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SELECTED CASE STUDIES

# Promoting inclusive green finance in agriculture



INCLUSIVE RURAL FINANCE





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# Promoting inclusive green finance in agriculture

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# Abbreviations

AFD	Agence Francaise du Developpement (French Development Agency)
ALIDE	Asociación Latinoamericana de Instituciones Financieras para el Desarrollo
BID	Interamerican Development Bank
CABFIN	Improving Capacity Building in Rural Finance
CAF	Latin America Development Bank
CBI	Climate Bonds Initiative
CESPEDES	Centro de Estudios del Sector Privado para el Desarrollo Sustentable
CFI	Center for Financial Inclusion
CGAP	Consultative Group to Assist the Poor
CSA	climate-smart agriculture
CTF	Clean Technology Fund
DFI	Development Finance Institution
EEGF	Energy Efficiency Guarantee Fund
E&S	environmental and social
ESG:	environmental, social and governance
FEFA	Fondo Especial para Financiamientos Agropecuarios
FEGA	Fondo Especial de Asistencia Técnica y Garantía para Créditos Agropecuarios
FI	financial institution
FIRA	Fideicomisos Instituidos en Relación con la Agricultura
FONDO	Fondo de Garantía y Fomento para la Agricultura, Ganadería y Avicultura
FOPESCA	Fondo de Garantía y Fomento para las Actividades Pesqueras
GBE	Green People's Energy for Africa Initiative
GFI	Green Finance Institute
GHG	greenhouse gas
GIZ	German Development Cooperation
GSMA	Global System Mobile Association
ICMA	International Capital Market Association
IDB	Inter-American Development Bank
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
INECC	Instituto Nacional de Ecología y Cambio Climático
KfW	German Development Bank
MFI	microfinance institution
MoU	Memorandum of Understanding
MSME	micro-, small- and medium-sized enterprise
NGO	non-governmental organization
PAYGO	pay-as-you-go



RBF	results-based financing
SARAS	Sistema de Administración de Riesgos Ambientales y Sociales
SDGs	Sustainable Development Goals
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales
SIIOF	Sistema Informático Integral de las Operaciones
SSA	sub-Saharan Africa
STPS	Secretaría del Trabajo y Previsión Social
TAF	Technical Assistance Facility
UNCDF	United Nations Capital Development Fund
WFP	World Food Programme









# Introduction

Across the world, the rising effects of climate change have resulted in an increased frequency, magnitude, and unpredictability of a wide variety of extreme natural events, which are rapidly becoming the greatest threat to the livelihoods and well-being of agricultural communities in every region. In developing and emerging countries, especially, small-scale farmers and other low-income actors in agricultural value chains are among those who are the most vulnerable to the multidimensional impacts of climate change. This is due to a wide range of factors, such as: their businesses' high exposure to systemic or covariate risk; a lack of knowledge on climate-smart and resilient agricultural practices; scarce income diversification; low access to clean technology; and few available financial buffers that could help them weather the brunt of extreme natural events.

In recent years, various stakeholders in the financial inclusion domain (such as development agencies, development finance institutions and multilateral development banks, among others) have begun taking an interest in the possibility of designing innovative financial services – tailored to the needs of vulnerable agricultural actors – that can also promote the adoption of sustainable practices, technologies and production models, all aimed at fostering farmers' resilience and growth in the face of rising effects of climate change. Nested at the intersection between financial inclusion and environmental sustainability, this **“inclusive green finance”** approach to development seeks to combine the promotion of different financial services suitable for the needs of small-scale agriculture (e.g. credit, savings and insurance) with a range of incentives aimed at promoting sustainable agriculture, forest protection, efficient water use, clean energy transition, and a host of other practices linked to climate change adaptation and mitigation, environmental protection, efficient use of natural resources, among other aspects.<sup>1</sup>

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<sup>1</sup> Note that, in the frame of this specific study, we are focusing on how an inclusive green finance approach can be applied specifically to small-scale agriculture. Nevertheless, “inclusive green finance” as a general concept has a far broader definition. According to a recent policy note by the UN Secretary-General's Special Advocate for Inclusive Finance for Development, inclusive green finance can be defined as the “*access to and usage of financial services and products that build resilience to the negative impacts of climate change, loss of biodiversity, and ecosystems, and facilitate participation of low-income households, small businesses, and vulnerable groups in the green and low-carbon economy*” (UNSGSA, 2023).

However, from a knowledge generation perspective, relatively little research has been carried out so far to develop guidance material, reference studies and templates that can assist relevant stakeholders (such as development finance institutions (DFIs) or private financial institutions active in rural areas) in designing and offering green and inclusive financial services aimed at vulnerable population segments – especially in the agricultural sector. As noted in a recent publication by the Center for Financial Inclusion (CFI):

**Inclusive financial services can have a significant impact on how vulnerable populations respond to climate risks and challenges, but the inclusive finance community lacks an overarching framework for understanding and explaining the critical ways in which financial services can support improved outcomes for low-income and vulnerable people in the context of climate threats (Miller, Krishnan, and Alvarez Ruiz, 2023, pg. 1).**

Consequently, the present publication seeks to contribute towards filling the current knowledge gap on inclusive green finance by presenting **three concrete case studies that touch upon different aspects and applications of inclusive green finance in agriculture**, with a specific, overarching focus on the promotion of sustainable small-scale agricultural production. This selection of case studies aims to showcase how widely differing types of institutions (i.e. an agriculture-focused development finance institution, a blended finance fund and a development programme), engaged in the promotion of agriculture in developing and emerging countries, have created **innovative and impactful models** for mainstreaming climate-smart and “green” considerations in their financial provision activities. In different ways, these entities have sought to pursue – in a strategic manner – a range of coordinated objectives linked to the generation of positive socio-environmental impacts (e.g. through climate-smart agriculture, reforestation and clean energy transition) on one side, while promoting an accessible offer of financial services for agricultural actors on the other.

The **overall objective** of this publication is to provide insights and food for thought to a range of stakeholders that have an active interest in mainstreaming aspects of inclusive green finance in their strategies and operations. These include development agencies, development finance institutions (DFIs), impact and blended finance funds, public banks and financial institutions (FIs) with relevant institutional mandates. In line with this, it should be mentioned that the widely different nature of the case studies selected for this publication is in fact a reflection of the variety of institutions that might view inclusive green finance as a relevant concept for their strategies and operations. Specifically, the case studies included in the publication are the following:

- **An institutional commitment towards promoting green finance in agriculture – FIRA:** this case study showcases the experience of a large-scale, second-tier Mexican DFI that is the main provider of financing to small- and medium-sized enterprises engaged in agriculture, livestock, fisheries and aquaculture. In recent years, *Fideicomisos Instituidos en Relación con la Agricultura* (FIRA) has implemented an ambitious and comprehensive institutional strategy to promote sustainable agriculture through its financing activities, designing a variety of financing mechanisms and solutions that seek to incentivize the uptake of climate-smart agricultural practices and technologies on the part of its clients.
- **Financial innovations to foster access to renewable energies in agriculture – Insights on the Green People’s Energy for Africa initiative:** this case study analyses a large-scale development programme managed by the German Development Cooperation (GIZ) and implemented in nine sub-Saharan African countries, which seeks to support (through

financial incentives and capacity building) the creation of a public-private market for the financing and sale of decentralized renewable energy technology for small and medium-scale agribusinesses.

- **Catalysing climate finance flows towards sustainable agriculture – An analysis of the AGRI3 Fund**  
**AGRI3 Fund:** this case study illustrates the experience of a blended finance fund that promotes large-scale investments in developing agriculture which focus on mainstreaming climate-smart practices, the fight against deforestation, as well as overall improvements to farmers' livelihoods, all through a mix of financial incentives and capacity building.









# An institutional commitment towards promoting green finance in agriculture

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## The case of FIRA

This case study seeks to provide a comprehensive analysis of the strategy adopted by *Fideicomisos Instituidos en Relación con la Agricultura* (FIRA), a second-tier DFI dedicated to enabling access to financial services for Mexico's farmers, to mainstreaming and promoting green and climate-smart considerations in all aspects of its operations and financial provision activities. The choice to focus the analysis specifically on this financial institution stems from the fact that FIRA's green finance strategy represents an **ambitious and comprehensive plan for institutional change in the frame of the current climate-related crisis**, which has few precedents among development finance institutions in developing and emerging countries, and holds considerable potential for replication in other climate change-affected contexts.

The hope is that the analysis of FIRA's successes and obstacles with regard to the design and implementation of an in-house green financing strategy **will encourage other FIs engaged in agricultural financing** – whether private or public – to initiate similar institutional transformations. The case study was built by leveraging a combination of direct interviews with FIRA representatives and secondary research based on various sources, including a sizeable amount of knowledge material on green finance made available by FIRA itself over the years.

The case study begins by providing, in Section 1, a brief overview of the current scenario related to the impact of climate change on Mexican agriculture, along with a general description of FIRA's structure, mandate and operations. This section is essential to set the stage for the case and convey the main reasons that brought FIRA to develop its institutional stance towards climate change mitigation. The study then moves on to illustrate, in Section 2, different facets of FIRA's green finance strategy, including its core programmes, initiatives and specific financial services. Finally, in

Section 3, the study provides a critical analysis of FIRA's overall experience in implementing such a strategy, highlighting the current challenges still faced by the organization, as well as the potential for future growth and expansion.

## 1. Context of the case

### 1.1 The rising impact of climate change on Mexico's agriculture

Climate change represents an existential threat to Mexican agriculture. This sector, which employs 14 percent of the national labour force, contributes to 3.8 percent of the national GDP. At the same time, it is responsible for 14 percent of the country's greenhouse gas (GHG) emissions and is becoming increasingly more affected by shifting and erratic rainfall patterns, rising temperatures, water scarcity, a higher incidence and magnitude of extremal natural events and a host of other damaging phenomena. This is particularly critical for the 5.2 million Mexican smallholders (owning less than 5 hectares) who derive their livelihoods from agriculture, and account for three-quarters of the national farmer population. This segment of actors is characterized by varied and **multidimensional aspects of vulnerability**, which include endemic poverty,<sup>2</sup> food insecurity, malnutrition and low levels of financial inclusion. Further compounding these issues is the increased volatility in weather conditions which is becoming a prime cause for **increasingly higher levels of socioeconomic insecurity** for Mexican smallholders, especially as the vast majority of them are semi-subsistence producers who rely on rainfed agriculture to ensure their livelihoods (World Bank, CIAT and CATIE, 2015).

Mexico's agriculture is projected to be impacted considerably more than other countries as a result of the rising effects of climate change, not least because of its geographical location (amid two oceans and straddling the Tropic of Cancer) which exposes the country to considerable weather volatility. In particular, the northern part of the country is particularly exposed to drought risk, while the southern part is highly vulnerable to tropical storms. In fact, Mexico is the most exposed country to extreme natural events in Latin America, having withstood 18 percent of all natural disasters that have struck the region between 1970 and 2009. (Oré, 2021; World Bank, CIAT and CATIE, 2015).<sup>3</sup>

With regard to drought especially, it must be underlined that Mexico ranks among the most water-stressed countries in the world, with a neglected and inefficient irrigation infrastructure being a primary cause for this. There are 22 million hectares of cultivated land in Mexico (amounting to 11 percent of the national territory), of which 26 percent are irrigated. These 5.7 million hectares of irrigated land are **responsible for 78 percent of water use in the country**. This has led to the implementation in recent years of large-scale scale programmes – by both the government and various development agencies – focused on the promotion of water-efficient, climate-smart agricultural practices among farmers, such as water harvesting, drip irrigation, contour ditches and accurate irrigation schedules. Nevertheless, substantial work still remains to be done regarding this issue (CYMMIT, 2022; CEDRSSA, 2019).

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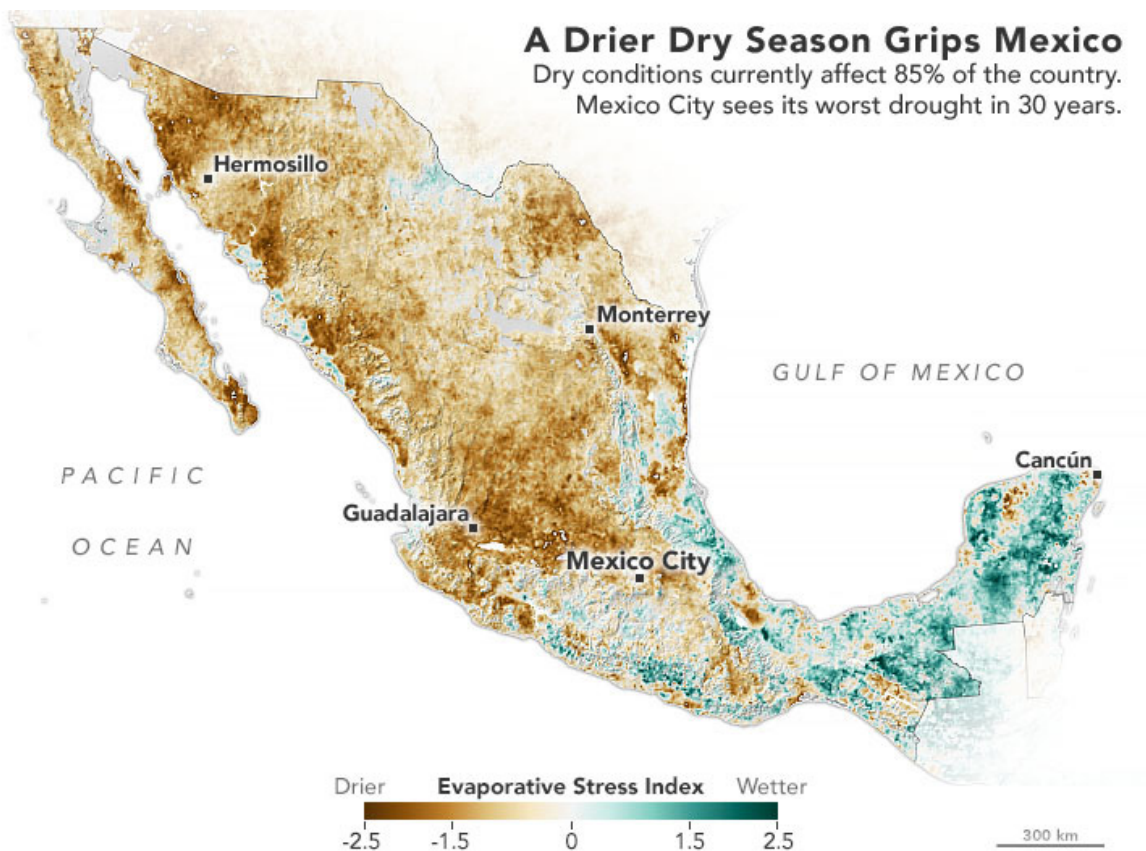
<sup>2</sup> While rural dwellers in Mexico account for 24 percent of the total population, they also make up two-thirds of the extremely poor in the country. Furthermore, around 44 percent of the rural population is engaged in the agricultural sector (IFAD, 2020).

<sup>3</sup> In Mexico, 90 percent of subsistence farmers depend on rainfed agriculture, compared to 63 percent of commercial farmers. Of the 22 million hectares of land in Mexico that are devoted to agriculture, only 23 percent are irrigated (World Bank, CIAT and CATIE, 2015).



The relation between climate change and water scarcity has been made painfully clear by recent events. During the dry season of 2021, Mexico experienced **one of its worst droughts in decades**, with nearly 85 percent of the country being affected. In particular, 46 percent of drought-affected land was classified by the National Meteorological Service as facing “severe drought” or worse. The map in Figure 1, which shows the Evaporative Stress Index (ESI) registered across the country, illustrates that in most of Mexico’s northern and central territory vegetation was highly stressed because of lack of water. The country experienced approximately 20 percent less rainfall than normal during that season. (NASA, 2021).

**FIGURE 1:** Evaporative Stress Index registered across Mexico during the dry season of 2021



Source: NASA. 2021. Widespread drought in Mexico. In: NASA Earth Observatory. Washington, DC. <https://earthobservatory.nasa.gov/images/148270/widespread-drought-in-mexico>

The effect of climate change on agriculture is a key factor contributing to a number of damaging trends that have been affecting Mexican rural society, such as: rising food insecurity; rural-to-urban migration (especially among youth); expatriation; and an ageing farmer population.<sup>4</sup> Reduced crop yields, as a consequence of climate change, are also bound to generate impacts that go well beyond Mexico’s borders, affecting global trade networks and the state of food security in countries that

<sup>4</sup> Some key data can help to make sense of these statements: 24.6 million Mexicans lacked access to sufficient, safe and nutritious food in 2016; between 1.4 to 6.7 million adult Mexicans are expected to leave the country by 2080 owing to the impact of climate change on the agricultural sector; and the average age of the head of a farming household in Mexico is 53 years old (IFAD, 2020; Arslan, 2019).

have become considerably dependent over time on agricultural trade with Mexico, thanks to free trade policies such as the United States–Mexico–Canada Agreement. In 2020, Mexico’s agricultural exports to other countries amounted to USD 44.8 billion, making the country an important player in international agricultural trade (USDA, 2022).

One of the most critical aspects of climate change’s impact on Mexican agriculture is the damage it brings to **maize cultivation**, given that this crop occupies the largest cultivated area in the country and is a critical component of Mexicans’ food and economic security, as well as a staple of their diets and nutrition. Almost 60 percent of rainfed agricultural land in Mexico is used to plant maize, while 50 percent of this area is dedicated to producing maize for self-consumption, providing a main nutritional base for approximately 20 million people (Murray-Tortarolo, Jaramillo and Larsen, 2018). The total national area for maize cultivation decreased by 7 percent between 2015 to 2020 because of drought and water scarcity, a key factor that contributed to farmers switching to planting other types of crops that are less water-dependent (e.g. pistachio and maguey) as well as resorting to more drought-resistant maize varieties. This last point is critical considering that Mexico is home to 59 recorded maize landraces, and climate change can lead to a considerable loss in crop biodiversity as some traditional maize varieties stop being planted. A progressive reduction in maize production at national level will also make Mexico increasingly more dependent on imports from the USA for genetically modified yellow maize (14.5 million tonnes were imported in 2022 alone), which is used mainly as livestock feed and for industrial purposes (Oré, 2021).

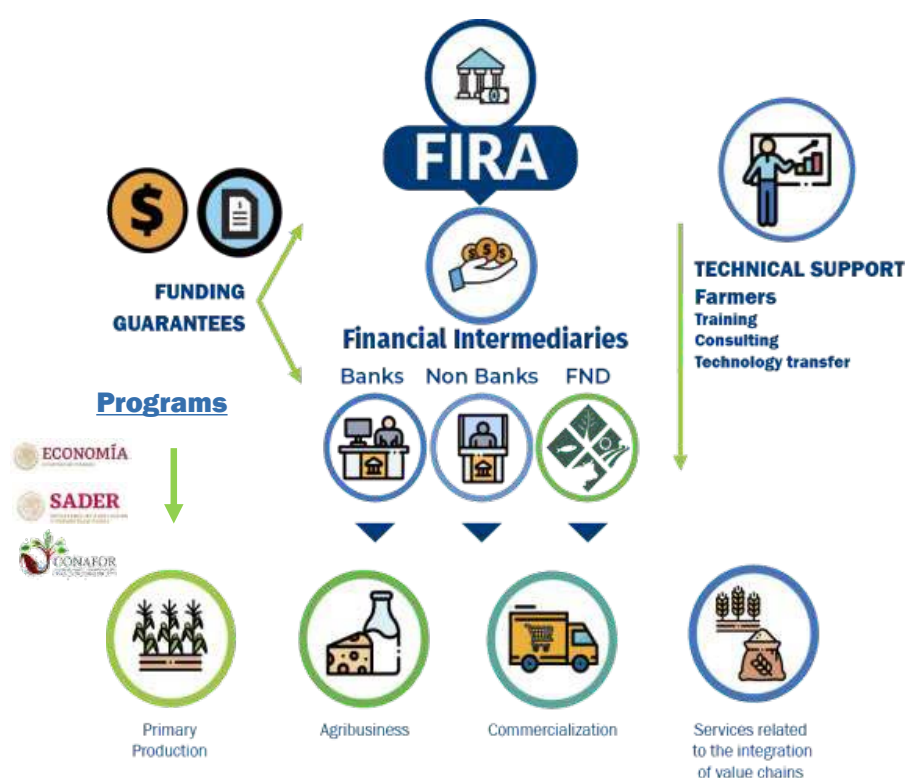
In the past two decades, the Mexican government has started adopting a varied and complex policy response to the issue of climate change, although it must be underlined that policy objectives have not always translated into concrete, impactful results. In 2012, the **Law on Climate Change** set a number of ambitious targets for the mitigation of GHG emissions in the country, such as generating of at least 35 percent of the country’s power through clean technologies by 2024. In 2015, the country approved the **Energy Transition Law**, which set longer-term goals for clean electricity generation in the country (37 percent by 2030 and 50 percent by 2050). Nevertheless, by 2020 only 25 percent of energy in Mexico was produced through clean sources, with no additional, substantial increases foreseen as of 2022. In 2018, a national decree brought Mexico’s domestic emission reduction targets in line with those of the Paris Agreement: the key goals under Mexico’s Nationally Determined Contribution (NDC) include reducing GHG emissions by 22 percent and black carbon emissions by 2050, as well as reaching a net zero deforestation rate by 2050 (Necochea Porras, 2022).

Despite these ambitious targets, it must be highlighted that total GHG emissions in the country have only slightly decreased since the Law on Climate Change was promulgated, aside from a brief dip that coincided with the start of the COVID-19 pandemic. The country still lacks a number of fundamental enabling factors required to see these commitments pursued and concretized in a strategic manner, such as a clear national roadmap, a dedicated financing strategy, robust mechanisms for accountability and enforcement of targets (such as an independent monitoring body), and a number of other elements. Furthermore, in recent years the Mexican government has rolled back or reformed several of its original commitments and investments in renewable energy promotion and climate change mitigation, reverting to an emphasis on fossil fuel production based on the rationale, or discourse, of energy sovereignty and employment generation in the oil industry (IEA, 2022a).

## 1.2 Introduction to FIRA

*Fideicomisos Instituidos en Relación con la Agricultura (FIRA)* is a development financial institution (DFI), founded in 1954, whose mission is to strengthen the productivity and sustainability of the agriculture, livestock, fisheries and forestry sectors of Mexico. To this end, FIRA provides credit, guarantees, capacity building, technical assistance and support to technology adoption, both to formal financial institutions (FIs) as well as rural enterprises across all value chain segments. In particular, FIRA's core target are **small-scale producers and micro-, small- and medium-sized enterprises (MSMEs) lacking access to formal credit sources**, which the institution assists both through financing as well as training and technical assistance. As a second-tier DFI, FIRA channels its financial resources through a network of financial intermediaries,<sup>5</sup> with the aim of amplifying the flows of credit directed towards agriculture and associated sectors. As will be further illustrated in this case study, approximately 2.1 million farmers in Mexico receive loans and guarantees that are at least partially financed by FIRA's funds. To carry out its operations, FIRA relies on a network of 130 offices spread across Mexico, with a staff of 1 044 employees, as well as its network of intermediary FIs. Figure 2 provides a summary of FIRA's core operative mechanism along its different workstreams.

FIGURE 2: FIRA's core operative mechanism



Source: FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2020.pdf>

<sup>5</sup> As of 2020, these include 23 commercial banks, 73 non-bank FIs as well as the *National Financing Facility for Agricultural, Rural and Fisheries Development* (NFD), which is a public FI that fosters rural development by promoting inclusive finance for producers and MSMEs.

As for its **guarantee provision** activities, FIRA has been providing first-loss and second-loss guarantees to its network of intermediary FIs since 1972, making it the oldest guarantee institution in Latin America. These guarantees are aimed at incentivizing FIs' engagement in the financing of segments of public interest, such as small-scale farmers and financially marginalized client categories.

#### BOX 1 FIRA's trust funds

The name *Fideicomisos Instituidos en Relación con la Agricultura* (FIRA) translates into English as "Trust funds established in relation with agriculture". This is because FIRA is actually composed of **four different trust funds**, responsible for channelling the institution's resources towards different sectors and areas that fall within its scope of operations:

- **Fund for the Guarantee and Promotion of Agriculture, Livestock and Aviculture (FONDO)**, which focuses on mobilizing resources to the primary sector through short-term financing, targeted towards working capital.
- **Special Fund for Agricultural Financing (FEFA)**, which provides credit, grants and other services aimed at promoting production, retrieval and distribution of goods and services in agriculture. It achieves this through long-term financing finalized towards the acquisition of machinery, equipment and facilities, among others. FEFA is also responsible for the issuance of FIRA's green bonds.
- **Special Fund for Technical Assistance and Guarantees for Agricultural Credit (FEGA)**, which provides guarantees, technical assistance, supervision, and training and technology transfer services aimed at fostering the development of the Mexican agricultural sector.
- **Fund for the Guarantee and Promotion of Fishery-related Activities (FOPESCA)**, which is responsible for channelling FIRA's resources towards the fishing sector.

With regard to its **technical assistance and capacity building** activities, FIRA provides training to a wide range of stakeholders: producer organizations, intermediary FIs, agricultural extension officers, public institutions and many others. In this sense, FIRA's objective is to support farmers' capacity to access quality financial services, while promoting their productivity, market access and integration into value networks. Intermediary FIs, on their part, are provided with capacity building on a wide variety of technical aspects associated with their financing operations, such as: loan appraisal, risk management, product design, socio-environmental impact evaluation and strategic planning at the institutional level, as well as technology adoption. To effectively implement its technical assistance activities, FIRA leverages a network of **five Technological Development Centres** (*Centros de Desarrollo Tecnológico*) spread across Mexico, which have as their objective streamlining the process of adoption of new technologies and good practices to foster the efficiency of agri-food and rural sectors, by identifying, validating and capacitating a range of new technologies related to agriculture (FIRA, 2021a).<sup>6</sup>

FIRA's overall contribution to the development of Mexico's rural economy is quite noteworthy. In fact, the institution is the **main source of credit and guarantees** for Mexico's agriculture, forestry

<sup>6</sup> As FIRA (2021a, pg. 45.) states: "The Technological Development Centers are business units managed according to business-like standards, equipped with the infrastructure necessary to identify, validate and demonstrate different technologies, provide training, and carry out a variety of activities related to agricultural production."





Chinampa system for sustainable farming, Xochimilco, Ciudad de Mexico.

and fisheries sectors. As of 2020, FIRA's total financing portfolio amounted to USD 20.8 billion, of which 78 percent was composed of credit and 22 percent of guarantees, financing a total of 2.1 million people (of which 80 percent were women, and 29 percent were first-time borrowers). Notably, **97 percent of FIRA's beneficiaries are microenterprises or family farms**. Overall, FIRA's second-tier credit accounted for 63 percent of the overall financing provided by commercial banks to the agriculture and agrifood sectors. Finally, FIRA's financing activities contributed towards the creation of 400 000 jobs in Mexico's primary sector, which employs overall 7.1 million people (FIRA, 2021a).

