The West African Initiative for Climate-Smart Agriculture (WAICSA)

LAB INSTRUMENT ANALYSIS
September 2019

DESCRIPTION & GOAL —
A dedicated blended finance fund providing financial and technical support to smallholder farmer organizations and agribusinesses to adopt climate-smart agriculture practices in West Africa.

SECTOR —
Sustainable Agriculture

FINANCE TARGET —
- Public resources: ECOWAS Member States contributions, ECOWAS Donors Group, ECOWAS Bank for Investment and Development, DFIs, international institutional donors
- Private resources: Commercial impact investors, family offices, foundations

GEOGRAPHY —
West Africa: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo

The Lab identifies, develops, and launches sustainable finance instruments that can drive billions to a low-carbon economy. The 2019 Global Lab Cycle targets four specific sectors across mitigation and adaptation: blue carbon in marine & coastal ecosystems; sustainable agriculture for smallholders in West and Central Africa; sustainable energy access; and sustainable cities.

AUTHORS AND ACKNOWLEDGEMENTS

The authors of this brief are Daniela Chiriac, Soumaila Diakite, Rosaly Byrd, and Randy Rakhmadi.

The authors would like to acknowledge the management teams and other professionals from the ECOWAS Commission and EBID, the proponent organizations, for their support during the analytical process. We would also like to acknowledge the following professionals for their cooperation and valued contributions, including the proponents Hon. Commissionner Sékou Sangaré (ECOWAS), Mr. Abdoulaye Fall (EBID), Alain Sy Traore (ECOWAS), Pierre Haas (ECOWAS), Dethie Ndiaye (ECOWAS), Hugues Goa (EBID), P. Rodrigue Takougnadi (EBID), and Dr. Ablassé Bilgo (RAAF); and the working group members Mike Adu Gyamfi (EBID), Catherine Bureau (Fondation Avril), Alice Caravani (UK BEIS), Mark Ellis-Jones (F3 Life), Augustin de Vitry (Fondation Avril), Tanja Havemann (Clarmondial), Giles Henley (UK BEIS), Daniel Kandy (US DoS), Dr. Niéyidouba Lamien (CORAF), Benhan Limketkai (Kois Invest), Philippe Leroux (Fondation Avril), Zano Mataruka (IFC), Serge Mayaka (Akipeo), Alberto Millan (CGIAR), Raphael Stein (BNDES), Jutta Werner (BMU), and Dr. Robert Zougmore (ICRISAT). The authors would like to acknowledge the contribution of the experts Nicolaus Cromme (CFC), Evan Girvetz (CIAT), Astrid Manroth (independent), Todd Rosenstock (ICRAF), Amath Pathe Sene (IFAD), and Sebastien Subsol (IFAD), and practitioners Dr. Louis Koko (OCP Africa) and Kenneth Ukaoha (NANTS Nigeria).

The authors would also like to thank Ben Broche, Barbara Buchner, Angela Falconer, Valerio Micale, Tatiana Alves, Elysha Davila, Angela Woodall, Maggie Young, and Angel Jacob for their continuous advice, support, comments, design, and internal review.

The Lab's 2019 programs have been funded by the Australian, Dutch, German, and UK governments, as well as Bloomberg Philanthropies, GIZ, the International Fund for Agricultural Development (IFAD), the Rockefeller Foundation, and the Shakti Sustainable Energy Foundation. Climate Policy Initiative serves as Secretariat and analytical provider.

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
Department for Business, Energy & Industrial Strategy
Australian Government Department of Foreign Affairs and Trade
Ministry of Foreign Affairs of the Netherlands
Bloomberg Philanthropies
The Rockefeller Foundation
IFAD Investing in rural people
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Climate Policy Initiative
SHAKTI Sustainable Energy Foundation

1. CONTEXT

Although West African smallholder farmers are among the most vulnerable to the impacts of climate change, the financing needed to help them adapt and build resilience is largely missing.

West African smallholder farmers are among the most vulnerable to the impacts of climate change. Smallholder farms (between 1-10 hectares) supply up to 80% of produce for sub-Saharan Africa's food markets. Temperature increases, changing rainfall patterns, and increased frequency of floods and droughts are already impacting agricultural productivity (Ouédraogo et al., 2018). If no adaptation action is taken, yields of crops like maize and sorghum could decline by 5-25% over the next decades in the region (Rhodes et al, 2014).

However, the financing needed to help them adapt and build resilience is largely missing. At the moment, less than 1% of banking credit is directed towards the agricultural sector in African countries. Smallholders are particularly disadvantaged due to finance institutions' perceived risk and high transaction costs (AGRA, 2017).

Despite the challenges, the sub-Saharan Africa food system presents considerable investment opportunities. With appropriate investments, agricultural production and agribusinesses could grow three-fold to represent an industry worth US$ 1 trillion by 2030 (from US$ 313 billion in 2010) (World Bank, 2013). Climate-smart agriculture (CSA) provides ways to build farmers' resilience and adapt to climate change, while sustainably increasing productivity and incomes.

A regionally driven blended fund incentivizing climate-smart agricultural (CSA) practices and technologies provides a way to address the financing and knowledge gap in the agricultural sector. Such a fund can improve smallholder farmers' access to financial services tailored to their needs, increasing their ability to invest in and adopt CSA practices, and ultimately better absorb climate shocks.

CONCEPT

2. INSTRUMENT MECHANICS

The West Africa Initiative for Climate-Smart Agriculture (WAICSA) will provide financial and technical support and incentivize smallholder farmers to adopt climate-smart farming practices and technologies in the West African region.

WAICSA is a blended finance mechanism initiated by the Commission of the Economic Community of West African States (ECOWAS), which is comprised of 15 Member nations. WAICSA supports the uptake of climate-smart agricultural practices through the provision of grants for technical assistance and subsidized-rate loans, guarantees and equity investments for smallholder farmer organizations and agricultural businesses.

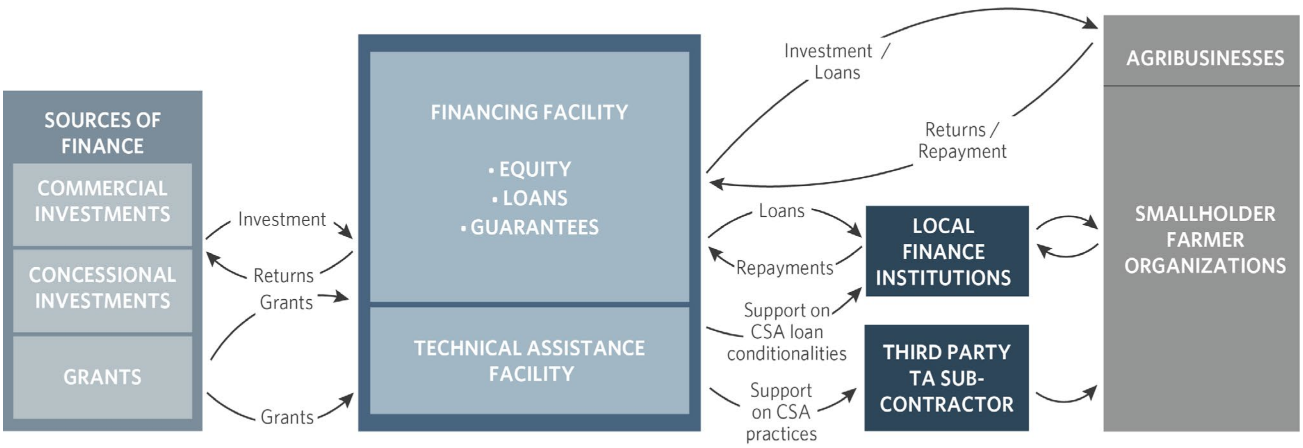
2.1 INSTRUMENT DESIGN

WAICSA has two main components:

1. The Financing Facility (FF) accounts for a minimum of 80% of the Fund and operates through loans, guarantees, and equity investments. It is managed by the ECOWAS Bank for Investment and Development (EBID).

- Loans will be provided at concessional/subsidized rates (i) directly by the fund manager to agribusinesses; and (ii) through local finance institutions (LFIs) such as local banks or microfinance institutions to agribusinesses and farmer organizations. The loan terms will include conditions related to the adoption of CSA by the smallholder farmers with whom the recipients of the loans are engaging. Loans will be the predominant instrument of the financing facility.
- Guarantees will act as a de-risking mechanism to incentivize the engagement of financial intermediaries with agribusinesses and farmer organizations. Single-loan guarantees or a portfolio guarantee fully funded by WAICSA will be contracted through a third-party scheme[1] or managed directly by the fund manager. The guarantees will be granted on a case by case basis for first-time loan applicants, mainly farmer organizations.
- Equity investments will potentially be made directly by the fund manager and will target agribusinesses working with smallholder farmers. Adoption of CSA by the farmers will be stipulated as conditions in the investment and shareholders' agreements.

Figure 1: WAICSA instrument mechanics



2. The Technical Assistance (TA) Facility accounts for up to 20% of the Fund. It is managed by the Regional Agency for Agriculture and Food (RAAF), and is funded through grants from the 15 ECOWAS Member States and donors. It extends grants to help farmers implement CSA practices, and to help LFIs integrate climate-smart metrics into their loan products.

2.2 KEY STAKEHOLDERS

2.2.1 INVESTORS

Contributions from the ECOWAS Member States and investments from the fund manager will catalyze investments from external sources. WAICSA is structured as a blended finance fund

[1] Such schemes are provided at a cost to partially hedge the credit risk of local banks or microfinance institutions. Some examples of providers include the African Guarantee Fund (AGF) (https://www.gogla.org/african-guarantee-fund-agf-0) and PROPARCO (https://www.proparco.fr/en/financial-instruments).

with a target size of US$ 80 million. It is structured into three different classes of investors, each of them featuring a distinct risk/return profile with returns being paid following a waterfall principle (more details in Annex 8.1).

