Food and Agriculture Organization of the United Nations

Asia-Pacific Rural and Agricultural Credit Association

FOOD SECURITY GREEN BONDS

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Scaling finance for sustainable and climate-resilient agrifood systems

Mikell O'Mealy
Food and Agriculture Organization of the United Nations, Rome

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FOREWORD

Alue Dohong
Assistant Director-General and Regional Representative, Regional Office for Asia and the Pacific, Food and Agriculture Organization of the United Nations (FAO)

The world stands at a critical point – food insecurity remains persistently high and is projected to worsen under the intensifying impacts of climate change. In the Asia and the Pacific region, home to the largest number of undernourished people globally, climate risks are undermining progress toward SDG 2: Zero Hunger, as well as broader gains across the 2030 Agenda for Sustainable Development. Countries in Asia and the Pacific and globally recognize the urgent need to adapt and mitigate climate change in their agrifood systems to build resilience and safeguard food security, but a severe financing gap limits the implementation of national climate action plans.

Innovative public-driven finance instruments are critically needed to unlock and align private investment with national priorities and pathways for agrifood systems transformation. This report builds on work led by FAO's Regional Office for Asia and the Pacific with countries and partners to assess opportunities for Food Security Green Bonds and similar instruments to accelerate finance for climate-smart agriculture and food systems. Such instruments can channel much-needed finance to smallholder farmers, small-scale producers, and small-and-medium-sized agricultural enterprises (agri-SMEs) on the front lines of the climate and food security crises. Grounded in regional experience and drawing on global expertise, this report aims to support countries worldwide in public-led bonds that help close the financing gap for a sustainable, climate-resilient and food-secure future.

Grounded in regional experience and drawing on global expertise, this report aims to support countries worldwide in public-led bonds that help close the financing gap for a sustainable, climate-resilient and food-secure future.

Kaveh Zahedi
Assistant Director-General and Director of the Office of Climate Change, Biodiversity and Environment, FAO

Transforming agrifood systems to be resilient, low-emission, sustainable and inclusive will require a dramatic increase in investment – an estimated USD 1.1 trillion per year through 2030, approximately twelve times today's levels. Closing this financing gap requires innovative, public-led finance mechanisms to de-risk and mobilize private capital at scale. Green bonds and similar instruments are proving to be effective, country-led tools to direct investment toward actions that deliver tangible climate and environmental benefits while protecting food security and livelihoods.

Recognizing their catalytic role, multilateral funds such as the Global Environment Facility (GEF) and the Green Climate Fund (GCF) are expanding support for non-grant instruments, including public-led bonds. In the GEF's ninth replenishment (2026–2030), countries will gain broader access to resources for innovative bonds that generate global environmental benefits and accelerate food systems transformation. Over the past few years, countries have entrusted FAO to help them access record levels of finance from the GEF and GCF, and FAO stands ready to help them seize new opportunities. This includes tapping into capital markets including through Food Security Green Bonds, blended finance schemes and similar instruments to unlock private capital, implement national plans and commitments, and position agriculture as both a climate solution and a foundation for resilient, inclusive and food-secure development.

Sean Kidney
CEO and Co-Founder, Climate Bonds Initiative

With more than USD 6 trillion now outstanding in the market, green and climate-aligned thematic bonds are proving to be an important instrument to mobilize capital for climate action. Demand is driven by institutional investors seeking opportunities that also address their concerns about the negative impacts of climate change to their portfolios – investors representing some USD 130 trillion have expressed such concern. Significant over-subscription rates for climate-related bonds remain the norm despite a rapidly growing market.

Agriculture and food systems now represent the next critical sector for finance to support deep, lasting change for people and the planet. The Climate Bonds Initiative has developed science-based guidance for investors that addresses climate change mitigation, adaptation and resilience in agricultural production, food value chains, alternative proteins, protected agriculture, and deforestation- and conversion-free sourcing.

By aligning Food Security Green Bonds and similar instruments with these criteria, and with transparency requirements of the thematic finance market, countries can gain greater access to institutional investors, with all the benefits that come from tapping into strong demand.

The Climate Bonds Initiative is proud to contribute to this collaboration and stands ready to support governments, financial institutions and partners in designing and issuing bonds that drive climate-smart transformation across agrifood systems.

Prasun Kumar Das
Secretary General, Asia and the Pacific Rural and Agricultural Credit Association (APRACA)

As a long-standing champion of inclusive rural and agricultural finance, APRACA is proud to co-publish this report with FAO to advance innovative solutions for climate-smart agriculture and food security. Across our 95 member institutions in 24 countries throughout Asia and the Pacific, we are committed to helping shape a new generation of finance that supports resilient, sustainable and equitable agrifood systems. Our members – including government agencies, central banks, monetary authorities, national development banks, and agricultural credit and research institutions – are uniquely positioned to lead this transformation.

Through this collaboration, APRACA aims to strengthen the capacity of its members to design and implement public-led green bonds that channel finance and technical support to smallholders and agri-SMEs, aligned with national priorities and international standards. This collaboration also extends to our sister organizations worldwide – including the African Rural and Agricultural Credit Association (AFRACA), Latin American Association of Development Financing Institutions (ALIDE), North Africa Regional Agricultural Credit Association (NENARACA), and the International Confederation of Agricultural Credit (CICA) – reinforcing a global network committed to innovative finance for food security, climate resilience and sustainable development.

ABBREVIATIONS

A&R	adaptation and resilience
ACMF	ASEAN Capital Markets Forum
ADB	Asian Development Bank
AFA	Asian Farmers Association for Sustainable Rural Development
AfDB	African Development Bank
agri-SMEs	small and medium-sized agricultural enterprises
AMS	ASEAN Member State
APRACA	Asia-Pacific Rural and Agricultural Credit Association
APU	agricultural production unit
ASEAN	Association of Southeast Asian Nations
AWD	alternate wetting and drying
BAAC	Bank for Agriculture and Agricultural Cooperatives (Thailand)
CSA	climate-smart agriculture
CSAIP	CSA Investment Plan
DAE	Direct Access Entity
DCF	deforestation- and conversion-free
DFI	development finance institution
ESG	environmental, social and governance
EUDR	European Union Deforestation Regulation
FAFD	Food, Agriculture and Forestry Division of the ASEAN Secretariat
FAI	farmer-aligned intermediary
FAO	Food and Agriculture Organization of the United Nations
FIRA	Fideicomisos Instituidos en Relación con la Agricultura (Mexico)
GBPs	ICMA Green Bond Principles
GCF	Green Climate Fund
GEF	Global Environment Facility
GGBI	Global Green Bond Initiative
GHG	greenhouse gas
GSS+bonds	green, social, sustainability and sustainability-linked bonds
IDB	Inter-American Development Bank
ICMA	International Capital Market Association
IFC	International Finance Corporation
KPIs	key performance indicators
MDB	multilateral development bank
MFI	microfinance institution
MoF	Ministry of Finance
MSMEs	micro, small and medium-sized enterprises
NABARD	National Bank for Agriculture and Rural Development (India)
NAP	National Adaptation Plan
NbS	nature-based solutions
NDC	Nationally Determined Contribution
NGI	non-grant instrument
PPF	project preparation facility
R&D	research and development
SAFIN	Smallholder and Agri-SME Finance and Investment Network
SDGs	Sustainable Development Goals
SLB	sustainability-linked bond
SPO	second party opinion
SPV	special purpose vehicle
SRP	Sustainable Rice Platform
TA	technical assistance
UNFCCC	United Nations Framework Convention on Climate Change
UoP	Use of Proceeds

GLOSSARY OF KEY TERMS

- **Agrifood systems:** Agrifood systems encompass the journey of food from farm to table – including when it is grown, fished, harvested, processed, packaged, transported, distributed, traded, bought, prepared, consumed and disposed of. Agrifood systems also encompass non-food products that constitute livelihoods and all of the people, activities, investments and choices that play a part in getting us these food and agricultural products. In the FAO Constitution, the term "agriculture" and its derivatives include fisheries, marine products, forestry and primary forest products (FAO, 2024a).
- **Agrifood systems transformation:** The process by which the functioning of agrifood systems is changed to make them more efficient, inclusive, resilient and sustainable for better production, better nutrition, a better environment and a better life, leaving no one behind (FAO, 2024a).
- **Climate-smart agriculture:** An approach that helps guide actions to transform agrifood systems towards green and climate resilient practices. Climate-smart agriculture addresses three main objectives: sustainably increasing agricultural productivity and incomes, adapting and building resilience to climate change, and reducing and/or removing greenhouse gas emissions (FAO, 2026a).
- **Coupon rate:** The annual interest rate that the issuer pays to bond holders. A lower coupon rate means reduced borrowing costs.
- **Disclosure:** Transparent reporting of how proceeds from a green bond are allocated and utilized.
- **Earmarking**: The internal identification and tracking of an amount equal to the net proceeds of a green bond that are allocated to eligible green projects. The proceeds are not necessarily held in a separate account, but are recorded and managed through internal systems to ensure they support green activities.
- **Food security:** A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Four pillars of food security include food availability, economic and physical access to food, food utilization, and stability over time (FAO, IFAD, UNICEF, WFP and WHO, 2024).
- **Food Security Green Bond:** A finance instrument designed to support implementation of national priorities for climate-smart agriculture and agrifood systems transformation, including a focus on delivering finance and associated support to smallholder farmers, small-scale producers and agri-SMEs for adoption of climate-smart practices, approaches and technologies at scale.
- **Green Bond:** A Use of Proceeds bond instrument that allocates proceeds exclusively to finance or refinance new and/or existing eligible green projects with environmental benefits.
- **Greenium:** The amount by which the yield on a green bond is lower, compared to a conventional bond, resulting in reduced borrowing costs for the issuer.
- **Issuer:** A legal entity that authorizes, registers and sells bonds to raise capital for financing its projects, operations, assets or other specific expenditures.
- **Look-back period:** The timeframe during which proceeds from a green bond can be used to refinance existing projects that meet the bond's eligibility criteria.
- **Maturity:** The date that the principal amount of a bond is to be repaid in full to bondholders.
- **Oversubscribed:** A term used when the demand for a bond issuance exceeds its available supply, reflecting strong investor appetite in the bond.
- **Paris Agreement:** A legally binding international treaty on climate change adopted by 196 parties. Its overarching goal is to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
- **Public financial institution:** A financial institution owned or controlled by a public-sector entity, such as a national government, state or municipality. These institutions have a public mission, reflect government priorities and operate under government oversight.