## 2. FIRA's engagement in green finance

### 2.1 Overview of FIRA's strategy

FIRA's commitment towards fostering green and sustainable financing within its projects and activities is embedded in its very own institutional strategy. To begin with, FIRA's approach to sustainability is based on **three core tenets** that guide and define the institution's actions:

- 1) **Do no harm**, i.e. the institution's actions shall not aggravate environmental and climate issues. This implies adequately identifying and assessing the socio-environmental risks that could derive from FIRA's financing operations;
- 2) **Do good**, i.e. contribute with a range of tools and solutions to address socio-environmental challenges. This has led FIRA to develop a range of innovative instruments that have proven quite effective in generating both positive socio-environmental impacts and appreciable financial returns in the domain of rural and agricultural investment, as detailed in the next sections; and
- 3) **Engage**, i.e. mobilize – and collaborate with – various public and private stakeholders whose interests in the domain of green and sustainable financing align with those of FIRA.

A key document, that lays the foundation for FIRA's strategy, is the Institutional Programme (*Programa Institucional*) for 2020–2024, which explicitly emphasizes the importance of promoting socio-environmentally sustainable finance. The institution sets out **three priority objectives** within

this strategic document, which act as an overall compass for FIRA's operations and are meant to be aligned with both the Sustainable Development Goals (SDGs) and Mexico's National Plan for Development 2019–2024:

- 1) Foster financial inclusion and mitigate the barriers that limit financial access for agricultural producers, especially small-scale ones;
- 2) promote productivity and efficiency growth in all segments of rural value chains; and
- 3) contribute to the effective development of responsible and sustainable agricultural, forestry and fishing sectors.

Within the framework of the third priority objective, FIRA set out to develop its strategy for green and sustainable financing. To this end, the institution defined **five sustainability principles** that guide FIRA's operations and commitment towards designing and mainstreaming sustainable practices – from a social and environmental standpoint – in its financing activities. These principles, which represent the foundation of FIRA's sustainable finance strategy, are aligned with the five strategic pillars of the Sustainability Protocol established by the Mexican Bankers' Association.

FIRA's sustainability principles are:

- 1) institutionalization of sustainability policies;
- 2) management of social and environmental risks in credit provision;
- 3) promotion of financing directed at sustainable projects;
- 4) efficient use of resources in all internal processes; and
- 5) knowledge generation and sharing on policies and practices related to sustainable financing.

FIRA's push towards implementing sustainability considerations in its financing activities has been a result of **the institution's acknowledgment of the considerable environmental impacts** generated by the farming sector in Mexico, as this sector is responsible – as mentioned in Section 1.2 – for 14 percent of greenhouse gas emissions in the country, while agriculture alone consumes 78 percent of Mexico's water. According to data from the Mexican Institute of Ecology and Climate Change (INECC), climate change risks raising temperatures in the country between 2.5 °C and 4.5 °C by the end of the century, while reducing rainfall by 5 to 10 percent. This will have extremely damaging consequences for the country's agriculture, livestock, forestry and fisheries sectors, in terms of reduced crop productivity, increased frequency and severity of natural disasters, demographic collapse of marine fauna and various other negative impacts (Gamboa González, 2018). Aside from the will to mitigate and counteract this catastrophic scenario, FIRA's efforts towards integrating green considerations in its portfolio and operations is perceived by the institution as a **risk mitigation strategy**. This strategy ultimately benefits all stakeholders participating in FIRA's credit and guarantee provision activities; negative socio-environmental impacts generated by a financed project, for example, can damage a borrower's ability to repay effectively and on time, while they can also affect the reputation of both FIRA and the intermediary financial institution (FI).

To operationalize its green financing strategy, FIRA has established partnerships with a wide variety of both regional and international institutions (e.g. development agencies, governmental agencies, development finance institutions and investment funds) that have collaborated with the bank on a number of projects and initiatives related to sustainable and green financing, as will be further illustrated in this Section. Figure 3 presents a schematic depiction of these collaborations, as well as the main areas of activity that FIRA engages in to achieve the goals detailed in its sustainable financing strategy.

**FIGURE 3:** Schematic depiction of FIRA's sustainable finance strategy



Source: FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2020.pdf>

In accordance with its sustainability principle no. 3, FIRA has been maintaining and growing since 2007 a second-tier credit and guarantee portfolio of sustainable investment projects that seek to achieve a **wide range of objectives associated to positive socio-environmental impacts**, within four main areas of interest: environmentally sustainable agriculture; energy efficiency; renewable energies; and efficient water use. In the framework of this portfolio, FIRA's second-tier capital (channelled through its network of intermediary FIs) is used to finance investment projects of widely different sizes and nature focused on generating positive socio-environmental impacts together with an economic return. These projects are designed and submitted for proposal by agribusinesses of all sizes and nature, either singly or as a group, and across a wide variety of value chains.

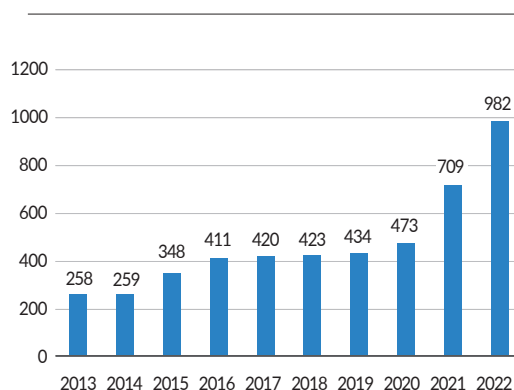
Over 2022, the total value of FIRA's portfolio devoted to sustainable projects rose considerably. As can be seen in Figure 4, at the end of the year FIRA's total portfolio value of sustainable projects amounted to USD 982 million (a 38 percent increase on the previous year) distributed over 3 260 projects, and representing 7 percent of FIRA's overall financing portfolio. As shown in Figure 5, more than two-thirds of FIRA's green portfolio was destined to projects focused on promoting sustainable agricultural practices, while 18 percent was used to promote efficient water use in agriculture and related sectors. Along with funding, FIRA provides **technical capacity and training** to investee agribusinesses to ensure that they are able to use the capital borrowed by FIRA in the most efficient manner, so as to achieve the socio-environmental objectives linked to each of the investment projects. This technical capacity is provided both through FIRA's in-house pool of experts, as well as through external experts who might be hired on an ad-hoc basis within the framework of each of the green projects in order to fill any specific capacity gaps. Furthermore, FIRA's technical centres play a fundamental role in streamlining and maximizing the efficiency of its training programmes.

When it comes to analysing the **core sources of financing** for FIRA's sustainable portfolio, there are three that should be highlighted in particular: 1) FIRA's own resources, which represent the foundation as well as constituting the greatest part of its portfolio; 2) the considerable amount



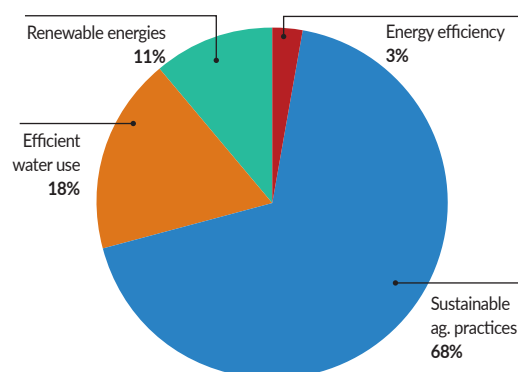
of funding FIRA has managed to raise on international financial markets through the issuances of “green bonds” (see Section 2.3); and 3) specific **credit lines for green investment projects** provided by external parties, which FIRA established over the years through agreements with different development agencies and DFIs, including the Interamerican Development Bank (IDB), the Latin America Development Bank (CAF), the German Development Bank (KfW) and the French Development Agency (AFD) (see Section 2.2). These organizations selected FIRA as the recipient for these financing lines because they deemed the institution to be a reliable national partner with which to pursue their objectives linked to socio-environmental advancements in Mexican agriculture.

**FIGURE 4:** Total value of FIRA's portfolio of sustainable projects credit + guarantees, in USD million



Sources: FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City (with additional data provided to the author by the institution). <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2020.pdf>

**FIGURE 5:** Breakdown of project destination



Source: FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2020.pdf>

A key enabling factor in FIRA's sustainable financing strategy has been the “**eligible investment concepts**” (conceptos de inversión eligible), which are predetermined categories of investment associated to a variety of different aspects of agriculture and agribusiness that the organization uses to streamline and facilitate its credit provision activities. These concepts were developed by FIRA over decades of its operations, by associating *a range of specific, predetermined credit terms and conditions* to different types of investment in hundreds of possible areas and dimensions of agriculture, forestry, livestock and fisheries. The complete list developed by FIRA over the years currently encompasses more than 600 investment concepts.

This tool has played a critical role in the structure of FIRA's sustainable financing strategy: the institution has selected **55 eligible investment concepts**, from the broader list it had developed over the years, that it deemed had the potential to generate positive impacts in terms of climate change mitigation, environmental sustainability and conservation, energy saving and clean energy production. Only loans provided by FIRA that fit into one of these eligible investment concepts are considered as contributing to the institution's sustainable financing portfolio. Table 1 provides a sample of a few of these green eligible investment concepts taken from FIRA's operational handbook, and specifically from the “efficient water use” category of investments.

The use of the eligible investment concepts for the operationalization of FIRA's sustainable financing strategy has proven to be considerably useful for the institution, as it possible to define with a great deal of precision – and also in advance – which specific investment areas hold the greatest



impact potential for the achievement of FIRA's strategy from a socio-environmental perspective. This instrument is also of great assistance to the intermediary FIs that form FIRA's network. Even if these institutions do not possess strong expertise in sustainable financing, they can use the eligible investment concepts **as a guidance framework** to facilitate and orient their own credit application decisions. Finally, the investment concepts also allow for a more precise monitoring and assessment of the following aspects: 1) the exact share of FIRA's total portfolio that belongs to the "sustainable financing" denomination; and 2) the institution's current state of advancement towards the achievement of its strategic objectives within green and sustainable financing.

**TABLE 1:** A sample of eligible investment concepts according to FIRA, from the "efficient water use" category

Number	ID	Eligible investment concept
1	61	Border maintenance
2	90	Building of irrigation channels
3	161	Irrigation by pulse discharge
4	164	Water meters
5	265	Micro-sprinkler irrigation
6	273	Sprinkler irrigation
7	274	Drip irrigation
8	1257	Septic tank
9	2515	Wastewater treatment
10	8146	Lining of irrigation channels
11	8147	Piping of irrigation channels
12	8223	Water purification plant
13	8224	Water purification equipment

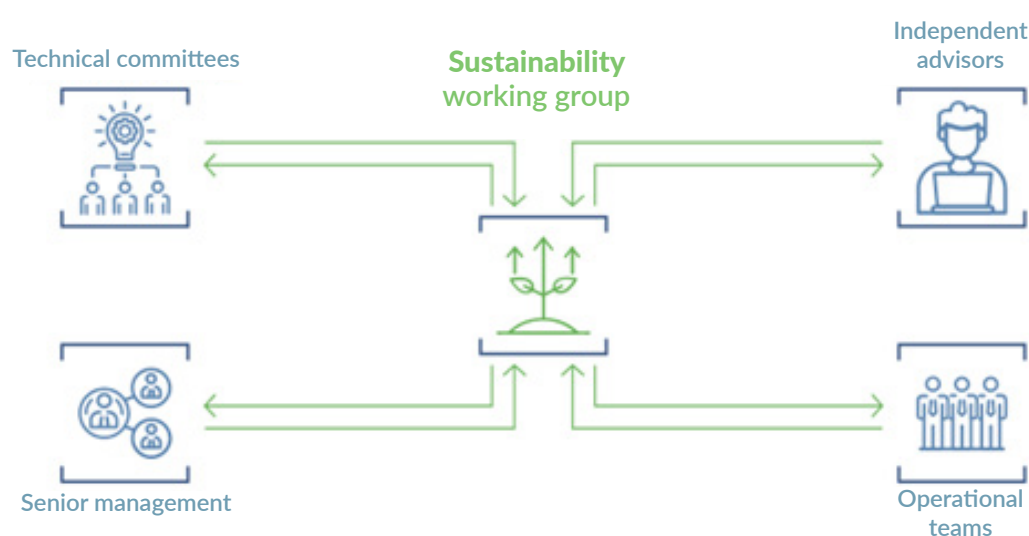
Source: FIRA. 2021a. Memorias de Sostenibilidad 2020. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2020.pdf>

**Governance.** The operationalization of FIRA's strategy in the sustainable finance domain is the result of a **coordinated effort** among various echelons and departments of the institution, which ensures that FIRA's commitment towards mainstreaming socio-environmental considerations in its financing activities is appropriately integrated, maintained and monitored throughout all phases of the financing process. Two main bodies are responsible for overseeing the implementation of FIRA's strategy for sustainable financing across all levels of the institution:

- **The Technical Committees** are responsible for defining the policies and strategies employed to achieve FIRA's institutional objectives, in close coordination with FIRA's directorate-general. This includes articulating and pushing forward FIRA's Sustainability Strategy, as well as overseeing its implementation. These are four coordinating technical committees, one for each of the trust funds that compose FIRA. They are composed of **independent members that represent FIRA's main interest groups**, such as representatives of the financial regulatory authority, governmental entities focused on agriculture, the private financial sector, as well as distinct sectors of agricultural production. To ensure operational effectiveness, the technical committees rely on a range of committees and subcommittees that are tasked with following various, specific aspects of the institution's operations and functioning, such as the Auditing Committee, the Committee for Risk Management and the Credit Recovery Committee.

- **The Sustainability Working Group** supports the Technical Committees in operationalizing the Sustainability Strategy across the institution. This working group is composed by the directors and sub-directors of FIRA's different operational areas (such as the directors of: administration; product development; credit; quality and processes), as well as the director-general of the institution. As can be seen in Figure 6, the sustainability working group works in close coordination with the four technical committees, the directorate-general, all of FIRA's operational teams, as well as a number of independent advisors, to ensure that FIRA's Sustainability Strategy is implemented effectively across all levels of the institution's structure and its operations.

**Figure 6:** Main lines of collaboration of FIRA's Sustainability Working Group



Source: FIRA. 2022. *Memorias de Sostenibilidad 2021*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2021.pdf>

Monitoring and knowledge generation. In terms of the work carried out under Principle 5 ("Knowledge generation and sharing on policies and practices related to sustainable financing), it must be underlined that every year FIRA publishes a **"Sustainability Report"** (*Memorias de Sostenibilidad*) in which it details the institution's achievements in the economic, social and environmental areas of sustainable development, detailing both the advancements achieved from a project perspective, as well as in terms of in-house, institutional advances. Furthermore, FIRA voluntarily monitors and reports on **the greenhouse gas emissions generated by the projects it finances**. Hence, it maintains the GEI-1 recognition issued by the Mexican Secretariat of Environment and Natural Resources (SEMARNAT) and the Private Sector Sustainable Development Commission (CESPEDES) through the *Programa GEI México*, for having taken voluntary action in the accounting and report of greenhouse gas (GEI) emissions.

In 2020, FIRA also launched an **environmental, social and governance (ESG) portal**, which consists of an online platform that gathers and illustrates the various activities and operations the institution has carried out to promote positive environmental, social and governance impacts, while mitigating or preventing negative ones. The portal seeks to promote and disclose FIRA's sustainability strategy and achievements, increase the transparency of FIRA's financing operations

from an ESG perspective, as well as provide assurances of the institution's adherence to ESG risk management practices to the international investors who might consider channelling their resources into FIRA's bond products (see Section 2.3).

At the end of 2021, FIRA published its first **Sustainability Accounting Standards Board (SASB) report**, which referred to operations during 2020, as part of its efforts to attract further capital from international financial markets which could be channeled into investment projects carrying socio-environmental benefits. Flesher (2021, pg. 14) states that the SASB standards are "industry-specific disclosure standards across ESG topics that facilitate communication between companies and investors about financially material, decision-useful information." These reports can prove to be quite valuable for institutions seeking to attract capital from investors, lenders and other financial providers seeking to mainstream ESG considerations in their investments. SASB has developed specific sets of standards for 77 different industries, each encompassing different topics and metrics linked to ESG considerations. FIRA adopted The SASB standard for commercial banks was adopted by FIRA as the basis its report, which includes analyses and metrics spanning the following dimensions:

- 1) data security;
- 2) promotion of financial inclusion and financial capacity;
- 3) mainstreaming of ESG factors in credit scoring processes;
- 4) institutional ethics; and
- 5) management of systemic risks.

Beyond the aforementioned initiatives, which are a direct result of FIRA's commitment to "greening" its financing operations, there are a few more notable financial mechanisms and programmes, described in the following subsections. These require a **more in-depth analysis**, given the considerable results they have managed to achieve in the framing of the FIRA's institutional push towards green and sustainable financing, as well as the critical role they play in the institution's strategic approach to this domain.

## 2.2 Focus on FIRA's green bonds

Since 2018, FIRA has raised considerable amounts of funds from global financial markets through the issuance of green bonds, with the objective of financing a variety of projects focused on achieving a positive environmental impact across four different thematic areas: environmentally sustainable agriculture; renewable energies; energy efficiency; and solar efficiency.<sup>7</sup> In fact, FIRA was **the first entity to issue certified green bonds** to raise financing for sustainable agriculture. One of the four trust funds that compose FIRA, the Special Fund for Agricultural Financing (FEFA), was responsible for developing this innovation and for issuing the bonds.

The issuance of the green bonds was the result of a collaboration between FIRA, the Inter-American Development Bank (IDB), and the Climate Bonds Initiative (CBI), a not-for-profit organization responsible for developing a voluntary certification scheme for green bonds. To this end, the CBI developed the **Protected Agriculture Standards**,<sup>8</sup> a set of certification criteria which FIRA's green

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<sup>7</sup> To quote FIRA's green bond framework: "the proceeds of FEFA's Green Bond will be used to finance and re-finance granted loans and investments of eligible green projects which provide clear environmental benefits and promote the transition to low-carbon and climate resilience" (FIRA, 2018, pg.3).

<sup>8</sup> As illustrated by de Anda and Shea (2017, pg. 4), the term "protected agriculture" is defined as "a system of production under various artificial structures to protect crops by minimizing the restrictions and effects imposed by climate and weather".

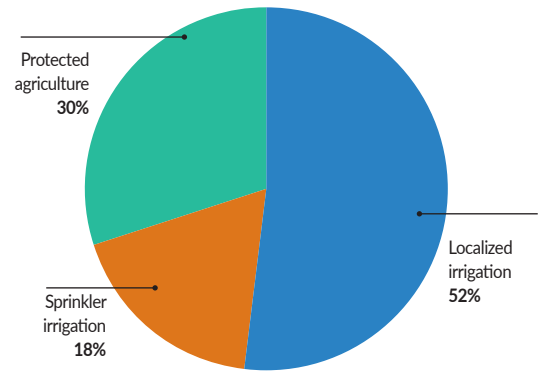
bonds are required to comply with. These standards are based on a study conducted by the IDB and FIRA in 2018 on protected agriculture in Mexico, which provided a methodology to evaluate the environmental benefits of protected agriculture facilities (CBI, 2019). The FIRA's green bonds also comply with the Green Bond Principles established by the International Capital Market Association (ICMA), which are voluntary process guidelines aimed at fostering transparency and integrity in the development of the green bond market.

The **green bond framework**, published by FIRA in 2018 to guide the institution's activities in the issuance of green bonds, illustrates the process followed to approve the financing of a project with funds raised through green bonds. Potential projects are first screened and selected by a dedicated technical unit within FIRA's Environment Department. This department is tasked with conducting a sustainability analysis to evaluate the compliance of the project's nature and objectives with the green bond certification criteria (FIRA, 2018).

**Sustainalytics**, an independent ESG research company, is responsible for assessing FIRA's compliance with the Protected Agriculture Standards and the ICMA's Green Bond Principles. Furthermore, since 2020, FIRA reports information related to the issuing of green bonds on the **green bond transparency** platform, an online portal developed by the IDB to foster the transparency of activities in the green bond market in Latin America and the Caribbean (LAC).

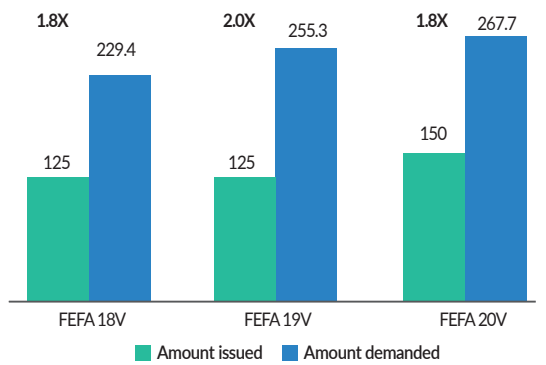
The first green bond was issued by FIRA in 2018 for MXN 2.5 billion (USD 130 million) and a three-year maturity, to raise financing for projects focused on environmentally sustainable agriculture and water efficiency. In fact, almost half of the funding raised was used to finance greenhouse projects that employed **technologically advanced irrigation systems**, for efficient water use (see Figure 7). The second green bond was issued in 2019, for the same amount but for a four-year

**FIGURE 7:** FIRA's 2018 green bond (first issuance) financing destination, by type of project



Source: FIRA. 2021b. *Annual Green Bond Report 2021 – FEFA 18V*. Mexico City.

**FIGURE 8:** FIRA's green bond issuances and their excess demand (in USD millions)



Source: FIRA. 2021c. *IFAD member states presentation - PDB Group progress*. Mexico City, FIRA. <https://webapps.ifad.org/members/events/2021-09-07/docs/FIRA-IFAD-member-states.pdf>





duration, with the aim of raising funds to finance sustainable forestry and solar energy projects, as well as sustainable agriculture. The third of FIRA's green bonds was issued in 2020, for a total value of USD 150 million, pursuing similar objectives as in the previous two rounds. Overall, the three green bond issuances have totaled USD 410 million dollars, **an amount that was used to finance 782 projects** of various natures across all of Mexico. The FIRA is planning to continue this practice with new issuances of bonds in upcoming years, also in view of the considerable demand for such a product on international markets (see Figure 8).

In terms of financial additionality, it is evident that the green bonds have strongly increased FIRA's capacity to provide credit to its target segments, through its intermediary FI network. In terms of the **positive environmental impacts** generated by the projects financed by the three green bond issuances, Table 2 shows the results achieved as of 2021, across different categories of projects, in terms of the annual reduction in water consumption as well as greenhouse gas (GHG) emissions. It should also be emphasized that FIRA's efforts in fostering protected agriculture through the issuances of green bonds hold particular importance as they have shown the potential of this financial mechanism for sustainable agro-finance promotion, representing a fundamental first step towards its replication and uptake in other contexts. The achievements reached by FIRA in the green bond domain have been acknowledged by ALIDE, the Latin American Association of Development Financial Institutions, which awarded FIRA with its ALIDE Verde (Green ALIDE) prize in 2020.

**TABLE 2:** Positive environmental impacts of the projects financed by the three green bond issuances (2018, 2019 and 2020)

Eligible green project	Projects	Annual reduction in water consumption (m³)	Annual GHG emissions reduced (ton Co <sub>2</sub> e)
Environmentally sustainable agriculture	Protected agriculture	5 694,399	23.5
	Forestry	N/A (not available)	200 000
Water efficiency	Localized irrigation	18 881 573	N/A
	Sprinkler irrigation	9 025 863	N/A
Renewable energy	Solar photovoltaic systems	N/A	5 575
<b>Total</b>		<b>33 601 736</b>	<b>205 599</b>

Source: FIRA. 2021b. Annual Green Bond Report 2021 – FEFA 18V. Mexico City. [https://www.fira.gob.mx/Files/AnnualGreenBondReport\\_FEFA18V-2021.pdf](https://www.fira.gob.mx/Files/AnnualGreenBondReport_FEFA18V-2021.pdf)

## 2.3 Focus on the ProSostenible programme

FIRA has strengthened its sustainable financing portfolio through a programme called ProSostenible, established in partnership with the French Development Agency (AFD – *Agence Française du Développement*) and the Latin American Investment Facility (LAIF), and with funding from the European Union. Although the AFD and FIRA have been collaborating since 2013, the current version of ProSostenible was launched in 2019. Through ProSostenible, FIRA contributes financially towards the **reduction of interest rates** for loans provided by formal FIs to rural enterprises of all sizes, when said loans are destined to finance projects that seek to achieve one, or all, of the following objectives: generate a positive environment impact; improve climate risk mitigation capacities; and support adaptation to climate change. As detailed in the previous section, FIRA has formalized 55 eligible investment concepts categorized according to four “green” thematic areas (environmentally sustainable agriculture; water efficiency; energy efficiency; and renewable energies); projects whose objectives follow one or more of these concepts are eligible for support through ProSostenible’s resources.

In order to apply for ProSostenible’s support, the borrower must fill out an application form on the programme’s online platform. The targeted loan needs to be provided by one of the FIs that are FIRA’s intermediaries, and to have been financed (at least partially) by FIRA’s second-tier credit. **The higher the socio-environmental impact foreseen** by the project being financed, as recognized by FIRA, the greater will be the financial support provided to reduce the interest rate. Interest rate subsidies that are over MXN 30 000 (USD 1 515) have to comply with additional administrative requirements. The financial support provided by ProSostenible lasts for the entire duration of the loan, and it is provided to the FI on an annual basis. Since 2020, ProSostenible has also been providing intermediary FIs with a first loss partial guarantee coverage for projects that pursue one of the 55 green investment concepts, covering 5 percent of the credit amount for short-term loans and 20 percent for longer-term loans.

During the first phase of ProSostenible (2014–2015), 132 projects were financed in the agriculture, livestock, forestry and fisheries sectors, for a total amount of USD 32 million. At the end of 2021, ProSostenible had financed 49 projects for a total of USD 403 000, which acted as seed money to leverage further credit from the formal financial sector for USD 7 million.

Although the share of FIRA’s loans that falls under the frame of ProSostenible is quite small in comparison to the institution’s overall sustainable finance portfolio (as detailed in Section 2.1),





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an analysis of this programme is useful in showcasing how FIRA has proved quite effective in channelling resources provided by international donors (i.e. the European Union) towards investments associated with the promotion of sustainable agriculture, in partnership with a national development agency (i.e. the AFD).

#### BOX 2: FIRA's credit lines with the French Development Agency

Aside from the ProSostenible programme, the AFD provided in 2013 a credit line to FIRA for USD 35 million, with the loan having a ten-year maturity, a three-year grace period and semestral repayments. This credit line was meant to be channelled by FIRA towards projects aimed at improving climate change adaptation and resilience in Mexican agriculture.

In July 2020, FIRA opened a second credit line with the AFD, for a USD 100 million loan with similar terms as the previous one. The credit line thus provided was meant to be channelled by FIRA towards the following areas:

- socioeconomic inclusion for highly marginalized territories;
- financing for technical assistance projects for up to USD 1 million; and
- financing to projects dedicated to promoting climate change adaptation and resilience

Within the framework of the third area, FIRA further refined the investment concept taxonomy that it had used for ProSostenible, expanding it to 88 eligible investment concepts that hold the potential to generate considerable socio-environmental benefits.

