	13.00	9.42	18.06	26.00
Bovine meat	5.76	11.08	15.98	11.53	22.16	31.96
Bovine milk	4.93	9.48	13.67	9.87	18.96	27.35
Total	15.40	29.59	42.65	30.82	59.18	85.31

3.2. CSA adoption: Spillover benefits

16. Table A3.3 shows the estimated spillover benefits of adoption of CSA practices in the 20 "extrapolation domain" countries, expressed as in Table A3.1 in terms of the increase in value of production per year per percentage point increase in crop, meat and milk yield (i.e., assuming adoption over all the cropping areas and all cattle in the target systems). Table A3.4 shows the marginal benefits in value of production for the same productivity increments as in Table A3.2. For consistency, the same adoption rates are used in Table A3.4 as in Table A3.2, recognizing that AICCRA investments alone are unlikely to generate as much incremental adoption in spillover countries as in anchor countries.

Table A3.3. Increases in value of production (2005 US$ x 1000) of maize, other food crops, bovine meat and bovine milk for a 1 percent increase in yield throughout the mixed crop-livestock systems in the 20 AICCRA "spillover" countries.

	Region, Countries, Systems			
	East Africa: Burundi, Rwanda, Tanzania, Uganda	**West Africa: Benin, Burkina Faso, Chad, Cote d'Ivoire, Cameroon, Guinea, Gambia, Guinea-Bissau, Mauritania, Niger, Nigeria, Togo**	**Southern Africa: Botswana, Malawi, Mozambique, Zimbabwe**	**Total**
	MRA, MRH, MRT, MIA, MIH, MIT	**MRA, MIA**	**MRA, MIA**	
Maize	12,760	15,082	6,087	33,929
Other food crops	180,824	403,858	32,566	617,248
Bovine meat	8,477	13,184	1,802	23,463
Bovine milk	9,943	4,142	1,574	15,659
Total	212,004	436,266	42,029	690,299

Systems based on Robinson et al. (2011): MR = mixed rainfed; MI = mixed irrigated; A = arid-semiarid; H = humid-sub-humid; T = tropical highland.

Table A3.4. Marginal increases in value of production per year at year 10 (2005 US$, millions) of maize, bovine meat and bovine milk for a range of plausible productivity benefits and adoption rates per year in the mixed crop-livestock systems in the 20 AICCRA "spillover" countries.

	5 percent Productivity increment			10 percent Productivity increment		
Annual adoption rate	**1 percent**	**2 percent**	**3 percent**	**1 percent**	**2 percent**	**percent**
Maize	14.8	28.5	41.0	29.6	56.9	82.1
Bovine meat	10.2	19.5	28.2	20.3	39.1	56.3
Bovine milk	6.8	13.0	18.8	13.6	26.1	37.6
Total	31.8	61.0	88.0	63.5	122.1	176.0

3.3. Benefits of yield losses avoided through use of CIS

17. The benefits for farmers who use CISs arise from their being able to adjust their management practices to likely imminent or future weather patterns. If the growing season is likely to be wetter than average, then it may be appropriate to increase the use of purchased inputs to increase production and net revenues, for example. For drier conditions, CIS can help farmers and herders reduce production losses via a range of management decisions (such as sale of animals or reducing cropping inputs). The long-term implications of a drought on vulnerable households may be profound, because such a "system shock" can push farmers and their families into poverty from which it can be difficult to escape.[70]

18. The use of CIS will not only reduce production variability, it should also increase average yields. This latter effect is not included in the CIS analysis done here as it would double-count the benefits already estimated from CSA technology adoption. An assumption in the EFA is that CSA adoption leads to production benefits (increases in distribution means) and that CIS leads to reductions in yield losses in poorer seasons (reductions in production standard deviations). Thus, the target populations for CSA and CIS are essentially the same, which is judged to be appropriate in the AICCRA context in view of the fact that weather-related production variability in the arid-semiarid mixed systems of SSA can be considerable.

19. Annual national yield variability was calculated from FAOSTAT for each of the six target countries for the last 30 years available (1989-2018). Maize yield coefficients of variation (CVs) for the target and extrapolation countries are about 75 percent for southern Africa, 37 percent for East Africa, and 34 percent for West Africa.

20. Because CIS are still relatively new in SSA, information on the potential for the use of CIS to reduce yield variability is still scarce. To the extent that use of CIS prompts changes in technology choice, the impacts can be significant; as noted above, Wossen et al. (2017) reported that yield variance in farmers' fields can be halved via the use of drought-tolerant maize.

21. One way to translate reduced yield variability into production benefits is to calculate the economic losses avoided (in terms of value of production) for a percentage reduction in yield CV, measured with respect to the left-hand tail of the production distribution. A very approximate estimate is to assume that maize yields in farmers' fields are distributed normally and calculate the difference in the probability densities of two normal yield density curves, one with the observed mean and yield CV and another with the same mean but a reduced yield CV. For maize grown in the MRA systems in the target

countries, average yield is 1.24 t/ha, and the yield CV is about 35 percent. This indicates a yield standard deviation of 0.43 t/ha. For example, if the CV is reduced to 30 percent with the same mean, the new standard deviation is 0.37 t/ha. The area between the PDFs of these two normal distributions in the left-hand tails (i.e., the total of the yield loss foregone because of the reduction in CV from 35 percent to 30 percent), amounts to 3.3 percent of total production. Values of the loss avoided are shown in Table A3.5 for the same adoption rates used in Tables A3.2 and A3.4. In practice, mean yields will increase through the use of CIS, but as explained above the focus here is on the avoided losses, which may be extremely important for household food security.