- **Quasi-sovereign issuers:** Bond issuers that are legally separate from, but controlled, supported or majority-owned by a government. Quasi-sovereign issuers often fulfill a public policy mandate while operating with a degree of independence.
- **Refinance:** Use of green bond proceeds to replace or restructure financing for existing projects that are already operational and that meet the bond's eligibility criteria.
- **Ring-fencing:** The practice of segregating or separately managing the proceeds of a green bond to ensure that they are exclusively used for eligible green projects. This may involve using a dedicated account, sub-account, sub-portfolio or tracking system to isolate the funds.
- **Sovereign and sub-sovereign issuers:** Bond issuers that are government entities at the national and subnational levels, respectively. Sovereign bonds are issued by national governments, often through ministries of finance or treasuries. Sub-sovereign bonds are issued by subnational governments, such as provinces, states or municipalities.
- **Spread:** The difference between the yield of a green bond and the yield of a benchmark bond (often a government bond of similar maturity). The spread reflects the relative risk, liquidity or demand for the green bond compared to the benchmark.
- **Sukuk:** A financial certificate that is the closest Islamic law-compliant instrument to conventional bonds.
- **Sustainability Bond:** A Use of Proceeds bond instrument that allocates proceeds exclusively to finance or refinance a combination of both green and social projects with environmental and social benefits.
- **Sustainability-Linked Bond:** A bond instrument in which the financial and/or structural characteristics vary depending on whether the issuer achieves predefined sustainability or ESG objectives. The issuer explicitly commits to future improvements in measurable sustainability outcomes, assessed through pre-determined key performance indicators or sustainability performance targets. Unlike Use of Proceeds bonds (such as green or sustainability bonds), SLB proceeds are not earmarked for specific projects and may be used for general purposes to incentivize the issuer's transition to more sustainable practices.
- **Taxonomy:** A green or sustainable finance taxonomy is a classification system that defines activities or investments that are aligned with specific national and/or international environmental and sustainability objectives.
- **Tenor:** The length of time until the final repayment of principal is due. For a bond, tenor is the period from issuance to maturity. For tranches, it is the specific repayment period associated with the tranche. For on-lending facilities funded by bond proceeds, tenor refers to the maximum loan term available to participating financial institutions or end-borrowers, which must fit within the overall bond maturity.
- **Tranche:** Segments of a green bond divided by risk, time to maturity, and other characteristics in order to market the bond to different investors.
- **Underwriter:** A financial institution or group of institutions that facilitate the green bond issuance process and ensure the bond meets necessary standards and is successfully sold to investors.
- **Upsize:** Increasing the total amount of proceeds raised from the bond issuance, typically in response to greater investor demand during the initial offering.
- **Use of Proceeds (UoP):** How the money raised by the green bond will be allocated to eligible projects.
- **Yield:** The return that an investor receives on a bond, based on the bond's purchase price and interest payments (coupons) received over time, including the repayment of principal at maturity.

EXECUTIVE SUMMARY

An estimated 733 million people in the world face hunger, nearly half of which live in Asia and the Pacific. Beyond hunger, over 2.3 billion people suffer from moderate or severe food insecurity. Climate change will worsen these figures as the global population approaches 10 billion by 2050, requiring agrifood systems to produce nearly 50 percent more food, fibre and biofuel than in 2012 (FAO, 2021b). Under high-emissions scenarios, however, up to 10 percent of current agricultural land may become climatically unsuitable by mid-century (IPC, 2022).

Structured in two parts, this report presents the need and opportunity for innovative, public-driven bonds to mobilize private sector finance for climate-smart agriculture and agrifood systems transformation (Part 1) and provides initial guidance for designing Food Security Green Bonds and similar instruments (Part 2).

Countries recognize the urgent need for climate change adaptation and mitigation in agrifood systems, but a severe financing gap limits the implementation of national climate action plans and pathways for agrifood systems transformation.

At the same time, agrifood systems produce about a third of all global greenhouse gas (GHG) emissions, significantly contributing to climate change as the second largest source of emissions (second only to energy systems) (CLIC, 2025). Cost-effective mitigation actions are readily available to achieve net-zero emissions in agrifood systems, while strengthening food security and climate resilience (Sutton, Lotsch and Prasann, 2024). Under the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement, countries recognize the urgent need for climate-smart agriculture (CSA) and agrifood systems transformation in their Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), but a severe financing gap limits the implementation of these national commitments and plans.

Urgent need to accelerate finance for food security and agrifood systems transformation

Approximately USD 1.1 trillion is needed annually through 2030 to align agrifood systems with climate goals – twelve times more than current finance levels (CLIC, 2025). Within this, smallholder farmers have unmet annual financing needs of USD 170 billion and small and medium-sized agricultural enterprises (agri-SMEs) an additional USD 106 billion (CPI, 2023). Existing financing mechanisms are also not reaching independent small-scale producers that supply domestic markets and safeguard local food security, and which must be engaged for agrifood systems transformation.

The public sector has a crucial role in financing climate action that reaches smallholders and agri-SMEs. In 2019–2020, 96 percent of climate finance for small-scale food systems was provided by public sources, reflecting both the urgent need to accelerate private sector finance and persistent barriers that deter private investment (CPI, 2023). Governments, public financial institutions and multilateral development banks (MDBs) deploy catalytic capital through grants, concessional loans and de-risking guarantees and are uniquely positioned to develop finance instruments that unlock private capital to help close the finance gap for low-emission, climate-resilient agrifood systems.

The public sector has a crucial role in financing climate action that reaches smallholder farmers, small-scale producers and agri-SMEs.

Governments, national financial institutions and MDBs are uniquely positioned to deploy finance instruments that catalyse, de-risk and crowd in private investment.

Public-led green bonds: A strategic opportunity to mobilize private and institutional investment

Green and sustainable bond markets have grown exponentially, with cumulative issuances reaching USD 6.3 trillion as of June 2025. Countries note that their main reason for issuing green bonds is to diversify their investor base, engaging private and institutional investors in both domestic and international markets where demand for green bonds continue to expand.

In the Asia and the Pacific region, green bonds are becoming an increasingly important source of market-based finance. Over the last five years (2020–2024), the total amount issued by governments in Asia through green and sustainable bonds was seven times larger than the previous period (2015-2019). Issuers in Asia are also increasingly tapping international markets to engage global investors, raising approximately USD 80 billion from international green and sustainable bond markets in both 2022 and 2023 to finance implementation of national priorities for sustainable development.

For many countries, green bonds are becoming an increasingly important source of market-based finance, enabling issuers to diversify their investor base for green and sustainable development.

Understanding the strategic opportunity of public-led bonds to mobilize private investment, multilateral climate funds such as the Global Environment Facility (GEF) and Green Climate Fund (GCF) are scaling up support to countries for innovative blended finance instruments that deliver climate and environmental benefits.

Building investment-ready pipelines of eligible projects for a bond

Despite the urgent need for finance and growing investor interest in climate-aligned bonds for agrifood systems, only a small percentage of green bonds target the agriculture sector. This reflects a major constraint in scaling climate finance for agrifood systems – the need to develop large pipelines of investment-ready projects. Technical assistance (TA) programs and project preparation facilities (PPFs) can support the development of bankable projects and pipelines, including those delivering finance and associated support to smallholder farmers, small-scale producers and agri-SMEs for adopting CSA practices and technologies at scale. TA and PPFs can be used to:

- engage small-scale producers, agri-SMEs and finance intermediaries in identifying eligible projects, assets and investments for bond funding;
- develop aggregation models for delivering finance and support to smallholders and agri-SMEs through intermediaries;
- develop on-lending facilities tailored to the needs of smallholders and agri-SMEs, paired with TA for both finance intermediaries and borrowers;
- enhance capacities of small-scale borrowers, including technical, business and financial literacy, to increase access to and effective utilization of finance;
- identify digital tools for monitoring impacts at the smallholder level, enabling robust reporting for a bond;
- develop broader CSA Investment Plans with scalable projects, assets and investments across value chains and the agrifood system;
- de-risk and blend finance to make projects bankable, leveraging concessional finance, guarantees, insurance schemes and grants; and
- enhance coordination between government, finance, private sector and community partners for implementing and scaling bond-funded activities.

Technical assistance programs and project preparation facilities can support development of investment-ready pipelines of eligible projects for bond funding, including to deliver finance and associated support to smallholder farmers, small-scale producers and agri-SMEs.

Food Security Green Bonds: Models, examples and alignment

Integrating investment-ready project pipelines, Food Security Green Bonds and similar instruments can provide dedicated funding streams and long-term capital to implement national priorities for agrifood systems transformation. These innovative instruments include a focus on channeling proceeds to smallholder farmers, small-scale producers and agri-SMEs, paired with TA to support adoption of climate-smart practices, approaches and technologies at scale.

Six potential models for Food Security Green Bonds are provided in this report, with examples from issuances in Asia and the Pacific and globally, including:

- sovereign bonds funding national programme implementation;
- sub-sovereign bonds funding subnational programme implementation;
- quasi-sovereign bonds funding national programme implementation;
- quasi-sovereign bonds providing loans and technical assistance to implement national strategies;
- private financing with public support to implement national strategies; and
- regional bonds with public support to implement multi-country regional priorities.

These models can align with national or regional sustainable finance taxonomies and international standards and criteria, such as the International Capital Market Association (ICMA) Green Bond Principles and Agriculture Criteria developed by the Climate Bonds Initiative, to enhance transparency, impact and access to a growing pool of investors interested in bonds targeting agriculture. For issuers interested to develop Food Security Green Bonds and similar instruments, this report provides initial guidance – outlining steps for bond planning, developing a Green Bond Framework, and designing Use of Proceeds (UoP) to reach and support smallholder farmers, small-scale producers and agri-SMEs in adopting climate-smart practices and technologies.