Financing Facility investors:

- Class B (22%): ECOWAS public resources will provide the first loss tranche, thus bearing the highest risk and serving as a risk buffer for the more senior classes of investments. This tranche is designed to stimulate Class A senior and mezzanine participation.
- Class A mezzanine (31%): This ranks junior to the class A senior tranche, and is designed for development finance institutions, impact investors. This tranche provides a lower level of risk.
- Class A senior (47%): This includes the most senior investments, featuring lower risk, while also enjoying the highest priority in terms of capital repayments and return payments. This tranche aims to attract private impact investors and family offices and the fund manager, EBID.

TA Facility and guarantee mechanism funders

Both the TA Facility and the guarantee mechanism will be financed through grants and subsidies from ECOWAS public resources, the ECOWAS donors' group[2] and other international institutional donors & foundations.

2.2.2 LOCAL FINANCE INSTITUTIONS

Approximately 80% of the Fund Facility will be dedicated to credit lines which will be channelled through intermediaries such as local banks and microfinance institutions. For the first stage loans (Fund Facility to LFIs), the interest rates will be fixed at levels below commercial market rates. The loan/financing agreement will stipulate the obligation for the financial intermediaries to apply concessional interest rates for the second stage loans (from LFIs to end-users) in addition to the condition to integrate climate-smart metrics into their loan products to farmer organisations or agribusinesses.

2.2.3 SMALLHOLDER FARMERS, FARMER ORGANIZATIONS AND AGRIBUSINESSES

To stimulate the adoption of CSA practices by smallholders, the Fund will require and consolidate the formal linkages that smallholder farmers have established with: (i) farmer organizations[3] and (ii) agribusinesses.[4] Loans to farmer organizations, through LFIs, will be used for projects developed by smallholder farmers that are formally registered as cooperatives or associations. Loans to or investments into agribusinesses along the supply chains will be used in contexts where contract farming is prevalent. The CSA conditionality will be embedded within the elements typically included in production contracts (ex., specific CSA inputs on credit, training of CSA production methods, other extension services related to CSA projects). Monitoring of the loans will be ensured by the fund manager on the financial aspects and the TA facility manager on the adoption and implementation of CSA practices and technologies.

---

[2] The Donors Group includes mainly: USAID, the European Union, the French Development Agency (AFD), the Swiss Agency for Development and Cooperation (SDC), the Spanish Agency for International Development Cooperation (AECID), GIZ, the World Bank.

[3] Equivalent to "smallholder farmers' association", "cooperatives", "farmer collectives", "rural producer associations", indicating groups of farmers acting collectively" (Poole & de Frece, 2010)).

[4] The term "agribusiness" is equivalent to "small and medium sized agro-enteprises (SMAEs)" (FAO, 2017) and it includes: agricultural input and technology suppliers, produce buyers or intermediaries, processing companies, supermarkets, exporters etc.

2.3 CSA PRACTICES AND TECHNOLOGIES

In determining the eligibility of projects submitted for loans, the relevance of the CSA practices involved will play a central role. The assessment of the CSA dimension of projects will be based on criteria that combine the three main pillars of CSA: economic, social and environmental sustainability, as well as appropriateness for the local agro-ecological conditions, local market conditions (FAO, 2013; Rosenstock et al., 2019; Bilgo and Kaire, 2015) and feasibility of monitoring the implementation. Quantitative evidence will be required for each one of the projects based on the specific criteria listed in Annex 8.2.1 and exemplified in Annex 8.2.2.

3. INNOVATION

By including a CSA conditionality and providing guidance and technical support to smallholders and local financial institutions in West Africa, WAICSA offers a unique way to overcome barriers associated with financing and adoption of CSA practices.

3.1 BARRIERS ADDRESSED: CHALLENGES TO CLIMATE-SMART AGRICULTURE FINANCING AND IMPLEMENTATION

WAICSA overcomes barriers to the financing and adopting of CSA practices by smallholder farmers. These barriers include:

Limited knowledge & capacity of LFIs to implement and support CSA projects. The Fund's TA component will build the capacity of LFIs to include CSA metrics into their loan products and internal processes (Ruete, 2015). The Fund will also increase awareness and political consensus on the importance of CSA investments, in coordination with the ECOWAS Member States.

Lack of investment in smallholder agriculture. Public and private investments into agriculture remains insufficient, particularly in sub-Saharan Africa, due to high transaction costs and the inherent risks associated with the sector (FAO, 2013). The Fund will use blended finance and guarantees to de-risk and crowd-in private investments, while the TA Facility will further de-risk investments, providing support for CSA practices that offer improved productivity and income, to ensure repayment.

Credit systems poorly adapted to smallholder needs. There remains a large gap between financial services offered and the needs of smallholders globally (RAF, 2016). The Fund will work with LFIs and agribusinesses to provide affordable financial products that are tailored to smallholders (i.e. time between harvests, input purchases, and repayment structures).

Weak adoption of CSA by smallholders. Weak adaption can result from limited financial incentives and high upfront costs, lack of information, and perception of risk (Bayala et al., 2016; Ouédraogo et al., 2018). Short-term needs during the transition period can also mean drop-off, even after initial adoption of CSA (Barnard et al., 2015).[5] The Fund will address this barrier with TA to ensure that smallholders can adequately adopt CSA measures that are context-specific. Monitoring will help in determining where and why drop-off is occurring.

[5] Although most practices have been shown to improve incomes, there can be a delay in seeing these benefits and payoffs after initial adoption, resulting in the inability to address short term needs. Because of this, smallholder farmers may abandon the CSA practices with fear that they will not pay off, or because of the high upfront costs associated with them.

3.2 INNOVATION: CSA-ADOPTION CONDITIONALITY ON FINANCIAL PRODUCTS AND A SMALL TICKET SIZE

WAICSA is the only blended finance fund operating in West Africa that has a specific focus on increasing the uptake of CSA practices by smallholder farmers. The provision of subsidized interest rate loans for smallholders and agribusinesses of ticket size below US$ 1 million makes credit more accessible, while the technical guidance on CSA implementation bridges the knowledge gap. The Fund also builds the capacity of LFIs to design loan products with CSA adoption conditions, helping mobilize additional resources for this sector.

To better understand the current landscape of sustainable agricultural financing and identify where WAICSA would be most valuable, the Lab Secretariat gathered information from 24 comparable existing instruments (see Annex 8.3). WAICSA differentiates itself from other instruments with the following components:

West Africa leadership and geographic focus. Of the comparable instruments reviewed by the Lab analysts, some have financed projects in West Africa, but none have an explicit focus on this region. Moreover, unlike other funds that are present in the region, WAICSA is locally driven and establishes an important precedent with regional public resources, providing the capital necessary to de-risk private investments.

CSA conditionality. Although many funds have environmental standards, no comparable instruments contain specific conditions based on CSA uptake by smallholders. Although the Climate-Smart Lending Platform (CSLP) incentivizes CSA adoption by smallholders, it has not yet established a fund to finance these projects, thus demonstrating WAICSA's possible value added and the complementarity between the two concepts.[6]

CSA technical assistance and support. Technical assistance is available in most of the comparable funds, but in few instances is it dedicated specifically to CSA practices and, if so, it does not target lending intermediaries. WAICSA's TA component can have a transformational effect on the financial system by building the capacity of LFIs to mainstream CSA conditionality into their loan products. CSLP is the most comparable instrument in this regard, with an objective of increasing financial institutions' capacity for climate-smart lending and incorporating climate risk into portfolios.

Small ticket size (US$ 20,000-1 million). Only five of the funds examined offered products less than US$ 1 million, and of those, only one (Agri-Business Capital or ABC Fund) offers loans under US$ 50,000. With WAICSA, farmer organizations and agribusinesses will have access to loans starting at US$ 20,000 through local MFIs.

3.3 CHALLENGES TO INSTRUMENT SUCCESS

There are several **potential challenges** that the instrument may encounter in becoming operational and financially sustainable. It is also important to note that this type of instrument relies on a specific institutional structure: a regional economic community. Thus, replicability of the instrument depends on this specific structure being in place and it may be unsuitable in other contexts. Furthermore, given this particular institutional structure, it is important to couple management strategies with political strategies and commitment to ensure the instrument's success.

[6] CSLP is a previous Lab instrument (2015/2016 cycle): http://www.climatesmartlending.org/; https://www.climatefinancelab.org/project/climate-smart-finance-smallholders/

Table 1: Challenges to instrument success and mitigation strategies

Potential Challenge	Management Strategy
Low private investments due to poor profitability and perceived risk associated with agriculture (especially smallholder agriculture)	(i) Use public funds to de-risk early stage investments; (ii) target concessional debt to crowd-in funds
Lack of capacity for LFIs to integrate & monitor CSA conditions into loan products	(i) Provide technical assistance and training to build capacity; (ii) screen and select the most suitable LFIs with whom to engage
Difficulty in converting CSA practices into loan conditionality (including monitoring) and non-adequacy of loan products	(i) Within the TA Facility and the Ad Hoc CSA Expert Panel, partner with local technical experts and stakeholders to identify most appropriate CSA measures to use in each agro-ecological zone; (ii) partner with organizations with monitoring skills and capacity