## 2.4 Focus on the Energy Efficiency Programme

The Energy Efficiency Programme (Programa de Eficiencia Energetica) is the result of a collaboration between FIRA, the BID and the Clean Energy Technology Fund (CTF).<sup>9</sup> Launched in 2015, the programme seeks to support agribusinesses of a wide, diverse range in replacing old machinery and equipment with new versions that are more energy-efficient and less impactful on the environment. It does so through a combination of financial instruments (a credit line and a dedicated fund) and non-financial ones (technical support and the certification of reliable technology providers). The operative mechanism that underpins the Energy Efficiency Programme sees the participation of three core actors:

- **FIRA**, which plays a threefold role: it provides second-tier credit through one of the intermediary FIs within its network; it ensures financial guarantee coverage in the event that the project fails to bring the expected benefits in terms of energy savings for the recipient agribusiness; and it oversees the technical quality of the project.
- **The investee agribusiness**, which is the recipient of the loan and the technology. Several technologies focused on energy efficiency and clean energy can be financed in the framework of the programme, including: wind generators; LED lights; centrifugal pumps; solar water heaters; photovoltaic systems; compressed air systems; and many more. These technologies are categorized under 22 “eligible investment concepts”, selected from FIRA’s broader list of concepts, in line with the ProSostenible programme.
- **The technology provider**, which is a company that specializes in energy-efficient and clean energy technologies. Each of these companies needs to be certified by FIRA before they can take part in the Energy Efficiency Programme, and this is done through a specific body, known as FIRA’s Organism for Technology Validation. The latter is made up by a group of experts tasked with ensuring that the technology providers are skilled and trustworthy, while also checking that each piece of machinery and equipment installed in the framework of the programme operates according to the standards agreed upon.

Figure 9 provides a schematic depiction of the system that underpins the Energy Efficiency Programme. The process is quite straightforward and unfolds over three phases: structuring, implementation and operation. These three phases can be broken down in the following fashion:

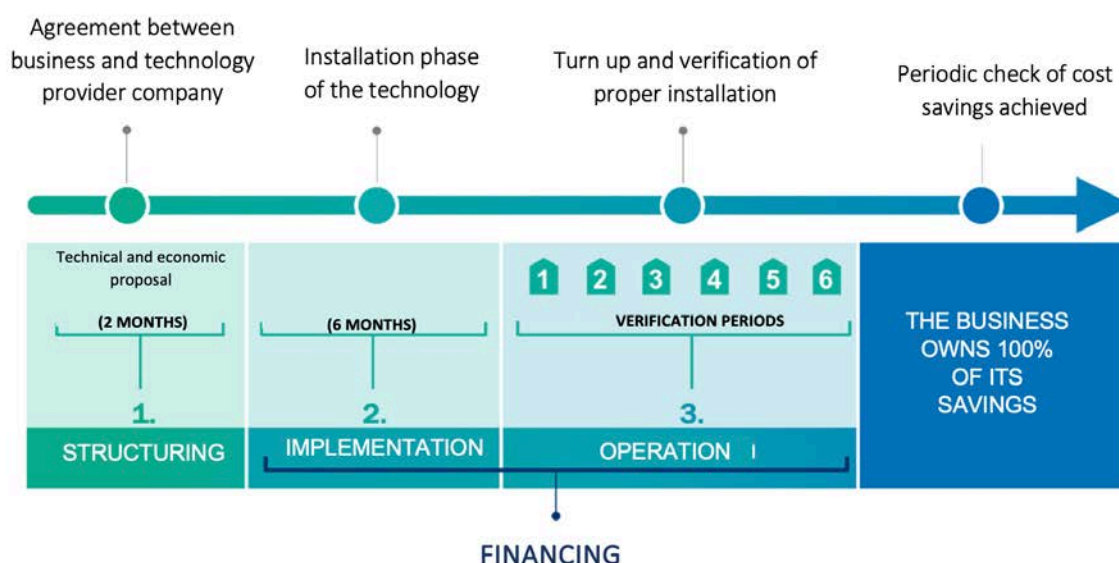
- 1) **Structuring.** FIRA’s Organism for Technology Validation certifies a technology provider.
  - The technology provider designs an energy efficiency project that includes the specific technology/machinery to be installed and the projected energy savings that should be derived from its installation. The project is then validated by **FIRA’s Authority for Technology Validation**.
  - The recipient agribusiness and the technology provider develop an agreement which includes the features of the project validated in the preceding step, and which clearly defines the energy savings that are expected to be achieved through the newly installed technology.

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<sup>9</sup> The Clean Technology Fund is one of the two multi-donor trust funds under the Climate Investment Funds (CIF). The CIF was created in 2008 and is managed by the World Bank. However, it operates in coordination with regional DFIs, including the Inter-American Development Bank, and serves as an interim source of finance. The USD 5.8 billion Clean Technology Fund aims to promote transformation in developing countries by providing funding to scale-up the demonstration, deployment and transfer of low-carbon technologies with significant potential for long-term GHG emission reductions (Kwasniok, 2021).



**FIGURE 9:** Schematic description of the underlying mechanism of the Energy Efficiency Programme



Source: FIRA. 2022. *Memorias de Sostenibilidad 2021*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2021.pdf>

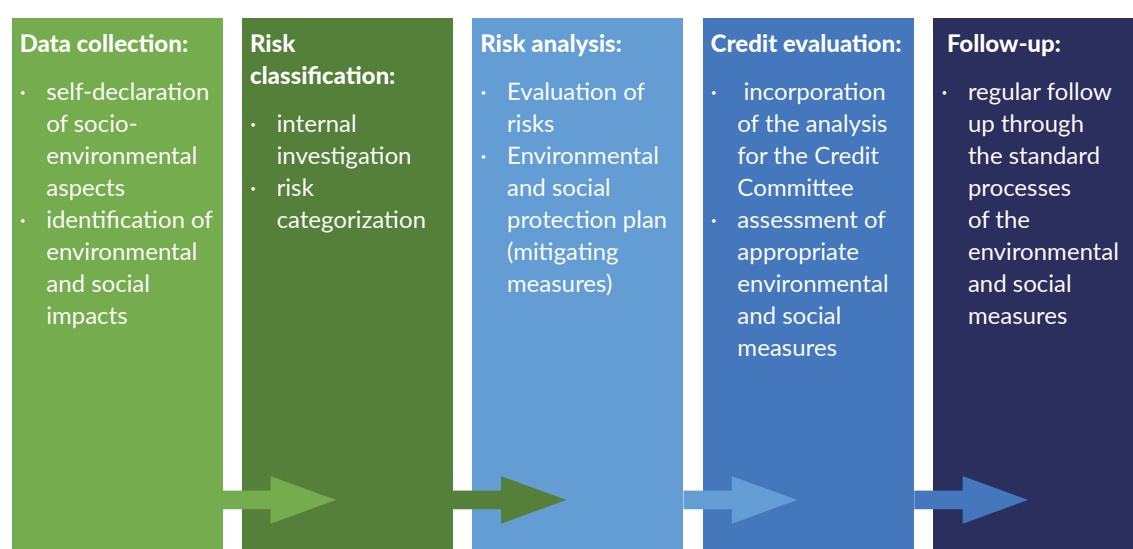
- 2) **Implementation.** The agribusiness receives a loan from FIRA through one its intermediary FIs, which comes from a dedicated credit line established in the framework of the Energy Efficiency Programme.
  - The provider carries out the installation of the technology in question, according to the project specifications.
  - The Authority for Technology Validation verifies the proper installation of the technology.
- 3) **Operation.** The technology provider carries out regular monitoring of the energy savings obtained through use of the new technology, in accordance with the project specifications, and reports the results to FIRA.
  - The recipient agribusiness presents to FIRA a request to be covered by the Energy Efficiency Guarantee Fund (EEGF). The EEGF is a dedicated fund developed by FIRA which provides coverage to agribusinesses in the Energy Efficiency Programme, and mitigates the risk they face by implementing a new type of energy-efficient technology.
  - In cases where the projected cost savings are *not* in fact achieved over a set period of time, the EEGF **reimburses the agribusiness for the difference** between the expected, but unachieved, savings (as defined by the original contract) and the savings actually generated by the new technology. It is important to note that the EEGF does not cover the eventual default on the part of the agribusiness on the loan it took from FIRA to pay for the energy-efficient technology; it only covers the loss incurred by the agribusiness in the eventuality that the savings derived from the technology do not reach the levels estimated during project design.

## 2.5 Focus on the System for the Management of Social and Environmental Risks (SARAS)

In 2018, FIRA developed and launched a **System for the Management of Social and Environmental Risks (SARAS)**, with support from the IDB. The system is based on the Equator Principles,<sup>10</sup> as well as the International Finance Corporation's (IFC) Performance Standards on Environmental and Social Sustainability. By setting up this risk management and evaluation system, FIRA sought to pursue four main goals:

- 1) Strengthen the sustainability of the projects financed by the institution and reduce the chance of negative socio-environmental impacts.
- 2) Improve the institution's capability of managing any eventual socio-environmental risk linked to a financed project and identifying the most appropriate mitigation measures.
- 3) Mitigate the reputational risk associated with possible adverse socio-environmental events.
- 4) Encourage international investors that seek socio-environmental returns together with economic ones (e.g. impact funds and DFIs) to finance FIRA's projects.

**FIGURE 10:** The five phases of the SARAS methodology



Source: FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City.

The SARAS methodology is **only applied to projects of over USD 9 million**, which require the approval of FIRA's Special Loans and Programmes Committee for financing. This specific cut-off amount has been selected in an attempt to find a balance between: 1) the recognition of the considerable socio-environmental (and reputational) risks that may derive from financing agriculture-related projects of a considerable magnitude; and 2) FIRA's inevitably limited resources that impede the institution from applying the same standards for socio-environmental risk management to all the projects it finances. As can be seen in Figure 10, the **SARAS methodology consists of five phases**, through which FIRA seeks to assess the potential socio-environmental risks associated with an

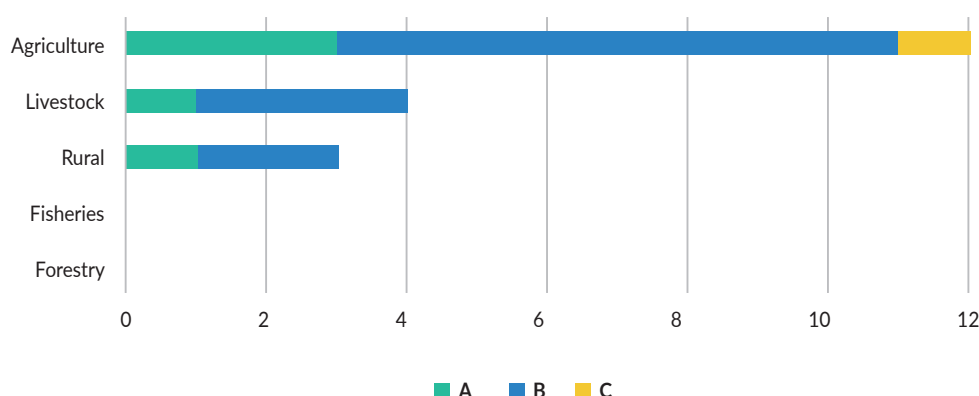
<sup>10</sup> The Equator Principles are a set of voluntary guidelines adopted by financial institutions to ensure that large-scale development or construction projects appropriately consider the associated potential impacts on the natural environment and the affected communities.

investment project, as well as design, implement and monitor adequate countermeasures. In the structure of the SARAS evaluation process, the intermediary FI that receives financing from FIRA is expected to support – when necessary – the data gathering and monitoring process relative to the project in question, to ensure that the socio-environmental measures selected are implemented in a satisfactory manner. At the end of the evaluation process, each project assessed through SARAS is given one of three ratings:

- **A-rated projects** projects are those that involve minimal risks of potentially generating negative socio-environmental impacts.
- **B-rated projects** projects are those that risk generating impacts that are more easily assessed (and reversed) through preventive, mitigating, recovery or compensative measures.
- **C-rated projects** projects are those that risk generating irreversible or long-term negative socioenvironmental impacts, and are challenging to assess in terms of the likelihood or possible of these impacts..

In 2021, the SARAS methodology was applied to 19 of FIRA's investment projects, of which 5 were rated as category A, 11 as B, and 1 as C. As can be seen in Figure 11, the majority of such projects encompassed investments in agriculture (12), followed by investments in livestock (4) and non-agricultural businesses in rural areas (3).<sup>11</sup> Among the project-related risks that have been identified through SARAS, the most common have been the generation of toxic residue, wastewater and atmospheric gases, as well as harmful impacts on health and work safety through to the handling of chemical and toxic substances. To mitigate A-level and B-level risks, **FIRA incorporates a series of prerequisites in its financing conditions** that borrowers must comply with, such as the need to provide FIRA with a report that illustrates how the project complies with all environmental and labour laws applicable in the project context, and that confirms it has received the required environmental permits from the Mexican Secretariat for the Environment and Natural Resources (SEMARNAT) and the Secretariat for Labor and Social Security (STPS) (FIRA, 2021a).

**FIGURE 11:** Rating and sector of FIRA projects evaluated through SARAS (2021)



Source: FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2021.pdf>

<sup>11</sup> These could encompass a wide range of different businesses in rural areas, e.g. transport services, general stores, pharmacies, etc.

### 3. Analysis of the FIRA case

#### 3.1 Challenges in the design and implementation of the green finance strategy

The case of FIRA is an excellent example of how a large-scale DFI can achieve noteworthy results in its promotion of sustainable agriculture through green finance provision. This is accomplished by committing a large part of its considerable institutional resources towards the operationalization of an ambitious strategy on sustainable financing that encompasses widely different sectors, business models, financial mechanisms and project concepts. However, it must be noted that, while developing its strategy, FIRA could rely on a considerable number of **foundational elements** that were crucial for the success of this initiative. These factors set FIRA apart from a good number of national DFIs in other developing and emerging contexts (which are usually not as sophisticated from an institutional perspective), and need to be adequately considered in order to explain the effectiveness of the bank's green finance strategy. Among such foundational elements we can highlight the following:

- Ample and qualified staff with considerable expertise in agriculture and the different types of impacts that climate change has on it.
- A strong and clearly defined mandate focused on the promotion of small-scale farmers' entrepreneurship and resilience (which implies that addressing the impact of climate change represents an unavoidable necessity for FIRA).
- A capillary presence across rural Mexico, thanks to a vast network of intermediary FIs.
- Pre-established investment "concepts" that can be used to standardize various categories of green investment (see Section 3.2).
- Substantial resources that could be leveraged to hire the international expertise needed to develop the theoretical groundwork for the design of the green finance strategy (see Section 3.2).
- An already existing, strong focus on internal and external capacity building, as exemplified by the institution's Technological Development Centers (see Section 1.2).

Despite these advantages, the implementation of FIRA's strategy in the green finance domain has not been exempt of challenges and bottlenecks, the analysis of which is as important as that of FIRA's successes, in order to bring to light useful lessons learned and recommendations for FIs seeking to replicate FIRA's methodologies and results in different contexts. In this sense, the following main challenges to the growth of FIRA's sustainable projects portfolio can be pointed out:

- **The issue of sustainability of incentive mechanisms for green projects.** From the perspective of FIRA's clients (i.e. the borrowers), ensuring that sustainable projects adequately implement socio-environmental aspects in the frame of their implementation implies **considerable monitoring and supervision requirements**, which are obviously associated with greater operational costs. Overall, this makes such projects considerably more complex and costly to run (and therefore less desirable), especially for smaller actors with scarcer access to resources, such as micro- and small-scale enterprises. As a result, in order to encourage small-scale actors to become involved in such projects there is a need for considerable incentive mechanisms,

such as complementary technical assistance, direct financial support and complementary risk mitigation. The ProSostenible project, described in Section 1.2, is a good example of such an incentive mechanism, as it provides interest rate reductions to investment projects that fit into a range of predetermined sustainability “concepts” defined by FIRA beforehand. Nevertheless, it must be highlighted that providing these incentives on a regular basis entails a considerable resource commitment on the part of the institution. This commitment is challenging to maintain in the long term without strong donor support – which leads to the next issue detailed here.

- **A need to integrate multiple objectives.** As FIRA's has been partnering with an increasingly greater number of international donors to amplify its impact in the sustainable finance domain, the institution has also finds itself **increasingly more pressed** to integrate various donor-led objectives into its green finance strategy. The latter diverge from purely environment-related issues to tackling other dimensions of development including gender empowerment, preservation of indigenous livelihoods, promotion of decent employment opportunities. This impinges on the effectiveness of FIRA's efforts in this domain, as it forces the institution to direct part of its resources towards projects that are not strictly focused on achieving the socio-environmental impacts defined by the institution's strategic framework.
- **Ensuring intermediaries' capacity to identify relevant projects.** FIRA relies heavily on its network of intermediary FIs to carry out a first round of selection of loan applications for “green” projects, which are subsequently passed on to FIRA for possible approval. With that being said, **not all of these intermediary FIs have the capacity to carry out effective analyses** of the concrete socio-environmental potential of a project application, which can result in: a) projects with good potential being discarded even before being presented to FIRA; or b) projects with a scarce likelihood of generating positive socio-environmental impacts being granted credit in any case. FIRA has sought to counteract this situation by providing capacity building to its intermediary FIs to provide them with the necessary expertise to implement such analyses in their loan appraisal processes. Nevertheless, given the size of FIRA's intermediary FI network, this represents a large-scale undertaking, and serious capacity gaps in this area are still observed among intermediary FIs, especially non-bank ones such as rural financial cooperatives.

### 3.2 Lessons learned and the way forward

Having highlighted the main challenges and bottlenecks faced by FIRA in its efforts to incorporate environment- and sustainability-related aspects within its financing activities, it is useful to analyse the **potential for replicability and adaptability** of the institution's strategy in other contexts and on the part of other FIs. To this end, a number of key aspects of FIRA's experience need to be underlined, given the import role they have played in enabling the success of FIRA's engagement in the green finance domain:

- **The importance of a complete institutional uptake.** With regard to the potential for replicability of FIRA's approach to green finance promotion, the first point to highlight is the **large-scale, institution-wide effort** that has supported the operationalization of FIRA's strategy in this domain. Any financial institution, regardless of its size, needs to understand that implementing an ambitious strategy – such as that of FIRA – while bringing mainstream socio-environmental considerations into its financing activities requires a complete “institutional embrace”, i.e. the incorporation of such strategy across all levels of the organization. This entails the need to position all departments and teams within the FI so that they clearly understand

the management's rationale behind the design and mechanism of the strategy, as well as the specific role expected of each department and team within its operationalization. This is well exemplified in Section 2.1 by the breakdown of the different roles played by the directorates within FIRA in successfully implementing its green financing strategy.

- The critical role of the “investment concepts”.** As illustrated in Section 2.1, FIRA has developed over the years an ample series of “eligible investment concepts” which support the institution in streamlining and operationalizing all of its credit and guarantee provision activities. This is especially useful considering the widely varied types of investments the institution can engage in, spanning across hundreds of different dimensions of agriculture. As for FIRA's sustainable financing strategy, the importance of the investment concepts cannot be overstated, as they allow the institution to clearly define and categorize the different types of investment that come to compose its sustainable financing portfolio, acting as a key instruments in keeping track of the operations carried out – as well as the results achieved – within the strategy's framework. Most importantly, the eligible investment concepts are key to supporting FIRA's network of intermediary FIs in schematizing and streamlining their credit provision activities in the domain of sustainable financing. They also provide these institutions with a guidance framework on the range of terms and conditions that can be offered in the setting of investment projects carrying positive socio-environmental benefits, even when the intermediary FI in question lacks a strong expertise in green and sustainable financing. Interestingly, FIRA has used combinations of different investment concepts (selected from its broader list) to enable different investment promotion programmes developed as part of its sustainable financing strategy, such as the ProSostenible programme, the Energy Efficiency Programme, and the as yet undeveloped programme to promote farmers' resilience and adaptation to climate change (described at the end of this section).
- High technical expertise and networking requirements.** Another critical point to underline is that the operationalization of a green finance strategy implies **complex underlying requirements** with regard to the technical expertise necessary to both design and enact it. Obviously, FIRA did not begin the development of its sustainable financing strategy already equipped with all the necessary knowledge and experience required to design and activate it in the best possible way. The organization employed instead a gradual and steady learning by doing approach, through which it sought, on a case-by-case basis, the best way to address each specific in-house capacity gap it encountered thus enabling the sustainable financing strategy to unfold and evolve. This also entailed the need to find expert consultants (both locally and internationally) with the expertise required to fill these capacity gaps, in order to have them either carry out specific tasks that FIRA was unable to or, when possible, transmit their aptitudes to the institution. From the perspective of the **design of the sustainable financing strategy** and its programmes, FIRA has relied on senior international consultants to develop the theoretical foundations of the strategy (e.g. in terms of its methodology, objectives, tools and mission); to support the institution in meeting the quality standards required to become viable partners with DFIs and other large-scale investors on international capital markets (e.g. the Protected Agriculture Standards and the green bond principles described in Section 2.2); to review and select the specific “eligible investment concepts” that streamline and facilitate the institution's credit and guarantee provision activities in the green finance domain; and a host of other tasks. This consultancy support has been key to ensuring that all the programmes and initiatives developed by FIRA in the framework of its sustainable financing practices are in line with the good practices and most recent successful experiences registered



among FIs and DFIs – across all regions – in the field of green and sustainable finance. From the perspective of the **implementation of the sustainable financing strategy**, including guaranteeing the effective appraisal, monitoring and evaluations of green projects, requires FIRA to rely on a large network of professionals with expertise in a variety of fields: i.e. agronomy, fisheries, climate-smart agricultural practices and rural markets, just to cite a few. The wide variety of different project concepts that can be financed by FIRA in the frame of its sustainable project portfolio, from irrigation to solar energy and from beekeeping to sustainable tourism, only adds to the complexity and magnitude of the capabilities required to enable its sustainable financing strategy. From the perspective of FIRA, this expertise can either be already present in-house, or be part of a network of external consultants that can be tapped into when needed. In this regard, smaller FIs might find it challenging to obtain the resources to develop (or externally contract) this capacity base, unless they can leverage considerable donor support.

Aside from the technical expertise FIRA possesses, it is fundamental to underline that a major enabling factor in the success of the institution's sustainable financing strategy has been the deep-rooted network of relations FIRA maintains with a wide variety of regional and international actors, both public and private, including DFIs, local FIs, development agencies, ministries, private consultancies and think tanks. **FIRA's sustainable financing strategy is built on critical partnerships** established with a wide range of institutions, such as the Interamerican Development Bank (IDB), the French Development Agency (AFD), the Latin America Development Bank (CAF) and the German Development Bank (KfW). Over the years, these agencies have provided FIRA with both the technical assistance as well as funding required to enable the development of a number of flagship programmes in the frame of FIRA's sustainable financing strategy, such as the green bonds, the ProSostenible programme and the Energy Efficiency Programme.

- **The catalytic effect of FIRA's green bond.** The issuance of FIRA's green bonds for agriculture, which began in 2018, has generated a catalytic effect in the domestic financial market, and other FIs (both local and international) have sought to replicate the institution's results by carrying out their own green bond placements. As of 2022, more than USD 5.37 billion in financing for investment projects carrying positive socio-environmental impacts had been raised on the Mexican Stock Exchange through 44 dedicated bond issuances, representing 52 percent of all capital raised through "thematic bond" placements in that period. At present, more than a quarter of all long-term debt issued on the Mexican Stock Exchange carries embedded ESG objectives, with a forecast of this figure rising to 50 percent in a few years. Aside from FIRA, sustainable bonds have been issued on the Mexican Stock Exchange by, for example, large-scale banking conglomerates (BBVA Mexico) and leading companies in the agri-food sector (Group Herdez). This shows that the importance of green bond issuances does not just rely on the amount of capital raised for sustainable projects, but also on the critical **promotion effect** that their positive results can have on domestic banking sectors. As a result, increasingly more FIs began to appreciate the effectiveness of these financial products as a key instrument to achieve both mandate-related developmental objectives and good financial returns. Furthermore, FIRA's case has shown that the institution's very own **green bond framework**, which acts as the foundation for FIRA's green bond issuances, is solid and trusted at the international financial market level. As such, it can be taken up and replicated by other interested FIs, without the need for expensive initial investments and focused on developing a new methodological framework that can act as the foundation for a green bond placement.

- **The high potential for replicability and expansion of the “thematic bond concept”.** The considerable results achieved through the three green bond placements encouraged FIRA to expand upon the concept of thematic bonds pursuing specific social and environmental returns. This led to the issuance on the part of the Special Fund for Agricultural Financing (FEFA) of Mexico’s first social bond with a gender focus (or gender bond, in short) in October 2020, with the support of the IDB and with the intermediation of a number of large commercial banks. This was a USD 152 million bond issuance with a 3-year maturity, aimed at raising exclusive financing for rural women who are in need of working capital or agricultural assets for their businesses. It received a positive rating by Sustainalytics (see Section 1.3), and is in compliance with the International Capital Markets Association’s (ICMA) Social Bond Principles. The issuance of such a bond – which has the overarching goal of fostering women’s financial inclusion and socioeconomic empowerment – is particularly critical in a context such as that of Mexico, where women own only 21 percent of agri-food production assets. In its first year, roughly half of the bonds raised funds that were used to refinance investment projects focused on women that were already present in FIRA’s portfolio, while the rest was channelled towards new loans for women entrepreneurs whose projects fit the eligibility criteria. A second social gender bond placement took place in 2021, which raised USD 177 million on bonds with a 3-year maturity. To date, the two bond placements have raised USD 218 million in funding for over 13 000 investment projects, benefitting approximately 17 000 women entrepreneurs.

This experience shows that the “sustainability bond” concept can be adapted to a wide variety of dimensions of development, attracting considerable capital from international investors that are seeking to deploy investment capital to contribute to specific (and widely varied) development-related outcomes that are of interest to them. As exemplified by FIRA’s case, a DFI can begin using different sustainable bonds to raise capital **to pursue a wide variety of institutional objectives linked to its broader mandate**, provided that it has:

- gained enough experience in developing the necessary framework that sustains a bond issuance and lifecycle;
- established a range of trustworthy partners to assist in the bond placement (e.g. the central bank, a consultancy firm and a reputable certifier such as Sustainalytics); and
- proven its reliability on international markets.

In this context, it is worth noting that FIRA has recently issued yet another type of sustainable bond. In May 2022, it issued the first Social Bond for Financial Inclusion, in collaboration with the Mexican Central Bank and the Development Bank of Latin America (CAF). This is a USD 195 million bond with a three-year maturity that intends to mobilize resources to promote investment projects aimed at bridging the financial inclusion gap in Mexico. From the viewpoint of sustainable finance, it will be interesting to see whether FIRA will manage to mainstream objectives related to environmental protection and climate change mitigation even towards those investment projects that have been financed through the “social gender bond” and the “financial inclusion bond”. In other words, whether the institution will be able to pursue objectives related to its green financing strategy even when said objectives do not strictly match the core thematic focus upon which these bonds have been designed and issued.