Food Security Green Bonds can provide dedicated funding streams and long-term capital to implement national priorities for agrifood systems transformation, channeling proceeds to smallholder farmers, small-scale producers and agri-SMEs for adopting climate-smart practices and technologies at scale.

Climate Bonds Agriculture Criteria to support use of proceeds

This report also provides a simplified version of the Climate Bonds Agriculture Production Criteria that issuers can draw from in developing UoP for agricultural projects that reduce emissions, enhance resilience and strengthen capacities for climate-smart agriculture. For smallholder farmers in low-income areas, any project that helps increase crop yields in a sustainable way – without harming the environment or communities – can be automatically approved for green finance under the Climate Bonds Agriculture Criteria. These rules apply until 2030 to support smallholders in accessing the finance they need to produce more food sustainably, while capacities are being developed for monitoring and reporting climate-related impacts of bond-funded activities.

For smallholder farmers, any project that helps increase crop yields in a sustainable way can be automatically approved for green finance under the Climate Bonds Agriculture Criteria until 2030.

Strategies for reaching smallholder farmers and small-scale producers with bond proceeds

Supporting smallholder farmers and small-scale producers in adopting new practices and technologies requires integrated programs that combine finance, technical assistance and capacity building. Technical assistance is also needed for effective monitoring at the smallholder level to enable bond impact reporting.

Food Security Green Bonds can incorporate proven strategies to effectively reach and support smallholder farmers and small-scale producers with bond proceeds, including through farmer-aligned intermediaries and aggregation models, tailored delivery mechanisms with targeted de-risking, bundling finance with technical support, and capacity building for project implementation, monitoring and reporting. This report provides examples from recent and upcoming bond issuances that utilize these strategies to empower smallholders with inclusive investments for sustainability and resilience.

Food Security Green Bonds can use proven strategies to reach smallholder farmers and small-scale producers with bond proceeds, as illustrated by examples from recent and upcoming bond issuances highlighted in this report.

Supporting countries and partners in public-led instruments to accelerate private sector finance for agrifood systems transformation

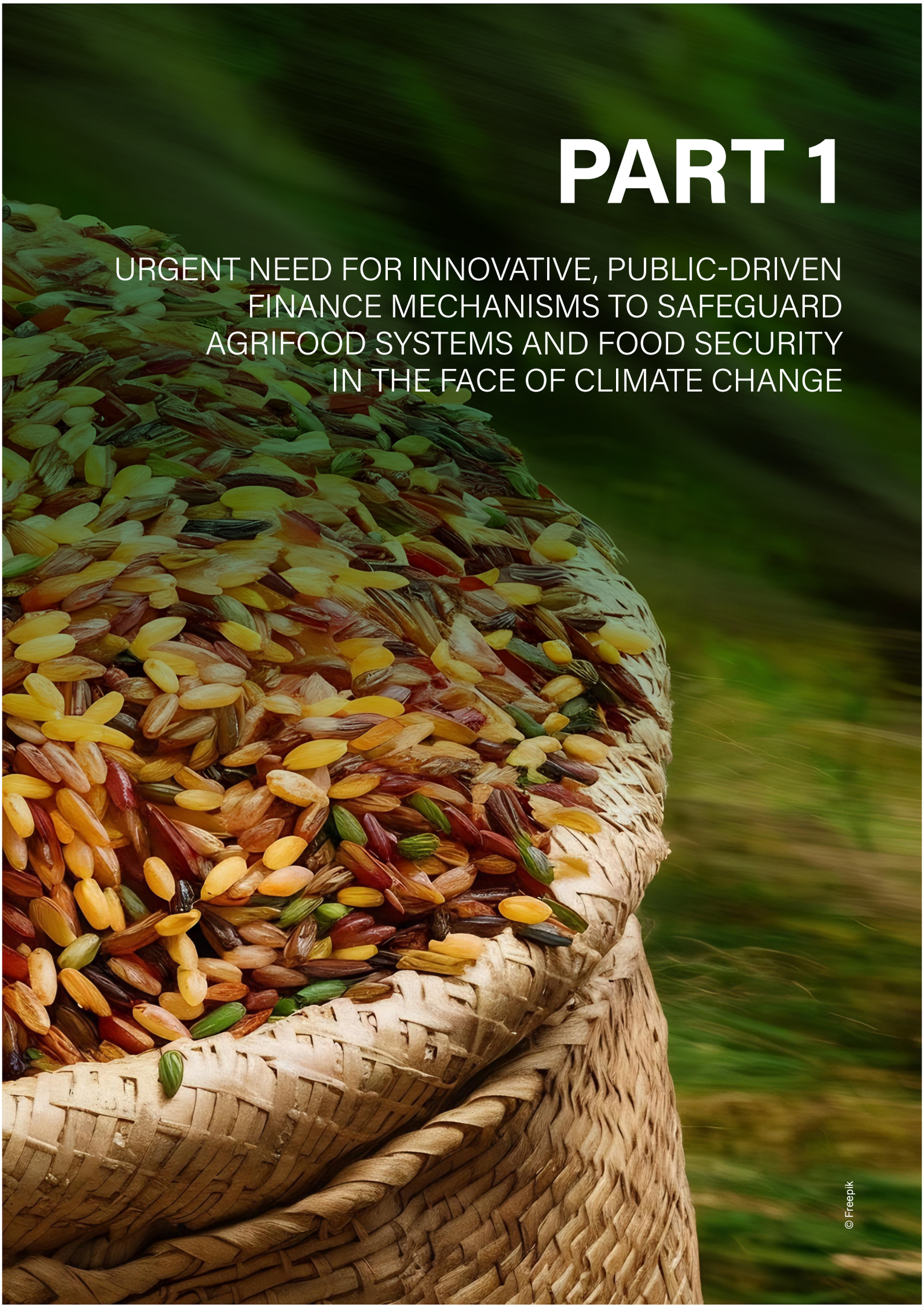
This report aims to support countries and partners globally in designing and issuing innovative public-led bonds to help close the finance gap for smallholder farmers, small-scale producers, agri-SMEs and agrifood systems overall. Food Security Green Bonds and similar instruments offer countries a strategic mechanism to de-risk and scale private sector finance, access domestic and international capital markets, directly fund those most at risk, and signal strong commitment to attract further investment – while also strengthening domestic financial capacities and delivering economic, social and environmental co-benefits.

This report aims to support countries and partners globally in developing public-led bonds to de-risk and scale private sector finance for implementation of national programs and priorities for agrifood systems transformation.

The Food and Agriculture Organization of the United Nations (FAO) and key partners stand ready to support countries in developing innovative public-led bonds to accelerate private investment in agrifood systems transformation – unlocking the potential of agriculture as both a climate solution and a foundation for resilient, inclusive development.

PART 1

URGENT NEED FOR INNOVATIVE, PUBLIC-DRIVEN FINANCE MECHANISMS TO SAFEGUARD AGRIFOOD SYSTEMS AND FOOD SECURITY IN THE FACE OF CLIMATE CHANGE



CLIMATE CHANGE IMPLICATIONS FOR FOOD SECURITY

An estimated 733 million people in the world face hunger, representing approximately 9.1 percent of the global population (FAO, IFAD, UNICEF, WFP and WHO, 2024). Approximately half of these people, or 371 million, live in the Asia and the Pacific region (FAO, 2023). Beyond hunger, a much larger number of people – approximately 2.33 billion – experience moderate or severe food insecurity, lacking regular access to enough safe and nutritious food.

Climate change will worsen these figures with widespread impacts on agrifood systems, including crops, livestock, fisheries, forestry and the value chains connecting producers to consumers (IPC, 2019). Ongoing impacts include:

- **Reduced agricultural yields:** Rising temperatures, altered rainfall, increasing floods and droughts, soil salinization, sea level rise and other impacts are affecting agricultural productivity and reducing yields.
- **Reduced fisheries productivity:** Ocean warming and acidification is negatively affecting marine ecosystems and fish populations, threatening fisheries productivity and the livelihoods of coastal communities.
- **Loss of biodiversity and ecosystem services:** Declining biodiversity, including loss of pollinators, soil organisms and natural pest regulators, is further reducing agricultural productivity and impairing ecosystem services vital for resilience.
- **Food system and supply chain disruptions:** Increasing frequency and intensity of extreme weather events, including floods, storms and droughts, is directly damaging crops, livestock, aquaculture and infrastructure, disrupting food production and supply chains.
- **New health risks:** Changes in temperature and precipitation will continue to alter the prevalence of pests and diseases affecting crops and livestock and pose new risks to human health, nutrition and food safety.
- **Exacerbated vulnerabilities:** These and other climate change impacts will continue to disproportionately affect the most vulnerable populations, including small-scale farmers, fishers, pastoralists, forest-dependent communities and Indigenous Peoples; those in arid, semi-arid, landlocked and small island developing states; and women and children.

These interconnected impacts are projected to heighten food price volatility and reduce global food supplies, undermining the stability, accessibility, utilization and availability of food – the four pillars of food security. The compounded pressures of declining agricultural productivity, biodiversity loss and disrupted supply chains will further erode livelihoods and increase inequalities, particularly among those already vulnerable to hunger and poverty. Climate-induced disruptions to regional and global food trade are expected to exacerbate supply imbalances and heighten food security risks, not only for low- and middle-income countries but also for import-dependent high-income nations. As a result, climate change is driving the world further off track from achieving Sustainable Development Goal (SDG) 2: Zero Hunger and threatening progress across the broader 2030 Agenda for Sustainable Development (UNICEF, 2025).

Importance of smallholder farmers, small-scale producers and agri-SMEs to food security

By 2050, agrifood systems will need to produce nearly 50 percent more food, livestock fodder and biofuel than in 2012 to support a world population approaching 10 billion people (FAO, 2021b). At the same time, 10 percent of current agricultural areas are expected to be climatically unsuitable by mid-century under high-emission scenarios, indicating an urgent need for resilience measures to safeguard and strengthen food security (IPPC, 2022).

By 2050, agricultural production must increase significantly to feed a global population approaching 10 billion people. At the same time, 10 percent of agricultural areas are expected to be climatically unsuitable by mid-century under high-emission scenarios.