MARKET TEST AND BEYOND

4. IMPLEMENTATION PATHWAY AND REPLICATION

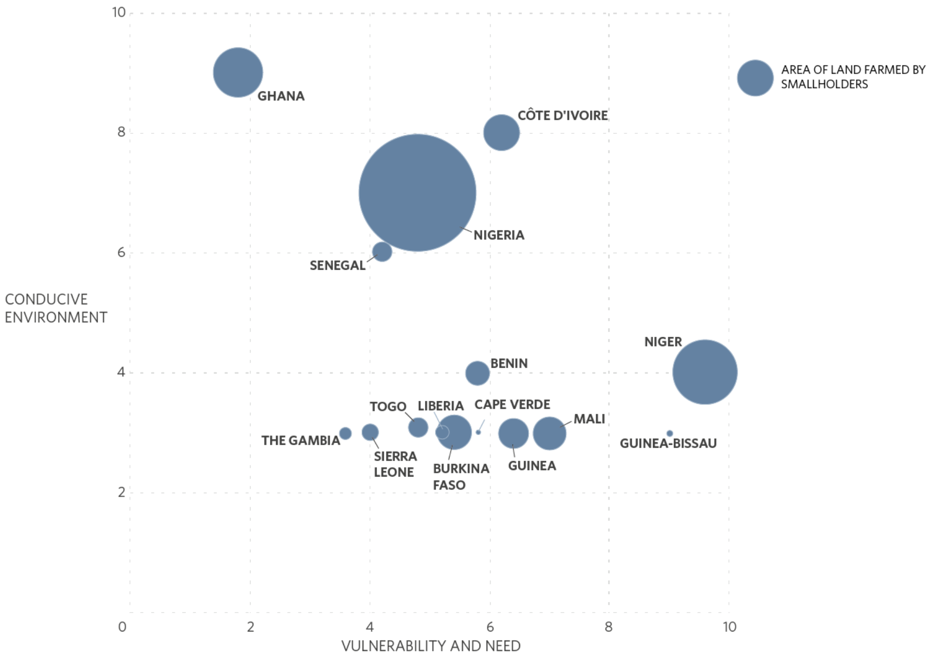
WAICSA is expected to launch in early 2020. ECOWAS and EBID have already pledged US$ 8 million as their share for the pilot phase, which will take place in six of the ECOWAS Member States. After the concept is proven, it will be replicated in all 15 ECOWAS Member States.

4.1 TARGET GEOGRAPHY FOR PILOT AND BEYOND

The pilot phase will involve six countries within the ECOWAS region where the mechanism will be tested and, based on the proof of concept, it will be subsequently replicated in all 15 ECOWAS Member States: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, the Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

The specific pilot countries will be determined through a country-level analysis. The Lab Secretariat analysis provides an overview of all the ECOWAS states in Figure 2 according to their vulnerability to climate change and the economic and regulatory conditions enabling agricultural businesses, while indicating the maximum market potential of the fund, calculated based on agricultural land area managed by smallholder farmers (methodology presented in Annex 8.4).

Figure 2: ECOWAS countries by vulnerability, conduciveness, and smallholder land areas



Additionally, the appetite of LFIs to access this type of loan will be considered in selecting the six pilot countries. The fund manager will launch a call for interest to LFIs listed by the Finance Ministries in each country. In parallel, the fund manager will approach banks and microfinance institutions with whom it has established collaborations in the past.

4.2 KEY IMPLEMENTERS

WAICSA was initiated by the ECOWAS Commission, who will also ensure the general orientation of the Fund's implementation.

Fund manager: WAICSA will be managed by the ECOWAS Bank for Investment and Development (EBID) as a mechanism embedded in the ECOWAS Regional Agriculture Development Fund (ECOWADF). EBID will be responsible for (i) management of the Fund's investments; (ii) project pipeline development; and (iii) coordination with the TA Facility Manager and the Ad Hoc CSA Expert Panel.

Technical Assistance Manager: The Regional Agency for Agriculture and Food (RAAF) is a technical agency of the ECOWAS Commission. RAAF will be in charge of the TA Facility management and will operate through grants to provide: i) technical support for the adoption and implementation of CSA practices and technologies to smallholder farmers involved in selected loan or equity investment projects, with a focus on women and youth; ii) research to inform the definition of CSA practices adapted to local conditions based on best practices; iii) in coordination with EBID, support to LFIs in the design of loan products that incorporate climate-smart metrics into credit assessments and loan terms.

Ad Hoc CSA Expert Panel: This panel will act as an advisory body for WAICSA's general technical direction (conversion of CSA practices into loan conditionality, monitoring and the adequacy of the CSA related loan terms). Chaired by the ECOWAS Commission, the Panel will include experts from relevant West African and international institutions.[7]

4.3 IMPLEMENTATION TIMELINE

WAICSA is expected to launch in early 2020. In the beginning of 2019, the ECOWAS Commission and EBID signed a fund management agreement for the entire Regional Agriculture Development Fund, including WAICSA. As a result, the ECOWAS Commission will provide an initial amount of approximately US$ 2 million by the end of 2019 and add US$ 14 million more over the subsequent 7 years. EBID, the fund manager, also pledged US$ 10 million over the initial 5 years. For the first year of the two-year pilot phase WAICSA will be fully capitalized by public investors. The second year should see an initial contribution from private investors.

7 Including EBID, the West African Bank of Development (BOAD), RAAF, the CILSS-Agrhymet Centre (Comité Permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Conseil ouest et centre africain pour la recherche et le développement agricoles (CORAF), West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL).

Table 2: WAICSA implementation timeline

Implementation milestone	Date
Elaboration of a detailed operating plan, including a clear definition of EBID's and RAAF's roles to be formalized in a manual on operational procedures	August - December 2019
Set-up of the WAICSA management structures	October 2019
WAICSA 1st Board meeting	October 2019
1st outreach to investors (ECOWAS Donors Group)	November 2019
Transfer of ECOWAS contribution & start of fundraising	December 2019
2nd outreach to investors	January 2020
Start of operations for pilot countries	First half of 2020

4.4 IMPLEMENTATION CHALLENGES

The table below lists potential implementation challenges to the pilot, alongside strategies for management.

Table 3: Implementation challenges and mitigation strategy

Challenge	Mitigation strategy
The pilot should be initiated in less than one year. This is an ambitious timeline since some of the fund's financial features are still to be finalized.	The risk could be mitigated by (i) dedicating a qualified EBID team for the elaboration of the detailed operating plan and governance structure; (ii) Closely coordinating with RAAF to define roles and responsibilities in the management of the two facilities of the fund.
EBID's limited experience in fundraising and managing a fund of this size might affect investors' trust. EBID has managed special funds of up to $30 million, without however engaging in fundraising with the type of investors WAICSA is targeting.	This risk can be mitigated by contracting specialised third-party expertise to provide long term TA. This assistance will support EBID in the initial fundraising activities, setting up the management structures and initial operations. The level of assistance needed will be reviewed every second year in order to re-adjust the assistance based on progress made by EBID's own staff. The level of assistance should the gradually decrease.
Maintaining the adequate level and timing of ECOWAS contributions in the context of other regional emergencies. The ECOWAS resources are committed on an annual basis following budgetary discussions among Member States.	This risk could be mitigated by: (i) maintaining political commitment over the life of the fund at the level of the ECOWAS Commission and at the level of Member States; (ii) aligning with the other investors to ensure commitments are on track.
Low demand for WAICSA's resources might limit its impact and the returns of the fund.	EBID will develop project pipeline by: (i) launching calls for interest to LFIs listed by the Finance Ministries in each country; (ii) approaching banks and microfinance institutions with whom it has previously collaborated.

5. IMPACT

At scale, the West African Initiative for Climate Smart Agriculture has the potential to improve food security for 90,000 smallholder farming households, and convert over 185,000 hectares to climate-smart agricultural lands over the lifetime of the fund.

5.1 QUANTITATIVE MODELLING

The Lab Secretariat modeling has examined the potential financial profitability of the fund for different classes of investors. The model aimed to optimize the returns of Class A investors in addition to limited risk exposure provided by the Class B (ECOWAS) absorbing first losses. This resulted in negative returns of -7.9% for ECOWAS, which is in line with the main purpose of their contributions: to catalyze private investments. The results of the model are based on a number of fixed assumptions (see Annex 8.5) regarding interest rates, loan tenor, loan amounts and management fees. These assumptions were provided by the proponents based on their knowledge of the market and will be subsequently tested during the pilot.

To understand how the risk of default from end-beneficiaries and low dividends from equity investments would impact investors' returns, the Lab conducted a sensitivity analysis.

Figure 3: Loan repayment scenarios

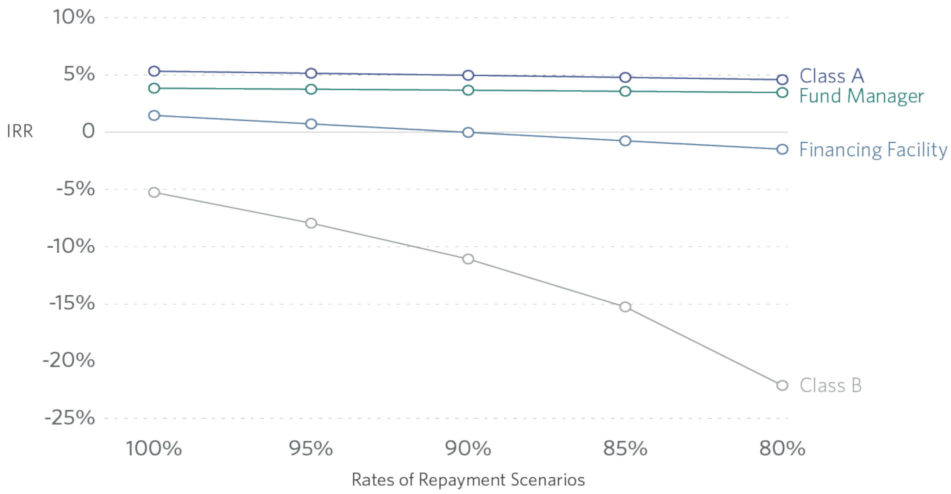
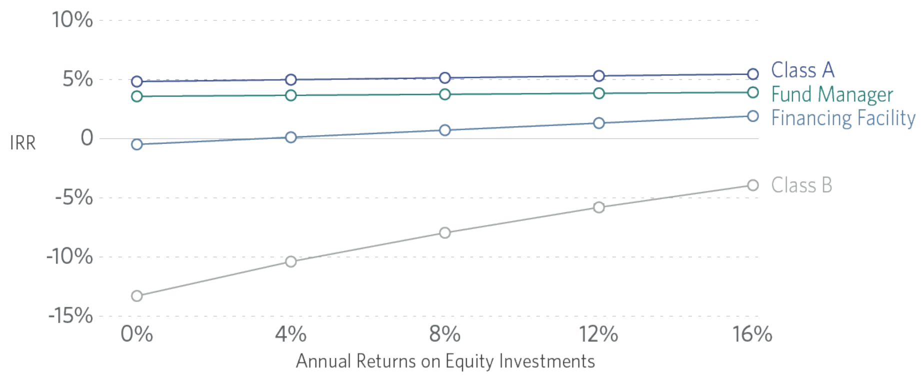