The way forward. In terms of the next steps that FIRA envisages for its sustainable financing strategy, there are a number of key undertakings that the institution is currently actively taking



on, which expand on the work done so far in the domain of sustainable financing and are aimed at further strengthening and expanding FIRA's efforts in this area:

- Develop Key Performance Indicators (KPI) for the sustainable financing portfolio.** Together with the AFD and the private consultancy, Carbon Trust, FIRA is currently developing a series of KPI for its sustainable financing portfolio. These indicators (see Table 3) will be key to strengthening the monitoring and evaluation of all projects built on the 55 eligible investment concepts intended to generate positive socio-environmental impacts. They are also expected to strengthen FIRA's capacity to report on (and advertise) its results to international investors, further establishing the success and position of the institution as a reliable domestic partner to channel international capital destined to investment projects with positive socio-environmental returns.
- Develop a programme to support farmers' climate change adaptation and resilience.** In a similar direction to that of the ProSostenible programme, FIRA is currently developing – in the frame of its sustainable financing portfolio – a programme that aims to provide interest rate rebates on investment projects focused on strengthening the adaptation and resilience of agricultural producers in the context of climate change. An international consultancy company was hired to analyse which investment concepts, among the broader list FIRA has developed over the years, have the greatest potential to foster farmers' adaptation and resilience, in much the same way that the ProSostenible and Energy Efficiency programmes were developed.
- Issue new types of “thematic bonds” with socio-environmental returns.** FIRA plans to keep expanding its range of thematic bonds, with a view to synergizing their objectives and action, thus amplifying their impact on a variety of social and environmental issues that are endemic to Mexican agriculture. To this end, in August 2022, FIRA announced that it would issue in 2023 another type of bond with a socio-environmental character: the Bono Azul (“Blue Bond”), aimed at raising funds to invest in projects focused on sustainable fisheries and aquaculture. Furthermore, the institution announced that it would issue a Bono Enfocado en la Resiliencia (“Resilience-focused Bond”), devoted to financing projects that seek to promote resilience against extreme natural events for vulnerable agricultural actors.

**Table 3: Key performance indicators**

1. Sustainable growth and resilient economy



2. Social well-being and reduction of social imbalances



3 Gender equality



4. Biodiversity conservation, environmental management, and natural resources



5. Fight against climate change and its effects



6. Consolidating project-generated impacts and the governance framework



Source: FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2020.pdf>









# Financial innovations to foster access to renewable energies in agriculture

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## Insights on the Green People's Energy for Africa Initiative

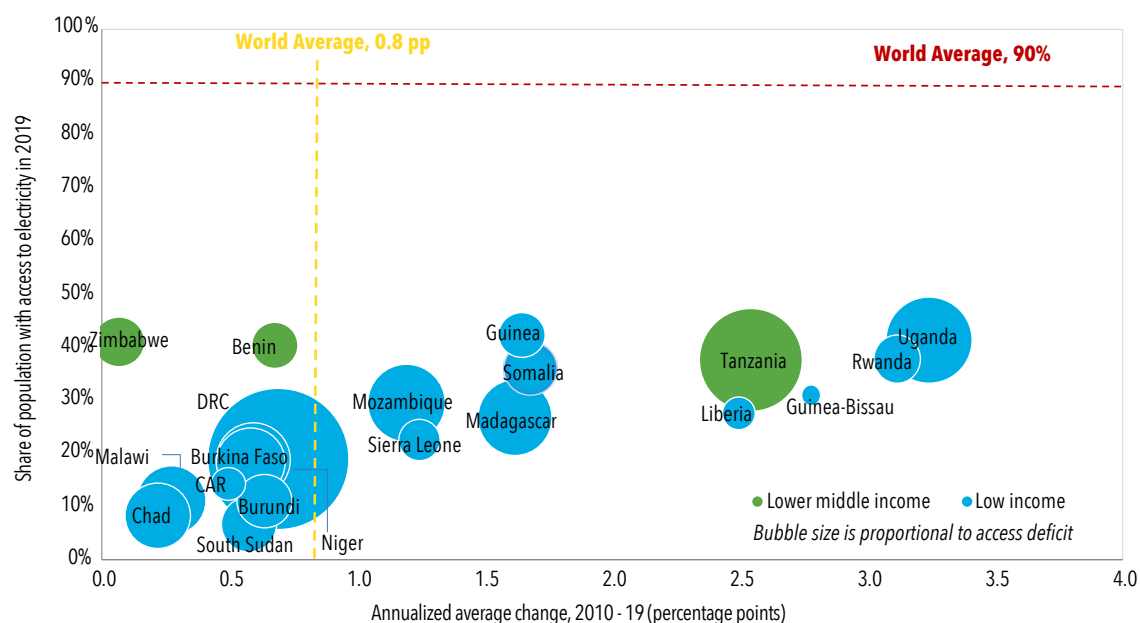
### 1. Introduction: Access to electricity and the green energy transition in sub-Saharan Africa

Insufficient access to electricity remains a critical constraint that strongly limits growth across the whole of sub-Saharan Africa (SSA). National electricity grids in most SSA countries keep expanding in a slow and imbalanced manner in rural areas, with starkly negative implications for several facets of socioeconomic development. In these areas, the vast majority of small-scale entrepreneurs face considerable costs linked to the use of outdated and inefficient diesel-powered machinery to sustain production (which strongly reduces their revenue), while access to innovative equipment for renewable energy generation remains quite limited because of a wide range of barriers – the first of these being affordability.

A series of key data points can help give an idea of the scarcity of energy access in the region: according to World Bank (2022) data, only 48.4 percent of SSA's population had access to electricity in 2021. From a global perspective, **72 percent of all people lacking electricity access live in SSA**, or 565 million people, in absolute terms. Although the region has seen some notable increases in energy access levels in recent years, these have been mainly made possible by the progress achieved by a small number of countries (namely, Ethiopia, Ghana, Kenya, Rwanda and Senegal); in fact, thirteen countries in SSA register less than 25 percent in national electricity access rates. From a global perspective, the twenty countries with the lowest rates of electricity in the world are all located in SSA. Not incidentally, these twenty countries account for 81 percent of the global population without access to clean fuels and technologies (IEA, 2022b). Rising demographics and

economic development are also set to substantially increase energy consumption requirements in the future. Hence energy demand from SSA's industry and agriculture, for example, is set to increase by 40 percent by 2030, under the current growth pathway (OECD, 2019).

**Figure 12:** Electricity access in the world's 20 least-electrified countries, 2010-2019



Source: IEA. 2021. *Tracking SDG 7 – The Energy Progress Report 2021*. Joint report of the IEA, IRENA, UNSD, the World Bank and WHO. Washington, DC, World Bank. [https://iea.blob.core.windows.net/assets/b731428f-244d-450c-8734-af19689d7ab8/2021\\_tracking\\_SDG7.pdf](https://iea.blob.core.windows.net/assets/b731428f-244d-450c-8734-af19689d7ab8/2021_tracking_SDG7.pdf)

The region faces considerable challenges not only in terms of meeting its total energy demands, but also in terms of how most of the energy it produces is high-carbon and harmful to the environment. Sub-Saharan Africa is the leading region in terms of wood consumption and net loss of forest area, as a result of an **annual demand for charcoal and firewood** that is projected to increase to roughly 800 million m<sup>3</sup> by 2030. Approximately 65 percent of the world's charcoal production can be attributed to SSA countries, with 195 million people in the region using charcoal as their primary cooking fuel (Rose *et al.*, 2022).

Access to modern and renewable energy technology in the region is still very low, with the notable exception of a few countries such as Kenya and South Africa, which makes electricity generation in rural areas a **costly and inefficient endeavour**, and one which often has harmful side effects for human health (GIZ, 2021). This points to what can be considered a sizable missed opportunity, as the SSA region is characterized by a vast and untapped amount of natural resources (e.g. sun, wind, hydro and geothermal) which could be leveraged to enable a green energy revolution. As illustrated by the International Energy Agency (IEA, 2022b, pg. 2), for example: “Africa is home to 60% of the best solar resources globally, yet only 1% of installed solar photovoltaics capacity”. As for wind energy, the region is estimated at present to only use 0.01 percent of its total potential (GWEC, 2021). As of 2020, less than 9 percent of energy generation in Africa could be attributed to renewable resources, with hydropower being responsible for most of this share. Although solar and wind contributions to the region's primary energy mix are gradually increasing, Africa is still



projected to rely heavily on natural gas and oil until 2050 (PwC, 2021). Under the current growth pathway, and despite rising investment in clean energy generation,<sup>12</sup> the SSA region is expected to be locked into a carbon-heavy energy production model for a long time yet. Thus, in the frame of the fight against climate change and the catastrophic consequences of global warming, it is critical to promote solutions and innovations that can bring about a significant shift in SSA's energy growth trajectory towards a far higher reliance on renewable energy sources.

From the specific perspective of agricultural development, renewable energies carry a considerable potential to **tackle the energy gap affecting SSA agri-food systems**, especially in view of growing demographics and rising food demand. As illustrated in a FAO and IRENA (2021, pg. 8) study:

**Energy use in Africa, which hosts around 15% of the global population and faces growing food demand, has remained largely constant, accounting for only about 4% of global energy consumption in agri-food systems. Limited access to energy at each step of the agri-food system limits the ability of farmers and agri-enterprises to raise productivity, cut losses, and cope with a changing climate and other shocks.**

In this sense, strengthening access to renewable energy technology could benefit small-scale agricultural producers in SSA in a wide number of manners: it could address heating, cooling and transport needs across all segments of key value chains;<sup>13</sup> lower the environmental impact of both commercial and subsistence agriculture; reduce farmers' exposure to fuel price fluctuations; foster their resilience and adaptability to shifting climate patterns; and create thousands of new jobs across all segments of agri-food value chains. The market potential for the uptake of this type of technology is enormous: FAO and IRENA (2021), for example, estimate a potential demand of at

<sup>12</sup> According to data from the International Renewable Energy Association (IRENA), the average annual investments in the African renewable energy sector have grown tenfold over the past decade, from less than USD 0.5 billion in the 2000–2009 period to USD 5 billion in 2010–2020. With that being said, only 2 percent of global investments in renewable energy over the last two decades have been made in Africa, while the region hosts less than 3 percent of all jobs related to the renewable energy sector. (IRENA and AfDB, 2022).

<sup>13</sup> As illustrated by FAO and IRENA (2021), crop losses in the “first mile” between harvesting and processing account for approximately 37 percent of food losses in SSA value chains. In Kenya, for instance, decentralized and solar-powered cold storage infrastructure has been shown to reduce losses and improve market access for farmers, providing up to 30 percent additional income through aggregation and shortening of the value chain.

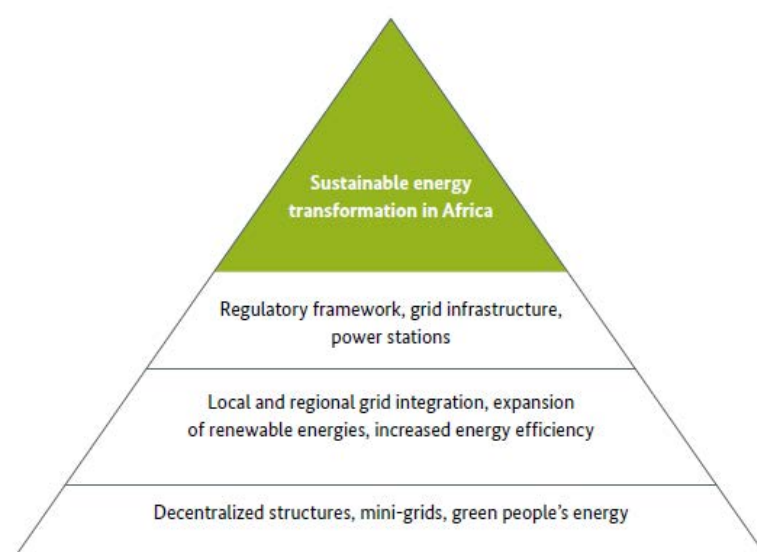


least 130 million new solar-powered water pumps across West, Central and East Africa, and not counting the opportunity to substitute existing diesel-powered ones.

In light of this scenario, the German Federal Ministry for Economic Cooperation and Development (BMZ) published in 2017 a position paper entitled “Green People’s Energy for Africa”, which detailed a number of modular interventions that it viewed as critical to support and enable a green energy revolution in SSA. At the core of this strategy is **the promotion of decentralized, renewable energy solutions** across SSA – and especially among micro-, small- and medium-sized enterprises (MSMEs) – which can help achieve the twofold objective of satisfying the rising demand for energy in the region, while overtaking (or at least curbing) the development of power system models that are high-carbon and centralized in nature. As can be seen from Figure 13, the BMZ views “green people’s energy”, i.e. the dissemination of decentralized and small-scale energy generation assets owned and used by individuals and small enterprises, as a core foundation block to promote a sustainable energy transformation across the whole region. This would take place in coordination with the expansion of national electricity grids powered by renewable energy sources.

From a global perspective, these kinds of low-scale, decentralized solutions for electricity generation (both mini-grid and off-grid) are becoming increasingly more cost-effective, accessible and of higher quality, mainly thanks to improvements in technology and a rising number of private providers. Nevertheless, the vast majority of agricultural MSMEs in rural sub-Saharan Africa, with the exception of a few countries, are still unable to benefit from these technologies without substantial public support, both financial and non-financial. Given this situation, **the issue of financial access** is particularly critical for small agri-entrepreneurs looking at renewable energy solutions to improve their businesses, as these actors usually have neither the necessary capital to purchase these technologies outright nor the means to obtain a loan from a formal financial institution (FI) to buy the equipment, because of the many barriers curtailing access to finance in rural SSA.

**FIGURE 13: BMZ’s modular strategy to promote a sustainable energy transformation**



Source: BMZ. 2017. *Green people’s energy for Africa*. BMZ Paper 06/2017. Bonn, Germany. <https://www.bmz.de/resource/blob/23758/strategiepapier395-green-peoples-energy.pdf>

In this regard, it should be pointed out how scarce access to quality renewable energy equipment and financial exclusion can be viewed as **mutually reinforcing deficiencies**: having to rely on outdated and inefficient diesel-powered machinery, for example, greatly raises business expenses for agri-entrepreneurs, while weakening their capital and creditworthiness. This, in turn, makes it more challenging to access quality financing from formal FIs, which could be used to invest in more efficient (and cost-cutting) renewable energy technologies to enhance agri-enterprises. From the perspective of a development agency pursuing the goal of fostering the uptake of clean energy solutions in rural and agricultural areas of developing countries, it is paramount to tackle these two aspects in tandem, and through a range of support interventions.

This logic is what brought the BMZ, through the implementing arms of GIZ and the KfW Development Bank, to **intervene at the nexus between energy access and financial access in select SSA countries**, with the aim of operationalizing its vision for the dissemination of decentralized clean energy solutions and thus advance a “green people’s energy” revolution in the region. The following sections aim to illustrate the details of the programme that stemmed from BMZ’s strategic approach to green energy promotion in SSA: the Green People’s Energy for Africa Initiative.

## 2. General features of the Green People’s Energy for Africa Initiative

The Green People’s Energy for Africa Initiative (*Grüne Bürgerenergie*, or GBE) is a programme commissioned by the BMZ and jointly implemented by the German Development Cooperation Agency (*Deutsche Gesellschaft für Internationale Zusammenarbeit*, or GIZ) and KfW Development Bank, as a concrete actualization of BMZ’s vision for green energy transition in SSA. It is currently being implemented in nine SSA countries,<sup>14</sup> over the 2018-2023 period and for a total budget of USD 63.4 million.

The main objective of the GBE is to **improve access to sustainable energy sources in rural and marginalized areas of SSA**. The programme carries a particular focus on agricultural MSMEs as beneficiary targets, mainly engaged in production, but also across other value chain segments. Furthermore, the programme promotes the uptake of off-grid solutions for renewable energy generation on the part of schools, health centres and other public establishments active in rural areas.<sup>15</sup> Along with its main goal of promoting access to decentralized, clean energy generation systems in SSA, the GBE also seeks to increase agri-businesses’ efficiency and profitability through these technologies, while reducing the overall CO<sub>2</sub> emissions generated by agricultural economic activity in the region.

To achieve these objectives, the GBE has partnered with a wide range of national and international institutions whose mandates and goals have an affinity with the promotion of renewable energy solutions in SSA, such as ministries, local municipalities, universities, vocational training centres, non-governmental organizations (NGOs) and civil society organizations. In addition to country-specific measures, the initiative seeks **to promote renewable energy projects of common benefit across countries**, as well as strengthen partnerships between actors in Europe and Africa. The GBE seeks primarily to support the achievement of SDG 7 (“Ensure access to affordable, reliable, sustainable and modern energy for all by 2030”), although it also generates a wide range of positive

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<sup>14</sup> Namely, Ethiopia, Benin, Côte D'Ivoire, Ghana, Mozambique, Zambia, Senegal, Uganda and Namibia.

<sup>15</sup> Some notable examples of GBE’s initiatives that promote access to renewable energy solutions among schools and health clinics in rural areas are provided in Section 4.

impacts that are linked to the realization of SDG 1 (poverty), SDG 3 (health), SDG 4 (education), SDG 5 (gender equality), SDG 8 (sustainable economic growth) and SDG 17 (global partnerships).

Although the GBE supports the dissemination of all types of decentralized clean energy assets in rural areas, it focuses in particular on the promotion of **solar energy technology for productive use** – mainly solar-powered water pumps and refrigeration systems. Aside from the fact that they do not generate greenhouse gases, the use of **solar water pumps** in agriculture carries a range of advantages over traditional diesel-based ones: they carry considerably lower operating costs as fuel is not needed; they require less regular maintenance and break less often; and their extended lifetime is considerably longer. As operational costs are lower, farmers are not forced to save on irrigation time and can irrigate their fields more regularly, leading to better crop quality, increased yields and, possibly, an expansion of the area under cultivation. As for **off-grid solar refrigeration systems**, these are ideal for farms, fisheries and other rural businesses that need ample space to keep fruits, vegetables, meat or fish refrigerated in a safe and inexpensive manner, regardless of the remoteness of their location.<sup>16</sup>

Despite these evident advantages, it must be noted that, as it stands, there are still several challenges that constrain rural entrepreneurs' capacity to access solar energy equipment in the SSA countries targeted by the GBE. These include:

- 1) The high purchase costs for solar-powered equipment (e.g. solar water pumps and solar freezers). This is arguably the most pressing constraint faced by rural entrepreneurs looking to purchase such devices.
- 2) The low levels of capital available to most small-scale agricultural entrepreneurs, especially when kick-starting a business.
- 3) The low-risk inclination shown by solar companies (most of which are urban-based) when it comes to expanding their offer to rural markets.
- 4) The scarcity of tailored financing solutions developed by rural FIs to facilitate the purchase of renewable energy technology.
- 5) The challenges associated with financing projects focused on renewable energy promotion without some kind of public-private collaboration, especially in the underdeveloped markets where the GBE is active.
- 6) The diffused lack of knowledge on the uses and advantages of renewable energy technologies among most small-scale agricultural entrepreneurs, which can result in a widespread bias and suspicion against such innovations.
- 7) The challenges faced by prospective rural clients in properly assessing by themselves the quality and the suitability of the various models of solar-powered equipment available for purchase, as well as the overall reliability of a solar company.

In light of this scenario, the GBE programme managers sought to address all of these constraints by developing **innovative financing models** aimed at facilitating the purchase of sustainable energy equipment on the part of local farmers and other small-scale agricultural entrepreneurs. These models are based on the engagement of – and collaboration between – three main categories of actors:

- 1) the targeted **small-scale entrepreneurs**, who are seeking to purchase solar-powered equipment to improve their businesses;

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<sup>16</sup> Solar refrigerators also play a critical support role for public establishments active in rural areas: health clinics, for example, can gain the ability to store vaccines and other medicines, despite not being connected to a grid.

- 2) **solar technology companies** – active in each country – that seek to expand their market in rural areas, but would welcome external support to mitigate the risk they face in this regard; and
- 3) **local microfinance institutions (MFIs)** that are interested in expanding their agricultural loan portfolios while benefitting from credit risk mitigation support provided by the GBE.

The GBE seeks to promote commercial linkages between these different categories of actors, in an effort to tackle the various imbalances and information asymmetries that prevent the development of solid private markets for solar-powered equipment in SSA's agriculture sector. To this end, agri-entrepreneurs are supported by the GBE through both financial (i.e. subsidies and credit) and non-financial means (i.e. capacity building, financial education and awareness raising) in the purchase and appropriate use of solar-powered devices that are suitable for their businesses. Solar power companies are assisted by the programme in establishing commercial linkages with vast new segments of rural clients, as well as in expanding their point-of-sale networks in rural areas. Finally, the MFIs are provided with financial support by the GBE that partially mitigates the credit default risk they shoulder when providing loans to agri-entrepreneurs for the purchase of solar-powered equipment, together with technical assistance aimed at strengthening their understanding of these technologies and the business models associated to them. Furthermore, the general expenses they incur to adapt and commercialize their offer of financial products for agricultural entrepreneurs are partially covered by the GBE, in order to encourage their outreach towards rural and agricultural markets. It should be pointed out that, in each target country, the GBE evaluates **both solar companies and MFIs** on the basis of competitive criteria before partnering with them, in an effort to maintain a high standard of quality for the services and products being offered to the agricultural entrepreneurs.

To sustain the interest and engagement of these three core categories of actors, the GBE has sought to create **a solid structure of incentives** (both financial and non-financial), tailored to the needs of each group, which is meant to support and promote over time the development, in each target country, of a public-private market both for solar-powered technology and for the financing required for its purchase. To this end, the solar companies and the MFIs that participate in GBE's model are encouraged by the programme to work together in order to develop **a coordinated offer of both solar-powered equipment and the credit to purchase it**.<sup>17</sup> In fact, among the prerequisites set by the GBE to provide financial support to individual solar companies and MFIs is for these organizations to first formally agree on a collaboration by signing a memorandum of understanding, as well as develop an action plan that lays out the details of this partnership. Another prerequisite is that the solar-powered equipment sold in the framework of the model needs to be used strictly for the purpose of energy generation in small-scale businesses; to do otherwise would defeat the GBE's intended objective of promoting a public-private market for renewable energy solutions in the agribusiness sector (and other enterprises more loosely associated with agricultural value chains, such as retail shops in rural areas). Finally, solar companies and MFIs should strive to ensure that at least 30 percent of clients purchasing solar-powered equipment in the frame of the programme are **women entrepreneurs**, in an effort to counteract the multidimensional, gender-based constraints that stifle female entrepreneurship in SSA countries.<sup>18</sup>

<sup>17</sup> It should be noted that the presence and role of the MFIs in GBE's model vary widely depending on the country of operation (see Section 4 for more detail). In Benin, for example, MFIs fully participate in the financial incentives system designed by the GBE. In Côte d'Ivoire, on the other hand, MFIs do not participate in GBE's system and do not receive incentives towards the provision of loans to agri-entrepreneurs for the purchase of solar-powered equipment.

<sup>18</sup> It should be noted that this goal is not limited to just selling the equipment to a woman agri-entrepreneur, but also effectively checking that she is actually the one benefitting from it in the context of the business. There might be instances, for example, in which a woman purchases the equipment in name only, and this actually ends up being used by a male relative.

As will be illustrated in the next sections, the GBE has employed **different financing models** in the various countries involved to facilitate the purchase of solar-powered equipment on the part of farmers, such as pay-as-you-go solar,<sup>19</sup> microfinance loans, crowdfunding and cooperative-based group loans. The specific features and terms of the financial support provided by the programme can vary considerably depending on the target country, as will be shown more in detail in Section 4. With that being said, a common approach adopted by the GBE in its engagement with key partners is that of **results-based financing** (RBF). Box 3 presents a more detailed explanation of this approach.

### BOX 3: Focus on results-based financing

Results-based financing (RBF) is a type of financing mechanism that ties the disbursement of funds to the achievement of predetermined results. Rather than simply providing funding upfront, it is designed to incentivize the delivery of specific outcomes or outputs on the part of service providers by linking payouts to the achievement of specific milestones or targets.

In the frame of the GBE, the programme has stipulated RBF arrangements with both solar companies and MFIs. Solar companies receive a range of staggered subsidies from the GBE that cover part (up to 50 percent) of the purchase cost of the solar energy equipment. Although the exact details of the RBF arrangements vary from country to country, the GBE usually provides part of this subsidy to the solar company as soon the sale to the rural customer is confirmed, while the rest of it is only released by the GBE once the correct installation of the device on the customer's premises has been technically verified by the programme. Similarly, MFIs that provide loans in the frame of the programme for the purchase of solar-powered devices can only ask for GBE's subsidies at the end of four-month windows, following verification on the part of the GBE of the correctness of their loan provision activities. Section 4 describes more in detail various aspects of specific RBF arrangements that the GBE programme has developed in different countries of operation.

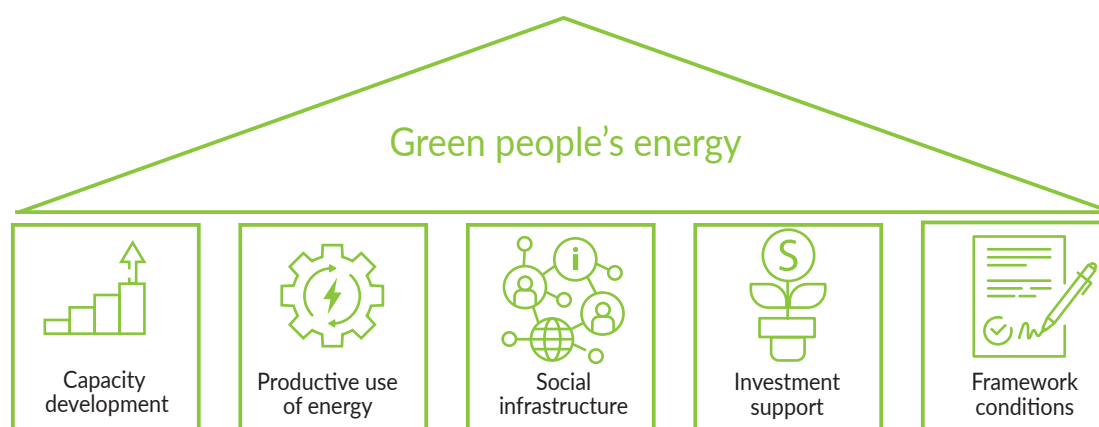
From the viewpoint of the GBE programme, these RBF arrangements are meant to gradually encourage the creation of a private market for both the sale and financing of clean energy solutions in rural areas, by addressing market imbalances through the implementation of a set of incentives aimed at fostering a deeper engagement with small-scale rural entrepreneurs on the part of solar companies and MFIs alike, as well as enhancing their accountability towards the donor. By linking payouts to the realization of a series of defined results, an RBF approach increases the likelihood that donor funds will be used by the service providers in a targeted and cost-effective manner, while promoting a closer and more regular interaction between the providers and the programme itself. Furthermore, in order to adhere to the RBF scheme, the solar companies and MFIs have to comply with a series of requirements that the GBE has set to strengthen customer service and promote the quality and reliability of the solar-powered equipment. The solar companies, for example, have to guarantee that all devices sold in the framework of the RBF scheme are covered by (at least) a two-year warranty, within which all devices that have broken down (for reasons not ascribable to the agri-entrepreneur's actions) need to be fixed or replaced within a set time frame.