Smallholder farmers produce about a third of the world's food while supporting rural livelihoods and local economies (FAO, 2021a). They operate on small plots and in localized ecosystems, often using traditional knowledge and practices that can be vital for sustainable resource management. Small-scale farmers, fishers, pastoralists and forest keepers are among the most vulnerable to climate change and economic marginalization, however. Most lack access to needed technologies, financial services and markets, limiting their ability to adapt and recover from shocks. Their vulnerabilities are often compounded by limited land tenure security, poor infrastructure and inadequate social protection, making them highly susceptible to poverty.

Smallholder farmers produce a third of the world's food, are highly vulnerable to climate impacts, and are essential actors in mitigating climate change.

Access to finance is one of the top barriers limiting their ability to adapt to climate change.

Ninety percent of all businesses in the agrifood sector are SMEs, and 72 percent of agri-SMEs list tailored finance as the main support needed to expand their impact.

Small-scale producers are also essential actors in mitigating climate change and building resilient food systems. In aggregate, they manage large shares of land and aquatic resources and can adopt climate-smart agriculture (CSA) practices that reduce greenhouse gas (GHG) emissions, sequester carbon, strengthen resilience, restore agrobiodiversity and improve ecosystem health. Access to finance has been identified as one of the top barriers for smallholder farmers to adapt to climate change (AgFunder and ISF Advisors, 2024).

Similarly, small and medium-sized agricultural enterprises (agri-SMEs) are critical in addressing climate change and strengthening food security. They supply small-scale producers with needed inputs, transport and process producers' yields, sell agricultural products to consumers, facilitate finance and investment in small-scale agrifood systems, and provide capacity building and partnerships that can improve agricultural productivity and sustainability. Agri-SMEs also adjust their business models in response to climate change impacts and market opportunities, develop innovations for increased resilience, and generate economic and employment opportunities in rural and urban areas (SAFIN, 2021). Making up 90 percent of all businesses in the agri-food sector, agri-SMEs list tailored finance as the main support needed to expand their impact.

A severe financing gap limits the ability of small-scale producers and agri-SMEs to invest in productivity, climate resilience and sustainable practices. Their annual unmet financing needs are estimated at USD 170 billion for smallholder farmers and USD 106 billion for agri-SMEs (CLIC, 2023).

FINANCE GAP TO SAFEGUARD FOOD SECURITY AND MITIGATE CLIMATE CHANGE

Agrifood systems overall require USD 1.1 trillion annually through 2030 to achieve emissions reduction and climate resilience targets under the UNFCCC Paris Agreement – approximately twelve times more finance than current levels (CLIC, 2025). Agrifood systems produce about a third of all global GHG emissions and are the second largest source of emissions – second only to energy systems. Investing in low-emission agriculture and transforming agrifood systems could generate health, economic and environmental benefits totaling USD 4.3 trillion in 2030 (Sutton, Lotsch and Prasann, 2024). Cost-effective mitigation actions are readily available to achieve net-zero emissions in agrifood systems, while strengthening food security and climate resilience. Despite these opportunities and the critical need for climate action, agrifood systems received only USD 95 billion (or 3.8 percent) of total mitigation finance tracked across all sectors in 2021/22, and only USD 13 billion in adaptation finance (CLIC, 2025).

Trillion-dollar agrifood funding gap

Agrifood systems need 12 times more finance – USD 1.1 trillion annually through 2030 – to align with climate goals.

The unmet financing needs of smallholder farmers are estimated at USD 170 billion annually and USD 106 billion for agri-SMEs.

In Asia and the Pacific, risks to food security and agrifood systems are the most frequently reported climate-related risks in country NDCs, 98 percent of which include adaptation actions in agrifood systems and 78 percent of which include mitigation actions in agrifood systems.

Under the Paris Agreement, countries recognize the critical need for agrifood systems adaptation and mitigation in their national climate action plans, including Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs). Risks to food security and agrifood systems are the most frequently reported climate-related risks in NDCs globally and in nearly every region (FAO, 2024b). In Asia and the Pacific, 98 percent of country NDCs include adaptation actions in agrifood systems and 78 percent include mitigation actions (FAO, 2025a). NAPs emphasize the importance of supporting smallholder farmers and small-scale producers in adopting climate-resilient practices, including through sustainable finance.

Need to mobilize private finance through innovative, public-led instruments

While various public, private and blended finance instruments are available to support sustainable, climate-resilient agrifood systems (see Table 1), most instruments are not designed or well suited to deliver finance to smallholder farmers and small-scale producers, particularly those supplying local markets with staple crops. This majority group of independent smallholders are also unlikely to benefit directly from carbon markets and sustainable sourcing initiatives that aim to finance actions within export value chains.

In addition, many smallholders lack access to sustainable lending from local banks and instead must rely on high-interest, high-risk finance options that can perpetuate poverty. Without sustainable finance, small-scale producers have limited ability to adopt practices and technologies that strengthen resilience, increase production, reduce GHG emissions and sequester carbon, as called for in country NDCs and NAPs and as needed to safeguard food security.

Most existing instruments are not designed or well-suited to deliver finance to smallholder farmers, particularly those supplying local markets with staple crops. These independent smallholders are also unlikely to benefit directly from carbon markets and sustainable sourcing initiatives linked to export value chains.

Table 1. Types of public, private and blended finance instruments available to support sustainable, climate-resilient agrifood systems

Public finance is provided by governments, public financial institutions, multilateral development banks (MDBs), international finance institutions, bilateral development agencies and multilateral climate funds. It provides foundational and de-risking capital for initiatives that may not attract private investment due to high risk or low direct financial returns, but which offer significant public goods (e.g. food security, environmental benefits).	
Types of instruments	**Types of initiatives the instrument is best suited to address**
Public grants	Early-stage research and development (R&D) of climate-smart agricultural practices and technologies, capacity building for farmers and institutions, pilot projects, direct support to small-scale producers for adaptation measures (e.g. purchasing drought-resistant seeds, implementing water-efficient irrigation), and emergency response to climate shocks. Grants are essential where financial returns are minimal or highly uncertain.
Concessional loans (e.g. low-interest, long-tenor loans)	Financing climate-resilient agricultural infrastructure (e.g. irrigation, storage, on-farm renewable energy), scaling proven sustainable practices, and supporting agricultural enterprises (e.g. cooperatives, agri-SMEs) capable of generating revenue but requiring patient capital. Concessional loans are typically provided by national development banks and MDBs.
Public subsidies and tax incentives	Reducing initial investment costs and improving the commercial viability of climate-smart technologies and practices (e.g. organic farming, agroforestry, efficient fertilizer use, renewable energy for farming). Subsidies and tax incentives encourage adoption by making sustainable options more accessible and profitable.
Guarantees and risk-sharing facilities	Provision of public finance to de-risk private sector investments in sustainable agriculture by covering a specified share of credit losses or portfolio risk. This encourages commercial banks and other private lenders to extend credit to agricultural projects that might otherwise be considered too risky, particularly for smallholder farmers or innovative ventures.
Insurance and risk-transfer mechanisms	Protecting producers, agribusinesses and governments from climate-related shocks through publicly supported insurance instruments – including farmer-level agricultural and index-based crop, livestock and weather insurance; meso-level products for cooperatives, financial institutions and value-chain actors; and sovereign disaster-risk insurance and regional risk pools. Public finance may subsidize premiums, provide reinsurance or capitalize risk pools to expand coverage for smallholders and vulnerable communities.
Sovereign and quasi-sovereign bonds	Mobilizing capital for national or subnational sustainable agriculture programs, climate-resilient infrastructure (e.g. irrigation, flood control, land restoration) and large-scale R&D initiatives; supporting implementation of national climate action plans through dedicated funding; and channeling resources to small-scale producers and agri-SMEs for adopting climate-smart practices and technologies.
Private finance is provided by commercial banks, private equity and venture capital funds, capital markets, microfinance institutions (MFIs), agribusinesses and corporations, and crowdfunding platforms. It often seeks commercially viable projects and requires mechanisms to mitigate perceived risks (which may be provided by the public sector or MDBs).	
Types of instruments	**Types of initiatives the instrument is best suited to address**
Commercial loans/debt instruments (e.g. project finance, balance sheet debt)	Financing established agricultural enterprises, agribusinesses and larger farms with proven revenue streams and collateral to invest in climate-smart technologies, sustainable production expansion or value chain improvements.
Equity investments (e.g. venture capital, private equity)	Supporting innovative agri-tech startups and scalable sustainable agribusinesses (e.g. precision agriculture, sustainable aquaculture) developing new climate-resilient products or services. Equity provides patient capital for growth, innovation and market expansion.
Corporate bonds	Enabling large corporations or financial institutions to raise capital for environmentally sustainable or climate-smart agricultural investments (e.g. resilient supply chains, renewable energy for operations, land restoration).

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Impact investing funds	Financing projects and businesses seeking both financial returns and measurable social or environmental impacts, including sustainable agriculture initiatives focused on smallholder livelihoods, biodiversity conservation or climate adaptation.
Microfinance and digital financial services	Providing small loans, insurance products and payment services to smallholder farmers and agri-SMEs, enabling investment in climate-smart inputs, adoption of sustainable practices and improved resilience to climate shocks.
Supply chain finance	Enabling upstream companies to provide finance or guarantees to their agricultural suppliers (e.g. farmers, cooperatives) to encourage sustainable production practices and strengthen supply chain resilience.
Blended finance strategically combines public or philanthropic capital with private capital to de-risk investments, improve financial returns or provide catalytic funding to attract private sector participation in sustainable agriculture where pure commercial finance is not yet feasible. Blended finance can be delivered through public-private partnerships, specialized funds that pool public and private capital, MDBs and development finance institutions (DFIs), national development banks and philanthropic organizations.	
Types of instruments	**Types of initiatives the instrument is best suited to address**
First-loss guarantees/ facilities	Attracting private investors by using public funds to absorb initial losses. Public capital takes the highest-risk tranche to de-risk investments and increase private sector participation in innovative finance instruments or sustainable agriculture projects with higher perceived risk.
Concessional debt/equity paired with commercial debt/equity	Supporting projects close to commercial viability that require public capital to improve overall financial attractiveness for private investors. Concessional funds lower the cost of capital and help crowd in private investment.
Technical assistance facilities paired with private investment	Enhancing the readiness and effectiveness of sustainable agriculture projects by building capacity within farmer groups, agricultural enterprises and financial institutions. Technical assistance facilities reduce risks for private investors and support better investment outcomes.
Results-based financing (e.g. payments for ecosystem services)	Incentivizing specific environmental or social outcomes (e.g. carbon sequestration, reduced water use, improved agrobiodiversity). Payments are disbursed upon verified achievement of results, attracting private investors seeking impact alongside financial returns.
Incubators and accelerators with seed funding	Supporting early-stage sustainable agri-tech startups and innovative agricultural solutions by providing mentorship, technical support and seed capital to prepare enterprises for larger-scale private investment.