Figure 4: Annual returns on equity investments



Compared to the baseline scenario (95% loan repayments and 8% annual return on equity investments), the analysis produced the following results:

- For the Class A including private investors, DFIs and impact investors, the returns in the baseline scenario would be 5.1 %. Their returns would see minor variation (within 0.5% across scenarios) in case of decrease of loan repayment rates from 95% to 80%. The reduction of dividends to zero, would affect the returns by 0.3%.
- The Class B including ECOWAS absorbs the impacts of both changes of parameters to the highest degree, as their function is to privilege social and environmental impacts primarily and serve as a risk buffer for the other classes of investors. Compared to the baseline scenario (-7.9% return), at 80% repayment rates, the returns for Class B would be over negative 22% (nearly than three times the negative returns at 95% repayment) and would push the returns at the level of the Financing Facility to -1.5%. In case of zero dividend yields, the return for this class would be close to negative -13.3% and would drive the returns at the fund level to slightly below zero.
- The fund manager's returns on investment would follow a similar trajectory to Class A, with minor variations: compared with the baseline scenario i.e. 3.7%, EBID would see its returns decreasing by 0.2% if repayment rates go down to 80% or by 0.1% if returns on equity investments are zero.

5.2 ENVIRONMENTAL AND SOCIAL IMPACT

By supporting the adoption of CSA practices both financially and through technical assistance, WAICSA has the potential to improve smallholders' socioeconomic well-being, build resilience, and contribute to climate mitigation of up to 2 million tonnes of CO_2 a year.

The Lab team used three CSA practices to model environmental and social impact: improved drought-tolerant maize seeds, agroforestry, and system of rice intensification (SRI) (see Annex 8.6 for methodology). Based on the total amount to be dispersed by the Financing Facility, if resources are allocated equally to all of these three CSA practices, the Fund could mitigate **approximately 900,000 tonnes of CO_2 emissions annually**[8] (see Annex 8.6). In a scenario of **maximum mitigation potential** (when the majority of loans are allocated to agroforestry, which has the highest mitigation potential), WAICSA **could contribute to mitigating over 2 million tonnes of CO_2 emissions a year** – equivalent to over 4 billion miles of driving.

In addition, the Secretariat found that WAICSA has the potential to convert over **185,000 hectares of smallholder agricultural land to CSA over its lifetime, thus helping over 90,000 households limit their exposure to climate risks and absorb climate shocks**. The CSA practices chosen for modelling have been shown **to improve smallholder yields, food security, and income.** The studies examined in a desk review showed an average increase in yields of 70% (improved seeds), 79% (agroforestry), and 89% (SRI). In terms of food security, a typical household farm in the region can expect to double rice production per hectare when using SRI (Norman and Kebe, 2006; Styger, 2018). By assuming WAICSA will support the uptake of these CSA practices, the initiative can contribute to generating **over 80 additional tonnes of food** compared to conventional agricultural practices over its life time (see Annex 8.6 for other climate resilience impact figures).

---

[8] At the peak of trees' sequestration phase

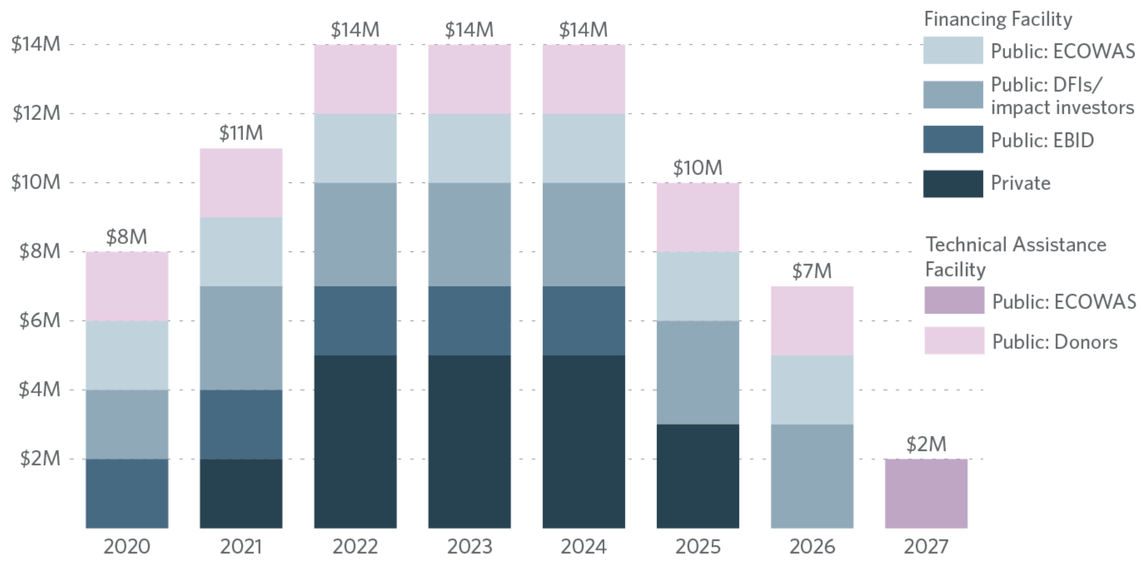
5.3 PRIVATE FINANCE MOBILIZATION AND REPLICATION POTENTIAL

The target size of WAICSA is US$ 80 million with 80% to the Financing Facility and 20% dedicated to the TA Facility (US$ 64 million and US$ 16 million respectively). The ECOWAS Commission has pledged to provide capital of US$ 16 million over the life of the Fund. This capital will be entirely public, provided by contributions from the ECOWAS Member States through the regular community levy. WAICSA's fund manager, EBID, has also pledged US$ 10 million over the life of the project in their capacity as a class A senior investor. These pledges will have to be formalized through specific internal validation processes of the two organizations.

WAICSA also received indications of support from investors and other relevant stakeholders such as the ECOWAS Donors Group. The objective is to raise US$ 14 million from this group of potential investors. A meeting with the ECOWAS Donors Group will be organized in Q4 2019 to confirm their contributions and support. In addition to these commitments, the Fund will aim to mobilize an estimated US$ 20 million in public resources from other DFIs and concessional investors and US$ 20 million in private capital from commercial investors and family offices. The public–private leverage potential is therefore estimated at 0.23 over the Fund's 15-year lifetime. Although low in absolute numbers, the joint mobilisation of capital promoted by WAICSA is significant in the context of insufficient investments directed to agriculture by both the public and private sector in sub-Saharan Africa due to high transaction costs and risk.

For the first year of the two-year pilot phase, WAICSA aims to be fully capitalized by public investors to de-risk the Fund, while the second year should see an initial contribution from private investors. The Fund aims to fund 19 projects in six countries in its pilot phase (eight loans through MFIs, seven loans through local banks, two direct loans to agribusinesses and potentially two equity investments) and could reach a total of 72 projects in all the 15 ECOWAS countries over its lifetime.

Figure 5: Public and private capital contributions



6. KEY TAKEAWAYS

6.1 2019 LAB FOCUS SECTOR: SUSTAINABLE AGRICULTURE FOR SMALLHOLDER FARMERS IN AFRICA

The main goal of the Lab's sustainable agriculture for smallholders in West and Central Africa stream is to mobilize climate investment to benefit smallholders and rural economies in the region. WAICSA intends to ensure more successful climate-smart investments in the region, higher rates of CSA uptake by smallholders, and increased resilience to the impacts of climate change.

Moreover, in increasing the resilience of smallholders and incentivizing sustainable land practices, WAICSA will also contribute to national adaptation and mitigation plans under the Paris Agreement as well as several of the Sustainable Development Goals (SDGs), including SDG 1 (no poverty), 2 (zero hunger), 13 (climate action) and 15 (life on land).

6.2 LAB ENDORSEMENT CRITERIA

WAICSA meets the four Lab criteria for endorsement:

Innovative: WAICSA offers unique features for an agricultural fund of its kind, including a small ticket size, CSA conditionality, and a geographical focus of West Africa.

Financially Sustainable: Although WAICSA is designed to maintain some level of public financing from Member States, by de-risking through concessional finance, guarantees, and technical assistance support, WAICSA should attract commercial investments from year two onwards.

Catalytic: The Fund's specific institutional structure (i.e. the regional community of West African states) will allow it to quickly scale up the experience gathered during the pilot phase and reach all the 15 countries of the ECOWAS region by 2026.

Actionable: The institutional backing and financial commitments that are already in place will help propel WAICSA to achieve its milestones. However, expertise should be sought after to ensure prompt start-up and adequate managing of a fund of this size and scope.

7. REFERENCES

AGRA. (2017). Africa Agriculture Status Report: The Business of Smallholder Agriculture in sub-Saharan Africa (Issue 5). Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). Issue No. 5

Barnard James, Manyire Henry, Tambi Emmanuel and Bangali Solomon. (2015). Barriers to scaling up/out climate smart agriculture and strategies to enhance adoption in Africa. Forum for Agricultural Research in Africa (FARA), Accra, Ghana.