<sup>19</sup> Pay-as-you go (or PAYGO) is a financing model that allows customers to pay for solar energy systems on a per-use basis and through small installments, rather than by making a full purchase upfront. Customers typically pay a small upfront fee (10–20 percent) to purchase a solar energy system, and then pay the rest over time, leveraging the additional cost savings generated by the system. This model is designed to make solar energy more accessible and affordable for customers, particularly in developing contexts where customers might lack the capital to purchase a solar energy system upfront, and where traditional financing options to access such capital are scarce.



The financial support schemes implemented by the GBE are complemented by the programme through a wide variety of **non-financial interventions** aimed at bridging various gaps that can limit rural uptake of decentralized energy equipment notwithstanding the provision of financial assistance (see Figure 14). These interventions include capacity building on sustainable energy technology for trainers and technicians; coaching programmes for agri-entrepreneurs seeking financing for renewable energy projects; policy advice on renewable energy promotion for governments; training for FIs to enhance their credit offer in the sustainable energy domain; and support to energy companies to attract investment capital from abroad. Section 3 of this case study provides a more detailed description of the various types of non-financial support interventions provided by the GBE in its nine target countries.

**FIGURE 14: Dimensions of strategic intervention of the GBE**



Source: BMZ. 2017. *Green people's energy for Africa*. BMZ Paper 06/2017. Bonn, Germany. <https://www.bmz.de/resource/blob/23758/strategiepapier395-green-peoples-energy.pdf>

### 3. Focus on GBE's capacity development and technical assistance interventions

A key component of the GBE programme is the provision of ground-level assistance aimed at supporting not just the end beneficiaries, but a wide range of agents engaged in the GBE model (e.g. agricultural extension officers, MFI agents) as well, in **strengthening their knowledge and capacity with regard to** the use of renewable energy equipment. This kind of capacity development is provided in partnership with a range of public and private entities, such as vocational training centres, universities, solar energy companies and others. The GBE provides this support in recognition of the fact that it is impossible to promote the dissemination of renewable energy assets without also addressing the considerable capacity gap related to the use of this technology in most rural areas of SSA countries. Aside from strengthening the capacity of agri-entrepreneurs that wish to leverage clean energy technology in their businesses, the programme also places considerable importance on **training and building distribution networks of agents** focused on promoting and selling decentralized, renewable energy equipment to small-scale agricultural actors.

A strategic priority of the GBE is the strengthening of rural know-how on renewable energy technology through **trainings-of-trainers (ToTs)**, which seeks to ensure that each country of

operation can carry on developing its national capacity on decentralized energy systems even in the absence of continued support from the GBE. In **Ghana**, for example, the GBE provided solar irrigation systems to three national universities in 2022, which are being used by these institutions as demonstration tools to train solar technicians, agricultural extension workers and loan officers, on the specific features of the technology. In this manner, they are able to assist and counsel farmers on the use and maintenance of the equipment. In **Zambia**, the GBE partnered with Fountain Gate Crafts and Trades School and the University of Zambia to develop and launch two different ToTs focused on solar technology. The first ToTs course centred on applications of solar technology specifically for agriculture, while the second focused more on the installation and maintenance of these same technologies. By the end of the programme, 288 professionals from four vocational training centres were taught about the use, installation, maintenance and repair of solar systems, with practical, hands-on training made possible by equipment (e.g. solar panels, pumps) made available by the GBE.

These ToTs have also had an international breadth. In 2022, the GBE organized an **advanced training course in Wildpolsried, Germany**, for a number of African vocational schoolteachers hailing from the programme's target countries, and who were selected for participation through a combination of written and oral tests. This two-week professional development course, which is part of a broader modular training programme developed jointly by the GIZ project VET4Africa and the Vocational Training Centre of the Bavarian Economy (BBW), aims to train participants on how to design, build and operate battery-based solar power systems, through a combination of theoretical lessons and hands-on practice. The vocational schoolteachers trained in this manner are expected, in turn, to impart this know-how to their students back home. Beyond the training, a number of German instructors from the course are expected to act as mentors for those who graduated, travelling to the different GBE project countries to support the improvement of local trainings. More than 200 vocational teachers were trained in 2022 as part of this initiative, with GBE providing funding for the travel and costs associated with attendance.

To enable the hands on-training of new technical experts, the GBE has also sought to develop **permanent training spaces** which can be used to demonstrate and teach how to properly use and maintain renewable energy systems. In **Uganda**, the programme set up in 2022 a “demonstration garden” for solar-powered irrigation systems near GIZ's office in the town of Gulu. This demonstration space contains different types of equipment used for training purposes: two water harvesting storage tanks; two pressure tanks on raised stands for drip irrigation systems; two solar water pumps; and a nursery greenhouse. The garden has already hosted a first training round for 120 prospective technicians, and it is also used as an exposition space to raise visitors' awareness about the advantages of solar-powered irrigation.

Another key aspect of GBE's support interventions is that of its **advisory services and coaching** to small- and medium-sized companies, as well as project developers to promote investment projects in renewable energy. Longer-term capacity building aimed at supporting agri-businesses and project developers in strengthening their investee profile and attracting funding from both local and foreign investors, with a view to financing renewable energy projects for productive use, is thus also supported. In **Senegal**, for example, the GBE partnered in 2021 with GET.invest Finance Catalyst and Kof Experts,<sup>20</sup> to provide coaching services to twenty different types of enterprises (such as farmers' cooperatives,

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<sup>20</sup> GET.invest Finance Catalyst is a service provided by GET.invest, a development programme funded by the European Union, which focuses on financing business opportunities linked to renewable energy and clean cooking projects in sub-Saharan Africa, the Caribbean and the Pacific. Kof Experts is a Senegalese consultancy firm engaged in accounting and financial management.

renewable energy companies and recycling companies) that sought to attract investment capital for off-grid renewable energy projects, with capital demands ranging from EUR 7 000 to 500 000. The coaches from GET.invest and Kof Experts, on behalf of the GBE, began the process by carrying out individualized assessments of each enterprise, to identify capacity gaps that needed to be filled in order to strengthen the business' investee profile. Afterwards, each investment project for which the enterprise needed financing was evaluated by the coaches from a technical, financial and organizational perspective, in order to address any specific flaw or weakness that could turn away potential investors. Finally, the coaches assisted the entrepreneurs in strengthening their financing applications and pitch presentations.



GBE's demonstration garden for solar-powered irrigation systems in Gulu, Northern Uganda.

Aside from providing training and advisory services, the programme has also established **knowledge hubs** that can support local actors in developing their know-how on different technologies, business models and financing approaches associated to renewable energy promotion. In Mozambique, the GBE launched in 2021 the **Mozambique Off-grid Knowledge Hub**, an online repository that makes available, in both English and Portuguese, a trove of information and material linked to various aspects of renewable energy promotion in the country, such as: local market analyses; political framework conditions; detailed information on various clean energy technologies (e.g. solar home systems, improved cookstoves and mini-grids); good practices; and case studies. This initiative was developed in collaboration with Energypedia, an energy-themed wiki platform, which also hosts on the portal a series of webinars dedicated to various renewable energy solutions, in collaboration with the Mozambican Renewable Energy Association (AMER).

To conclude, it is important to underline that **the promotion of gender equality** is also extremely important in the frame of GBE's overall approach to capacity building, in recognition of the heightened and unique challenges that women entrepreneurs in SSA's agriculture face when trying to access modern energy assets, or when pursuing a career as technicians and professionals in the field of renewable energy. In **Uganda**, for example, the GBE has implemented a wide range of interventions aimed at enhancing women's capacity in this domain:



- The GBE launched a series of “Gender-smart Awareness Workshops” to encourage female community members to learn about energy topics and to inform them about the upcoming training opportunities.
- It developed tailored training sessions for women, which took into account the heightened time and mobility restrictions they faced, with female trainers leading the classes (to avoid possible issues related to dealing with a male trainer borne out of sociocultural pressures).
- It engaged successful women entrepreneurs to share their experiences during the training sessions as local “champions”, to showcase the results and success that could be achieved through the adoption of modern energy systems.
- It sensitized GBE’s field agents on how to reach out and engage rural women in a proper and effective manner, and to encourage their participation to the trainings.
- Given the considerable education gap faced by women in rural Uganda, especially in fields related to science and technology, GBE adapted the qualification criteria for the training courses to lower the barrier of entry for female participants; and additional application windows and training rounds were organized exclusively for women.

#### 4. Specific insights from country-level experiences

As already noted in Section 3, the concrete strategy for intervention adopted by the GBE to support the dissemination of decentralized clean energy technology varies considerably across the nine target countries. This is necessarily so because of the differences registered at ground level in a wide variety of key aspects: market conditions; beneficiaries’ level of preparation and awareness regarding clean energy technology; the presence and interest shown by local MFIs and solar companies; and other elements. This case study therefore sought to provide a more in-depth analysis of the specific strategies adopted by the programme in three countries: Senegal, Benin and Côte d’Ivoire. These countries were selected because of their relatively advanced state of



implementation of the RBF incentive mechanism developed by the GBE to promote the sale and financing of solar-powered equipment. Table 4 provides a summary of key data relative to the GBE's activities for the three countries, while the following sub-sections provide a more in-depth analysis of the programme's approach in each national context.<sup>21</sup>

**TABLE 4:** GBE's activities in three project countries (as of February 2023)

	Senegal	Benin	Côte d'Ivoire
<b>No. of solar companies engaged in the model</b>	3	8	5
<b>No. of pieces of solar-powered equipment sold (as of Q1 2023)</b>	52 solar water pumps and 7 solar-powered refrigeration systems	110 solar water pumps and 38 solar-powered refrigeration systems	8 solar water pumps and 56 solar-powered refrigeration systems
<b>Time span of the incentive window targeting solar companies</b>	June 2021 - ongoing	First window: August 2020-September 2022  Second window: December 2022 – June 2023	May 2022 – July 2023
<b>Role of the MFIs in GBE's model</b>	Only responsible for collecting loan repayments  (supplier credit is provided by the solar companies)	Full RBF incentive model: MFIs receive financial incentives from the GBE to provide loans to agri-entrepreneurs	MFIs have not been engaged by GBE for its RBF model in the country
<b>No. of MFIs engaged in the model</b>	2	4	Not available

Source: the author, based on data provided by the GBE programme

#### 4.1 Country focus: Senegal

While Senegal registers one of the highest electrification rates in Africa (around 73 percent), the country still presents a stark urban/rural gap in this regard, with only 53 percent of rural households having access to electricity versus 94 percent of urban ones. Roughly 5.1 million Senegalese are not covered by the national electricity grid. In rural areas of the country, people spend on average 13 percent of their monthly income on energy expenses derived from the use of traditional (and inefficient) sources, such as kerosene lamps and diesel generators. For farmers, fuel expenses to power diesel-based machinery can account for up to 60 percent of production costs. Roughly 42 percent of MSMEs in Senegal point to the lack of access to electricity as a major constraint to doing business, while 52 percent say that financial exclusion is another critical concern (UNCDF, 2021).

In light of this scenario, GBE-Senegal has been promoting the purchase of decentralized, solar-powered equipment on the part of agri-entrepreneurs through the establishment of **RBF**

<sup>21</sup> Note that the GBE Programme makes available the latest results achieved in its countries of operation, as well as a range of case studies and informational material, at its Knowledge Hub hosted on the Energypedia platform: [https://energypedia.info/wiki/Green\\_People%27s\\_Energy\\_for\\_Africa\\_-\\_Measures\\_%26\\_Projects](https://energypedia.info/wiki/Green_People%27s_Energy_for_Africa_-_Measures_%26_Projects)



**agreements with a network of three partner solar companies,**<sup>22</sup> which have shown an interest in expanding their commercial reach in rural areas. In the framework of this agreement, the GBE provides a range of subsidies that are meant to assist agri-entrepreneurs in overcoming some of the main constraints that prevent them from accessing solar-powered equipment, particularly the high, upfront cost required to purchase such devices.

How does GBE's financial incentive scheme work? First, a partner solar company engaged in the RBF incentive mechanism presents to the programme a list of prospective customers engaged in agriculture, who are looking for support in purchasing solar-powered water pumps or refrigerators. As part of the RBF arrangement, these customers are required to pay an initial 10 percent of the cost of the device upfront with their own capital, while 30 percent of the purchase cost is covered by a subsidy that the GBE provides to the solar company once the sale has been confirmed. Afterwards, once the solar company has installed the device on the customer's premises (and the GBE has verified this has been done properly), the GBE pays out another 20 percent subsidy to the company. This means that the solar company has already received 60 percent of the total cost of the device: 50 percent from the GBE and 10 percent from the customer. The remaining 40 percent of the purchase cost is considered **a supplier loan advanced by the solar company to the customer**, who is expected to pay it back in instalments.

In order to participate to the RBF arrangement, a solar company has to formally guarantee that it will carry out the correct installation of the device, as well as provide regular maintenance of the solar-powered devices it sells to the end customers for at least two years, which implies repairing or replacing the equipment (within a set time frame) in the event that the device proves to be defective. Furthermore, the company agrees to provide a number of post-sale services to the client, all of which need to be clearly detailed in the contract it signs with the end customer. All these requirements are set by the GBE to ensure that the partner solar companies will adhere to a certain standard of quality in their service; failure to do so can lead to their expulsion from the programme.

It should be noted that MFIs play a far more secondary role in GBE-Senegal's financial incentive model as compared, for example, to Benin as illustrated in Section 4.2. In GBE-Senegal's model, the two partner MFIs do not provide financing directly to agri-entrepreneurs, but are instead tasked with collecting the repayments of the supplier loans provided by the solar companies to the agri-entrepreneurs. Their profit line in this model is a fee, basically a share of the original loan amount, that is charged to the partner solar company upon effective retrieval of the credit in its totality. The overall RBF mechanism developed by GBE in Senegal, highlighting the different actors and their roles, is presented in Figure 15.

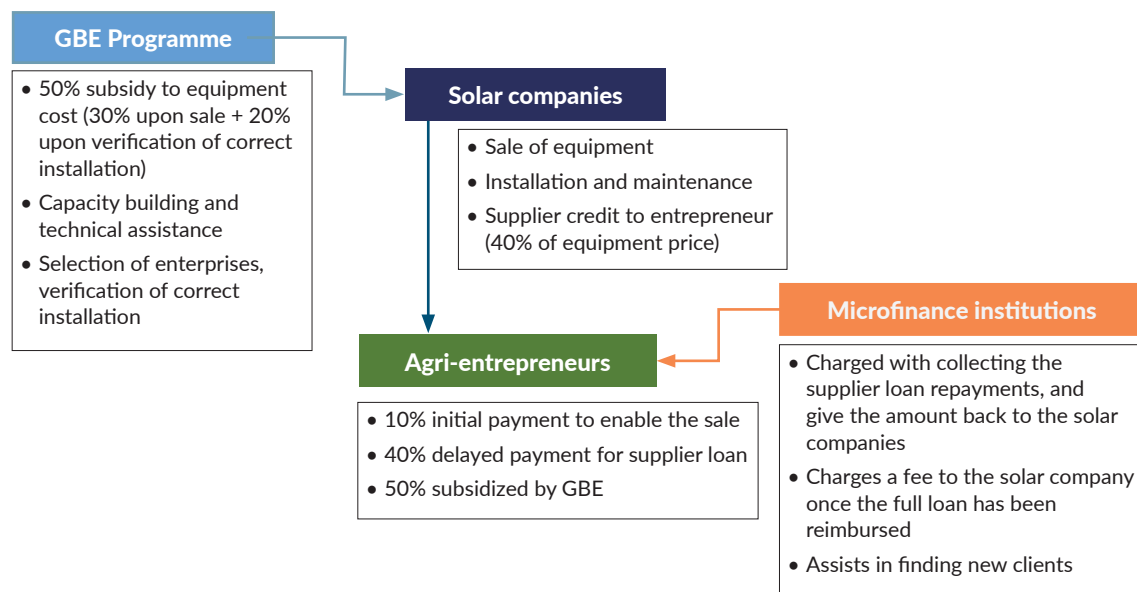
To apply for a GBE-subsidized loan, an **agricultural entrepreneur** needs to meet the following prerequisites:

- being a prospective or current client of an MFI engaged in the RBF mechanism;
- having the financial capacity to pay upfront for 10 percent of the cost of the equipment;
- having an established income-generating activity; and
- having a water source on his/her terrain.

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<sup>22</sup> The solar companies participating in the scheme are selected by GBE-Senegal on the basis of their experience, the quality of their products, staff and resource capacity and financial solidity, as well as their reliability in service provision. In the framework of the agreement with GBE, together with the actual sale of the equipment, the company also commits to installing the machinery and to maintaining it at no additional cost for the duration of the guarantee.

**FIGURE 15:** Green People's Energy for Africa Programme's (GBE) results-based financing mechanism in Senegal



Source: the author, based on data provided by the GBE programme

Before finalizing the sale, prospective clients are obliged to participate in awareness-raising information sessions aimed at strengthening their knowledge on the warranty conditions associated with the purchased equipment, as well as the specific post-sale services (e.g. maintenance and addressing malfunctions) that are offered by the energy companies.

As stated in a recent publication by GBE-Senegal that explains clearly the different advantages for each actor participating this financing model:

**Results-based financing is a win-win partnership. The farmer receives a high-quality solar system on credit with good customer service. The solar water pump suppliers expand their customer base and secure repayments of supplier credits through cooperation with financial institutions. The financial institutions, in turn, reach more customers [...] despite little liquidity of their own. Half of the price has already been pre-financed by support from GBE, and the other 40% is in the form of a supplier credit (GBE, 2022a, pg. 4).**

The initial results of GBE's financing model in Senegal have been quite promising: as of December 2022, 47 solar-powered devices purchased with GBE's subsidies had been installed (both solar water pumps and solar refrigerators); the three solar companies had substantially increased their share of rural clients; and 12 additional pieces of renewable energy equipment had been sold and installed without the need for a GBE subsidy – all through word of mouth. Some farmers reported yield increases of up to 100 percent thanks to the new technology, which – coupled with the cost savings derived from not having to purchase diesel anymore – have led to considerable profit improvements.

#### BOX 4: Providing photovoltaic systems to rural health centres

Aside from financial support to entrepreneurs, the GBE has been engaged in various initiatives aimed at strengthening access to decentralized clean energy solutions for rural public establishments. In 2021, GBE partnered with the NGO Eau Vive to provide 15 rural health centres with solar-powered refrigerators to store vaccines and medicines, photovoltaic systems to ensure that each centre can power lights and fans throughout the day, as well as a set of portable and rechargeable solar lamps. Some health centres have also begun using the new systems to provide additional services to neighbouring residents for a fee, such as charging phones, storing drinks and ice cream for sale, and renting out the solar lamps for personal use. The income generated in this manner is used for the upkeep and repair of the decentralized solar equipment. In addition to this, GBE-Senegal trained 37 employees from the health centres on the functioning and maintenance of this technology.

## 4.2 Country focus: Benin

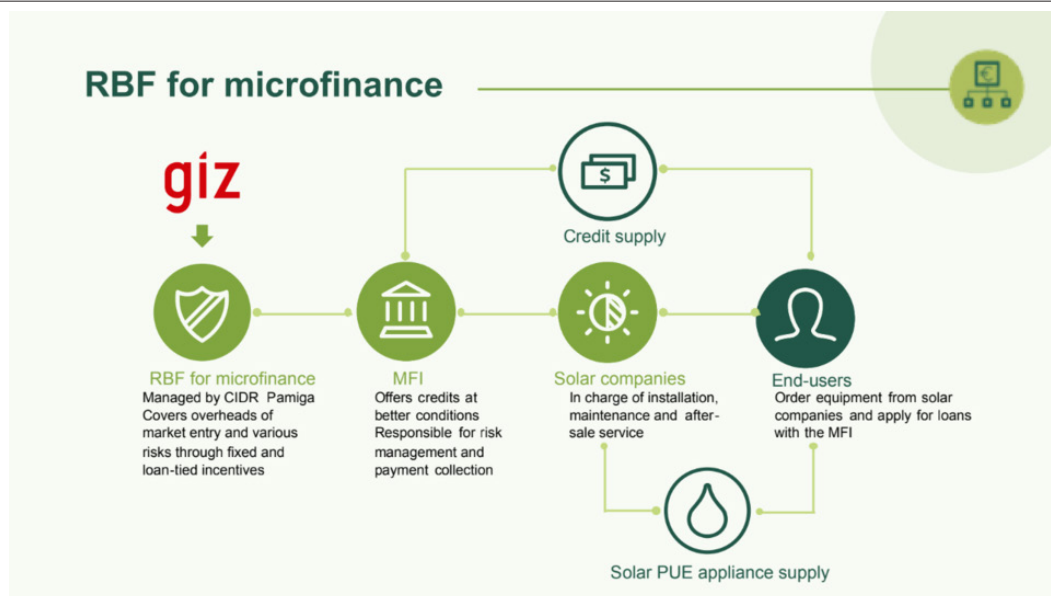
The current scenario in Benin for concerning the rural gap in electricity access is quite dire. Less than 19 percent of the rural population has reliable access to electricity, in contrast to an urban access rate of 70 percent. Across the country, only 10 percent of households are using off-grid solar equipment, while four out of five rely on inefficient kerosene lamps or candles for lighting. Only 4 percent of the 12 million strong Beninese population has access to clean cooking solutions. The country is mostly dependent on biomass and petroleum imports for its energy supply, with 85 percent of its electricity consumption being met by petroleum imports from Ghana, Côte d'Ivoire and Nigeria. A 2017 survey on rural households in Benin showed that 76 percent were dependent on fuelwood and 18 percent on charcoal for energy production. Approximately 160 000 hectares of forest are cut down each year for fuel, with another 50 000 hectares being cut down to make way for farming expansion. While the government's national target is to achieve a rate of rural electrification of 65 percent by 2025, as the situation now stands this goal appears to be far from being realized (EIB, 2022; IEA, 2022c; Ekouedjen *et al.*, 2021).

Unlike the case of Senegal, in Benin the GBE programme does not provide incentives on an RBF basis only to solar companies, but also to partner MFIs (which play a far more active role in this system), on the basis of a mechanism which will be analysed in this section. The overarching goal of the GBE of promoting the development of a private market for off-grid solar technology solutions can be a game-changing proposition in a country such as Benin, where – according to a market assessment commissioned by the GBE itself – **less than 100 solar-powered water pumps were sold per year** prior to the establishment of the RBF model, and barely 20 percent of these installations were used for agricultural activities. Furthermore, only two solar companies in the whole country had managed to establish some sort of agreement with MFIs before the GBE began its operations. While all MFIs had some degree of experience in financing the purchase of agricultural equipment, their knowledge of solar-powered technology was almost non-existent.

After two years of operations, by the beginning of 2023, GBE-Benin had established RBF agreements with **eight solar companies and four MFIs**. Figure 16 provides a schematic overview of the different categories of actors engaged in the RBF scheme, together with their main tasks and responsibilities.<sup>23</sup>

<sup>23</sup> It should be noted that the component of the RBF model that deals specifically with providing financial incentives to MFIs is implemented by CIDR Pamiga, a French non-profit organization focused on providing technical assistance and digitization support to the African microfinance sector. The RBF component that provides financial incentives to solar companies, on the other hand, is managed by the Agency for Rural Electrification and Energy Control (ABERME) – a governmental institution. In both cases, the capital used for financing is provided by the GBE programme.

**FIGURE 16:** Results-based financing model employed by the Green People's Energy for Africa Programme's (GBE) in Benin



Source: GBE, 2022a. Results-based financing lets farmers in Senegal buy solar-powered water pumps, helping to increase harvests. *GBE Story, SDG 7*. Bonn, GBE of BMZ. <https://gruene-buergerenergie.org/format/story/results-based-financing-lets-farmers-in-senegal-buy-solar-powered-water-pumps-helping-to-increase-harvests/>

Within the frame of the RBF scheme, a solar company can receive a subsidy from the GBE to cover a portion of the cost of a solar-powered appliance (a solar-powered pump or refrigerator) sold to an agricultural entrepreneur (the “end customer” in Figure 16). Based on the logic of an RBF scheme, incentives are paid out to the solar company after the programme has verified the correct installation of the equipment. The incentive amount is dependent on the model and manufacturer of the solar-powered equipment in question, **which can only be selected from a specific list of eligible products** that the GBE-Benin has made available on the Odyssey platform (described at the end of this section). This prior identification of the specific models of solar equipment that are eligible for subsidies in the RBF system was carried out by the GBE to ensure a **standard level of quality for all appliances installed**. In addition to this, all solar companies that partner with the programme have to commit to guaranteeing a two-year warranty on all the appliances they sell.

The GBE-Benin has foreseen an **additional subsidy premium** for those solar-powered appliances installed by the solar company with both a performance monitoring device and a remote activation switch, with a cost equivalent to CFAF 75 000 (USD 123) per device. By introducing this premium, the GBE seeks to promote remote monitoring and the diffusion of pay-as-you-go (PAYGO) arrangements in the sale of solar-powered equipment among agricultural actors (see Section 2). The integration of remote monitoring technologies allows PAYGO companies to improve both their after-sales service and the overall loan repayment rates they register, while strengthening these companies' ability to offer PAYGO financing to a wider number of clients. While PAYGO arrangements are common in Benin for small off-grid solar appliances, before the GBE's intervention they were rarely offered to facilitate the purchase of larger types of equipment intended for productive use, such as solar-powered water pumps. By incentivizing this type of mechanism, the GBE-Benin hopes to encourage the growth of a more varied and competitive market for PAYGO solutions in Benin's agriculture. However, to date, only one solar company in GBE-Benin's model integrates PAYGO solutions on a systematic basis, and specifically for the sale of solar-powered refrigeration units.



Compared to the case of Senegal, MFIs play a far more prominent role in GBE's model for Benin. In the structure of this model, a partner MFI, after having signed a collaboration agreement with one or more solar companies, becomes eligible to receive financial incentives by the programme to support the provision of credit to the agri-entrepreneurs. In order to qualify for a subsidy, the loan provided by the MFI should cover at least 50 percent of the total cost of purchase of the solar device, and it should have a duration of at least 12 months. The total subsidy rate applied to an MFI loan in the frame of the programme will depend on the conditions of the credit provided, as illustrated in Table 5.