Source: Authors' own elaboration.

The public sector has a crucial role in financing climate action that reaches smallholder farmers, small-scale producers and agri-SMEs. Public entities deploy catalytic capital through grants, concessional loans, guarantees and first-loss instruments that lower investment risk and can crowd in private capital. Governments are also uniquely positioned to channel funds through public financial institutions and to develop strategic finance initiatives addressing national and public priorities, such as food security, climate change adaptation and mitigation, and broader environmental objectives.

The public sector has a crucial role in financing climate action that reaches smallholders, small-scale producers and agri-SMEs. In 2019/20, only 4 percent of climate finance to small-scale agrifood systems came from private sources.

To unlock larger and more sustainable capital flows for climate-smart agriculture and food security, governments can design innovative green bonds to mobilize private finance from domestic and international markets.

In 2019–2020, only 4 percent of climate finance to small-scale agrifood systems came from private sources, reflecting the urgent need to mobilize private investment and persistent barriers – including perceived high risk, limited investment readiness and low financial returns – that deter private sector finance (CPI, 2023).

To unlock larger and more sustainable capital flows to implement national priorities for climate-resilient agriculture and food security, governments can design public finance instruments – such as sovereign and quasi-sovereign green bonds – to mobilize private investment through domestic and international markets.

Sovereign green bonds are issued by national governments and their finance authorities, such as Ministries of Finance or Treasuries, to raise capital for environment and/or climate-related projects. Sovereign bonds are well suited to finance large-scale public goods, such as national programs for sustainable agriculture, climate-resilient agricultural infrastructure (e.g. irrigation, flood control, land restoration) and significant R&D initiatives. Sovereign green bonds can be designed to support the execution of national climate change strategies and sustainable agriculture policies, providing dedicated funding streams that can be allocated through national budgets to Ministries of Agriculture and rural development programs. Sovereign green bonds demonstrate a government's commitment to climate and environmental action, which can help attract additional funding from investors committed to financing positive environmental and climate objectives. These bonds often advance and deepen domestic green bond markets as well, encouraging other public and private entities to issue green bonds.

BOX 1

Sovereign and quasi-sovereign green bonds

Sovereign green bonds: Issued by national governments and their finance authorities.

- ➜ Can support implementation of national strategies and policies for climate-smart agriculture and agrifood systems, providing a dedicated funding stream that can be allocated through national budgets to Ministries of Agriculture and rural development programs.

Quasi-sovereign green bonds: Issued by entities majority-owned or controlled by a government, such as state-owned agricultural banks.

- ➜ Can provided dedicated, long-term capital for targeted green loans, credit lines and other financial products tailored to the needs of small-scale producers and agri-SMEs for adopting climate-smart practices and technologies.

Source: Authors' own elaboration.

Quasi-sovereign green bonds are issued by entities majority-owned or controlled by a government, such as state-owned agricultural banks and other public financial institutions. These bonds are well suited to finance small-scale producers and agri-SMEs for adopting climate-smart practices and technologies, as they can provide dedicated, long-term capital for financial institutions to offer targeted green loans, green credit lines and other finance products tailored to the needs of smallholders and agri-SMEs. Backed by government mandates and often enhanced by concessional funds or guarantees, quasi-sovereign green bonds enable public financial institutions to absorb risk, offer below-market terms, channel proceeds to projects unable to attract purely commercial investment, and mobilize private capital aligned with national policies and priorities for climate-smart agriculture and agrifood systems. Quasi-sovereign bonds also demonstrate an institution's commitment to climate and sustainability objectives, which can enhance access to other sources of climate finance to further develop and scale green financial products.

In light of increasing climate impacts, the financing gap to safeguard food security and mitigate climate change, and the need for catalytic capital that reaches smallholders and agri-SMEs, there is a significant opportunity for governments and public financial institutions to leverage green bonds. Innovative Food Security Green Bonds and similar instruments targeting proceeds to small-scale producers and agri-SMEs can be designed to mobilize private finance for implementation of national priorities for food systems transformation, aligned with green bond market opportunities and growing interest from investors in bonds addressing sustainable agriculture.

OPPORTUNITY FOR FOOD SECURITY GREEN BONDS TO SCALE PRIVATE SECTOR FINANCE FOR CLIMATE-SMART AGRICULTURE AND AGRIFOOD SYSTEMS TRANSFORMATION

The market for green, social, sustainability, sustainability-linked and transition bonds (collectively referred to as GSS+ or thematic bonds) has grown exponentially, with cumulative issuances reaching USD 6.3 trillion as of June 2025 (World Bank Treasury, 2025). A continued focus on climate change mitigation financing and a growing interest in climate adaptation and nature-based financing is expected to further drive green and sustainability bond issuances in the coming year (Moody's, 2025). Investor demand for these financial instruments has continued to expand and investors express strong interest in emerging market sovereign green bonds.

In a 2022 World Bank survey, countries note that their main reason for considering green and thematic bonds is to diversify their investor base, engaging ESG-focused investors in both domestic and international markets. A second motivator is to signal the country's commitment to sustainability and raise awareness about progress being made toward achieving the SDGs and Paris Agreement goals. Additional key reasons are to raise the funding needed to sustainable investments and to build domestic markets and encourage private sector green and thematic issuances (see **Figure 1**) (World Bank Treasury, 2022).

"As tracking of climate finance data improves, it has become clear that it is not reaching the agriculture sectors and smallholder farmers in particular. There is strong consensus that green bonds are an important but underutilized vehicle for the public sector to drive investment in climate-resilient, low-emission agriculture with wider benefits for farming communities and food security. FAO is committed to working with partners in government and the finance community to unlock their transformative potential."

– Beau Damen, Natural Resources Officer, FAO Regional Office for Asia and the Pacific

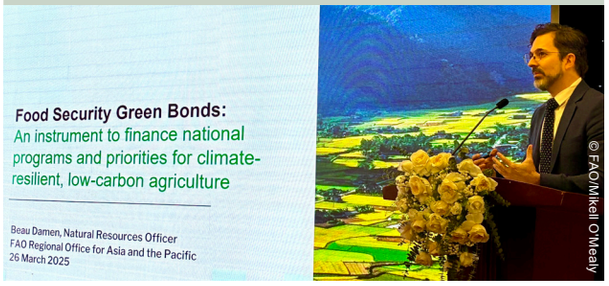
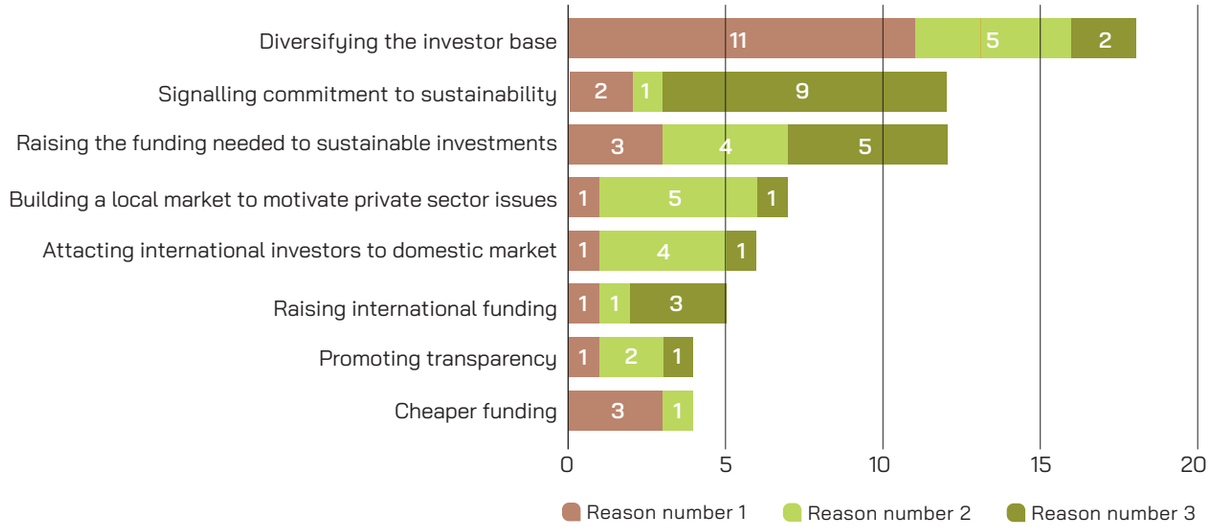


Figure 1. Main reasons countries consider green and thematic bonds as funding options.



Source: 2022 World Bank Sovereign Debt Management Offices Survey. 2022. Washington DC.

While the possibility of raising funds with GSS+ bonds at a lower cost than conventional bonds was not a primary focus for countries in the 2022 survey, strong investor demand is enabling some sovereign issuers to benefit from reduced borrowing costs, gaining a "greenium" in the form of a price premium or yield discount on the bond (Climate Bonds Initiative, 2024a). The greenium reflects investor willingness to accept slightly lower returns in exchange for positive impact. **Box 2** provides an example of a greenium gained by the Government of India through its 2023 sovereign green bond issuance.

BOX 2

Greenium gained by the Government of India's sovereign green bond

Overview: In 2023, the Government of India issued a sovereign green bond that raised INR 80 billion (approximately USD 1 billion) with two tranches of 5 and 10-year tenors.