Table A3.5. Value of production losses avoided per year at year 10 (2005 US$, millions) via a reduction in the CV of annual maize production from 25 percent to 20 percent (e.g. through the use of CIS) in the MRA mixed crop-livestock systems.

	3.3 percent maize productivity increment (loss avoided)					
Annual adoption rate	**0.1 percent**	**0.2 percent**	**0.3 percent**	**1 percent**	**2 percent**	**3 percent**
AICCRA target countries				16.5	32.1	46.8
Spillover countries	5.1	10.2	15.3			

4. Indicative AICCRA returns on investment

22. The information presented in the tables above illustrates estimated changes in the value of production of different commodities for different production increments and adoption rates. To estimate returns on investment (though without estimating the costs of the "enablers" – see paragraph above on the primary benefits), some estimate is needed of the direct costs of implementing CSA and CIS technologies at the farm level, so that cash flows can be calculated on changes in net profits or grow margins per ha or per animal.

23. Harris and Orr (2013)[71] provide benefit-cost ratios for a wide range of smallholder agricultural production technologies using many household-level datasets in countries throughout SSA (and India). Many of these technologies for different crops can be classed as CSA (e.g., conservation tillage, crop rotations and crop mixtures, fertilizer micro-dosing, and many others). Median net returns increased from US$186 per ha (in 2005 US$) for "baseline technologies" to US$558 per ha for the 64 technologies considered, and the median Benefit-Cost Ratio (BCR) from 1.62 to 2.24 for the 49 technologies for which this was reported.[72] This combination of increases in net returns and BCR implies an increase in costs per ha of implementing the CSA technologies at the farm level, compared with the baselines, by a factor of about 2.2.

24. Table A3.6 shows the Net Present Value (NPV), Internal Rate of Return (IRR) and BCR for the AICCRA project for a range of conservative adoption rates and yield increments, with the assumptions that the investment is allocated to the indicator crop (maize), and that the marginal VOP additions each year from CSA and CIS adoption are adjusted by a factor of 2.5 to account for the increased costs of implementation at the farm level (as above) plus the essentially unknown off-farm costs (increased market access, improved seed production, etc.).[n]

[n] The BCR ratio used for the economic analysis is based on figures reported by Harris and Orr (2013), which

25. Table A3.7 shows the NPV, IRR and BCR for the AICCRA spillover countries for a range of conservative adoption rates and yield increments, with the same assumptions as in Table A3.6, though here just for CSA technology adoption.

Table A3.6. Investment criteria to 2030 using a discount rate of 5 percent for maize CSA and CIS adoption for different plausible yield benefits and adoption rates per year in the mixed crop-livestock systems of the AICCRA anchor countries (Ethiopia, Ghana, Kenya, Mali, Senegal, Zambia).

	Benefits of CSA and CIS adoption					
	15% yield benefit + 3.3% avoided loss			**30% yield benefit + 3.3% avoided loss**		
Annual adoption rate	**1 %**	**2%**	**3%**	**1%**	**2%**	**3%**
(implied adoption % by 2030)	**9.1%**	**17.4%**	**25.0%**	**9.1%**	**17.4%**	**25.0%**
NPV (2005 US$ million)	(US$2.66)	US$48.9	US$97.9	US$54.7	US$160.7	US$261.1
IRR (%)	4.3%	15%	23%	16%	30%	41%
B/C ratio	0.95	1.86	2.71	2.75	3.81	5.57

Table A3.7. Investment criteria to 2030 using a discount rate of 5 percent for maize CSA adoption for different plausible yield benefits and adoption rates per year in the mixed crop-livestock systems of the AICCRA spillover countries.

	Benefits of CSA adoption					
	15% yield benefit			**30% yield benefit**		
Annual adoption rate	**1 %**	**2%**	**3%**	**1%**	**2%**	**3%**
(implied adoption % by 2030)	**9.1%**	**17.4%**	**25.0%**	**9.1%**	**17.4%**	**25.0%**
NPV (2005 $ mill)	US$34.5	US$121.6	US$204.3	US$150.2	US$347.0	US$534.1
IRR (%)	12%	25%	34%	28%	45%	57%
B/C ratio	1.60	3.13	4.58	3.63	7.07	10.35

5. Sensitivity analysis

26. The robustness of some key assumptions of the EFA was tested for one of the scenarios shown in Table A3.6: a 2 percent adoption rate of both CSA technologies and CIS, and a 15 percent yield benefit resulting from the adoption of CSA. Results are shown in Table A3.8, with respect to (1) increases in the discount rate used; (2) less conservative estimates of yield losses avoided through the use of CIS; and (3) changes in the total costs of implementation of both CSA and CIS. The results of the investment

could reflect bias in the literature against publishing negative results. Nevertheless, since AICCRA will focus on high performing and scalable options that have been proven effective through CGIAR and partner research, the BCR ratio used appropriately represents the expected BCR for innovations promoted through the Project.

analysis using less conservative estimates of the benefits of avoided production losses are particularly noteworthy.