Bayala, J. et al. (2011). Cereal yield response to CA practices in drylands of West Africa. *Journal of Arid Environments, 78*, 13-25. doi:10.1016/j.jaridenv.2011.10.011

Bayala, J., et al. (2014). Parklands for buffering climate risk and sustaining agricultural production in the Sahel of West Africa. *Current Opinion in Environmental Sustainability*, 6, 28-34. doi 10.1016/j.cosust.2013.10.004

Bayala J., R. Zougmoré, C. Ky-Dembele, BA Bationo, S. Buah, D. Sanogo, J. Somda, A. Tougiani, K. Traoré, A. Kalinganire. (2016). Towards developing scalable climate-smart village models: approach and lessons learnt from pilot research in West Africa. ICRAF Occasional Paper No. 25. Nairobi: World Agroforestry Centre. Available at: https://cgspace.cgiar.org/handle/10568/76336

Bilgo A., Kaire M. (2015). Mise à l'échelle de la gestion durable des terres et changements climatiques Eléments de méthode. Presentation. ECOWAS Regional Agency for Agriculture and Food, CILSS, Available at: http://climatechange.ecowas-agriculture.org/sites/default/files/Mise%20%C3%A0%20l%27%C3%A9chelle%20GDT%20changement%20climatique_23nov2015_FINAL.pdf

Boffa, J-M. (1999). Agroforestry parklands in sub-Saharan Africa. FAO Conservation Guide, FAO, Rome, Italy. Available at: http://www.fao.org/3/x3940e/X3940E00.htm#TOC

CCAFS/CGIAR. (2019). Evidence of Success: Drought-Tolerant maize boosts food security in 13 African countries. Available at: https://ccafs.cgiar.org/bigfacts/#theme=evidence-of-success&subtheme=crops&casestudy=cropsCs

CIAT; BFS/USAID. (2016). Climate-Smart Agriculture in Senegal. CSA Country Profiles for Africa Series. International Center for Tropical Agriculture (CIAT); Bureau for Food Security, United States Agency for International Development (BFS/USAID), Washington, D.C.

Cooper, PJM, S. Cappiello, SJ Vermeulen, BM Campbell, R. Zougmoré, and J. Kinyangi. (2013). Largescale implementation of adaptation and mitigation actions in agriculture. CCAFS Working Paper no. 50. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.

Dannson, A., Ezedinma, C., Wambua, T.R., Bashasha,B., Kirstan, J., Satorius K. (2004). *Strengthening farm-agribusiness linkages in Africa. Summary results of five country studies in Ghana, Nigeria, Kenya, Uganda and South Africa*. FAO, AGSF Occasional Paper 6.

Eaton, C. and Shepherd, A.W. (2001). Contract farming. Partnership for growth: A Guide. *FAO Agricultural Services Bulletin* 145, Rome, Italy.

FAO. (2013). Climate-Smart Agriculture Sourcebook. Rome, Italy. Available at: http://www.fao.org/3/i3325e/i3325e.pdf

FAO. (2016). Save and Grow in Practice: Maize, rice, wheat: A guide to sustainable cereal production. Rome, Italy. Available at: http://www.fao.org/3/a-i4009e.pdf

FAO (2017). The State of Food and Agriculture. Leveraging food systems for inclusive rural transformation, Rome. Available at: http://www.fao.org/3/a-i7658e.pdf

FAO. (2018a). Agricultural Investment Funds for Development- Descriptive analysis and lessons learned from fund management, performance and private-public collaboration, by Miller C., Ono T., Petruljeskov M., Rome, Italy. Available at: http://www.fao.org/3/I8226EN/i8226en.pdf

FAO; ICRISAT; CIAT. (2018b). Climate-Smart Agriculture in Benin. CSA Country Profiles for Africa Series. International Center for Tropical Agriculture (CIAT); International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); Food and Agriculture Organization of the United Nations (FAO). Rome, Italy.

FAO; ICRISAT; CIAT. (2018c). Climate-Smart Agriculture in Côte d'Ivoire. CSA Country Profiles for Africa Series. International Center for Tropical Agriculture (CIAT); International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); Food and Agriculture Organization of the United Nations (FAO). Rome, Italy.

FAO; ICRISAT; CIAT. (2018d). Climate-Smart Agriculture in the Gambia. CSA Country Profiles for Africa Series. International Center for Tropical Agriculture (CIAT); International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); Food and Agriculture Organization of the United Nations (FAO). Rome, Italy.

FAOSTAT. (2019). Crop data: rice cultivation. Food and Agriculture Organization of the United Nations (FAO). Rome, Italy. Available at: http://www.fao.org/faostat/en/#home

Faye, Mbène Dièye, et al. (2010). Contribution of parkland trees to farmers' livelihoods: a case study from Mali. *Development in Practice, 20* (3), 428-434. doi: 10.1080/09614521003710013

Francesconi N; Wouterse F. (2017). A new generation of cooperatives for Africa. CIAT Policy Brief No. 37. Centro Internacional de Agricultura Tropical (CIAT). Cali, Colombia.

Garrity, D.P., et al. (2010). Evergreen Agriculture: a robust approach to sustainable food security in Africa. Food Security, 2(3), 197-214. doi: 10.1007/s12571-010-0070-7

Griscom, B, et al. (2017). Natural climate solutions. *Proceedings of the National Academy of Sciences, 114* (44), 11645-11650.doi: 10.1073/pnas.1710465114

IFAD. (2019). West and Central Africa. Available at: https://www.ifad.org/en/web/operations/regions/wca

La Rovere, R., G. Kostandini, T. Abdoulaye, J. Dixon, W. Mwangi, Z. Guo, and M. Bänziger. (2010). Potential impact of investments in drought tolerant maize in Africa. CIMMYT, Addis Ababa, Ethiopia. Available at: https://repository.cimmyt.org/xmlui/bitstream/handle/10883/1084/93558.pdf?sequence=1

Luedeling, E. and Henry Neufeldt. (2012). Carbon sequestration potential of parkland agroforestry in *the Sahel. Climate Change 115*, 443-461. doi: 10.1007/s10584-012-0438-0

Mbow, C., et al. (2014). Achieving mitigation and adaptation to climate change through sustainable agroforestry practices in Africa. Current Opinion in Environmental Sustainability, 6, 8-14. doi: 10.1016/j.cosust.2013.09.002

Magorokosho, Cosmos. (2006). Genetic Diversity and Performance of Maize Varieties from Zimbabwe, Zambia, and Malawi. Doctoral Dissertation Texas A & M University.

Minot, N. (2011). Contract Farming in sub-Saharan Africa: Opportunities and Challenges. Prepared for the policy seminar: "Smallholder-led Agricultural Commercialization and Poverty Reduction: How to Achieve It?", 18-22 April 2011, Kigali, Rwanda. International Food Policy Research Institute.

Ng'ang'a, S.K., V. Miller, G. Essegbey, N. Karbo, V. Ansah, D. Nautsukpo, S. Kingsley, E. Girvetz. (2017). Cost and benefit analysis for climate-smart agricultural (CSA) practices in the coastal savannah agro-ecological zone (aez) of Ghana. International Center for Tropical Agriculture CIAT, USAID. Cali, Colombia.

Norman, J.C. and B. Kebe. (2006). African smallholder farmers: rice production and sustainable livelihoods. Regional Perspectives. Food and Agriculture Organization of the United Nations (FAO). Rome, Italy. Available at: http://www.fao.org/tempref/docrep/fao/010/a0869t/a0869t02.pdf

Olomola, A. (2016). *Governance and Impact of Farm-Agribusiness Linkages in Nigeria*, LAP LAMBERT Academic Publishing, Saarbrucken.

Ouédraogo, M., Partey S. T., Zougmoré R. B., Nyuor A. B, Zakari S. and Traoré K. B. (2018). Uptake of Climate-Smart Agriculture in West Africa: What can we learn from Climate-Smart Villages of Ghana, Mali and Niger?. CGIAR Climate Change, Agriculture and Food Security (CCAFS). Available at: https://ccafs.cgiar.org/fr/node/56012#.XS4O4OhKiUk

Place, Frank, Dennis Garrity, Sid Mohan, and Paola Agostini. (2016). Tree-Based Production Systems for Africa's Drylands. World Bank Studies. Washington, DC: World Bank. doi: 10.1596/978-1-4648-0828-9

Poole, N. and de Frece, A. (FAO). (2010) A Review of Existing Organisational Forms of Smallholder Farmers' Associations and their Contractual Relationships with other Market Participants in the East and Southern African ACP Region, AAACP Paper Series – No. 11. Available at: http://www.fao.org/fileadmin/templates/est/AAACP/eastafrica/FAO_AAACP_Paper_Series_No_11_1_.pdf

Reij Chris, Gray Tappan, and Melinda Smale. (2009). Agroenvironmental transformation in the Sahel: Another kind of "Green Revolution." IFPRI Discussion Paper. Available at: http://www.ifpri.org/publication/agroenvironmental-transformation-sahel

Reij, Chris and Robert WInterbottom. (2015). Scaling Up Regreening: Six steps to success. A Practical Appraoch to Forest and Landscape Restoration. WRI. Available at: https://wriorg.s3.amazonaws.com/s3fs-public/scaling-regreening-six-steps-success.pdf

Rhodes E. R., Jalloh A., Diouf A. (2014). Review of research and policies for climate change adaptation in the agriculture sector in West Africa, Working Paper 090, Future Agricultures, Available at: https://www.future-agricultures.org/publications/working-papers-document/review-of-research-and-policies-for-climate-change-adaptation-in-the-agriculture-sector-in-w-africa/

Rosenstock T.S., K.L. Tully, C. Arias-Navarro, N. Heufeldt, K. Butterbach-Bahl and L.V. Verchot. (2014). Agroforestry with N2- fixing trees: sustainable development's friend or foe? *Current Opinion in Environmental Sustainability* 6, 15-21. doi: 10.1016/j.cosust.2013.09.001