Issuer: Reserve Bank of India, authorized by the Ministry of Finance (MoF).

Investor demand: The bond attracted strong investor interest from public sector banks, insurance companies, foreign institutional investors and pension funds and was oversubscribed more than four times, with total bids exceeding INR 320 billion.

Greenium: The 5-year bond (maturing in 2028 with a coupon rate of 7.1 percent) and 10-year bond (maturing in 2033 with a coupon rate of 7.29 percent) were both priced at a greenium of 5-6 basis points below equivalent (ESG Today, 2023).

Use of Proceeds: Proceeds were earmarked for grid-scale solar and wind, decentralized solar such as water pumps for agriculture, green hydrogen, metro lines and afforestation, aligned with eligible expenditures in the MoF Sovereign Green Bond Framework (Climate Bonds Initiative, 2023).

Source: Authors' own elaboration.

Raising capital from domestic and international markets for implementation of national priorities

Over the last five years, green bonds have become an increasingly important source of market-based finance in Asia and the Pacific. In 2020–2024, the total amount issued by governments in Asia through green and sustainable bonds was seven times larger than the previous period (2015–2019) (OECD, 2025). Some countries prefer to issue green bonds in local currencies within domestic bond markets, which may offer more potential for smaller sized bonds such as those targeting a specific sector. Issuers in Asia are also increasingly issuing green bonds in hard currencies (e.g. USD, EUR, JPY) to raise capital from international markets. International bonds are larger in size to meet emerging market bond index requirements and the needs of international investors, often financing a broad portfolio of projects across multiple sectors, which can include agriculture.

In both 2022 and 2023, government and corporate issuers in Asia issued approximately USD 80 billion in international green and sustainable bonds (ICMA, 2024). Issuers in China have been the most active in accessing international markets through green and sustainable bonds, followed by Japan and the Republic of Korea. Sovereign issuers in Indonesia, Malaysia, the Philippines and Thailand have also engaged global investors through both international and domestic market listings, as summarized in **Box 3**.

Green and sustainable bonds are becoming an increasing important source of market-based finance in Asia, where governments are mobilizing private investment through domestic and international markets to support implementation of national priorities.

BOX 3

Examples of Asia and the Pacific countries mobilizing global investment through green bond markets

Indonesia Sovereign Green Sukuk and Blue Bonds (2018 and 2023)
Indonesia issued the world's first sovereign green sukuk in 2018, engaging international investors through listings on the Singapore Stock Exchange and Nasdaq Dubai. The bond **raised USD 1.25 billion**, followed by **USD 0.75 billion** tranches in 2019, 2020 and 2021, plus a **EUR 0.5 billion** issuance in 2021 – all listed in international markets (IMF, 2023). In 2023, Indonesia issued the world's first sovereign blue bond in the Japanese debt capital market, r**aising JPY 20.7 billion (approximately USD 150 million)**.

Malaysia Sovereign Sustainability Sukuk (2021)
Malaysia issued the world's first sovereign USD-denominated sustainability sukuk in 2021 through a special purpose vehicle that **raised USD 800 million**. The sukuk was oversubscribed 6.4 times, reflecting strong global investor interest and gaining a **greenium** with the lowest yield and spread of any previous Government of Malaysia 10-year USD sukuk issuance. Investors were from Asia (55 percent), Europe, the Middle East and Africa (33 percent), and the United States (12 percent) (Malaysia Ministry of Finance, 2021).

Philippines Sovereign Sustainability Bonds (2022)
The Philippines issued a sovereign sustainability bond in 2022 on the Luxembourg Stock Exchange that **raised USD 1 billion**. Initially launched at USD 500 million, the bond was upsized due to strong global demand, with investors from the United States (42 percent), Asia excluding the Philippines (33.5 percent) and Europe (24.5 percent) (World Bank Treasury, 2022). Also in 2022, the Philippines issued a sustainability bond on Japan's Samurai bond market, r**aising JPY 70.1 billion (approximately USD 559 million)** and winning a Sustainable Finance Award from the Research Institute for Environmental Finance (RIEF).

Ambassador Mylene J. Garcia-Albano receiving the Sustainable Finance Award in 2023 with Atty. Izumi Sato, Bureau of Treasury Operations Officer Jose Carlos M. Sebastian, from RIEF Executive Director Yoshihiro Fuji.

Source: Authors' own elaboration.

Recognizing significant opportunities in the green bond market, and aligned with national climate change and sustainability objectives, governments are establishing sustainable finance taxonomies and frameworks to guide and promote green bond issuance. In Asia and the Pacific, these include established taxonomies or frameworks in Bangladesh, China, Fiji, Indonesia, Japan, Kazakhstan, Malaysia, Mongolia, the Philippines, Singapore, Republic of Korea, Sri Lanka and Viet Nam and in-progress taxonomies in India and Pakistan.

At a regional level, the Association of Southeast Asian Nations (ASEAN) issued an ASEAN Taxonomy for Sustainable Finance in 2021-2024 and ASEAN Green, Social, Sustainability and Sustainability-Linked Bond Standards in 2017-2022, catalysing green bond issuances across the region. By early 2024, USD 47 billion in ASEAN-labeled bonds or sukuk had been issued (ACMF, 2024).

Building investment-ready pipelines of eligible projects for a bond

Only a small percentage of green and climate-aligned bonds target the agriculture sector, however, despite the urgent need for finance and growing interest from investors in green bonds addressing agriculture (Climate Bonds Initiative, 2024b). This reflects a major constraint in scaling climate finance for agrifood systems – a lack of large pipelines of investment-ready projects that could be funded by a bond. If issuers do not have enough eligible and "bankable" agriculture projects to include in a sector-specific green bond, they may incorporate agriculture-related investments broader in green bonds addressing multiple sectors or in sustainability bonds that combine green and social expenditures.

Technical assistance programmes and project preparation facilities can develop investment-ready pipelines of eligible projects for climate-smart agriculture and agrifood systems transformation, for inclusion in sector-specific green bonds or broader sustainability bonds.

For bonds that aim to deliver finance to smallholder farmers, small-scale producers and agri-SMEs for adoption of climate-smart agriculture (CSA) practices and technologies, building investment-ready pipelines of eligible projects is a critical need. Bond-financed programmes typically lack channels to reach disbursed, informally organized or independent smallholders, including those supplying local markets with staple crops. Challenges also include limited financial literacy among smallholders, lack of credit history and limited land tenure within some populations, complicating risk assessment and loan disbursement. In addition, high transaction costs and perceived risks can deter local financial institutions from on-lending, resulting in insufficient uptake of finance from bond proceeds.

Technical assistance (TA) programmes and project preparation facilities (PPFs) can support the development of investment-ready pipelines of eligible projects to be funded by a bond, either for sector-specific bonds targeting agriculture or broader green or sustainability bonds that include agriculture. To mobilize finance for CSA and agrifood systems transformation, countries can use TA and PPFs to:

- **Engage small-scale producers, agri-SMEs and finance intermediaries** in identifying and developing eligible projects, assets and investments, including to provide technical support, conduct baseline or feasibility studies, assess safeguards and prepare risk-reduction measures.
- **Develop aggregation models** for delivering finance and associated support to smallholders and agri-SMEs through finance intermediaries, such as farmer associations, producer cooperatives, local banks, microfinance institutions, women's networks and value-chain intermediaries (see the section on strategies for **strategies for reaching smallholder farmers and small-scale producers with bond proceeds** for more information).
- **Develop on-lending facilities or green credit lines** tailored to the needs of smallholders and agri-SMEs, paired with aggregation models, risk-sharing and associated TA for both finance intermediaries and borrowers (a model term sheet for on-lending facilities is provided in **Annex 1**).
- **Enhance capacities of small-scale borrowers**, including technical, business and financial literacy, to improve readiness for accessing and utilizing finance.

BOX 4

Using technical assistance or project preparation facilities to build investment-ready pipelines for climate-smart agriculture and agrifood systems transformation

- Engage small-scale producers, agri-SMEs and finance intermediaries to develop eligible projects, assets and investments for bond funding.
- Develop aggregation models for delivering finance and support to smallholders through intermediaries.
- Develop on-lending facilities addressing smallholder needs, paired with TA for both finance intermediaries and borrowers.
- Enhance capacities of small-scale borrowers including technical, business and financial literacy.
- Identify digital tools for monitoring impacts at the smallholder level, enabling robust reporting.
- Develop broader CSA Investment Plans with scalable projects, assets and investments across value chains and the agrifood system.
- De-risk and blend finance to make projects bankable, leveraging concessional finance, guarantees, insurance schemes and grants.
- Enhance coordination between government, finance, private sector and community partners for implementing and scaling bond-funded activities.

Source: Authors' own elaboration.

- **Identify suitable digital tools** to support monitoring the impacts of bond-funded activities at the smallholder level, enabling robust impact reporting for the bond.
- **Develop broader CSA Investment Plans** (CSAIPs) that include scalable projects, assets and investments across value chains and the agrifood system, aligned with national plans and priorities.
- **De-risk and blend finance to make projects bankable**, leveraging public and concessional finance to lower credit and performance risks, turning near-bankable projects into fully investable pipelines. Assess opportunities for guarantees, insurance schemes, grants and concessional tranches to crowd in private capital.
- **Strengthen coordination between key government, finance, private sector and community partners** to enhance readiness for implementing and scaling bond-funded activities.

Some costs associated with TA or PPFs can be included in the Green Bond Framework use of proceeds, as key components to reach and support smallholder farmers and small-scale producers in adopting climate-smart practices. Other TA and project preparation costs can be supported by aligned grant funding.

In Asia and the Pacific, Fiji, Thailand, Mongolia and Indonesia have issued pioneering sovereign and quasi-sovereign green bonds specifically targeting agrifood systems to mobilize private finance for CSA, as summarized below.