27. It is recognized that realizing the benefits evaluated will depend on many factors in addition to AICCRA investments. Given the challenge of attributing benefits to the AICCRA investment directly, compared with attributing benefits to other activities and investments made in the anchor countries and across the regions more generally, the returns to the AICCRA investment in this EFA have been estimated using extremely conservative assumptions. These include conservative estimates of CSA technology and CIS adoption rates, as well as conservative estimates of CSA production benefits and CIS-informed production losses avoided. Furthermore, the analysis was built around just one (albeit important) indicator crop to represent the complexity and variation in the mixed crop-livestock farming systems in the different regions of SSA. Even with such conservative assumptions, AICCRA investments are expected to generate attractive returns. It may reasonably be expected that AICCRA would generate even more attractive returns than indicated in Tables A3.6 and A3.7, if the VOP benefits of production increases and avoided losses for beef, milk and other key food crops were to be taken into account. In light of the evidence in Steward et al. (2019), bundled packages of CIS and CSA options, including livestock production-enhancing technologies, would likely increase these investment returns even further.

Table A3.8. Sensitivity analysis for AICCRA investment criteria to 2030 for different discount rates, CIS benefits, and implementation costs in the mixed crop-livestock systems of the AICCRA anchor countries.

	Scenario	NPV (2005 US$ million)	IRR (%)	B/C ratio
1	Baseline: • 2% adoption per year • 15% CSA yield benefit • CIS avoided loss benefit 3.3% (CV of annual yield reduced from 35% to 30%) • implementation cost factor 2.5 • 5% discount rate	US$48.9	15%	1.86
	CIS effectiveness			
2	CV of annual yield reduced from 35% to 25% (CIS avoided loss benefit 6.4%)	US$66.4	18%	2.16
3	CV of annual yield reduced from 35% to 20% (CIS avoided loss benefit 12.2%)	US$101.8	23%	2.78
	Implementation cost changes			
4	Implementation cost factor changed from 2.5 to 2.0	US$75.5	20%	2.32
5	Implementation cost factor changed from 2.5 to 3.0	US$31.3	12%	1.55
	Discount rate changes			
6	Discount rate changed from 5% to 6%	US$41.9	15%	1.74
7	Discount rate changed from 5% to 7%	US$35.5	15%	1.63

Figure A3.1. West Africa domain for AICCRA extrapolation: shaded areas show the mixed rainfed crop-livestock systems, arid-semi-arid (LGP≤180 days per year) (MRA). System classification from Sere and Steinfeld (1996), mapped in Robinson et al. (2011). Anchor countries in bold italic, other named countries are included in the extrapolation domain.

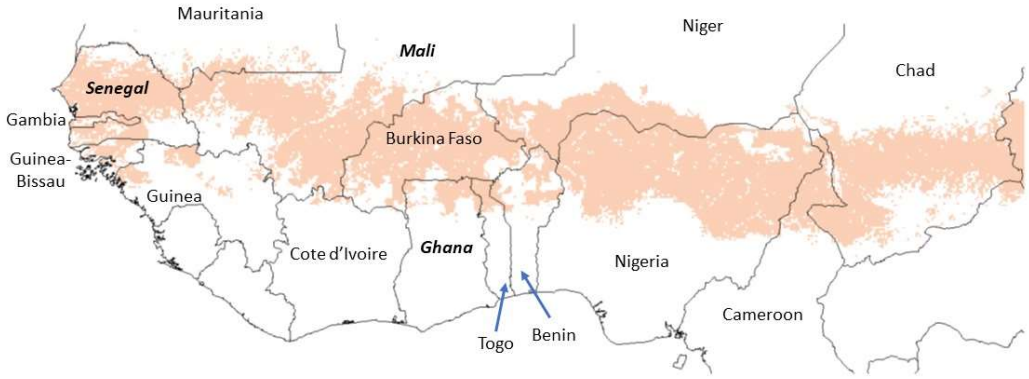


Figure A3.2. Southern Africa domain for AICCRA extrapolation: shaded areas show the mixed crop-livestock systems, arid-semi-arid (LGP<180 days per year) (MRA). System classification from Sere and Steinfeld (1996), mapped in Robinson et al. (2011). Anchor countries in bold italic, other named countries are included in the extrapolation domain.