Rosenstock T. S., Lamanna C., Steward P. (2019). *The CSA Compendium: What is and what is not climate smart?*. Presentation to Global Challenge Research Fund AFRICAP Consortium titled Climate Smart Change? Lessons from working with governments, NGOs and farmers on scaling up productive, resilient and low-emission agriculture in Africa under CCAFS (Act 2). June: Leeds, UK. Available at: https://bit.ly/2XbNXkJ

Ruete, Marina. (2015). Financing for Agriculture: How to boost opportunities in developing countries IISD Investment in Agriculture Policy Brief #3. Available at: https://www.iisd.org/sites/default/files/publications/financing-agriculture-boost-opportunities-devloping-countries.pdf

Rural and Agricultural Finance (RAF) Learning Lab. (2016). Inflection Point: Unlocking growth in the era of farmer finance. Available at: https://www.raflearning.org/sites/default/files/inflection_point_april_2016.pdf?token=OS8hc14U

Sanginga, N., et al. (2003). Sustainable resource management coupled to resilient germplasm to provide new intensive cereal–grain–legume–livestock systems in the dry savanna. *Agriculture, Ecosystems & Environment, 100*(2-3), 305-314. doi: 10.1016/S0167-8809(03)00188-9

Styger E, Traoré G. (2018). 50,000 Farmers in 13 Countries: Results from Scaling up the System of Rice Intensification in West Africa; Achievements and Regional Perspectives for SRI; SRIWAAPP Project Summary Report, 2014-2016; West Africa Agriculture Productivity Program (WAAPP). The West and Central Africa Council for Agricultural Research and Development (CORAF/WECARD), Dakar, Senegal. Available at: https://sriwestafrica.files.wordpress.com/2018/04/sri-waapp-book-single-p-8mb.pdf

Sullivan, Gregory, Susan Huke, and Jefferson Fox. (1992). Financial and Economic Analyses of Agroforestry Systems. Proceedings of a workshop held in Honolulu. Hawaii. USA. July 1991. Paia, Ill: Nitrogen Fixing Tree Association

Weston, P., R. Hong, C. Kabore and CA Kull. (2015). Farmer-managed natural regeneration enhances rural livelihoods in dryland west Africa. Environ Manage 55(6), 1402-17. doi: 10.1007/s00267-015-0469-1

World Bank. (2013). *Growing Africa - Unlocking the Potential of Agribusiness*. Financial and Private Sector Development Department, Agriculture, Irrigation and Rural Development Unit, Sustainable Development Department Africa Region. Available at: http://documents.worldbank.org/curated/en/327811467990084951/pdf/756630v10REPLA0frica0pub03011013web.pdf

World Bank. (2019). Climate-Smart Agriculture Investment Plan: Zambia. Analyses to support the climate-smart development of Zambia's agricultural sector. Available at: http://documents.worldbank.org/curated/en/358291552021231101/pdf/Zambia-Climate-Smart-Agriculture-Investment-Plan-Analyses-to-Support-the-Climate-Smart-Development-of-Zambia-s-Agriculture-Sector.pdf

8. ANNEX

8.1 CLASSES OF INVESTORS

Table 8.1: Three different classes of investors

Type	Description	Targeted Investors	Estimated amount (US$)	Financial instrument
Commercial investments	Class A investors - senior Targets lower risk and priority of returns	• Private investors • Family offices • Commercial impact investors	20 million	• Loans • Equity investments
		• Fund manager – EBID	10 million	• Loans • Equity investments
Concessional investments	Class A investors – mezzanine Targets lower risk and priority of returns	• Development finance institutions • Public impact investors	20 million	• Loans • Equity investments
	Class B investors First-loss tranche	• ECOWAS resources	14 million	• Loans • Equity investments
Grants	Grant providers	• ECOWAS Donors' Group • Other international institutional donors & foundations	14 million	• Guarantees • Technical Assistance facility
		• ECOWAS resources	2 million	
Total			**80 million**	

8.2 CSA PRACTICES AND TECHNOLOGIES

Table 8.2.1 CSA assessment criteria for investment projects

Relevance to the local context	Evidence of the specific CSA appropriateness for the respective agro-ecological zone
Economic impact: Sustainably increasing agricultural productivity and incomes	Productivity: Evidence of increased and less variable yields Increased income: Reduced production costs (longer term) and in some CSA cases, better prices for higher quality crops
Social impact: Adapting and building resilience to climate change	Resilience: Reduced risk and exposure to heat stress and extreme weather events owing to better yields, increased and diversified income; improved food security.
Environmental impact: Improving ecosystem services and reducing and/or removing greenhouse gases emissions	Climate change mitigation: Evidence of potential for CO2 sequestration/avoidance Ecosystem services: Improved soil quality; evidence of increased on-farm biodiversity
Local market conditions	• Availability of the technology[9] on local market

[9] For CSA purposes, technology is used in the broad understanding and includes: agricultural machinery and equipment, agricultural inputs, as well as the application of techniques to grow and harvest animal and vegetable products (https://www.britannica.com/technology/agricultural-technology).

	• Current adoption levels in the region (indicating social and cultural acceptability) • Short-term accessibility: Upfront investment required (cost of technology on the local market) • Medium and long-term accessibility: Maintenance costs
Feasibility of monitoring the implementation	Concrete proposal of how monitoring will be ensured

Table 8.2.2 CSA Assessment Criteria for investment projects – examples and evidence

CSAs Criteria and Evidence					
	Economic: Productivity	**Economic: Smallholder income**	**Social: Resilience**	**Environmental: Ecosystem services**	**Environmental: Mitigation potential**
Agroforestry	Shown to increase yields as well as longer term productivity. 50% increase in cocoa yield with agroforestry (Cote d'Ivoire)[10]	Diversified income/ food sources. Can reduce longer term production costs. Increased revenue by 26-73% (Mali).[11] Reduced food insecurity by 25% (Zambia)[12]	Increased food security, increased income stability. Spreads crop climate exposure risk.[13]	Improves water infiltration and prevents soil erosion. Increased nitrogen in soil.[14] Increases soil health and reduces need for synthetic fertilizer in longer term. Increases wildlife biodiversity[15]	Moderate to high mitigation potential through below and above carbon stocks and sequestration. FMNR has potential of 220 TgCo2e/year over 150 million ha globally[16]
Crop rotation	Associated with increased productivity and yields.[17] Maize yields up to 2.3 times higher than conventional (Nigeria)[18]	Increase in income stability. Gross income increased 50 - 70 % than continuous maize (Nigeria)[19]	Increased food security and income diversification Reduces exposure to climate risk.	Reduces soil erosion. Increases water and nutrient use efficiency. Increases soil biodiversity and soil health. Additional fixed nitrogen at a value of US$ 44 million a year (Nigeria)[20]	Promotes efficient use of nitrogen fertilizer and thus reduces nitrogen- based fertilizer emissions. Maintains/improves soil carbon stock
Drip irrigation	Shown to increase yields	Increased revenues	Increased resilience to drought. Increased water use efficiency	Can prevent soil erosion through limiting runoff	Little potential. Possibly lower synthetic fertilizer use & emissions/ improved soil carbon stock
Improved seeds (drought tolerant maize)	Associated with higher yields, especially in dry times, and diminished season fluctuations. Drought resistant groundnut improved yields by 30% (Senegal)[21]	Increased income. Full replacement to drought tolerant maize can take 0.9 m people out of poverty (Nigeria)[22]	Increased food security. Increased stability in times of drought	Reduced soil erosion. Can help improve soil health	Little potential. Possibly lower synthetic fertilizer use & emissions/ improved soil carbon stock

[10] FAO; ICRISAT; CIAT (Cote d'Ivoire), 2018
[11] Faye, 2010
[12] World Bank, 2019
[13] Cooper et al., 2013
[14] Cooper et al., 2013
[15] Bayala et al., 2014
[16] Griscom et al., 2017
[17] Ng'ang'a et al., 2017
[18] FAO, 2016
[19] Sanginga et al., 2003
[20] Sanginga et al., 2003
[21] CIAT; BFS/USAID, 2016
[22] La Rovere et al., 2010

Organic manure/ compost	Shown to increase horticulture yields and improve productivity of rice, maize, cereals in West Africa	Increased income from improved quality produce and reduced production costs (less inputs)	Enhanced soil quality, improved soil water retention. Improved soil fertility	Improved soil biodiversity. Reduced soil erosion	Reduces nitrogen-based fertilizer emissions from reduced use. Contributes to reducing methane emissions through aerobic decomposition. Maintains soil carbon sinks
System of rice intensification	Increased yields. 100% increase in areas of Benin[23]	Increased income compared to conventional practices	Increased food security. Promotes efficient water use. Improves soil health	Can reduce soil erosion	Potential to reduce methane emissions associated with rice fields. Mitigation potential at 265 TgCo2e/year globally[24]

	CSA Criteria and Evidence (cont)						
	Zones/crops relevant	**Market availability**	**Current adoption levels**	**Upfront investment requirement**	**Maintenance costs**	**Monitoring feasibility**	**Other notes**
Agroforestry	Relevant for both extreme wet & dry conditions. Millet, maize, sorghum, coffee, shea, cashew, nut, fodder, *Faidherbia albida*[25]	Access to saplings can be a constraint	Medium- high rates in West Africa. Farmer managed natural regeneration (FMNR) particularly prevalent in Sahelian region/dryland	Most require TA for adequate deployment. Can be capital intensive. FMNR offers a low-cost agroforestry system	Depends on agroforestry system used	Possibly limited, especially tracking forests in drylands	Awareness and information essential for adoption at the smallholder farm level. FMNR in some places already being used
Crop rotation	Temperate, sub-tropical rain fed and irrigated land. Maize, legumes, and grain	N/A	Low- medium in Benin, Cote d'Ivoire, the Gambia.[26] Higher rates in Nigeria[27]	N/A	Limited information	Limited information	
Drip irrigation	Regions with projected water scarcity/Dry or drought prone	N/A	Low adoption rates with smallholder farmers. High rates of "disadoption"	Associated with high upfront/installation costs. TA support necessary	Maintenance for irrigation system needed	Higher feasibility	
Improved seeds (drought tolerant maize)	Drought prone/threatened regions. Maize as well as other crops	Often limited access to seeds	High levels in areas with seed programs/ seeds being distributed	Seeds can be of high or unaffordable costs. 360 US$/t/year (Nigeria)[28]	Annual seed purchase	Can be monitored	Common barriers to uptake: accessibility, inadequate info, affordability & negative perception