**TABLE 5:** Credit subsidy provided by GBE-Benin to partner microfinance institutions

Type of subsidy/incentive	Rate/amount
Credit default risk coverage	15% of total loan amount
Premium for preferential guarantee conditions	8% of total loan amount
Premium for longer-term loans (>24 months)	5% of total loan amount
Premium for PAYGO loan	5% of total loan amount
Project start-up funds	CFAF 2 million (USD 3 270)

Source: data provided to the author by the GBE programme

As illustrated in Table 5, a standard 15 percent subsidy of the total amount is applied to every loan provided by an MFI in the frame of the RBF model, to partially cover the credit default risk faced by the institution and encourage it to lend to agricultural entrepreneurs. Furthermore, additional financial support can be provided to the MFI by the GBE on top of the base subsidy, depending on whether: 1) the credit guarantee demanded by the MFI to the client involves exclusively the solar device itself (i.e. "preferential guarantee conditions"); 2) the duration of the loan is over 24 months; and/or 3) the loan in question is financing a solar device purchased under a PAYGO arrangement. The latter is meant to complement the subsidy premium provided in the frame of the RBF programme to solar companies that sell solar-powered equipment under a PAYGO arrangement, as detailed in this section.

Aside from these incentives that depend on loans, the programme can fund the MFI with up to CFAF 2 million (USD 3 270) to partially cover the various expenses that the financial provider might incur in its efforts **to adapt and make available its offer of financial products** for the new segment of rural beneficiaries of the programme. This type of financial assistance can be provided at the very start of the MFI's engagement in the GBE model, before any loan has been granted. In order to access these "project start-up funds", however, the MFI must have signed at least one Memorandum of Understanding (MoU) with a solar equipment company,<sup>24</sup> as well as developed an action plan to support the credit provision activities it carries out within this system, which must be reviewed and approved by the programme. Once the MFIs have begun to provide loans for solar equipment purchases to agri-entrepreneurs, they are able to submit requests to the programme every four months to receive the financial incentives they are owed based on the number and features of the loans disbursed in that time period. The overall process of engagement of a new MFI in the GBE programme's RBF model is summarized in Figure 17.

<sup>24</sup> To facilitate this, the GBE has also made available a template agreement that MFIs and solar companies can use, which can be downloaded from the Odyssey platform.

**FIGURE 17:** Process of engagement of partner microfinance institutions in the results-based financing model



Source: data provided to the author by the GBE programme

The first RBF window aimed at incentivizing solar companies spanned from August 2020 to September 2022, with noteworthy results: as of the start of 2023, 108 solar water pumps and 29 solar-powered refrigeration systems had been installed and subsidized in the structure of the RBF scheme. An RBF round targeting MFIs was also expected to take place between July 2021 and July 2023, but **it actually began later**, in December 2022 (lasting until June 2023). As a result, at the beginning of 2023 only seven solar-powered devices sold along the GBE's model had actually been financed by partner MFIs.<sup>25</sup> The delays faced by the GBE in finalizing the entrance of partner MFIs in the RBF model was a result of the considerable time required to: 1) discuss, fine-tune and agree upon the final contractual arrangements to tie together MFIs and solar companies, to enable the financing of solar-powered devices sold to agri-entrepreneurs; and 2) provide technical assistance to the MFIs. As explained by GBE-Benin in an interview carried out in preparation for this study:

**There were long discussions around warranty negotiations, market cost sharing, and other aspects, between the MFIs and the solar companies. Since it is a results-based approach, both partners had to put aside a budget for training, client acquisition, and other activities, to be able to achieve the results and claim the incentive.**

As will be further discussed in Section 5, managing and fine-tuning the details of relations between MFIs and solar companies has been one of the core challenges faced by the GBE in its target countries, **requiring a considerable amount of time and resource investment** on the part of the programme in order to obtain the buy-in of all partners, refine the details of their contractual arrangements and address specific capacity gaps they might have in the frame of the model (such as MFIs' lack of familiarity with solar energy technology). In the case of GBE-Benin specifically, the programme managers expect MFIs' engagement in the model to deepen substantially throughout 2023, given that an initial proof of concept of collaboration between these institutions and the partner solar companies has been established.

<sup>25</sup> At the beginning of 2023, GBE-Benin had disbursed approximately EUR 123 000 to solar companies, and EUR 9 500 to MFIs.

#### BOX 5: Using smart data loggers to monitor solar generation systems' efficiency

On the basis of a study carried out in 2021 by the GBE, which showed that more than two-thirds of solar-powered systems installed in health centres across rural Benin were no longer functioning after five years, the programme partnered with the Access to Energy Institute (A2EI) to pilot the installation of **20 smart data loggers** in the solar-powered systems of ten on-grid and ten off-grid health clinics, which had been equipped with solar generation equipment as part of a governmental initiative. The smart data loggers provide an automated stream of real-time data to A2EI's online platform on the functioning and performance of the connected solar-energy system. Among its various benefits, this helps tackle a critical issue that explains why so many solar-energy systems in rural health clinics are not repaired or replaced after a breakdown. It highlights the government's inability to properly check (because of the remoteness of the clinics in question) whether the solar companies contracted to install and maintain these systems are actually delivering on their obligations. Furthermore, the real-time smart data tracked by these devices is remotely gathered and analysed by the A2EI, which uses it **to generate and deliver data-driven insights** that can be of interest to relevant stakeholders (e.g. the government; solar-energy companies; and donors). This, in particular, allows the government to make more precise evaluations of the quality and performance of the systems, as well as the standard of service provided by the solar companies. Furthermore, it allows the government to draw up more precise projections on the potential demand for electricity that would need to be met to expand the solar electrification programme and equip more health clinics with solar -powered systems, which would translate into a more efficient use of public resources.

A notable feature of GBE's RBF scheme in Benin is that its overall administration and monitoring is being outsourced to a partner digital platform. In 2022, GBE-Benin began a collaboration with **Odyssey**, an end-to-end investment and asset management platform focused on unlocking capital to finance renewable energy infrastructure projects in emerging markets. With the support of Odyssey, GBE has begun to digitize every step of its RBF processes. As stated by the GBE, this undertaking implies:

**[...] employing and deploying advanced data management tools for tracking, processing and analysing all aspects of the programme. Selected companies will be able to submit claims for financial disbursement on the Odyssey platform. Throughout the process, the platform will collect all important data for improved management, monitoring and visualization of progress (GBE, 2022b, pg. 18).**

The objective of this digitization process is to manage the RBF arrangements that GBE-Benin has with solar companies and MFIs in a more effective and streamlined manner. The programme pays Odyssey to be able to outsource to the platform a wide variety of tasks, including: applications for RBF financing; upload of relevant documentation to receive the subsidies; disbursements; data collection; and monitoring. Following the proof of concept established by GBE-Benin and Odyssey, GBE-Côte d'Ivoire (see Section 4.3) also began a partnership with the platform in 2022.

With regard to its capacity building efforts, it should be noted that GBE-Benin has launched in 2020 an **accelerator programme** for solar companies in their early stages of development. Every year, the programme selects a handful of promising companies that receive strategic coaching and support on business plan development – provided by specialized advisors hired by the GBE – with the goal of strengthening their capacity to attract capital from a variety of different investors. Following an in-depth evaluation of each company, aimed at identifying the strengths and weaknesses that



characterize their business models, the advisors develop tailored capacity building programmes that seek to address the core capacity gaps faced by each company. Once their business profile has been suitably strengthened, these companies are also supported in preparing their pitches to potential investors.

### 4.3 Country focus: Côte d'Ivoire

Côte d'Ivoire has registered considerable advances regarding overall electrification rates in the past decade. While in 2011 only 55 percent of the population had access to electricity, ten years later **this share had risen to over 80 percent**. Thus a 20-percentage point gap in access is still registered between rural and urban dwellers. Today, the country ranks as one of the highest in West Africa in terms of electrification rates, being also the first in the region to open up the energy market to private operators, which are responsible today for 70 percent of energy production and 100 percent of distribution. The national set goal is to have 99 percent of the population connected to the national grid by 2035, with 42 percent of the energy produced coming from renewable sources. The Ministry of Mines, Petroleum and Energy has identified the promotion of decentralized solar-based solutions as a key method to expand electrification in rural areas, although as of 2020 only 0.58 percent of total power generation capacity was derived from solar generation solutions, while natural gas and hydroelectric power remained the core sources responsible for the national power supply. A considerable number of rural electrification projects, for a total budget of USD 334 million, are currently being implemented in the country by the government and various donors, including the Electricity for All programme (PEPT) and the National Rural Electrification programme (PRONER). The “Project to Improve Access to Electricity Access in Rural Areas” is also relevant in this context, a USD 48 million initiative that is currently being implemented by the national government in collaboration with the African Development Bank. The project is seeking



to link rural villages of more than 500 inhabitants to the national grid, with the goal of connecting 460 localities by the end of 2023 (AfDB, 2022; US International Trade Administration, 2022 World Bank, 2020).

In light of this scenario, the GBE has also invested in the country on the development of a RBF mechanism, similar to that achieved in Senegal and Benin, with the aim of providing financial incentives to solar companies for the dissemination of decentralized solar-powered equipment among agricultural enterprises. To this end, the RBF mechanism supports the purchase of solar water pumps and solar refrigeration systems on the part of both MSMEs and large enterprises, in a similar line to that of the other two countries studied in this report. In the case of solar water pumps, the GBE provides a 70 percent subsidy on purchases made by MSMEs, which is reduced to 50 percent in the case of large enterprises. As for solar refrigeration systems, the subsidy is 60 percent for MSMEs and 40 percent for large enterprises, respectively. At the start of 2023, the GBE had established agreements with five solar companies. Two of these (Baobab+ and Greeno) sell solar-powered equipment embedded with smart meters and remote switches, allowing these companies to offer a PAYGO model for purchase.

Unlike the case of Senegal, the subsidy in Côte d'Ivoire is released in its entirety to the solar company only once the GBE has verified the proper installation and performance of the device. The **verification process** takes place in three steps. First, the solar company uploads to the Odyssey platform all the necessary documents required to attest the sale and installation of the devices. Second, the GBE carries out an initial check with the end-user that the installation has been carried out via a telephone call. Third, another check for proper installation of the device is performed through a field-level visit to the business itself, carried out by GBE staff or a designated agent. Once the installation has been confirmed, the solar company can upload a request through the Odyssey platform for GBE to release the subsidy amount that is owed, together with a report detailing the activities it has carried out within the frame of the programme thus far.

Dissimilar to the other two target countries discussed in this study, in Côte d'Ivoire the programme did not have an RBF component to provide financial incentives to MFIs. Payment in rates was offered to agribusinesses by the supported PAYGO companies. The main reason for this absence is that the overall design phase of the GBE programme did not originally plan to develop an RBF component targeting MFIs; this idea was conceptualized later during the programme's implementation, and after witnessing the challenges faced by agribusinesses in obtaining financing for renewable energy systems. The ground-level conditions in Côte d'Ivoire, on the other hand, were judged as not conducive to starting an RBF component for MFIs that could achieve an impact within the remaining time frame of the programme. With that being said, it should be remarked that the GBE has recently begun a partnership in Côte d'Ivoire with the international NGO **CARE International**. The partnership is expected to lead to a joint project focused on assisting credit and savings associations of rural women in accessing financing for the purchase of off-grid, solar-powered equipment destined for productive purposes – across different agriculture value chain segments. In the frame of this project, GIZ would fund a **partial credit guarantee scheme** to incentivize rural FIs in providing credit to women's associations for the purchase of decentralized technology, while CARE International would be responsible for liaising between the various actors involved, assisting the women's groups in preparing the business models for loan application, while also helping FIs in collecting repayments.

The first round of sales of subsidized solar devices to agri-entrepreneurs, carried out within the GBE's RBF model, began in May 2022: **56 solar-powered refrigerators and 8 solar water pumps**

were sold over the span of approximately seven months. As of mid-2023, the GBE was in the process of verifying the accurate installation of the devices on the part of the solar companies, and no subsidy had yet been disbursed by the programme. This first round of contracts with the partnering solar companies is expected to end, at the latest, in July 2023.

In terms of capacity building, it is interesting to remark that, in December 2021, GBE- Côte d'Ivoire carried out a **training workshop** in Yamoussoukro for 25 upcoming rural entrepreneurs, focused on building skills and exchanging experiences related to the sale of solar-powered agricultural equipment for productive purposes. The scope of the workshop was to teach the financial and accounting basics to these entrepreneurs so that they become part of a distribution network of agents promoting and selling solar-powered equipment in rural areas. Furthermore, the programme organized a networking event at the end of the workshop in which a number of solar companies were invited to showcase their products and discuss potential collaborations with the workshop participants.



Participants to GBE's training course on renewable energy equipment in Yamoussoukro, Côte d'Ivoire

## 5. Conclusions and final considerations

The GBE is an extremely interesting example of a carefully designed, ambitious programme that has sought to tackle the **major constraints currently limiting the development** of private markets for the sale and financing of decentralized renewable energy equipment among agricultural actors in SSA. These constraints include: a lack of public incentives and risk mitigation mechanisms for all actors involved; scarcity of capital, awareness and technical know-how among prospective agri-entrepreneur clients; unreliable standards of product quality; lack of data on clientele segments in agriculture, among both technology providers and MFIs; and weak agent networks in rural areas to commercialize these types of devices. The structure of incentives designed by the programme, underpinned by the RBF approach and a multidimensional strategy encompassing both financial and non-financial interventions, has, to date, proven effective in laying the foundation for a successful sales and financing model which, if given enough time, carries the potential to achieve scale and sustainability even without the continued support of the GBE.

While it is too early to assess the long-term effectiveness and impact of the programme, especially in terms of its financing component (in some project countries, the first RBF subsidy rounds only began in 2022), there are a number of interesting aspects that emerge from the analysis of both the GBE's design and its implementation, which can provide considerable food for thought for all

categories of stakeholders engaged in the promotion of decentralized renewable energy solutions in developing and emerging contexts, such as governments, development agencies, development financial institutions (DFIs), solar companies. In particular, the following considerations related to the GBE programme should be highlighted:

- **Establishing a mutually beneficial collaboration between MFIs and solar companies represents a key challenge.** As emphasized by the GBE project managers interviewed in preparation of this study, one of the main challenges associated to the establishment of the RBF components has been **brokering an understanding** between the two core partner institutions in the model: namely, the MFIs and the solar companies. These two types of institutions have very different approaches to working with clients, and they lack familiarity with each other's business models. As such, the GBE programme had to carry out a considerable amount of mediation work and awareness raising to ensure that the two counterparts could properly understand their respective needs and strengths; negotiate on a variety of aspects such as market cost sharing, client targeting and warranties; and eventually reach a mutually beneficial agreement. Technical assistance was also a key component that enabled this collaboration. In Benin, for example, it took half a year for the GBE programme to train the partner MFIs on the functioning and underlying profit models associated with different types of solar technologies, so that they could adapt their offers of credit accordingly. As a result of the considerable preparatory work required, the RBF component engaging MFIs began almost a year after that started up with solar companies in Benin.

Given these premises, two considerations are in order. On one side, it must be noted how the GBE programme has by now managed to develop a solid proof of concept for the RBF model, which means that its further consolidation and expansion with new partner institutions is bound to prove relatively easier, because of its already established track record in the above-mentioned countries on how to go about brokering collaborations between MFIs and solar companies for the financing and sale of decentralized solar energy equipment. On the other side, this experience carries an important lesson for possible future replications of the GBE programme in other contexts: namely, the importance of **accounting – starting right from the project design phase – for the considerable time and resource investment** required to ensure that all partner institutions in the RBF model are aligned in their expectations and properly capacitated.

- **Technical assistance was key in all phases of the RBF model.** The programme managers interviewed for this study underlined how considerable technical assistance had to be provided to both partner solar companies and MFIs throughout all phases of the RBF model's implementation of the project, to ensure that the sales and financing of solar-powered equipment adhered to a minimum and established standard of quality. The example of Benin is very relevant in this sense: in that country, the GBE had to assist solar companies **in importing from abroad** solar-powered equipment of a reliable level of quality, as the offer for such technologies within the country was unreliable in terms of both quality and price. To this end, the GBE reached out to several international manufacturers to facilitate the connection with local distributors in Benin. Similar challenges in this sense were faced by smaller solar companies in Côte d'Ivoire. **Installation** was also a challenging task at the beginning of the programme in Benin, as most installations of solar-powered equipment carried out by solar companies' technicians presented – upon controls carried out by the GBE – a range of technical issues. To this end, the GBE hired quality control consultants to coach the solar technicians accordingly, while also developing a handbook on guidelines for installation. Finally, and as

already mentioned in the previous recommendation, enabling the RBF model for **MFIs** in Benin was also challenging, as these institutions required substantial assistance and capacitation to understand the features and implications of solar technology, as well as to adapt their offer of credit in order to make this type of financing both profitable and sustainable.

- **Substantial research work has been key to designing the most appropriate bundle of interventions for each sub-Saharan country.** As evidenced from the various experiences detailed in Section 2 and Section 3, the combination of financial and non-financial interventions selected by the GBE in each target country varies widely depending on the specific context at hand. This is based on a variety of factors, such as the state of demand and supply for decentralized energy solutions; the average levels of know-how of the stakeholders involved, the market potential of decentralized energy solutions in rural areas; possible regulatory bottlenecks; the presence and availability of possible partner institutions; and a host of other aspects. Hence, what stands out in the GBE's experience is the notable amount of pre-implementation **knowledge generation work** the programme has carried out (either directly or through external consultants) to select and refine the specific terms of the RBF model it employs for each country, as well as the holistic bundle of non-financial interventions that the programme employs to promote the dissemination of renewable energy technology. This preparatory work is crucial to ensuring that the overall vision and core approach of the GBE programme is adequately transposed in an effective set of interventions that is tailored to each specific national context. Furthermore, this body of knowledge (which consist of a combination of market assessments, feasibility studies, technical notes and other similar documents) is often made publicly available by the GBE, thus acting as a valuable resource and reference for other stakeholders engaged in promoting renewable energy solutions across the programme's countries of operation.

The GBE-Côte d'Ivoire, for example, **has published on the Odyssey platform** a considerable number of feasibility studies and market assessments on renewable energy technology that it developed (through private consultants) prior the implementation of the RBF model. These include: a study on group financing for energy transition projects; a market assessment on the profitability of solar energy devices in specific agricultural value chains; a needs assessment on the demand for solar-powered equipment in agricultural value chains; and an analysis of the potential of engaging MFIs in co-financing models for renewable energy credit to rural dwellers.

- **The GBE's financial incentives are intended as a bridge to a sustainable sales and financing system.** GBE programme managers view the financial assistance provided by the programme as a temporary promotion instrument that is meant to encourage, over time, the development of a private market for decentralized renewable energy solutions. Within this framework, MFIs, solar companies and agri-entrepreneurs have established (through a solid trust relationship) a winning model of collaboration that is expected to remain sustainable even after all external assistance has been phased out. To achieve this, the terms and amounts of subsidies provided by the GBE are designed to incentivize an increased engagement of all stakeholders in the RBF model, without rendering them excessively reliant on the support received from the programme. As increasing numbers of agri-entrepreneurs join the model, MFIs and solar companies are able to offer better terms for their products and services, which is expected to gradually lead, over time, to a profitable market equilibrium where every stakeholder profits – without the need for external financial support. In this sense, it could be argued that **the exit strategy of the GBE programme** is already embedded, from its design stage, in the terms of





the financing and support it set out to provide to the three core categories of stakeholders engaged in its RBF model.

- A (too) early phase-out could impair the sustainability of the model. Despite the fact that the GBE programme ended in September 2023, the implementation of the RBF component began relatively late in the project life cycle, on account – as already discussed – of the considerable amount of work required to broker a model of collaboration and capacitate the partner institutions in the target countries. In Benin, for example, the GBE programme has only carried out two rounds of financing with partner solar companies and one with MFIs, with no expectations of accomplishing more now because of the insufficient time left for implementation. In Côte d'Ivoire, the first round of financing to the solar companies began in May 2022. Given this scenario, there is a risk that the support provided by the GBE to MFIs and solar companies so far has not generated an impact that is deep enough to ensure the model will be able remain sustainable after the financial incentives provided by the programmes are phased out. The evidence is mixed in this regard: the programme manager for Côte d'Ivoire, for example, anticipates that the larger solar companies partnering with the programme will indeed continue selling equipment to agricultural entrepreneurs within the frame of the model established by the GBE, even after the programme has ended.

With that being said, it should be mentioned that the number of solar companies and MFIs engaged in the RBF model is low on average, and it remains to be seen whether the model created by the GBE will remain sustainable in the absence of external incentives. While the GBE has ended in September 2023, the programme managers have already shared the lessons and insights learned from this experience with other development programmes implemented by the GIZ and its partners in Benin, Senegal and Côte d'Ivoire. These programmes have shown an interest in maintaining and promoting the current RBF model despite the termination of the GBE, although it remains to be seen whether this can be achieved considering the resources required to maintain the current level of financing.

- **Partnering with financial technology (fintech) to amplify results.** The partnership between the GBE programme and the Odyssey platform, aimed at digitizing the programme's RBF component in both Benin and Côte D'Ivoire, is emblematic of how fintech can be a powerful tool in enhancing the effectiveness of energy finance programmes at field level. Outsourcing key administrative responsibilities to the Odyssey platform (e.g. applications, disbursements and monitoring) frees up programme resources for its managers, allowing them to focus more on overarching strategic aspects related to implementation, while the increased efficiency in data management derived from the use of Odyssey's digital services results in more precise and punctual assessments of the GBE's ongoing impact at field level. Although, at present, there are not many other companies in developing contexts that provide similar services to Odyssey's, it is evident that the model of collaboration established between the platform and the GBE represents a very interesting blueprint for future potential replications in the field of distributed energy finance.







# Catalysing climate finance flows towards sustainable agriculture

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## An analysis of the AGRI3 Fund

### 1. Using blended finance to mobilize capital for climate adaptation in agriculture

Agriculture, forestry and land use represent together the second-largest source of greenhouse gas emissions and the main driver of biodiversity loss on a global scale. The increasing frequency and magnitude of extreme natural events affecting agriculture, brought about by climate change, are projected to lead to a 5–10 percent drop in global food yields for every additional 1 °C increase in average temperatures (Convergence Blended Finance, 2022). In this scenario, it is not surprising that impact investors of widely differing natures have begun mobilizing increasing amounts of capital in recent years towards **climate-smart agricultural development projects**, capable of achieving acceptable financial returns together with a range of climate adaptation and mitigation effects, such as: forest protection; rehabilitation of degraded farmland; smart irrigation; a shift to renewable energy sources to enable farming; and many others.

According to FAO data, 84 percent of the 608 million of farms worldwide are less than two hectares in size. Although these smallholders operate only around 12 percent of total agricultural land, they are responsible for a third of global food production (Lowder, Sanchez and Bertini, 2021). The vast majority of these actors rely on inefficient, resource-intensive and heavily polluting agricultural practices for their businesses, while also being extremely vulnerable to negative environmental shocks – both sudden- and slow-onset. Given these premises, it is evident that small-scale agriculture will require massive levels of investment to transition to sustainable food and land use systems. The global Food and Land Use Coalition (FOLU) estimates a need of around USD 300–350 billion in annual investment capital to achieve this transition by 2030, with the potential of unlocking USD 5.7 trillion worth of economic and social gains to society (Apampa *et al.*, 2021). With that being said, agriculture (and climate-smart agriculture in particular) remains a **perceivably**



**risky and uncertain sector to invest in**, in view of the significant transaction costs, small ticket sizes, data gaps and information asymmetries, high systemic risk and loosely structured value chains, among other factors. One of the consequences of this scenario is that even if financing for small-scale agriculture does materialize, **the terms of the credit offered are usually insufficient** to assist the farmer in transitioning towards a more sustainable agricultural model. The tenor and the possible grace period of such loans are insufficient for the types of farm-level endeavours that these types of projects require (e.g. tree planting and farmland restoration). Moreover, the loan amounts offered are usually too low, and interest rates can quickly become excessive if long-term financing is demanded. As a result, promoting and upscaling investments in small-scale agriculture that also pursue climate-related impacts require **considerable de-risking support** to become a feasible proposition for farmers.

In this scenario, one approach to de-risking and incentivizing investments in climate-smart agriculture has rapidly gained popularity in recent years, that of **blended finance**, i.e. the use of concessional funds from public and philanthropic sources to attract and mobilize considerable amounts of investment capital towards agricultural development projects that would not be normally considered by most investors because of their risk profile. By leveraging concessional funds, it is possible to incentivize private and public investors to deploy their capital in climate-smart, resilience-enhancing projects linked to developing agriculture. Thus, allowing for the achievement of both satisfying financial returns as well as significant environmental and social (E&S) impacts – such as greenhouse gas emission reductions, food security improvements, land rehabilitation and biodiversity protection.

As pointed out by a recent, comprehensive analysis of the global state of blended finance carried out by Convergence Blended Finance (2022), climate change has historically been **a strong thematic focus** of blended finance transactions. Since 2011, half of all blended finance transactions launched annually (on average) carried this type of focus, attracting more than 65 percent of the aggregate annual financing in the blended finance space (an average of USD 7 billion per year). Furthermore, the median size of these climate-focused transactions has been USD 80 million, considerably higher than the median size of transactions registered in the overall blended finance market (USD 55 million). From a regional perspective, climate blended finance has focused primarily on sub-Saharan Africa (41 percent of transactions during 2019–2021), followed by Latin America and the Caribbean (with 28 percent). From a country perspective, Kenya, Brazil, and Colombia have registered the highest number of blended finance deals with a climate focus.

**From the perspective of agriculture**, finance can play – as stated in the document – an essential role in:

[...] improving the bankability of projects and reducing transaction costs in a sector defined by high transaction cost/return ratios and information asymmetries, and loosely structured value chains in which most operators and transactions are small-scale (Convergence Blended Finance, 2022, pg. 4).

An increasing number of climate-oriented blended finance transactions in recent years have focused specifically on smallholder farmers and rural communities: 36 percent of climate deals between 2019 and 2021 have targeted these actors, up from 26 percent registered during 2016–2018. This rising interest can be explained by the fact that, from the perspective of impact investors, transactions focused on agriculture are well placed to achieve **both climate mitigation and climate adaptation results**. In other words, they can both contribute to reducing the emission of CO<sub>2</sub> and

other greenhouse gases, as well as assist rural dwellers in becoming more resilient against the rising effects of climate change, such as increased frequency and magnitude of extreme natural events, erratic weather patterns and soil salinization. In fact, according to Convergence's analysis, over 60 percent of climate blended finance deals in agriculture (during 2019–2021) were cross-cutting transactions aimed at achieving both mitigation and adaptation effects, such as expanding renewable energy usage in agribusiness and promoting forest restoration (Convergence Blended Finance, 2022).