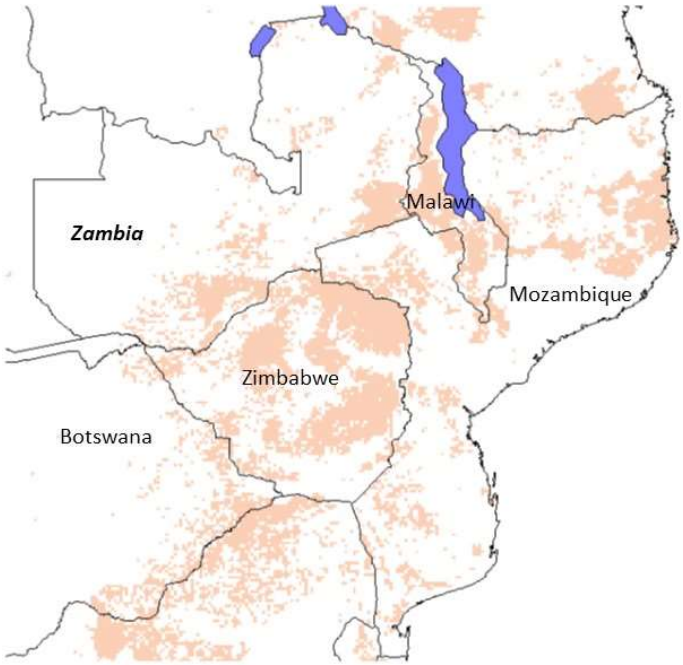
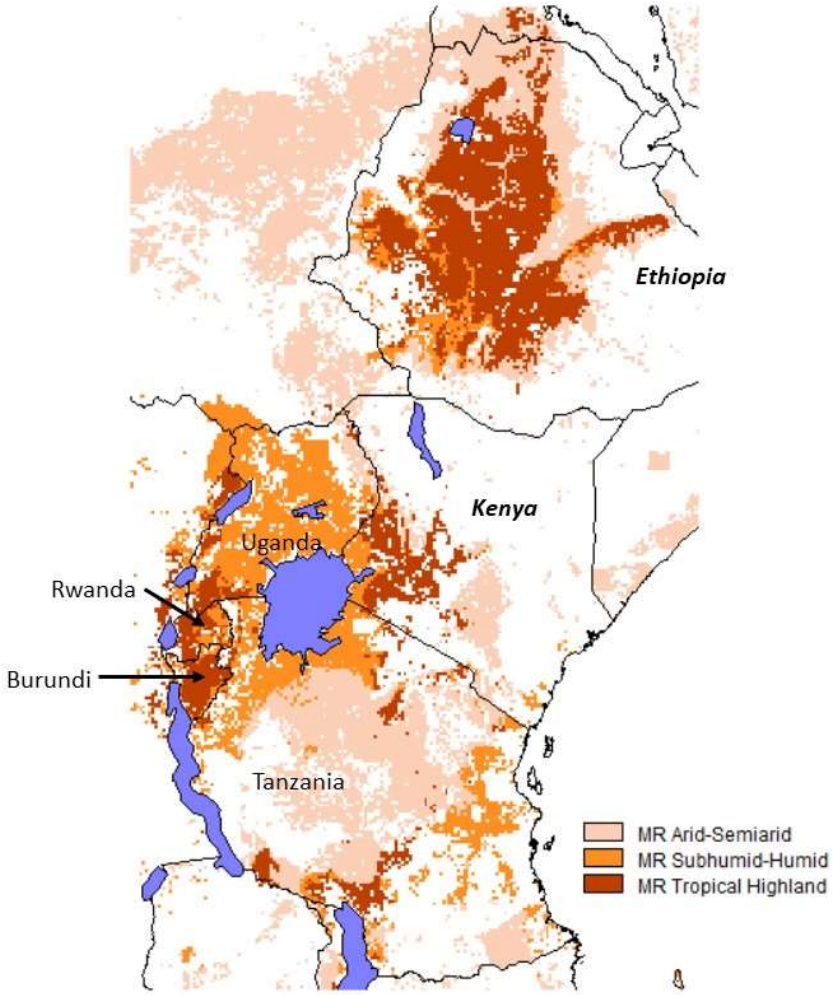


Figure A3.3. East Africa domain for AICCRA extrapolation. System classification from Sere and Steinfeld (1996), mapped in Robinson et al. (2011). Anchor countries in bold italic, other named countries are included in the extrapolation domain.



ANNEX 4: Environmental and Social Risks and Impacts

COUNTRY: Africa
Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

1. Introduction

1. The Project has an Environmental and Social Risk Category of "Moderate." The Project is not expected to have significant impacts on the environment or people.
2. Table A4.1 below summarizes the key Environmental and Social (E&S) risks and mitigation measures.

Table A4.1. Summary of Project Environmental and Social Risks and Mitigation Measures

Risks	Mitigation Measures
Solid and liquid waste pollution	Meeting environmental sustainability criteria such as waste indices (related to waste disposal, waste management and pollution)
Use of fertilizers and pesticides	Training on all aspects of best practice in sustainable pest and disease management programs with focus on compliance (food safety, pesticides residues); comply with synthetic input indices (related to integrated pest management, enforcement of prohibited lists and complete prohibition of synthetics); promote IPM approach; use ICT applications
Water scarcity/salinity	Sustainable use of water resources; ensure that water resources are allocated efficiently and equitably and used to achieve socially, environmentally and economically beneficial outcomes; management of floods, droughts, and drainage; conservation of ecosystems and associated cultural and recreational values
Soil degradation/nutrient loss/erosion	Best practice for minimal soil disturbance, the maintenance of plant cover and diversification of rotations and intercropping; awareness of the effects of inadequate soil management practices; monitor/follow soil indices related for soil conservation and quality maintenance;
Carbon footprint	Employ practices linked to climate change mitigation strategies (biofuel production, bio-production systems with benign or beneficial environmental consequences, carbon sequestration)
Natural Resource Depletion	Use of renewable energies; promote innovative technologies and platforms (effective environmental databases), information technology and biotechnology; promote natural resource management; practice conservation agriculture
Occupational Health and Safety (OHS)	Safe use of fertilizers and pesticides; personal protective equipment (PPE) used according to the Safety Data Sheets (SDS) of the product or according to a risk assessment of the fertilizer product.
Biodiversity Loss	Develop ICT application; promote sustainable; integrated natural resources management (NRM) (silvopastoral approach); encourage use of voluntary sustainability standards and practices