[23] Styger, 2018
[24] Griscom et al., 2017
[25] Place et al., 2015
[26] FAO; ICRISAT; CIAT, 2018
[27] Sanginga et al., 2003
[28] La Rovere et al., 2010

Organic manure/ compost	Rice, vegetables, maize, cereals, grains	N/A	High with vegetable growing/ horticulture	Little upfront costs associated	Little	Can be monitored	Maize and sorghum saw increase in productivity by 0.76 ton per hectare[29]
System of rice intensification (SRI)	Rainfed or irrigated rice fields	N/A	Medium rates of adoption. SRI West Africa Program helped disseminate practice	High production costs. 846 US$/hectare compared to 634 for conventional) (Benin)[30]	With each new harvest	Can be monitored	Less inputs in general are needed

8.3 COMPARABLE INSTRUMENTS

To understand the current field of agricultural funds and the Fund's market positioning, 24 instruments were examined. Table 8.3.1 contains information on the top 5 most comparable instruments along with a comparison to WAICSA. Table 8.3.2 is a list of all 24 instruments reviewed.

Table 8.3.1: Top 5 Most Comparable Instruments

Similar Instruments	Description	Comparison
Africa Agriculture and Trade Investment Fund (AATIF)	Invests across the entire agricultural value chain in Africa, targeting small, medium, and large-scale farms and agribusinesses.[1]	Products include general social and environmental components but does not specifically focus on climate or CSA
Agri-Business Capital (ABC) Fund	Initiated by IFAD with EU, ACP, Luxembourg & AGRA. Provides loans and equity investments to rural SMEs, farmers' organizations, and rural financial institutions. Particular focus on youth.[1]	Does not contain a CSA component/ TA. Global in scope
The Moringa Fund	Equity-only direct investment fund with an agroforestry TA facility with goal of removing barriers to agroforestry system development. Investments must comply to high environmental standards.[1]	Focus on agroforestry. No specific CSA conditionality. Large ticket size (4-10 million US$). Global in scope
Smallholder Finance Facility (SFF)	Managed by FMO and IDH. Offers support for investments in crucial value chains. Provides TA, grants and debt to promote good agricultural practices.[1]	Minimum ticket size US$ 1 million. Main region is Latin America but with projects in West Africa
Agri3 Fund	Main objective to catalyse private funds for deforestation-free agriculture. Targets smallholders through banks, agribusiness and local governments. Main project geographies include Indonesia and Brazil.[1]	Includes a sustainable land use component but does not specifically target WCA region. Ticket size over US$ 1 million
Dutch Fund for Climate and Development (DFCD)	A partnership between WWF, SNV and FMO to finance climate-relevant projects and TA in developing countries (1/4 going to LDC), with one investment theme being land use/ CSA.[1]	The fund targets larger ticket sizes. Global in scope

[29] Bayala et al., 2011
[30] Styger, 2018

Table 8.3.2: Full list of comparable instruments reviewed

Instrument name	Geographic focus	Type	Ticket size	Technical Assistance	Small-holders	Sustainable land use focus	CSA component
&Green Fund	Global (tropical forests)	Fund	US$ 10-15m				
African Agriculture Fund (AAF)	Africa (continental)	Fund	US$ 5-24m				
AAF SME Fund	Africa (continental)	Fund	US$ 150k-4m				
Africa Agriculture and Trade Investment Fund (AATIF)	Africa (continental)	Fund	US$ 5-30m		Grants for TA		
Africa Enterprise Challenge Fund (Agribusiness window)	Sub-Saharan Africa	Fund/ Grants for winners of competition	US$ 250k-1.5m				Mentions CSA
Africa Food Security Fund (AFSF)	Africa (continental)	Fund	US$ 2-8m				
AgDevCo	Sub-Saharan Africa	Fund/ working capital	US$ 100k-10m		Up to 800k		
Agri3 Fund	Global (Brazil, Indonesia mostly)	Fund	US$ 2-15m/ 5-25m				
Agri-Business Capital (ABC) Fund	Africa, South America & Asia	Fund	EUR 25k-1m/ up to EUR 5m				
AgriFI	Africa, Latin America & Asia		EUR 1-5m				
Agri-Vie Fund	Africa (continental)	Fund	US$ ~6m				
Beira Agricultural Growth Coorditor Catalytic Fund	Mozambique	Fund	US$ 50-500k	Grants for TA	Support facility		
Climate-Smart Lending Platform (CSLP)	East Africa	Platform	N/A				
Dutch Fund for Climate and Development (DFCD)	Global	Fund	N/A				Mentions CSA
Food Securities Fund	Global	Fund	N/A			Conditional products	Mentions CSA
Global Agriculture and Food Security Program (GAFSP)	Lowest income countries	Facility	N/A				Climate component
IDH Farmift Fund	Africa (continental)	Fund					Climate component
The Moringa Fund	Latin America & Sub-Saharan Africa	Fund	EUR 4-10m				Agroforestry
Partnerships for Forest	Africa, Latin America & Asia	N/A	N/A				
Private Agricultural Sector Support (PASS)	Tanzania	Facility	N/A				
R4 Rural Resilience Initative	Sub-Saharan Africa	Insurance/ microcredit	N/A				

Smallholder Finance Facility (SFF)	Africa, Latin America & Asia	Facility	US$ 2-10m			Good practices	
Solidaridad	Global	Accelerator					
Tropical Landscapes Finance Facility (TLFF)	Indonesia	Fund/ Securitization	N/A				

8.4 APPROACH FOR MAPPING OUT THE 15 ECOWAS COUNTRIES BY VULNERABILITY, CONDUCIVENESS AND AREA OF AGRICULTURE LAND FARMED BY SMALLHOLDERS

The analysis covers all the 15 ECOWAS Member States.

For each of them we assessed three compounded indicators: (a) the level of vulnerability to climate change and need of the country to adapt (the higher the vulnerability, the higher the priority), (b) the conduciveness of the environment and (c) the "market size". Sub-indicators used for each of the dimensions are illustrated in the sections below.

(a) The compound indicator "**Climate vulnerability and need**" was derived from the following formula:

$$Climate\ vulnerability\ and\ need = ROUND(VR * 0.4 + CrAg * 0.2 + CrD * 0.2 + OrAg * 0.2)$$

Variable	Description
VR = Vulnerability to climate change and readiness to improve resilience	The Notre Dame-Global Adaptation Index (ND-GAIN) Country Index is a free opensource index that summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. Source: https://gain.nd.edu/our-work/country-index/
CrAg = Private/commercial credit to agriculture	The FAO Credit to Agriculture dataset provides national data for over 100 countries on the amount of loans provided by the private/commercial banking sector to producers in agriculture, forestry and fisheries, including household producers, cooperatives, and agro-businesses. For this analysis, we used the latest data available showing the share of total credit provided to agriculture. Source: http://www.fao.org/faostat/en/#data/IC
CrD = Credit demand from rural population for farm-focused investments	The World Bank Global Findex Database 2017 is a comprehensive dataset on how adults save, borrow, make payments, and manage risk. Our analysis used the dataset on the percentage of respondents who report borrowing any money to start, operate, or expand a farm or business in the past 12 months, in rural areas (% age 15+). Source: https://globalfindex.worldbank.org/
OrAg = Rates of adoption of CSA – Agriculture area under organic agriculture	The FAOSTAT Land Use domain contains data on forty-seven categories of land use, irrigation and agricultural practices. Our indicator used the dataset on the agriculture area under organic agriculture per 1000 ha. Source: http://www.fao.org/faostat/en/#data/RL

(b) The compound indicator "**Conducive environment**" was derived from the following formula:

$$Conducive\ environment = ROUND(Finance * 0.4 + Seeds * 0.3 + Water * 0.3)$$

Variable	Description
Finance = access to financial services for agricultural enterprises	The World Bank Enabling the Business of Agriculture (EBA) Finance indicators measure the quality of laws and regulations that promote access to financial services and support the development of agricultural enterprises. Source: http://eba.worldbank.org/en/data/exploretopics/finance
Seeds = enabling production of improved seeds	The World Bank Enabling the Business of Agriculture (EBA) Seed indicators measure laws and regulations that support and promote the development, evaluation, and release of improved seed varieties, as well as seed quality control. Source: http://eba.worldbank.org/en/data/exploretopics/seed
Water = sustainable water resource management	EBA Water indicators measure key legal elements that can be used to support sustainable water resources management practices. Source: http://eba.worldbank.org/en/data/exploretopics/water

c) **The "market size"** indicator is created to provide a measurement of potential beneficiaries of WAICSA. Our analysis is based on the area of agriculture land farmed by smallholders with landholdings smaller than 10ha (in thousands of ha). This indicator is used to determine the size of the bubbles in Figure 3. Source: https://www.grain.org/article/entries/4929-hungry-for-land-small-farmers-feed-the-world-with-less-than-a-quarter-of-all-farmland

8.5 QUANTITATIVE MODELLING ASSUMPTIONS AND RESULTS

The results presented in section 5.1. Quantitative modelling and in tables below are based on the following assumptions:

(i) Loans interest rates and ticket size as summarized in Table 8.5.3 below;
(ii) Capital contributions from different investors as summarized in Table 8.5.4: below;
(iii) Management fees of 3% of the invested capital during the investment period (years 1 to 7) and 2% for the post-investment period.
(iv) Rates of loan repayment of 95%;
(v) Annual returns on equity investments of 8%.