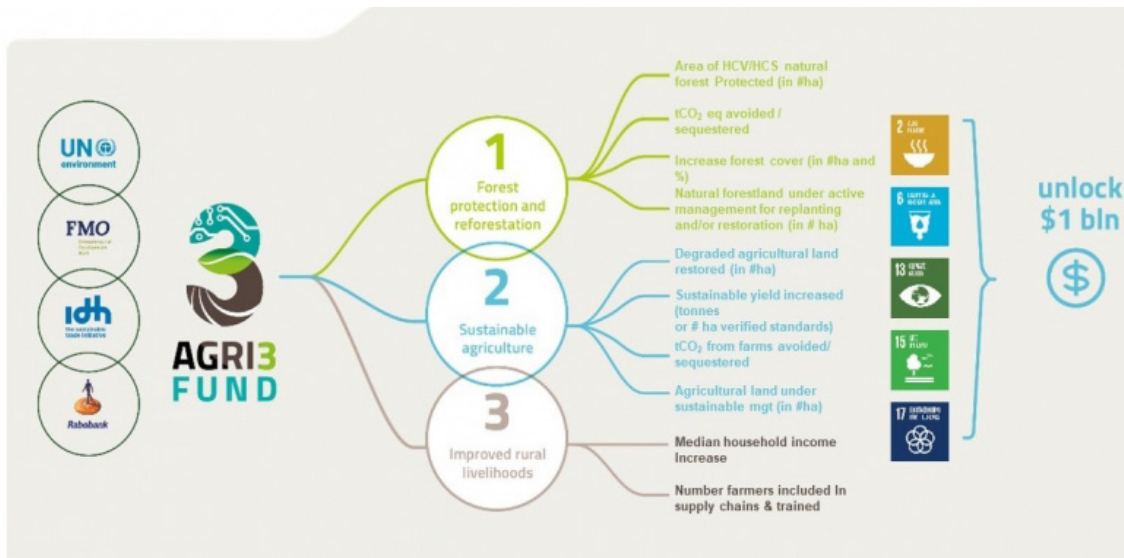
Nevertheless, as already discussed, successfully steering investors towards channelling their capital towards developing agriculture requires considerable technical expertise, an established track record of supported transactions and insightful, granular information on the context at hand (e.g. agroecological features of the territory, value chain dynamics and specific farm-related aspects of climate vulnerability). This, in turn, requires **extremely specialized blended finance funds** that have been set up with the necessary capacity, expertise and resources to identify and foster the most impactful deals in climate-smart agriculture. In this context, there have been some interesting examples in recent years, of blended finance funds specifically set up to incentivize investors' engagement in climate-smart projects targeting agriculture, albeit these are relatively few in number in the overall blended finance space. These funds focus on de-risking investments in projects that aim at achieving various types of E&S impacts, through the promotion of sustainable agricultural practices, forest protection, degraded farmland and pastureland rehabilitation, among other interventions. This case study is devoted precisely to analysing and discussing one of the most interesting examples among such facilities: the AGR13 Fund.

## 2. Overview of the AGR13 Fund

The AGR13 Fund is a blended finance facility focused on promoting sustainable agriculture, which was first conceived in 2017 through a partnership between the Rabobank Group and the United Nations Environment Programme (UNEP). Over the course of 2018, the partnership expanded to include the Dutch Development Bank (FMO) and the Sustainable Trade Initiative (IDH). Following a pilot phase, the fund was formally launched in 2020. The AGR13 Fund provides different de-risking arrangements (such as first-loss credit guarantees) and customized technical assistance to commercial banks and development finance institutions (DFIs), as well as impact and institutional investors active in the agricultural sectors of developing and emerging countries. The mission of the fund is to mobilize private and public capital from these institutions and channel it towards agricultural development projects that can contribute towards **three core impact areas**: promoting more sustainable and efficient agricultural production models; actively stimulating reforestation/mitigating deforestation; and improving rural livelihoods and enhancing opportunities, with a strong focus on rural women (see Figure 18). The stated end goal of the AGR13 Fund, in the words of its consortium of partners, is to: “mobilize USD 1 billion of financing by providing credit enhancement tools and technical assistance to enable a transition to more sustainable practices in agricultural value chains and avert deforestation” (Mulder, 2020, pg.1).

The initial funding that launched the AGR13 Fund was a USD 85 million anchor investment made by the Dutch Government and Rabobank. More specifically, as part of this deal, the Dutch Ministry of Foreign Affairs provided a USD 35 million non-interest-bearing repayable grant, constituting the fund's first loss tranche, while Rabobank provided a USD 50 million debt facility to match the first loss capital. On top of this, the Global Environment Facility (GEF) made an ulterior investment of USD 13 million. In terms of the practical management of the fund's portfolio, this is the responsibility

**FIGURE 18:** Core impact areas and end goal of the AGR13 Fund



Source: Mulder. 2020. AGR13 Fund launched with Dutch Government and Rabobank as anchor investors. In: *UN environment programme*. Geneva, UNEP. <https://www.unep.org/resources/case-study/agri3-fund-launched-dutch-government-and-rabobank-anchor-investors>

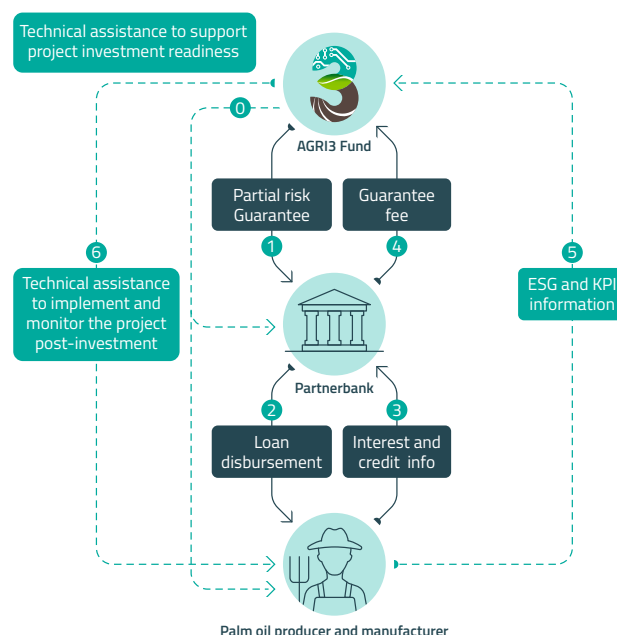
of **two private firms** appointed by the fund's consortium of partners: the impact incubator and fund manager Cardano Development, and the investment manager and advisory firm FOUNT. The AGR13 is an “evergreen” fund, meaning that it is an open-ended fund structure with no expected termination date (GFI, 2021).

The ultimate target beneficiaries of the AGR13 Fund’s investment enhancement interventions are farming businesses in developing and emerging countries. The fund works with large-scale agribusinesses across the value chain (e.g. producers, processors and wholesales) as direct recipients of the investments it supports, although its overall goal is to promote livelihood improvements among the most vulnerable agricultural producers. Livelihood improvement is a critical objective of the AGR13 Fund’s activities: **all investments promoted by the fund are required to improve rural livelihoods and enhance opportunities for women**, as well as either promote forest protection/reforestation or foster sustainable land use. As is typical of blended finance, the fund’s investment-enhancement interventions should respect the **additionality principle**, meaning that: 1) the fund should not displace current available funding for similar types of investments at similar or better conditions; and 2) it should demonstrate that the investment in question would not have materialized (and thus commercial funding would not have been mobilized) without the involvement of the fund (IDH, 2022).

The AGR13 Fund has a global scope with regard to the investments it promotes, although its main regions of focus are Latin America, sub-Saharan Africa, and East Asia and Southeast Asia. The first investments supported by the AGR13 Fund were carried out in Brazil and China (see Section 4), focusing on value chains such as soybean, cotton, corn, sugar, chili and livestock.

The fund’s interventions are intended to promote the transition of the agribusiness industry towards more sustainable and climate-resilient production models that require large-scale investments, long timescales, and significant capacity building efforts. These are all aspects that

**FIGURE 19:** Sample approach to investment promotion



Source: adapted from IDH. 2022a. AGRI3 Fund Technical Assistance Facility. In: IDH. Utrecht, the Netherlands. <https://www.idhsustainabletrade.com/landscapes/agri3-fund/>

imply **considerable risk levels which are outside of the comfort zone of most private investors**. To incentivize private engagement in this direction, the AGRI3 Fund mainly makes use of different types of partial loan guarantees to reduce the risk shouldered by partner financial institutions (FIs), although it also has the possibility of advancing subordinated loans directly to the FIs' customers. More specifically, the financial instruments that can be employed by the AGRI3 Fund include: first-loss guarantees, subordinated guarantees, tenor extension guarantees, pari passu participation interest and subordinated loans.

The typical value of the supporting interventions made by the AGRI3 Fund to each investment range between USD 3 to 15 million, and are aimed at mobilizing additional capital for projects ranging from USD 5 to 50 million. The fund can also consider exceptions to these thresholds for larger projects that carry significant impact, or for smaller projects with high potential for replicability and innovation. In particular, the partial credit guarantees offered by the AGRI3 Fund tend to cover between 30 and 50 percent of the risk exposure shouldered by a partner FI in the frame of a specific loan. In terms of its profit model, the fund generates financial returns in the following three principal ways: through the fees it accrues from issuing partial loan guarantees to partner FIs; through the interest it gains on subordinated loans it provides to customers of partner FIs; and through the liquid investments it makes with the cash assets of the fund (with the aim of preserving capital for guarantees, rather than maximizing capital) (AGRI3 Fund, 2020).

Figure 19 provides a basic scheme outlining a template approach the AGRI3 Fund would adopt to promote investments in sustainable agriculture. In this model, the fund provides a partial credit risk guarantee to a partner FI, to incentivize the institution to provide financing for a range a of climate-smart, business expansion projects led by local agricultural producers. Thanks to the long tenor



guarantee provided by the fund, agri-producers are able to receive customized financing from the partner FI, characterized by considerably longer terms (e.g. 10+ years) than what they could usually obtain in normal circumstances. This type of credit allows the producers to invest in longer-term expansion projects for their businesses (e.g. large-scale, on-farm improvements and tree planting) that can lead to substantial productivity increases and greater climate resilience (IDH, 2022).

Throughout this process, complementary technical assistance is provided by the **AGRI3 Technical Assistance Facility (TAF)**, managed by IDH.<sup>26</sup> The TAF was established to promote the investment readiness and the technical capacity of both partner FIs as well as the end beneficiaries of the fund, with a view to maximizing the impact of the fund's interventions. This facility was funded by a USD 5 million grant provided by the Dutch Ministry of Foreign Affairs. As illustrated by the document, the specific objectives of the TAF are to:

[...] help develop an investment pipeline; support an enabling environment for investment; and accompany investments to reduce project risk and ensure environmental, social and governance impacts are maximized and monitored, in and beyond the supply chains" (Mulder, 2020, pg. 5).

The TAF provides various types of support to the AGRI3 Fund's interventions, including:

- 1) **Pre-investment support:** focused on enhancing the investment readiness of agribusiness recipients (e.g. meeting key E&S criteria) and designing projects with a view to maximizing positive social and environmental impacts. These types of activities have been, so far, the predominant type of support provided by the AGRI3 TAF, since the AGRI3 Fund's initial years of operations of have been devoted to developing a pipeline of suitable investment tickets.
- 2) **Post-investment support:** focused on strengthening project implementation and reducing the risk assumed by the AGRI3 Fund and the partner FI. An example of such work could be supporting the design of a customized loan product provided by the partner FI to farmer groups, to assist and incentivize them in the transition towards more sustainable agricultural practices.
- 3) **Support to impact monitoring and evaluation:** which involves validating the impact data of the project as reported by partner FIs and end customers, as well as complementing it with alternative data sources, such as satellite imagery of cultivated terrain and qualitative surveys carried out among beneficiary farmers.
- 4) **Market reconnaissance and identification of possible deals:** which implies analysing different agricultural markets and value chains in various countries,<sup>27</sup> while assessing the scope of opportunities for the fund to carry out new transactions and initiate collaborations with a range of possible partner FIs. (IDH, 2022a). In this sense, a key added value of the AGRI3 TAF lies in the fact that the facility also actively advertises – through its field staff – the opportunities associated with the AGRI3 Fund's credit enhancement interventions with a range of potentially interested stakeholders such as local FIs and large-scale agribusinesses. In this sense, the TAF actively seeks out new possible deals for the fund and can act as an initial broker between the AGRI3 Fund and the prospective partners.

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<sup>26</sup> IDH (the Sustainable Trade Initiative) is a Dutch-based non-governmental organization that seeks to convene together companies, financial institutions, civil society organizations and governments in public-private partnerships devoted to developing innovative and economically viable approaches to enabling green and inclusive growth in different commodity sectors and sourcing areas. Aside from the AGRI3 TAF, the IDH manages Technical Assistance Facilities for other blended finance and impact investment funds, such as the Land Degradation Neutrality Fund and the &Green Fund.

<sup>27</sup> In this sense, the TAF has published two Sector Papers so far, focused on analysing the scope of further interventions on the part of the fund in different value chains in Brazil and Indonesia.



Extensive deforestation to make way for palm oil production, East Kalimantan, Indonesia

### 3. Environmental and social framework and key policy indicators

The AGRI3 Fund measures the positive impacts generated by its investments through a comprehensive environmental and social framework which was originally developed in close coordination with UNEP. This E&S framework encompasses a set of 12 key performance indicators (KPIs) that are used to assess the impact achieved by the fund's transactions in each of three core impact areas pursued by the AGRI3 Fund's transactions, namely: sustainable agriculture, forest protection and improving rural livelihoods (see Table 5). Furthermore, according to the AGRI3 Fund's E&S framework, additional KPIs can be agreed upon in the frame of each specific transaction. As explained in the GFI document:

[...] before loans are advanced, projects are screened against these objectives to see if they are likely to significantly contribute to the fund's core objectives, while mitigating any environmental and social risks. The Fund analyses the targeted impact, risks and opportunities and sets up an environmental and social action plan. This requires the borrower to meet certain milestones as part of the loan facility agreement (GFI, 2022, pg.10).

Together with the impact of the KPIs, most of the AGRI3 Fund's transactions also include an **Environmental and Social Action Plan (ESAP)**, which defines a series of actions the client agrees to carry out within a defined timescale to either address specific gaps in available information (e.g. a farm plan or an audit report), or to improve environmental and social impacts (e.g. develop a grievance resolution mechanism). These ESAPs are developed for each transaction, and the AGRI3 monitors their implementation through regular reports provided by the partner FI (AGRI3 Fund, 2022b). As pointed out by the IDH (2022), an ESAP can also assist agricultural producers in



implementing various improvements at farm level that can assist in safeguarding the sustainability of the investment and maximizing its potential impact.

In 2021, the fund revised its E&S framework to further refine and improve the existing KPIs, ensuring that they more adequately captured and reflected the specific impacts that the fund's transactions sought to achieve. For each KPI, the framework contemplates a **common assessment methodology**, which is adapted to the individual context of each project and establishes monitoring approaches for each indicator. There are two main sources of data that, combined, provide the AGR13 Fund with the information it needs to assess and validate the results and impacts it has achieved, compared to baseline. First, the majority of the monitoring data is provided on a semi-annual basis by the partner FIs and the end clients. Second, through the AGR13 TAF, the fund also works with a **remote sensing and impact measurement company**, called Impact52, which supports the fund in monitoring, verifying and validating the results achieved on the ground for each project. In some contexts, the fund has also used **independent sample surveys of farmers** to validate impact data provided by the partner FIs, in order to assess the actual rate of adoption and the livelihood impacts generated by the sustainable agricultural practices implemented in the frame of each project (AGR13 Fund, 2022c).

**TABLE 6:** Key performance indicators (KPIs) of the AGR13 Fund

Indicator	Unit
<b>Forest protection and restoration</b>	
Natural ecosystems (forest and non-forest) under management for protection	Hectares
Natural ecosystems (forest and non-forest) under management for restoration	Hectares
Production forest under sustainable forest management	Hectares
GHG sequestered through protection or restoration of natural ecosystems	Tonnes of CO <sub>2</sub> equivalent (tCO <sub>2</sub> e)
<b>Sustainable agriculture</b>	
Degraded land rehabilitated	Hectares
Agricultural area under sustainable management (defined per project)	Hectares
Agricultural area under sustainable management (defined per project)	Change per ha/year - disaggregated by commodity
Increase in agricultural yield through sustainable intensification	tCO <sub>2</sub> e/year
<b>Improved rural livelihoods and enhanced opportunities for women</b>	
Number of participants reporting increased income (preferably disaggregated by gender), and where relevant by local communities	Number of people
Number of people not included in the above, benefiting directly or indirectly from fund transactions (preferably disaggregated by gender)	Number of people
Number of people trained in, and technology transferred for, best management practices in sustainable agriculture/forest protection, preferably disaggregated by gender	Number of people
Client meets one or more of the criteria for the "2X Challenge on Financing for Women" <sup>28</sup>	Number of people

Source: AGR13 Fund. 2022c. *Impact monitoring: Summary 2021*. AGR13 Fund. Amsterdam, the Netherlands.

28 The 2X Challenge was launched at the 2018 G7 Summit as a commitment to inspire DFIs and the broader private sector to invest in the world's women. The aim of this initiative is to mobilize USD 15 billion among these actors, by the end of 2022, and channel this capital towards a varied range of gender-focused investments which comply with a set of specific criteria established by the 2X Challenge.

In relation to the specific categorization of the E&S risk associated to each transaction, the fund follows a four-level classification of E&S risk, used to evaluate each transaction during the due diligence phase that anticipates any potential deal, as well as to determine the various mitigation measures that would have to be adopted in the frame of each project during implementation. The four possible levels of E&S risk considered are the following:

- Category A: business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible or unprecedented.
- Category B+: business activities with potential adverse environmental or social risks and/or impacts that are largely reversible and can be addressed through known mitigation measures.
- Category B-: business activities with potentially adverse environmental or social risks and/or impacts that are a few, generally site-specific, largely reversible and readily addressed through mitigation measures.
- Category C: Business activities with minimal or no adverse environmental or social risks and/or impacts.

As of 2022, most of the projects supported by the AGR13 Fund fell either under the B+ or the B- categories. None of the projects fell under category A, nor does the fund anticipate investing in any project with such a high-risk classification.

A strip of former forest land, recently burned. Pará, Brazil





## 4. Results and examples of transactions

The investment pipeline for the AGRI3 Fund's first year of existence (2020) was relatively limited, also because the fund's launch coincided with the start of the COVID-19 pandemic and the various associated economic and mobility disruptions around the world, which curtailed opportunities for investment. Nevertheless, since then the investment pipeline of the AGRI3 Fund has begun to expand considerably, especially thanks to the assistance of Rabobank, which helped identify a number of suitable transaction deals within its existing portfolio of rural investments. At the end of 2021, the fund **had a total guarantee exposure of USD 21.6 million for loans of over USD 50 million**, divided across six transactions. All except one of these enhanced investment transactions had taken place in Brazil, because of the fact that the AGRI3 Fund had selected this country to carry out its first transactions in its pilot phase, and as such had already considerable experience in identifying suitable deals in collaboration with the local subsidiary of Rabobank. Aside from the deals identified in Brazil, the fund also carried out a transaction in China in 2021, described at the end of this section. Furthermore, the fund is currently looking at possible transaction deals in Malawi (investing in the macadamia value chain) and Kenya (blueberry and avocado), as well as India.

The aggregate impact results achieved by the AGRI3 Fund, as of June 2022, in its portfolio of transactions across its three core impact objectives and as measured by the KPIs, are illustrated in Table 6.

**TABLE 6:** Impact results of AGRI3 Fund's portfolio (as of June 2022)

KPI	Project target	Status (as of June 2022)
<b>Forest protection and restoration</b>		
Protection of natural ecosystem (direct and indirect)	10 338 of natural ecosystem under management for protection directly protected.  46 021 ha of natural ecosystem under management for protection indirectly protected	Both targets achieved
Restoration of natural ecosystem	1 551 ha of natural ecosystem under management for restoration	50 ha
GHG sequestered through protection or restoration of natural ecosystems <sup>29</sup>	596 238 tCO <sub>2</sub> e sequestered through the protection and restoration of natural ecosystem	
<b>Sustainable agriculture</b>		
Degraded land rehabilitated	14 336 ha of degraded pasture and agricultural land	600 ha
Increase in agricultural yield through sustainable intensification	Cattle: +87.5% yield	+25% yield
	Crops: +15% yield increase for soyabean, cotton and corn	+1.04% yield

<sup>29</sup> See Section 5 for more information on the challenges faced by the AGRI3 Fund when assessing the levels of carbon sequestration derived from the projects it supports.

KPI	Project target	Status (as of June 2022)
Agricultural area under sustainable management (direct and indirect)	15 626 ha  (1 200 ha of pasture under sustainable management, 10 000 ha of subsoiling practices, and 4 187 ha conversion of degraded pasture into high yield crops and 239 ha under sustainable pest management)	6 206 ha  (600 ha rehabilitated pasture, 5 367 ha of total subsoiled area and 239 ha chili planting area)
GHG emissions reduced from changes to farm practices	593 205 tCO <sub>2</sub> -e of GHG emissions sequestered through farm practices	
<b>Improved rural livelihoods and enhanced opportunities for women</b>		
Number of people trained in sustainable agriculture / forest protection	2 160 people (1 260 in Brazil and 900 in China)	1 957 people
Number of participants reporting increased income	20% income increase among farmers in the Chongqing Agricultural Chain Corporation (CACC) project	79% of farmers have achieved this increase in the frame of the CACC project

Source: AGRI3 Fund. 2022b. *AGRI3 Impact and E&S Policy Statement*. Amsterdam, the Netherlands, AGRI3 Fund. <https://agri3.com/wp-content/uploads/2023/11/AGRI3-ESG-Policy-Statement-V1.0.pdf>

Aside from the specific results measured by the core KPIs, the fund has generated various other types of impacts that are valuable for the promotion of sustainable agriculture, reforestation and the strengthening of rural livelihoods.

Examples of these impacts include:

- **Creation of new financial instruments:** in Brazil, the fund has supported the creation of a new credit product called “delegated authority”, in partnership with Rabobank. At its core, this is a sustainability-focused loan that seeks to promote the transition towards improved productivity and forest conservation practices among cattle farmers.
- **Support to founding partners:** the fund has supported Rabobank in strengthening its institutional capacity concerning E&S management and E&S impact assessment. An example of this work has been introducing “the concept of Environmental and Social Action plans into the investment process and contracting, as means of closing gaps between E&S performance prefinance and assessing progress” (AGRI3 Fund, 2022c, pg. 6).
- **Knowledge generation:** research papers have been developed by the AGRI3 TAF on the current landscape for agricultural investment in Indonesia (in the palm oil value chain) and Brazil (beef and soybean), to orient the fund in the selection of possible investment deals, as well as contribute to expanding knowledge on how to de-risk and mobilize funds towards forest conservation and sustainable agriculture in value chains characterized by a high deforestation risk.

In terms of concrete examples of AGRI3 Fund's transactions, the foremost one worthy of mention took place in Brazil in 2021, when the AGRI3 Fund complemented, with a **maturity subordination guarantee**, a large-scale loan that Rabobank Brazil provided to an established soybean and maize

agribusiness called **Grupo Wehrmann**, in the state of Goiás. This USD 13 million, ten-year loan facility was intended to provide the agribusiness with the long-term funding necessary to establish 8 000 new hectares of sustainable farmland on formerly degraded pastureland. Approximately half of this newly converted land will be used for high-yield soybean and corn seed production, to be cultivated with precision agriculture and smart irrigation technology, while the other half will be kept as a reserve in which to promote reforestation and natural vegetation growth. The AGR13 Fund's guarantee covered 50 percent of Rabobank's exposure on the loan, equal to a USD 6.5 million participation. As illustrated by the GFI (2022, pg. 2), the terms of the loan require the agribusiness to "preserve the native vegetation and wildlife in the project's forest reserve areas and protect and restore one hectare of native vegetation for every hectare used for crop production". Furthermore, the project sought to create 200 new jobs, establish a research station to test new cultivars and farming techniques, as well as promote education on environmental preservation in four schools across the region (AGR13 Fund, 2022c).

Another interesting transaction carried out in Brazil's agricultural sector was a **40 percent maturity subordination guarantee** that the AGR13 Fund placed in 2021 on a USD 11.4 million, ten-year loan provided by Rabobank to a large-scale processor in the State of São Paulo, called **Usina Açucareira São Manoel**, which converts sugarcane sourced from local farmers into sugar, ethanol and other by-products. The loan was destined to support São Manoel in disseminating sustainable agricultural practices among the farmers it sourced its raw materials from, which included implementing high-precision agriculture, incorporating pest management, and mitigating the use of fertilizers and pesticides across 52 000 ha of farmland. The processing company also strengthened its E&S monitoring and reporting capabilities with assistance from the fund, and it complied with the set of international standards required to obtain the "*Bonsucro*" certification for sustainable sugar production and processing (AGR13 Fund, 2022c).<sup>30</sup>

More recently, the AGR13 Fund complemented, with a partial credit guarantee, a USD 20 million loan provided by Rabobank Brazil in 2022 to a large-scale grain and cotton producer called **Grupo Locks**, in the State of Mato Grosso. This financing, supported by AGR13's guarantee, will be channelled towards a range of investments aimed at facilitating the company's transition to a model based more strongly on **regenerative agriculture**. These investments include upscaling the use of cotton by-products as animal feed, the recycling of animal manure into fertilizer, the intelligent application of herbicides and the deployment of solar panels for on-site energy consumption. Overall, this is expected to significantly reduce the use of agrochemical products, lower water and energy consumption and improve soil health. At the same time, yields at farm level would be maintained (or preferably improved). The company is also expected to share lessons learned with other agriculture-related stakeholders in the region through field days and various promotional materials. In the frame of the USD 20 million loan facility established by Rabobank, AGR13 supported the transaction with a USD 8 million risk participation, whereby the fund commits to guaranteeing 100 percent of the last three years of the loan. The AGR13 Fund's involvement was essential to extend the tenor of the loan, which is beyond the risk appetite of the partner bank, and to allow time for the initiative to succeed (AGR13 Fund, 2022d).

The only credit enhancement intervention made so far by the AGR13 Fund outside of Brazil has been in **China**, where the fund provided in 2021 a partial credit guarantee to a USD 10 million,

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<sup>30</sup> The Bonsucro Certification is a multi-stakeholder led certification program developed for the sugarcane industry, in order to meet the purchasing policies of large-scale sugar buyers that seek suppliers who support fair labor and environmental protection in sugar producing communities.





Chili pepper farming in Chongqing, China.

three-year loan made by Rabobank China to a large input manufacturer and distributor called Chongqing Agricultural Chain Corporation (CACC), in the Chongqing Municipality. The objective of the loan was to provide assistance to more than 80 000 local, small-scale chili farmers working with CACC in switching from poor crops with low yields to more resilient and profitable variants for chili pepper cultivation. The loan also was to serve to strengthen their resilience and profitability through a combination of training on climate-smart agricultural practices, access to modern planting technologies and the establishment of solid market linkages. Furthermore, with the support of the AGRI3 TAF, the fund sought to improve CACC's environmental and social standards, with a view to developing a new quality standard for chili pepper cultivation in China (Peng, 2021).

## 5. Insights and final considerations

The AGRI3 Fund is an extremely interesting example of a specialized blended finance fund set up with the explicit aim of incentivizing investments in climate-smart agriculture, while also generating positive impacts on farmers' livelihoods. Given the limited number of financing facilities that have been established so far with this combination of approach and focus area, the insights and lessons learned that can be inferred from the AGRI3 Fund's operations – during its initial years of operation – can prove to be quite helpful to inform future replications and expansions of such facilities, paving the way towards further mobilization of private and public capital in the domain of climate-smart agriculture. In this sense, a number of key considerations can be drawn, based on the



analysis of the impact assessments carried out thus far on the fund's supported projects, together with the results of the interviews carried out with the AGR13 Fund and TAF managers.