Risks	Mitigation Measures
Labor	LMP for each agricultural research institution; restrictions on child or forced labor; fair terms of employment; codes of conduct; OHS measures; grievance redress mechanism (GRM); training
Grievance redress	GRM (operational and budgeted) for each agricultural research institution; complaints resolved or escalated
Social inclusion of gender (including management of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH)), as well as other vulnerable groups	Risk assessment; stakeholder engagement; action plan; codes of conduct; monitoring

3. Based on the nature of the Project, key environment and social risks (Table A4.1) include solid and liquid waste pollution; use of pesticides and fertilizers, water scarcity/salinity, soil degradation/nutrient loss/erosion; carbon footprint; natural resource depletion; OHS; biodiversity risks and impacts related to cross-fertilization between experimental crops and local crops or other plant species (including natural habitats); some social exclusion, including gender and other vulnerable groups, Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH); grievance redress; and, labor risks.

4. The following type of activities are ineligible for financing under the Project. The ESRM Guide does reflect these prohibitions:
    - Production or activities involving forced labor,[15]
    - Production or activities involving child labor,[16]
    - Cross-border trade in pesticide, waste and waste products, unless compliant to the Basel Convention and the underlying regulations,[17]
    - Research that may lead to environmentally damaging activities, such as inappropriate use of chemical fertilizers,

[15] Forced labor means all work or service not voluntarily performed that is extracted from an individual under threat of force or penalty.

[16] Employees may only be hired if they are at least 15 years old, in accordance with the ILO Minimum Age Convention (C138, Art. 2). Children under the age of 18 will not be employed in hazardous work. Children will not be employed in any manner that is economically exploitive, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health, or physical, mental, spiritual, moral, or social development.

[17] The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, usually known as the Basel Convention, is an international treaty that was designed to reduce the movements of hazardous waste between nations. Under the convention, hazardous waste, as defined under the convention, generally will not be traded cross-border without the consent of the State of import. Under Basel Convention, “hazardous wastes” are defined as (a) Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III; and (b) Wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit.

- Production or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements, or subject to international bans, such as pharmaceuticals, pesticides/herbicides, ozone depleting substances, Polychlorinated Biphenyls (PCBs), wildlife or products regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),
- Biotechnology application in genetically modified (GM) crops that may involve genetic transformations of the national original crops and/or might generate irreversible environmental impacts,
- Activities that could introduce invasive alien species and may impact critical habitats and/or legally protected areas,
- Activities that may result in discrimination against vulnerable groups, including on the basis of gender and disability,
- Activities involving land acquisition leading to economic or physical displacement,
- Activities that affect existing land tenure arrangements or cultural heritage,
- Activities carried out by institutions with a record of unresolved occupational, health, and safety incidents or accidents,[18]
- Activities carried out by institutions with a record of unresolved Sexual Exploitation and Abuse/Sexual Harassment incidents,[19] and
- All the other activities excluded under the ESRM Guide of the Project.

5. Project financing can also be suspended in instances where there are confirmed cases of: discrimination of vulnerable groups, including gender and disability; occupational, health, and safety incidents or accidents; and SEA/SH.

2. Environmental and social due diligence process for agricultural research institutions

6. Grant recipients shall adopt the measures set out in the ESRM Guide developed by CIAT, per the requirements of the World Bank ESF (including the EHSGs, and other relevant Good International Industry Practice (GIIP)) and applicable national environmental and labor legislation and regulations.

ESMS for CIAT and Grant Recipients

7. To manage potential E&S risks associated with Project activities, E&S due diligence shall be conducted prior to client, project or transaction approval and also include adequate supervision of the Project during

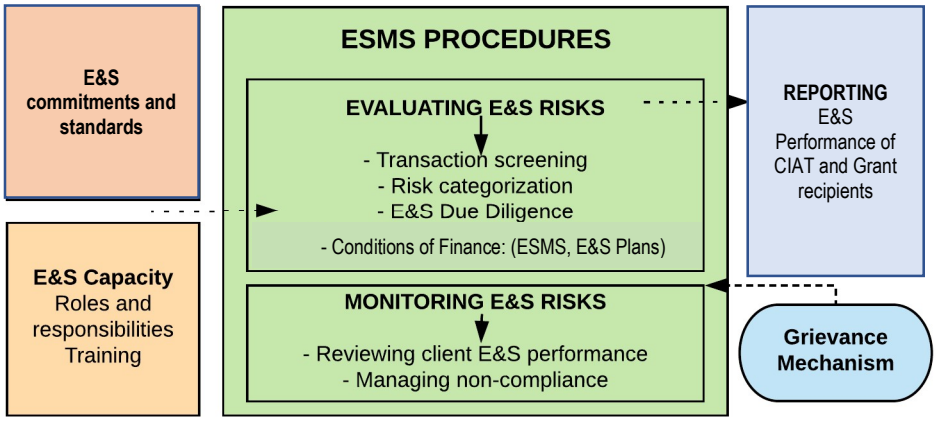
[18] Whether such incidents or accidents have been resolved and an institution is therefore eligible for a sub-grant will be evaluated and decided jointly in writing by CIAT and the Association.