Table 8.5.1: Internal rates of return for the baseline model scenario

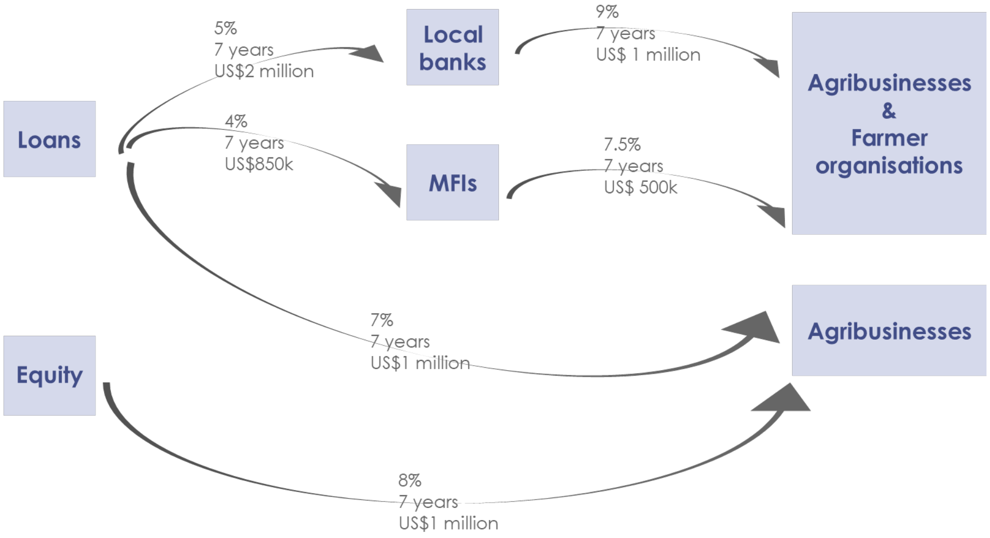
Partner	IRR
Financing Facility	0.7%
Class A (average Senior and Mezzanine)	5.1%
Class B - ECOWAS	-7.9%
Fund Manager - EBID	3.7%

Table 8.5.2: Number of projects financed for the baseline model scenario

Number of projects financed	72
Loans (Banks to Beneficiaries) - Indirect	40
Loans (MFI to Beneficiaries) - Indirect	20
Loans (WAICSA to Beneficiaries) - Direct	6
Equity Investments (WAICSA to Beneficiaries) - Direct	6

Figure 8.5.1: Loan interest rates, ticket sizes and annual returns on equity investments

Model assumptions: interest rates



8.6 APPROACH USED TO ASSESS THE ENVIRONMENTAL AND SOCIAL IMPACT OF WAICSA

During the completion of this report, no specific CSA practices had been prioritized by the proponents or Fund Manager. Moreover, the use and impact of CSA practices vary depending on agro-ecological region and crops, making it tremendously variable to determine which practices could or should be prioritized, particularly prior to understanding the interest of local farmer organizations and agribusinesses and to formulating priority areas for the project. Thus, based on data available and a desk review of studies of CSA in the region, and for the purpose of modeling WAICSA's potential socioeconomic and environmental impact, three possible CSA practices were selected by Lab analysts: (1) improved seeds (drought-tolerant maize); (2) agroforestry; and (3) system of rice intensification (SRI).Although a range of CSA practices exist and are used in West Africa, the adoption of these three specific practices have been more thoroughly documented than others, providing numbers for which Lab analysts could design a model to estimate WAICSA's possible impact.

Below are the figures estimated based on the total amount to be dispersed by WAICSA and the costs associated with implementing the three practices. Working backward in this way, analysts were able to determine how many hectares could be converted with the funds throughout the lifetime of WAICSA (as target geographies/areas had not been determined by proponents), by using estimated production costs associated with each practice. Production costs were derived from the desk review studies. In the case of agroforestry, the production costs found in three different sources were averaged to arrive at an approximate cost (US$/hectare) (see Table 8.6.1).

Mitigation

Although estimating mitigation potential for land use and agriculture is highly dependent on many factors, analysts used averages of cited mitigation potentials from five sources for agroforestry systems and one source for SRI (for over 12 countries in West Africa). Information for improved seeds was limited, mostly due to the fact that they do not offer much potential for mitigating greenhouse gas emissions. Agroforestry's potential lies in increased number of trees and thus increased carbon sequestration. Rice fields under SRI as compared to conventional rice emits less methane. The numbers found for mitigation potential were then converted to t/CO2e/ha/year. Based on the amount of hectares that could be converted for each of the CSA practices, the Lab analysts arrived at a total amount of carbon dioxide potentially avoided with the three CSA practices. Analysts acknowledge that potential mitigation rates depend on the age of trees and forests and peak sequestration phases. To take this into consideration, averages of mitigation potential of the three different CSAs from various studies were used to estimate WAICSA's possible mitigation potential, which is based on the assumption that those 185,000 hectares will be converted to CSA practices after all the resources of the fund have been dispersed and used to convert plots to CSA.

Socioeconomic & ecosystem adaptation

Climate resilience and socioeconomic adaptation to climate change is the ability to better absorb climate-related shocks, or to bounce back when these shocks hit. With climate change and more frequent extreme weather, smallholder farmers must find ways to adapt by using practices that result in reduced crop loss during extreme weather events (floods, droughts, etc.), diversified income, and enhanced soil health to avoid future losses. Climate-smart agricultural practices add to a farmer's resilience by allowing him/her to better absorb climate shocks, namely through increasing income, yields, and food security, or decreasing their income/yield variability in times of drought or flood (i.e. preventing additional losses during extreme weather). With this in mind, the main indicators used to measure the Fund's impact on smallholder adaptation and resilience include: income change; yield change; additional food; change in dietary diversity; yield variability; income variability, and ecosystem value.

It is important to note that depending on the CSA practice implemented, factors of climate resilience may differ. For instance, with agroforestry, smallholder farmers can diversify their crops and earn additional income for different crops than if a plot was solely used to produce one type of crop. Moreover, since trees are planted in agricultural plots, ground crops are more shaded and protected from heat in times of drought. In regard to improved seeds, depending on the crop, various climate benefits can be achieved. For the purpose of this modeling, seeds for drought-tolerant maize were selected, which, as the name suggests, provides farmers with a strain of maize that can withstand drought conditions that are more frequent with climate change. Being more drought tolerant means that farmers will not experience as great of losses during times of drought as compared to if they had used a more traditional type of maize.

Table 8.6.1: Economic and production figures for CSA practices[31]

Economic/Production				
	Production costs (US/ha)			% Yield changes
	Source 1	Source 2	Source 3	
Improved seeds	752	n/a	n/a	70

[31] Sources for economic/production figures: *Production costs:* Improved seeds: Ng'ang'a, et al., 2017 (implementation and maintenance costs, annually). Agroforestry: Source 1 costs: Reij et al., 2009 (agroforestry in zai, contour bunds in Burkina Faso); Source 2 costs: Reij et al., 2009 (FMNR with Faidherbia albida in Niger); Source 3 costs: Sullivan, 1992 (average of hypothetical costs in Nigeria). System of rice intensification: Styger, 2018 (average in Benin, the Gambia and Togo). *Percentage yield changes:* Improved seeds: (average of yield changes from three sources); Ng'ang'a et al., 2017; Magorokosho, 2006; CCAFS, 2019. Agroforestry (average of yield changes from six sources): Rosenstock et al., 2014; Boffa, 1999; Reij et al., 2009; FAO, ICRISAT, CIAT, 2018 (Cote d'Ivoire); Reij, & WInterbottom, 2015; Weston et al., 2015. System of rice intensification: Styger, 2018 (average of 12 countries in West Africa)

Agroforestry	200	20	37.3	79
System of rice intensification	664	n/a	n/a	89

Table 8.6.2: Mitigation figures for CSA practices[32]

Mitigation				
	Mitigation regional (tonnes CO2e/ha/year)			Mitigation global (TgCo2e/year)
	Source 1	Source 2	Source 3	
Improved seeds	n/a	n/a	n/a	n/a
Agroforestry	11.01	1.83	5.3	220
System of rice intensification	0.069	n/a	n/a	n/a

Table 8.6.3: Adaptation figures for CSA practices[33]

	Adaptation							
	Additional food (t/ha)	% income change			% change dietary diversity	% change yield variability	% change income variability	Ecosystem value change (US/ha)
		Source 1	Source 2	Source 3				
Improved seeds	n/a	18	n/a	n/a	n/a	-12	-15	24.5
Agroforestry	0.25	30	13	21	12	n/a	n/a	56
System of rice intensification	2.37	41	n/a	n/a	n/a	n/a	n/a	n/a

[32] Sources for mitigation figures: Agroforestry: Source 1: Garrity et al., 2010; Source 2: Luedeling et al., 2012; Source 3: Mbow et al., 2014; Global: Groscom et al., 2017. System of rice intensification: Average of 13 countries from West Africa (Griscom et al., 2017) divided by land under rice cultivation in hectares in those countries (FAOSTAT, 2019)

[33] Sources for adaptation figures: *Income change:* Improved seeds: World Bank, 2019. Agroforestry: Source 1: Weston et al., 2015 (Compared to FMNR non adopters); Source 2: Reij et al., 2009 (FMNR); Source 3: Haglund et al., 2011 (average). System of rice intensification: Styger, 2018 (regional average). *Dietary diversity:* Agroforestry: Reij et al., 2009. *Additional food:* Agroforestry: Reij et al., 2009 (average from Nigeria and Burkina Faso). System of rice intensification: Styger, 2018 (regional average). *Yield variability:* Improved seeds: World Bank, 2019. *Income variability*: Improved seeds: World Bank, 2019. *Ecosystem value change*: Improved seeds: Ng'ang'a et al., 2017. Agroforestry: Reij et al., 2009