BOX 5

Examples of public-driven green bonds in Asia and the Pacific supporting climate-smart

Fiji Sovereign Green Bond (2017)

- **Overview:** Fiji's sovereign green bond raised FJD 100 million (approximately USD 50 million) with four tranches in two tenor options: Five years (2022) with a 4.0 percent coupon rate,[1] and 13 years (2030) with a 6.3 percent coupon rate. The bond aligned with the International Capital Market Association (ICMA) Green Bond Principles and was listed on the London Stock Exchange.
- **Issuer:** Reserve Bank of Fiji for the Government of Fiji.
- **Use of proceeds:** Proceeds were used to finance Fiji's transition to a low-carbon, climate-resilient economy, targeting agriculture and other priority and vulnerable sectors. Bond-supported initiatives enhanced crop resilience and flood management for key agricultural products such as sugar cane and funded installation of rainwater harvesting systems (UNDP, 2022). The bond also supported the Fiji Development Bank to subsidize interest rates for agricultural loans, encouraging investments in sustainable farming.

Thailand BAAC Green Bond (2020)

- **Overview:** This quasi-sovereign green bond issued in 2020 raised THB 6 billion (approximately USD 192 million) in two tranches: Five years (2025) with a 1.76 percent coupon rate, and 10 years (2030) with a 2.76 percent coupon rate. The bond aligned with the ICMA Green Bond Principles and ASEAN Green Bond Standards.
- **Issuer:** Bank for Agriculture and Agricultural Cooperatives (BAAC), a government-owned bank under Thailand's Ministry of Finance.
- **Use of proceeds:** Proceeds were used to promote sustainable agricultural practices to increase organic and safe food production, support farmers in afforestation and reforestation, and enhance agricultural sector competitiveness to strengthen food security and food self-reliance (Bank for Agriculture and Agricultural Cooperatives, 2024). Additional insights from this bond are provided in a case study in Annex 2.

Mongolia Khan Bank Green Bond (2023)

- **Overview:** This public-driven 5-year green bond issued in 2023 was the first green bond issued in Mongolia, raising USD 60 million. Investors included the International Finance Corporation (IFC), Dutch Entrepreneurial Development Bank (FMO) and MicroVest Capital Management (an impact investor).

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[1] The coupon rate is the annual interest rate that the issuer pays to bond holders. A lower coupon rate means reduced borrowing costs.

- **Issuer:** Khan Bank (previously the state-owned Agricultural Bank of Mongolia, Khan Bank was privatized in 2003 and continues to finance national agricultural priorities)
- **Use of proceeds:** Proceeds are allocated to support sustainable, climate-smart agriculture and livestock, including improved land and pasture management, efficient water use, sustainable animal husbandry practices and green technologies. Khan Bank's Green Bond Framework aligns with Mongolia's national climate change and sustainable agriculture policies and strategies, including the country's NDC, which prioritize s adaptation actions in the agriculture and livestock sectors (Khan Bank, 2023).

Indonesia Sovereign Blue Bond (2023)

- **Overview:** This sovereign blue bond (sukuk) issued in 2023 raised JPY 20.7 billion (approximately USD 150 million) in two tranches: Seven years with a 1.2 percent coupon rate and 10 years with a 1.43 percent coupon rate. It aligned with the ICMA Green Bond Principles and was listed on Japan's 'Samurai' capital market (Ministry of Finance and Republic of Indonesia, 2023).
- The bond was recognized for its innovative structure and benefitted from climate budget tagging, a tool for tracking public expenditures related to climate change mitigation and adaptation (Environmental Finance, 2024).
- **Issuer:** Republic of Indonesia, Ministry of Finance.
- **Use of proceeds:** Proceeds were allocated to fund sustainable fisheries and aquaculture, marine biodiversity conservation, mangrove rehabilitation and coastal protection, supporting Indonesia's blue economy and strengthening food security.

Source: Authors' own elaboration.

For sovereign and quasi-sovereign green bonds targeting sustainable agriculture, repayments to bond investors typically do not rely on monetizing the eligible agricultural measures or on revenue generated from bond-funded activities. Instead, repayments usually come from the issuer's general budget, balance sheet or other revenue streams within the government or bank. This helps avoid the transaction costs and complexities associated with seeking to commodify sustainable agriculture activities.

In addition, the economic impacts of bond-funded measures, such as increased agricultural productivity, job creation, rural income growth, tax revenue or value chain development, can strengthen the business case for governments and public financial institutions to issue green bonds for climate-smart agriculture. These broader positive impacts can also enhance the issuer's capacity to honor its repayments from the general budget or balance sheet, improving fiscal sustainability. Further, supporting climate-resilient agriculture and agrifood systems reduces the issuer's exposure to climate and economic shocks, increasing fiscal resilience.

For sovereign and quasi-sovereign green bonds targeting sustainable agriculture, repayments to investors typically do not rely on monetizing eligible agricultural measures or on revenue generated from bond-funded activities. Payments usually come from the issuer's general budget or balance sheet, which reduces transaction costs.

Partnership opportunities to increase bond impact and reduce costs

Understanding the critical role of public-led instruments to mobilize private finance for implementation of national programmes and commitments, multilateral climate funds such as the Global Environment Facility (GEF) and Green Climate Fund (GCF) are increasingly supporting innovative bonds that deliver climate and environmental benefits. In its ninth replenishment cycle (2026–2030), the GEF aims to scale up resources available to countries for non-grant instruments (NGI) that accelerate blended finance, such as sovereign and quasi-sovereign bonds aligned with national priorities, including those targeting sustainable agrifood systems and food security.

The design and issuance of these innovative bonds provide opportunities for countries to engage partners that can contribute technical assistance, concessional finance, grants and guarantees to help reduce bond costs and increase impact. An example of a sovereign bond that strengthened food security in the Seychelles and benefited from GEF, World Bank and other partner contributions is provided below. The World Bank's Sustainable Finance Advisory Programme has helped emerging market public sector issuers raise nearly USD 27 billion through GSS+ bonds since 2017. The World Bank has also supported development of CSAIPs for 14 countries, identifying CSA investments of more than USD 2.5 billion (Sutton, Lotsch and Prasann, 2024).

Seychelles Sovereign Blue Bond (2018)

- **Overview:** A 10-year sovereign blue bond issued in 2018 that raised USD 15 million with a 6.5 percent coupon rate through private placement with three impact investors. The bond aligned with the ICMA Green Bond Principles.
- **Issuer:** : Government of the Republic of Seychelles.
- **Use of proceeds:** Proceeds funded the country's transition to sustainable fisheries and development of a blue economy, strengthening food security. Projects supported sustainable fishing practices, fisheries management planning, stock rebuilding, refitting fishing vessels, education and awareness, and expansion of sustainable-use marine protected areas. Grants and loans were provided through a Blue Grants Fund and a Blue Investment Fund, managed respectively by the Seychelles' Conservation and Climate Adaptation Trust and the Development Bank of Seychelles (Labonte, 2021).
- **Contributing partners:** The bond integrated public sector risk guarantees to unlock private investor capital. The GEF provided a USD 5 million concessional loan over 40 years with a grace period of 10 years and an interest rate of 0.25 percent. This effectively reduced the overall cost of capital for the Seychelles, enabling the country to lower the bond coupon rate from 6.5 percent to an effective rate of 2.8 percent – making the project more affordable to the Seychelles and impact investors alike. The World Bank contributed a USD 5 million partial guarantee for the bond and provided technical assistance in structuring the bond and engaging investors. The Rockefeller Foundation provided a USD 425 000 grant to assist with transaction costs for the bond (World Bank, 2018a).

The GCF is also increasing support to countries for public-led green bonds that mobilize private investment for low-emission, sustainable development. In July 2025, GCF approved a EUR 200 million (approximately USD 227 million) equity investment in the Global Green Bond Initiative (GGBI) to scale up access to climate finance in low- and middle-income countries in Africa, Asia and the Pacific, and Latin America and the Caribbean. The GGBI will prioritize hard-to-abate sectors through strengthening local capital markets and enabling environments for national and subnational green bond issuances. Its support includes a direct investment fund and parallel capacity-building facilities to lower borrowing costs for bond issuers (GCF, 2025).

In Southeast Asia, the Asian Development Bank (ADB) GSS+ Bonds Initiative, established under the ASEAN Catalytic Finance Facility and the ASEAN+3 Asian Bond Markets Initiative, aims to scale up GSS+ bond issuances by at least USD 1 billion by 2025. In 2024, the GSS+ Bonds Initiative supported Asia's first sovereign Sustainability-Linked Bond, issued by Thailand's Public Debt Management Office under the Ministry of Finance, which raised THB 30 billion (approximately USD 880 million) to reduce the country's GHG emissions by 30 percent by 2030 (Asian Development Bank, 2024).

Since 2020, the Initiative has catalysed over 20 GSS+ bond issuances, enabling issuers to raise more than USD 4.5 billion (local currency equivalent). These transactions have subsequently led to over USD 14 billion in follow-on GSS+ issuances, demonstrating strong market momentum and investor confidence (Asian Development Bank, 2025).

The Food and Agriculture Organization of the United Nations (FAO) is working with countries, banks and partners to assess opportunities for public-led green bonds to accelerate private investment in climate-smart agriculture, including to deliver finance and associated support to smallholder farmers, small-scale producers and agri-SMEs. This builds on FAO's longstanding assistance to countries in mobilizing finance for implementation of national priorities, climate action plans and pathways for agrifood systems transformation. FAO assistance can support countries and public financial institutions in designing Food Security Green Bonds and similar instruments in a number of ways, as summarized below.

- **FAO Technical Assistance programmes** can support countries in developing investment-ready pipelines of eligible CSA projects and CSAIPs for green bond use of proceeds, including those delivering finance and support to smallholders and agri-SMEs. In Southeast Asia, for example, FAO is supporting countries to develop CSAIPs for priority value chains and to enhance capacities for mobilizing climate finance (FAO, 2026b). This includes assisting countries in accessing GCF resources through existing and potential Direct Access Entities (DAEs) interested to issue green bonds for CSA and agrifood systems transformation (FAO, 2025b). In addition, FAO's Sustainable Rice Landscapes Initiative is providing technical assistance across 12 countries in Asia, has mobilized nearly USD 1 billion in GEF resources and co-finance, and is developing a blended finance facility to catalyse public and private investment in climate-resilient rice landscapes, value chains and livelihoods.
- **FAO's Investment Centre** partners with countries and financing institutions to advise on and design investment strategies, policies and projects for agrifood systems transformation, exploring innovations to increase food security, climate resilience and financial inclusion. In 2024, the Centre helped design projects in 36 countries approved by financing partners for USD 7.3 billion in new investment, while supporting ongoing investment projects totaling nearly USD 50 billion to ensure sustainable results (FAO, 2025c).