[19] Whether such incidents have been resolved and an institution is therefore eligible for a sub-grant will be evaluated and decided jointly in writing by CIAT and the Association.

the term of the grant. The Grant recipients implementing the environmental and social measures should factor E&S risks into the decision-making process before proceeding with a Project-financed activity.

8. The key elements of the ESMS for Grant recipients are summarized in Figure A4.1. The procedures operationalize this commitment into defined and guided actions and described in the ESRM Guide. These are part of the evaluating and monitoring E&S risk management steps. A proper and regular reporting system on the E&S performance is necessary to comply with contractual arrangements between CIAT and the Grant recipients, maintain effective working relationships and ensure transparency. Finally, the ESMS will be based both in the management commitment at the institutional level and the existence of a trained and capable capacity among technical staff with defined roles and responsibilities.

Figure A4.1. Key elements of an ESMS for CIAT and Grant recipients



3. Minimum E&S system requirements for agricultural research institutions:

9. CIAT and all other Grant recipients will be required to develop an ESMS to participate in the Project. Each grant recipient shall be required to have an ESMS at its level comprising a minimum of:

    1. ESMP, based on the relevant risks and impacts of the funded activities,
    2. Human Resource policy (including LMP, a code of conduct for workers and a grievance mechanism for workers),
    3. PMP,
    4. SEP and grievance mechanism.

4. Evaluating E&S risks and likely impacts of agricultural research

10. The E&S appraisal procedure for each grant application will include a review of the client's information to identify the Project's E&S potential risks and impacts, and mitigation measures. The three main steps in the review will consist of: (i) transaction screening; (ii) risk categorization; and (iii) E&S due diligence.

(i) Transaction screening

Table A4.2. Transaction screening when assessing agricultural research institutions

Transaction screening	Description
Type of transaction	Grants to agricultural research institutions
E&S risk screening	• Nature of the Project's activities in climate-resilient agricultural research activities, • Project work program or plan, • Any regulatory licenses/permits, • Exclusions per the exclusion criteria (see paragraph 4 above), • Monitoring or checks, based on inspection reports, media reports, notification of violations by labor and environmental authorities, supervision missions, etc. *If evidence is detected of any activities covered under the exclusion criteria, the potential Grant recipient client might not be considered for financing.*
ESMS for Grant recipients	**Does the potential Grant recipient have**: • An ESMS for climate-resilient agricultural research, including: - ESMP, - Policy, procedure and records on OHS, - LMP (including working conditions and management of worker relationships, measures to protect the workforce, including OHS, codes of conduct for workers and grievance mechanism for workers), - Pesticide policy or procedures, - SEP and GRM (such as call centers to respond to users' issues), - Procedure or process to assess E&S risks, - Voluntary management systems implemented (e.g. ISO 14001, OHSAS 18001 etc.).

(ii) Risk categorization of agricultural research institutions

11. CIAT shall categorize Grant recipients based on the screening conducted. No project activity is expected to have High E&S risks and impacts; the vast majority of impacts are likely to be low or moderate.

(iii) Environmental and Social Due Diligence

12. Transaction screening and risk assessment are the first steps before a more detailed due diligence process is initiated. Following the transaction screening and risk categorization, the extent of E&S due diligence will be determined by the E&S risk categorization (Table A4.3).

Table A4.3. Environmental and Social due diligence requirements

E&S Due Diligence	Description
ESMPs	CIAT should ensure that Grant recipients have agreed to adopt the measures in the ESRM Guide. Grant recipients will be required to prepare, consult upon and disclose appropriate E&S Plans (e.g. ESMPs, PMPs, etc.) to identify E&S risks and impacts, and address and mitigate them. CIAT should ensure that the Grant recipients have appropriate procedures with corrective actions to mitigate identified negative E&S impacts and reduce E&S risk levels. CIAT can request Grant recipients to develop a systematic work plan or action plan to improve identified areas of poor or inadequate E&S performance. Also, to communicate the E&S plan, if necessary, with affected communities. The E&S plan should be credible, time-bound and documented. The E&S instruments will be reviewed and approved by CIAT. The World Bank will review the first 10 ESMPs, PMPs, LMPs and SEPs.
E&S requirements in the PPA	The ESRM Guide is annexed to the PPA for the Grant recipients. IRI will be directly contracted to provide TA for the Project. The contract conditions will include requirements to conform with the ESRM Guide.
Monitoring and Reporting	CIAT shall monitor the E&S performance of the Grant recipients on E&S management. Grant recipients will report on the outcomes of the E&S due diligence for agricultural research institutions to CIAT.

5. Monitoring environmental and social risks

13. Where an agricultural research institution has been approved to receive a Grant from CIAT, CIAT will work with the Grantee to ensure they implement any agreed E&S plans, or other requirements, that have been included in the transaction documentation to ensure effective E&S risk mitigation. The ESRM Guide includes the E&S monitoring form. The monitoring will provide updates or any changes in exposure for E&S risks and ensure that these risks are properly managed. Non-compliance management situations are presented below (Table A4.4).

14. CIAT will notify the World Bank within 48 hours of being informed about any incident or accident related to the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers. The Grant recipient or CIAT will provide within 30 days of the reported incident or accident a report with sufficient detail on the event, indicating immediate measures taken or that are planned to be taken to address it, and any information provided by any contractor and supervising entity, as appropriate. This or a subsequent report will propose any measures to prevent its recurrence.