- **Transactions so far have been mainly focused on large-scale agribusinesses.** As pointed out in the AGR13 Fund's 2021 *Impact Monitoring Report*, the initial loans supported by the fund's guarantees have mainly targeted – as end clients – individual, large-scale agribusinesses with relatively small labour forces, because these actors present a range of substantial risk mitigation factors (e.g. significant collateral and reserves, good financial education and an established credit history) that increase their appeal and reliability as clients in the eyes of the partner FIs. This is actually a common occurrence with investment funds engaged in agriculture, especially when these facilities are first starting out and need to build an initial pipeline of investments: the majority of deals that are easier to seize at the start are those associated to larger-scale agribusiness companies, as opposed to mid-size enterprises or formal aggregations of small-scale farmers, which tend to present on average a higher risk profile.

The end result, however, is that the livelihoods of only a relatively small number of individuals have directly improved as a result of the fund's intervention, in these initial three years of operations – at least when measured against the AGR13 Fund's objectives. To partially mitigate this scenario, the fund has so far focused on indirectly promoting the livelihoods of those farmers connected to the large-scale agribusiness being supported (as in the case of the input supply company in China), as well as those who, more generally, reside in the area where the sponsored project was taking place. These types of interventions have taken the form of broad worker trainings and dissemination of sustainable agricultural practices, among other actions. Nevertheless, going forward, there will be a need for the AGR13 Fund to focus more on farmer groups and cooperatives as possible end customers of its interventions, leveraging the track record and expertise it is building in these kinds of transactions, to gradually take on (perceivably) higher-risk deals – and thereby encouraging partner FIs to mobilize their capital in this direction (AGR13 Fund, 2022b).

As remarked at the beginning of this case study, the challenge associated with reducing the ticket size in agricultural investment deals is one that is quite common to both impact investment and blended finance funds alike, when engaging with this sector. This is owing mainly to the push from donors (governments and commercial investors alike) towards achieving targeted rates of returns that are usually around commercial levels (i.e. high single digits) for these funds' investments, together with relatively high ticket sizes (e.g. deals of around USD 10 million). As a result, in the words of ISF Advisors (2022, pg. 5), these dedicated funds for agricultural development are brought to “operate within stringent mandates, not unlike private investors (return, sector exposure, risk management)”, even when they seek to achieve climate-related development impacts in conjunction with financial returns. This makes it considerably more challenging to find investment deals in medium- and small-scale agricultural enterprises (even at the levels of large cooperatives) that meet these strict requirements in terms of expected returns, ticket sizes and level of assumed risk. This is the norm, at least until a **solid track record has been established by the financial facility** that increases its capacity to identify and structure deals in this space.

- **A clear green impact, yet less so from the perspective of smallholders' livelihoods.** Building on the preceding point, it should be remarked how, on the one hand, the blended finance approach adopted by the AGR13 Fund (i.e. providing guarantee coverage to large-scale investments in sustainable agriculture made by partner FIs) translates into clear and direct impacts in terms of the mainstreaming and diffusion of climate-smart agricultural practices and technologies

within the recipient agribusiness' operations and its overall area of activity. This fits well with two of the three overarching goals of the AGRI3 Fund: promoting sustainable agriculture and bolstering forest protection. On the other hand, it should be noted how the choice of recipients for such enhanced investments, i.e. large-scale agribusinesses across different value chain segments, implies that the impacts achieved in terms of the third objective of the fund (i.e. promoting rural livelihoods) will be most likely **indirect and secondary**, especially with regard to small-scale farmers' livelihoods. In other words, while small-scale farmers are bound to benefit from the positive spillover effects and the complementary capacitation activities linked to the support provided to the large-scale agribusinesses receiving the loans, they will still remain a secondary beneficiary compared to the direct investee – the large-scale agribusiness. This is also reflected by the initial results registered by the fund, in its impact evaluation report, concerning the "rural livelihood promotion" strategic objective (as schematized in Table 6 of this case study).

From this viewpoint, it might be argued that the model currently presented by the AGRI3 Fund holds the greatest interest from the perspective of the promotion of climate-smart and sustainability considerations in agriculture. Conversely, with respect to the direct promotion of developmental additionality at the level of farmers' livelihoods, there will be a need to experiment with alternative financing approaches to achieve a greater impact. Offering portfolio guarantees to partner FIs is a possible example of such an alternative approach.

- Diversifying the fund's strategy to increase the number of possible deals. In order to seize opportunities for a higher number of investment deals with the potential to foster climate-smart and sustainable agriculture, especially outside of what has been the main country of focus (i.e. Brazil), the AGRI3 Fund is currently looking to diversify its strategy aimed at identifying and capturing new possible transactions as follows:
  - *Choice of partner FIs* – the AGRI3 Fund is planning to collaborate more with national and regional banks engaged in agricultural financing, as opposed to continuing to rely mostly on the existing portfolio of investment tickets of a multinational banking institution that is also one of the fund's donors (Rabobank). Furthermore, the fund is exploring the possibility of partnering with other types of FIs, aside from banks, that are focused on agriculture, such as large-scale microfinance institutions. In this context, a current challenge for the AGRI3 Fund is identifying suitable partner FIs at national/regional level that are: 1) strongly engaged in agricultural finance, and 2) also have an institutional interest in mainstreaming green and climate-smart agriculture in their loan provision activities.<sup>31</sup>
  - *Regions of focus* – the AGRI3 Fund is currently looking at possible investment deals in East African and South Asian countries (mainly Kenya and India), as these are characterized by two important enabling factors: a considerably well-developed agricultural finance market, with a range of banks and non-bank FIs engaged in this line of trade; and high rates of cooperativism among farmers, which increases the chances of finding suitable recipient investees to support.

<sup>31</sup> Interestingly, as emerged from the interviews carried out in preparation for this case study, at its inception the AGRI3 Fund carried a stronger focus towards collaborating with large multinational banks interested in mainstreaming aspects of sustainability in their agro-investment operations. This original approach has been revised by the fund in recent years, because large multinational banks usually do not lend to large-scale agricultural producers and do not have strong expertise in agro-finance, unless this focus is embedded in their very own institutional mandate (as in the case of Rabobank). This has led the AGRI3 Fund to explore more opportunities to collaborate with a variety of national and regional FIs that already have a strong expertise in agricultural finance, and for which lending to agricultural enterprises represents a core line of business.

- *Adapting financial support mechanisms* – beyond the provision of guarantees to individual investments directed at large-scale agribusinesses, the fund is currently considering the possibility of using alternative types of financial support mechanisms, such as providing a general guarantee coverage to the agricultural portfolios of partner FIs, owing to the commonly smaller size of borrowers that compose such portfolios (and the associated challenges in identifying eligible investment deals with individual large agribusinesses that could be supported). This would also hold potential to more directly benefit the livelihoods of small- and medium-sized farm holders that are part of the partner FI's guaranteed portfolio, given that they would be the direct recipients of the supported loans.
- **The Technical Assistance Facility (TAF) can be a strong added value when seeking to secure new investment deals.** As emerged from the interviews conducted in preparation of this case study, the AGR13 TAF has represented a notable enabling factor for the fund when it comes to “sealing the deal” on new transactions. The AGR13 Fund places a considerable number of added requirements on the investee agribusinesses that stand to benefit from the AGR13 Fund's loan enhancements, related to the implementation of various sustainability related practices and technologies. In this sense, having the TAF's explicit commitment to provide technical assistance and capacity building to the investee agribusiness, which can help it meet these requirements, represents a notable “selling point” that aids in convincing both the agribusiness and the partner FI to accept the fund's credit-enhancement support. The TAF also provides considerable support to the AGR13 Fund not only in scoping new contexts and identifying possible partner FIs and investment tickets, but also in those times when the fund requires in-house advice and expertise on the technical implications of specific sustainable practices, such as regenerative agriculture, within the frame of possible investment deals.
- **Challenges in assessing results and additionality.** The AGR13 Fund has faced challenges in properly collating and analysing the ground-level data reported by the end clients and the partner FIs, which was used to assess the environmental impact of the projects it supported – in accordance with the KPIs. To improve its capacity to evaluate impacts effectively, the fund began to make use of complementary data sources, including remote sensing data in Brazil and qualitative surveys carried out among farmers in China. Nevertheless, collecting and combining these different sources of data proved to be challenging for the AGR13 Fund, and establishing a direct causal correlation between the fund's intervention and specific socio-environmental impacts generated at ground level remains challenging – at least with regard to a number of specific KPIs. As stated by the 2021 Impact Monitoring Report, the fund:

*[operates] in complex legal, regulatory, financial and market environments, [with] a number of factors which contribute to overall impact of a transaction. The fund can only play part of the role in enabling impact, but in certain cases direct attribution may be difficult (AGR13 Fund, 2022c, pg. 5).*

An important challenge faced by the fund in this respect had to do with properly measuring and monitoring **the levels of carbon sequestration** generated by the forest regeneration and soil restoration projects promoted by its interventions, given the complexity and variables associated to such an exercise. This explains the lack of such data among the results already presented (in Table 6) previously in this study. At present, the fund is considering additional data gathering techniques to properly assess carbon sequestration, such as measuring soil quality and other remote sensing technologies. In this sense, the AGR13 Fund is currently partnering with a remote data sensing and data analytics company called 52Impact, a Dutch firm that specializes in – among other areas – supporting the impact evaluation of projects focused on sustainable agriculture and reforestation.

# References

- AfDB (African Development Bank).** 2022. Côte d'Ivoire: 260 Localities Already Connected to Electricity Through African Development Bank Project. *African Development Bank Group*. Abidjan, Côte d'Ivoire. Cited 13<sup>th</sup> of October 2023. <https://www.afdb.org/en/success-stories/cote-divoire-260-localities-already-connected-electricity-through-african-development-bank-project-54053>
- AGRI3 Fund.** 2020. *AGRI3 Investment Policy*. Amsterdam, the Netherlands
- AGRI3 Fund.** 2022a. AGRI3 Fund partially guarantees a USD 13 million, 10-year loan for Agricultural Producer in Brazil to restore degraded pastureland. News March 10<sup>th</sup> 2022. *AGRI3 Fund*. Amsterdam, the Netherlands. Cited 4<sup>th</sup> of June 2023. <https://agri3.com/another-news-story/>
- AGRI3 Fund.** 2022b. *AGRI3 Impact and E&S Policy Statement*. Amsterdam, the Netherlands, AGRI3 Fund. <https://agri3.com/wp-content/uploads/2023/11/AGRI3-ESG-Policy-Statement-V1.0.pdf>
- AGRI3 Fund.** 2022c. *Impact monitoring: Summary 2021*. AGRI3 Fund. Amsterdam, the Netherlands.
- AGRI3 Fund.** 2022d. *AGRI3 Fund and Rabobank close USD 20 mln deal in Brazil to promote regenerative practices and support a transition to sustainable agriculture*. Amsterdam, the Netherlands
- ALIDE (Asociación Latinoamericana de Instituciones Financieras para el Desarrollo).** 2019. Programa de Fideicomisos Instituidos En Relación Con La Agricultura (FIRA) de México. *ALIDE*. Lima, Peru. Cited 4<sup>th</sup> of June 2023. <https://www.alide.org.pe/3215-2/>
- Apampa, A., Clubb, C., Cosgrove, B.E., Gambarelli, G., Loth, H., Newman, R., Rodriguez Osuna, V., Oudelaar, J. & Tasse, A.** 2021. Scaling up critical finance for sustainable food systems through blended finance. *CCAFS Discussion Paper*. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). <https://hdl.handle.net/10568/115123>
- Arslan, A.** 2019. How old is the average farmer in today's developing world? In: *IFAD*. Rome. Cited 4<sup>th</sup> of June 2023. <https://www.ifad.org/en/web/latest/-/blog/how-old-is-the-average-farmer-in-today-s-developing-world->
- BMZ (German Federal Ministry for Economic Cooperation and Development).** 2017. *Green people's energy for Africa*. BMZ Paper 06/2017. Bonn, Germany. <https://www.bmz.de/resource/blob/23758/strategiepapier395-green-peoples-energy.pdf>
- CBI (Climate Bonds Initiative).** 2019. Climate Bonds & IDB launch Protected Agriculture Criteria: FIRA from Mexico first to Certify: New Opportunities for Greener Greenhouses. In: *Climate Bonds Initiative*. London. Cited 13<sup>th</sup> of October 2023. <https://www.climatebonds.net/2019/05/climate-bonds-idb-launch-protected-agriculture-criteria-fira-mexico-first-certify-new>
- CDRSSA (Centro de Estudios para el Desarrollo Rural Sustentable y la Soberanía Alimentaria).** 2019. *El cambio climático y el sector agropecuario en Mexico*. Mexico City, Mexico.
- CIMMYT (Centro Internacional de Mejoramiento de Maíz y Trigo).** 2022. Acciones frente a la escasez de agua. In: *CIMMYT/ IDP*. Cited. Texcoco, Mexico <https://idp.cimmyt.org/acciones-frente-a-la-escasez-de-agua/>
- Convergence Blended Finance.** 2022. *State of Blended Finance 2022: Climate Edition*. Convergence Report. Toronto, Canada. <https://www.convergence.finance/resource/state-of-blended-finance-2022/view>
- De Anda, J. & Shear, H.** 2017. Potential of vertical hydroponic agriculture in Mexico. *Sustainability*, 9(1): 140. <https://doi.org/10.3390/su9010140>
- EIB (European Investment Bank).** 2022. *Benin: Access to reliable and affordable off-grid energy to be transformed under new EIB – ENGIE Energy Access initiative*. Luxembourg, European Investment Bank. Cited 13<sup>th</sup> of October 2023. <https://www.eib.org/en/press/all/2022-286-access-to-reliable-and-affordable-off-grid-energy-to-be-transformed-across-benin-under-new-eib-engie-energy-access-initiative>
- Ekouedjen, E.K., Fagbemi, L.A., Zannou-Tchoko, S. & Bakounoure J.** 2021. Energy performance, safety and durability of charcoal cooking stoves commonly used in West Africa: Benin case study. *AIMS Energy* 9(1): 68-95. <https://doi.org/10.3934/energy.2021005>



- FAO & IRENA. 2021. *Renewable energy for agri-food systems – Towards the Sustainable Development Goals and the Paris agreement*. Abu Dhabi and Rome. <https://doi.org/10.4060/cb7433en>
- FIRA [Fideicomisos Instituidos en Relación con la Agricultura]. 2018. *FEFA Green Bond Framework*. Mexico City. <https://www.fira.gob.mx/InfEspDtoXML/abrirArchivo.jsp?abreArc=82361#:~:text=In%20specific%2C%20the%20proceeds%20of,therefore%20any%20existing%20or%20future>
- FIRA. 2019. *Estrategia de Sostenibilidad y Productos para la Promoción de proyectos de Energía Distribuida*. Mexico City. <https://www.greenfinancelac.org/wp-content/uploads/2019/12/Estrategia-de-Sostenibilidad-y-Productos-para-la-Promoci%C3%B3n-de-proyectos-de-Energ%C3%ADa-Distribuida-%E2%80%93-FIRA.pdf>
- FIRA. 2021a. *Memorias de Sostenibilidad 2020*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2020.pdf>
- FIRA. 2021b. *Annual Green Bond Report 2021 – FEFA 18V*. Mexico City. [https://www.fira.gob.mx/Files/AnnualGreenBondReport\\_FEFA18V-2021.pdf](https://www.fira.gob.mx/Files/AnnualGreenBondReport_FEFA18V-2021.pdf)
- FIRA. 2021c. *IFAD member states presentation - PDB Group progress*. Mexico City, FIRA. <https://webapps.ifad.org/members/events/2021-09-07/docs/FIRA-IFAD-member-states.pdf>
- FIRA. 2022. *Memorias de Sostenibilidad 2021*. Mexico City. <https://www.fira.gob.mx/Nd/MemoriasSostenibilidad2021.pdf>
- Flesher, J. 2021. *What does it mean if my investor is a signatory to SASB?* London, Nossa Data. [Cited 12<sup>th</sup> of September 2023] <https://www.nossadata.com/blog/what-does-it-mean-if-my-investor-is-a-signatory-to-sasb>
- Gamboa González, R. 2018. *¿Por qué impulsar el Financiamiento Sustentable?*. Mexico City, FIRA
- GBE (Green People's Energy for Africa Initiative). 2022a. Results-based financing lets farmers in Senegal buy solar-powered water pumps, helping to increase harvests. *GBE Story, SDG 7*. Bonn, GBE of the Federal Ministry for Economic Cooperation and Development (BMZ). Cited 4<sup>th</sup> of December 2023. <https://gruene-buergerenergie.org/format/story/results-based-financing-lets-farmers-in-senegal-buy-solar-powered-water-pumps-helping-to-increase-harvests/>
- GBE. 2022b. Green People's Energy working with Odyssey tech on results-based financing in Côte d'Ivoire. *GBE, News SDG 17*. Bonn, GBE of BMZ. Cited 2<sup>nd</sup> of August 2023. <https://gruene-buergerenergie.org/en/format/news/green-peoples-energy-working-with-odyssey-tech-on-results-based-financing-in-cote-divoire/>
- GFI (Green Finance Institute). 2022. *AGRI3 Fund. Green Finance Institute, GFI Hive – Case studies*. London. Cited 16<sup>th</sup> of September 2023. <https://www.greenfinanceinstitute.com/gfihive/case-studies/agri3-fund/>
- GWEC (Global Wind Energy Council). 2021. *Global Wind Report 2021*. Brussels, GWEC. <https://gwec.net/wp-content/uploads/2021/03/GWEC-Global-Wind-Report-2021.pdf>
- Hernandez-Ochoa I.M., Asseng, S., Kassie, B.T., Xiong, W., Robertson, R., Luz Pequeno, D., Sonder, K., Reynolds, M., Babar, A., Molero Milan, A. & Hoogenboom, G. 2018. Climate change impact on Mexico wheat production. *Agricultural and Forest Meteorology*, 263(15): 373–387. Elsevier B.V. <https://doi.org/10.1016/j.agrformet.2018.09.008>
- IDH (Sustainable Trade Initiative). 2022a. *AGRI3 Fund Technical Assistance Facility*. In: *IDH. Utrecht, the Netherlands*. Cited. <https://www.idhsustainabletrade.com/landscapes/agri3-fund/>
- IDH. 2022b. *Supporting the mobilisation of funds from commercial banks to finance forest conservation and sustainable agriculture in Indonesia*. Sector Paper – Indonesia. Jakarta, IDH. <https://www.idhsustainabletrade.com/uploaded/2022/06/AGRI3-Sector-Paper-Indonesia.pdf>
- IEA (International Energy Agency). 2021. *Tracking SDG 7 – The Energy Progress Report 2021*. Joint report of the IEA, the International Renewable Energy Agency (IRENA), the United Nations Statistics Division (UNSD), the World Bank and the World Health Organization (WHO). Washington, DC, World Bank. [https://iea.blob.core.windows.net/assets/b731428f-244d-450c-8734-af19689d7ab8/2021\\_tracking\\_SDG7.pdf](https://iea.blob.core.windows.net/assets/b731428f-244d-450c-8734-af19689d7ab8/2021_tracking_SDG7.pdf)

- IEA. 2022a. Nationally Determined Contribution (NDC) to the Paris Agreement (2022 update) – Mexico. In: IEA 50. Paris. Cited 28<sup>th</sup> of November 2023. <https://www.iea.org/policies/17055-nationally-determined-contribution-ndc-to-the-paris-agreement-2022-update-mexico>
- IEA. 2022b. *Africa Energy Outlook 2022*. World Energy Outlook Special Report. Paris, IEA. <https://iea.blob.core.windows.net/assets/220b2862-33a6-47bd-81e9-00e586f4d384/AfricaEnergyOutlook2022.pdf>
- IEA. 2022c. Tracking SDG 7 – Benin. In: IEA – *Energy Progress Report*. Paris. Cited 4<sup>th</sup> of March 2023. <https://trackingsdg7.esmap.org/country/benin>
- IFAD (International Fund for Agricultural Development). 2020. *United Mexican States – Country Strategic Opportunities Programme 2020–2025*. Rome, IFAD. <https://webapps.ifad.org/members/eb/129/docs/EB-2020-129-R-13.pdf>
- IRENA (International Renewable Energy Agency) & AfDB (African Development Bank). 2022. *Renewable Energy Market Analysis: Africa and Its Regions*. Abu Dhabi and Abidjan, IRENA and AfDB. [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Jan/IRENA\\_Market\\_Africa\\_2022.pdf?rev=bb73e285a0974bc996a1f942635ca556](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Jan/IRENA_Market_Africa_2022.pdf?rev=bb73e285a0974bc996a1f942635ca556)
- ISF Advisors. 2022. Getting ‘Smarter’ on Subsidies to Enable More Financing for Agri-SMEs. In: ISF. *Washington, DC*. Cited 7<sup>th</sup> of May 2023. <https://isfadvisors.org/getting-smarter-on-subsidies-to-enable-more-financing-for-agri-smes/>
- Kwasniok, R. 2021. Clean Technology Fund. In: *Changing Transport*. Bonn, Germany. Cited <https://changing-transport.org/clean-technology-fund/>
- Lowder, S.K., Sánchez Cantillo, M. & Bertini, R. 2021. *Which farms feed the world and has farmland become more concentrated? World Development*, 142(C). <https://doi.org/10.1016/j.worlddev.2021.105455>
- Miller, H., Krishnan, L., & Alvarez Ruiz, L. 2023. *Inclusive green finance - A framework for understanding how financial services can help low-income and vulnerable people respond to climate change*. Washington, DC., Center for Financial Inclusion at Accion International. <https://www.centerforfinancialinclusion.org/wp-content/uploads/2024/02/Green-Inclusive-Finance.pdf>
- Mulder, I. 2020. AGRI3 Fund launched with Dutch Government and Rabobank as anchor investors. In: *UN environment programme*. Geneva, UNEP. Cited 4<sup>th</sup> of May 2023. <https://www.unep.org/resources/case-study/agri3-fund-launched-dutch-government-and-rabobank-anchor-investors>
- Munyengerwa, L. & Whittaker, S. 2021. Powering Africa’s sustainable development through wind. In: *World Bank Blogs*. Washington, DC, World Bank Group. Cited. <https://blogs.worldbank.org/en/climatechange/powering-africas-sustainable-development-through-wind>
- Murray-Tortarolo, G.N., Jaramillo V.J. & Larsen, J. 2018. Food security and climate change: the case of rainfed maize production in Mexico. *Agricultural and Forest Meteorology*, 253–254: 124–31. <https://doi.org/10.1016/j.agrformet.2018.02.011>
- NASA (National Aeronautics and Space Administration). 2021. Widespread drought in Mexico. In: *NASA Earth Observatory*. Washington, DC., NASA Goddard Space Flight Center. Cited 13<sup>th</sup> of October 2023 . <https://earthobservatory.nasa.gov/images/148270/widespread-drought-in-mexico>
- Necochea Porras, P.B. 2022. Mexico: The 2021 Climate Year in Review. In: *Mexico News Brief and Action Alert, Climate Scorecard*. Cited 4<sup>th</sup> of June 2023. <https://www.climatescorecard.org/2022/02/mexico-the-2021-climate-year-in-review/>
- OECD (Organization for Economic Cooperation and Development). 2019. *Achieving clean energy access in Sub-Saharan Africa*. Paris, OECD. <https://www.oecd.org/env/cc/case-study-achieving-clean-energy-access-in-sub-saharan-africa.pdf>
- Oré, D. 2021. In Mexico’s cradle of corn, climate change leaves its mark. *Reuters*, 21 February 2020. Cited 12<sup>th</sup> of September 2023. <https://www.reuters.com/article/us-climate-change-mexico-idUSKBN20FOOC>
- Peng, T. 2022. Dutch Rabobank to Pour CNY70 Million into Chongqing’s Chili Industry. In: *i Chongqing*, 13 April, 2022. Cited. <https://www.ichongqing.info/2021/04/13/dutch-rabobank-to-pour-cny70-million-into-chongqings-chili-industry/>

- PwC (PricewaterhouseCoopers).** 2021. *Africa Energy Review 2021: The global race to net zero by 2050 is accelerating. Will Africa realise a just transition or become a stranded asset?* London, PwC. <https://www.pwc.com/ng/en/assets/pdf/africa-energy-review-2021.pdf>
- Rose, J., Bensch, G., Munyehirwe, A. & Peters, J.** 2022. The forgotten coal: Charcoal demand in Sub-Saharan Africa. *Ruhr Economic Papers*, No. 937. Essen, Germany, Leibniz-Institut für Wirtschaftsforschung. <https://doi.org/10.4419/96973097>
- UNCDF (United Nations Capital Development Fund).** 2021. Understanding Financing for Electricity Access in Senegal. In: *UNCDF Impact Capital for Development – News*. New York, USA. Cited 13<sup>th</sup> of October 2023. <https://www.uncdf.org/article/6698/understanding-financing-for-electricity-access-in-senegal>
- UNSGSA (UN Secretary-General's Special Advocate for Inclusive Finance for Development).** 2023. *Inclusive Green Finance: A policy and advocacy approach*. Inclusive Green Finance Working Group, Policy Note May 2023. New York, USA. [https://www.unsgsa.org/sites/default/files/resources-files/2023-05/UNSGSA\\_Inclusive\\_Green\\_Finance\\_Policy\\_Note.pdf](https://www.unsgsa.org/sites/default/files/resources-files/2023-05/UNSGSA_Inclusive_Green_Finance_Policy_Note.pdf)
- USDA (U.S. Department of Agriculture).** 2022. Mexico: Trade & FDI. In: *USDA Economic Research Service*, Washington, DC. Cited 12<sup>th</sup> of September 2023. <https://www.ers.usda.gov/topics/international-markets-u-s-trade/countries-regions/usmca-canada-mexico/mexico-trade-fdi/>
- USITA (U.S. International Trade Administration).** 2024. Côte d'Ivoire - Country Commercial Guide. In: *USITA International Trade Administration*. Washington, DC. Cited 4<sup>th</sup> of February 2024. <https://www.trade.gov/country-commercial-guides/cote-divoire-market-overview?section-nav=15217>
- World Bank.** 2020. The secret to Côte d'Ivoire's electric success. In: *The World Bank, Feature Story*. World Bank Group, Washington, DC. <https://www.worldbank.org/en/news/feature/2020/07/23/the-secret-to-cote-divoires-electric-success>
- World Bank.** 2022. Access to electricity (% of population) – Sub-Saharan Africa. In: *The World Bank Databank*. World Bank Group, Washington, DC. Cited 18 December 2022. <https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=ZG>
- World Bank, CIAT (International Center for Tropical Agriculture) & CATIE (Tropical Agricultural Research and Higher Education Center).** 2015. *Climate-smart agriculture in Mexico*. CSA Country Profiles for Latin America Series. Second Edition. Washington DC, the World Bank Group. <https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/CSA-in-Mexico.pdf>