Table A4.4. Management of non-compliance situations

Non-compliance situations: • Unexpected E&S risk activities with irreversible impacts happening or reported via GRS • Cases of accidents/fatalities • Grant recipient is not complying with the E&S terms agreed at approval
Management actions depend on the severity of the situation: • Request immediate action, including payment or repayment of the prepayment of the Grant • If grant is in several tranches, withhold next tranche until issue is resolved. If repeated business, factor it into next grant decision • Agree on a timeframe for resolution of the situation

6. Grievance mechanisms

15. The CCAFS ISC and CIAT have Grievance Redress Mechanisms (GRMs) for handling complaints on environmental and social issues. CIAT has also prepared LMP which set out the process for labor-related complaints. Each of the Grant recipients will need to prepare LMPs and set up GRMs, including a system/communication channel to receive inquiries from the public and provide responses. These mechanisms allow early warning on potential reputational risks to the institutions. The labor GRM for each Grant recipient will be based on the national law of the country in which the Grant recipient is based, the institution's labor policies and the requirements of World Bank ESS 2 (Labor and Working Conditions). The Project GRM for each Grant recipient will include a tiered system for handling complaints (response to the complaint, appeals committee, submitting complaints to the CCAFS ISC or CIAT). The GRMs will also note that, if complainants are still not satisfied with the proposed response to their complaint, they can use the judicial systems in the country where the complaint has originated.

7. Reporting

16. Grant recipients shall report twice annually in the first year of the Project's life (and annually thereafter) about their E&S risk management processes and operations. The reporting should at a minimum include, but is not limited to, the following:

    - Number of agricultural research institutions screened,
    - Number of grants approved,
    - Portfolio breakdown by activity and E&S risk category.
    - Compliance of agricultural research institutions with key requirements:
        - Environmental and social management,
        - Policy/ procedure and records on OHS,
        - LMP (including working conditions and management of worker relationships, measures to protect the workforce, including OHS, codes of conduct for workers and grievance mechanism for workers),
        - SEA/SH measures,

  - Pesticide management policy or procedures,
  - SEP and grievance mechanism,
- Cases of non-compliance and E&S incidents related to project activities,
- Progress in ESMS implementation.

17. The Project includes an E&S reporting form for Grant recipients.

8. Environmental and Social Capacity Building

18. Project management commitment is essential to document and implement the E&S requirements of the Project. CIAT and the Grant recipients should seek to build their capacity across relevant project activities functions with regard to E&S risk management, including provision of training, as well as recruiting and training specialized staff. Key issues for capacity-building include: (i) environmental and social management, including resource management and waste management; (ii) stakeholder mapping and engagement; (iii) grievance redress; (iv) OHS; (v) SEA/SH; and (vi) community health and safety.

ANNEX 5: Gender

COUNTRY: Africa
Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

1. Analysis

1. Climate change has varied effects on women and men. They are exposed to different climate shocks and experience different impacts related to their gender-differentiated roles, rights, and opportunities.[73] Rural women are at high risk of being negatively affected by climate change, particularly in relation to household responsibilities, agricultural activities, and male out-migration for employment—with resulting consequences on family nutrition and children's care and education.[74] Women are also at higher risk of physical, sexual, and domestic violence in times of climate shock and natural disaster.[75]
2. In many cases, women appear to be less able to adapt to climate change, even if they are aware of its effects. Gender inequalities in access to and control over resources, technology, and information, alongside less stable land tenure, restrict women's ability to act on and implement climate adaptation practices in agriculture.[76] Gender norms may limit women's ability to respond to or make quick decisions in the face of climate events. In households where men are working off-farm in cities, women may lack the power to make timely farming decisions or to convince their husbands to agree to new practices.[77]
3. In this context, the Project identifies two critical gender gaps: (1) Women are not accessing CSA technologies to the same extent as men, for reasons of access to resources, access to information, control over labor allocations, and gender norms.[78, 79, 80, 81] (2) Women are less represented in agricultural research and advance at lower rates than men. As in other sectors, there is a leaky pipeline effect, where the proportion of women decreases steadily along the progression to senior manager and decision maker.[82] The agricultural research system sees a continuing problem in recruitment, retention and advancement, and this relates to climate and agriculture research as well. Women make up only 25 percent of agricultural scientists in Africa, and a much lower proportion of decision makers on agriculture and climate at national and global levels.
4. Agriculture is an important livelihood source for women throughout sub-Saharan Africa, and women's labor makes up a large share of total agricultural employment. Women perform many roles in agri-food systems, and while the nature and extent of their contribution varies from country to country, tasks related to the production, processing, storage, and preparation of food nearly everywhere occupy a significant share of their time. Worldwide in developing countries, nearly four out of five women (79 percent) who are economically active report agriculture as their primary source of livelihood.[83] Consistent with this reality, much of the work in agri-food systems is performed by women. In a landmark study on the role of women in African agriculture, Christiaensen et al. (2015) found that in six countries (Ethiopia, Malawi, Niger, Nigeria, Tanzania and Uganda), the female share of labor input into primary agriculture averaged 40 percent. When other post-harvest agricultural activities such as processing and marketing are included, this number increases, sometimes significantly.[84] Time-use surveys that cover all agricultural

activities show that women's participation in agriculture in the region is as high as 80 percent in some countries.

5. In most parts of sub-Saharan Africa, productivity of women farmers consistently lags behind that of men farmers. The cost of the gender productivity gap is high: for example, the value of production foregone every year has been estimated at about US$100 million in Malawi, US$105 million in Tanzania, and US$67 million in Uganda.[85] The causes of the gender productivity gap have been amply documented and almost everywhere stem from the fact that women tend to have more limited knowledge than men and less access to land, improved production technologies, inputs such as improved seeds and fertilizer, credit, insurance, and advisory services. Women farmers and livestock keepers in Africa are thus generally less well-informed and less well-resourced, which makes them more vulnerable to shocks that negatively impact farming and livestock keeping activities.

6. Women farmers are especially vulnerable to climate change impacts. In many parts of Africa, women's household responsibilities include securing resources needed for daily household activities. As a result, they often spend many hours every day fetching water for drinking, cooking, and washing, and/or collecting firewood or other fuel for cooking and heating. To the extent that climate change reduces the availability of these vital resources, women must spend more time procuring them. In addition, as climate change reduces the productivity and increases the variability of agriculture and working-age men respond by out-migrating in search of employment, women must take on greater levels of responsibility for agricultural activities.

7. Climate-smart agriculture (CSA) options can provide important benefits for women. Most obviously these benefits come in the form of increased production and incomes from the adoption of improved varieties, labor-reducing technologies and climate-smart production practices.[86] A wealth of studies show that as a result of the gender gap in agriculture, a lack of technologies oriented towards women's crops or their agricultural and household activities, and lack of access to extension, women tend to have less access to information, credit, and technology and fewer resources with which to acquire inputs. [87, 88; 89] These constraints are magnified as a result of climate change: women take on more agricultural work as men migrate for labor, they have less access to agricultural resources such as land, CIS, extension services and inputs with which to adapt to variability and change, gendered social norms and roles inhibit their adaptive capacity, and they are absent from decision making at community, national and global levels.[90,91,92] When they do have access to information and the resources to implement CSA, they are often just as likely as men to adopt and can experience increased empowerment in the process.[93, 94, 95] Ensuring that women are able to benefit from CSA technologies and climate information will be a focus of the Project's gender strategy. Strategies and approaches will include gender analysis of CSA-related value chains targeted in the Project, as well as technologies targeted to women's agricultural tasks and workloads; participatory methods and diagnostic studies to select practices, technologies and services that meet women's priorities; and women-targeted capacity development workshops.[96,97] The CSA Rapid Appraisal is a situational analysis tool that integrates gender and youth in a mixed participatory approach.[98, 99, 100] The Project will use all these tools to ensure women's access to and benefits from CSA technologies and practices, climate information and climate finance by tailoring the delivery to women's different abilities and constraints in access to them.

8. Climate services can be a critical means of resilience-building for smallholder farmers. However, due to gender-related factors, women and men can face differing challenges and opportunities to access climate-related information, use it to improve farm management, and benefit from those improved management

decisions.[101] Meeting women's climate information needs and pursuing cross-sectoral collaboration will be important to enhance action on climate information. Gender-responsive rural climate services require inclusion of women's groups and networks in communication channels and in the development of ICTs that respond to women's preferences. It will also be paramount to connect with local and civil society organizations to address norms that constrain women's access.

9. Increased support for CGIAR presents an opportunity to tackle another pressing problem, namely, the fact that women are underrepresented in agricultural research, including research targeting climate change. The potential of women to contribute to climate change solutions and influence policy extends to the organizations devoted to the generation and diffusion of climate-relevant innovations. While generally the participation of women in agricultural sciences is increasing in most regions of the world, women remain the minority in many international and national organizations devoted to agricultural research, including CGIAR Centers, regional and national research institutes, and universities. Reasons for this include declines in numbers of positions due to funding cuts, difficulty in combining professional and family life, implicit biases in hiring women and under-represented groups, lack of funding support for women at different stages of their careers, and differences in capacity development needs. Furthermore, gender is not well integrated into climate change policy at national or global levels.[102, 103, 104] Driving and supporting women's participation in higher levels of research and in positions to influence and drive policy are key to sustaining gender-sensitive agricultural and climate policies nationally and globally.

2. Actions

10. The CCAFS Gender and Social Inclusion Strategy[105] ensures that gender is integrated into activities across CCAFS, and as a result gender is an important aspect of CCAFS work in scaling up CSA. AICCRA will ensure that women beneficiaries of the Project are able to benefit from CSA technologies and climate information, a focus of the Project's gender strategy. AICCRA is expected to deliver especially positive outcomes for women involved in agricultural research and agriculture sector activities that are vulnerable to the impacts of climate change through the following actions:

- Identification of tailored CISs and digital agro-advisory packages for use in building new extension systems or strengthening existing extension systems
- Development and identification of gender-responsive practices/technologies
- Targeting CSA technologies at tasks performed by women
- Development of business models and identification of innovative finance options for scaling-up CSA and climate-resilient value chains, with special consideration of gender and social inclusion
- Identification of scaling mechanisms for the uptake of CSA, especially for women and youth,
- Targeting post-doc fellowships for women researchers
- Support to AGNES for inputs to gender and climate policy in Africa and at the global level

3. Indicators

- Climate information services and climate-smart agriculture technologies reaching women through customized programs targeting their interests (Number)

ANNEX 6: Endnotes

COUNTRY: Africa
Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

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