BOX 6

FAO assistance that can support countries in Food Security Green Bonds and similar instruments

- FAO **Technical Assistance** programs can support development of investment-ready pipelines of CSA projects for green bonds, CSAIPs for agrifood systems transformation, and blended finance facilities to catalyse public and private investment.
- FAO's **Investment Centre** partners with countries and financing institutions to design investment strategies, policies and projects for agrifood systems transformation.
- FAO's **Hand-in-Hand Initiative** supports countries in developing agrifood investment plans through geospatial modeling, analytics and partnership building.
- FAO **networks and convenings** engage countries, banks and partners for national and regional collaboration in assessing opportunities for Food Security Green Bonds and similar instruments.

Source: Authors' own elaboration.

- **FAO's Hand-in-Hand Initiative** supports countries in developing agrifood systems investment plans by providing geospatial modeling and analytics paired with robust partnership-building to accelerate market-based transformation of agrifood systems. Launched in 2019, the initiative currently supports 80 countries worldwide, including Cambodia which prepared a USD 1.2 billion investment plan for priority value chains (rice, cashew, mango, aquaculture) and the Philippines which developed a USD 1 billion investment plan for key crops (seaweed, mango, arabica, bamboo) (FAO, 2026c).
- FAO also **engages national, regional and global partners** to bring the latest science, research and advisory expertise to support countries interested to develop green bonds for agriculture. FAO **networks and convenings** have enabled national and regional collaboration and knowledge sharing between countries, banks and partners to assess opportunities for Food Security Green Bonds (FAO, 202d5) and similar instruments (FAO, 2025e).

Technical support needs identified by countries, banks and partners

During a regional knowledge exchange held in Viet Nam in March 2025, governments, public financial institutions and partners in the Asia and the Pacific region identified key challenges and technical assistance needs for utilizing green bonds to accelerate investment in sustainable, climate resilient agriculture, as well as opportunities for regional collaboration. Shared challenges include:

- the extra costs of issuing a green bond, particularly for first-time issuers, such as costs associated with developing the green bond framework, external review, advisory fees, marketing and investor outreach, monitoring and reporting requirements, and internal capacity building for effective management and implementation of a green bond;
- the complexity of the green bond issuance process, which adds steps and requirements beyond those associated with a conventional bond; and
- difficulty identifying eligible expenditures and feasible projects to be financed by a green bond, particularly to support smallholder farmers and small-scale producers in adopting climate-smart practices and technologies.

To help address these challenges and support countries in various stages of readiness for green bonds, participants in the knowledge exchange highlighted opportunities for regional capacity strengthening initiatives to:

- assist countries in designing green bond products that deliver sustainable finance to smallholder farmers, small-scale producers and agri-SMEs, aligned with national and regional priories for climate-resilient, low-emission agrifood systems;
- develop innovative mechanisms to de-risk private investment in climate-resilient agriculture and food security, such as guarantees, concessional financing and grant-funded collateral financing;
- engage international partners to bring science, research and advisory expertise to support countries in developing and issuing Food Security Green Bonds and similar instruments; and
- enhance regional collaboration and knowledge sharing of experiences and strategies for issuing green bonds targeting sustainable agriculture and food security, helping to reduce the complexity and associated costs.

"Our efforts to transition to sustainable, climate-resilient and low-emission agricultural practices are more important than ever. But achieving this vision will require innovation not only in farming practices but also in mobilizing finance at scale – especially to support our smallholder farmers and agri-SMEs."

– Dr. Nguyen Do Anh Tuan, Director General of the International Cooperation Department, Ministry of Agriculture and Environment

During the March 2025 regional knowledge exchange, an ASEAN Green Bond for Sustainable Agriculture was proposed to catalyse finance for climate-resilient, low-carbon agrifood systems aligned with ASEAN strategies and guidelines, as summarized in **Annex 3**.

For governments and public financial institutions interested to develop Food Security Green Bonds and similar instruments to support implementation of national priorities for climate-smart agriculture and agrifood systems, **Part 2** of this report provides:

- ➜ models for designing public-led instruments, with examples from recent bond issuances illustrating each model;
- ➜ considerations for planning a Food Security Green Bond or a broader green or sustainability bond that includes agriculture sector projects;
- ➜ initial guidance for developing a Green Bond Framework, with examples from recent issuances highlighting good practices;
- ➜ an overview of the Climate Bonds Agriculture Criteria and a simplified version of the Agriculture Production Criteria that issuers can draw from in developing use of proceeds for a bond; and
- ➜ proven strategies for reaching smallholders and small-scale producers with bond proceeds, with examples from innovative issuances globally.

Food Security Green Bonds are innovative instruments designed to support implementation of national priorities for climate-smart agriculture and agrifood systems transformation, including a focus on delivering finance to smallholder farmers, small-scale producers and agri-SMEs for adopting climate-smart practices, approaches and technologies at scale.

PART 2

DESIGNING AND ISSUING A FOOD SECURITY GREEN BOND

MODELS AND EXAMPLES FOR PUBLIC-LED INSTRUMENTS

This section provides initial guidance for developing Food Security Green Bonds and similar instruments to accelerate private sector investment in agrifood systems transformation, including a focus on delivering finance and associated support to smallholder farmers, small-scale producers and agri-SMEs for adopting CSA practices, approaches and technologies at scale.

Food Security Green Bonds and similar instruments can be structured in various ways to support implementation of national priorities, programmes and plans. Six potential models include:

1. A sovereign bond funding national programme implementation.
2. A sub-sovereign bond funding subnational programme implementation.
3. A quasi-sovereign bond funding national programme implementation.
4. A quasi-sovereign bond providing loans with technical assistance to implement national strategies.
5. Private financing with public support to implement national strategies.
6. A regional bond with public support to implement multi-country regional priorities.

These models are described below with relevant examples from issuances in Asia and the Pacific and globally.

Model 1
Sovereign bond funding national programme implementation

Issued by a national government, with bond proceeds allocated through the national budget to implement a national programme for climate-smart agriculture and agrifood systems.

Example: Indonesia Sovereign Green Sukuk (2018)

- **Overview**: The world's first sovereign green sukuk, issued in 2018 that raised USD 1.25 billion with a 5-year tenor (2023) and coupon rate of 4.875 percent, listed on the Singapore Stock Exchange and Nasdaq Dubai.
- **Issuer:** Republic of Indonesia, Ministry of Finance
- **Use of proceeds:** Advancing Indonesia's NDC, proceeds were allocated through the national budget managed by the Ministry of Finance and then disbursed to the Ministry of Agriculture and other ministries responsible for implementing eligible green projects. In the agriculture sector, eligible projects included developing sustainable agriculture management and methods such as organic farming, reduced pesticide use, R&D on climate resilient seeds, and energy efficiency in agriculture, as well as subsides for agricultural insurance (Ministry of Finance, Republic of Indonesia and UNDP, 2020).

Model 2
Sub-sovereign bond funding subnational programme implementation

Issued by a state, provincial or municipal government, with bond proceeds allocated through the subnational government budget to implement a local programme for climate-smart agriculture and agrifood systems.

Example: Viet Nam Municipal Green Bonds (2016)

- **Overview**: Municipal green bonds issued under a Ministry of Finance pilot project approved in 2016. The People's Committee of Ba Rai Vung Tau Province issued a 5-year bond that raised VND 80 billion (approximately USD 4 million) with a coupon rate of 6 percent, and the Ho Chi Minh City Finance and Investment State-Owned Company issued a 15-year bond that raised VND 523.5 billion (approximately USD 23 million) with a coupon rate of 6.5 percent. Both bonds were listed on the Hanoi Stock Exchange.
- **Issuer:** People's Committee of Ba Rai Vung Tau Province and Ho Chi Minh City Finance and Investment State-Owned Company (local government entities).
- **Use of proceeds:** **Aligned with Viet Nam's national climate adaptation and sustainability goals**, proceeds flowed directly into the provincial government budget for implementation of 11 approved green projects for sustainable water management, climate change adaptation and sustainable infrastructure (Climate Bonds Initiative and ClimateWorks Foundation, 2019).

Model 3
Quasi-sovereign bond funding national programme implementation

Issued by a public financial institution or other quasi-sovereign entity, with bond proceeds allocated to implement a national programme for climate-smart agriculture and agrifood systems, with oversight by a national ministry.

Example: India NABARD Social Bond (2023)

- **Overview**: A social bond issued in 2023 that raised INR 1 040 crore (approximately USD 125 million) with a 5-year tenor (2028) and coupon rate of 7.63 percent, listed on the Bombay Stock Exchange.
- **Issuer:** National Bank for Agriculture and Rural Development (NABARD), a government-owned development finance institution that plays a key role in India's rural development financing.
- **Use of proceeds:** Proceeds were allocated to subnational governments and agencies **to implement India's national flagship programme for safe and sustainable rural drinking water**, with oversight and management by the Ministry of Jal Shakti (Ministry of Water Resources) (Spirit of Mumbai, 2023).

Model 4
Quasi-sovereign bond providing loans with technical assistance to implement national strategies

Issued by a public financial institution or other quasi-sovereign entity, with bond proceeds allocated to providing loans to beneficiaries paired with technical assistance to support adoption of climate-smart practices, as called for by national strategies.

Example: Mexico FIRA Green Resilience Bond for Agriculture (2023)

- **Overview**: A sustainability bond blending green and social objectives, issued in 2023 that raised MXN 2.8 billion (approximately USD 155 million) with a 3-year tenor (2026), listed on the Mexican Stock Exchange (Mexico Business News, 2023).
- **Issuer:** *Fideicomisos Instituidos en Relación con la Agricultura* (FIRA), a second-tier development bank supporting the agriculture, livestock, fishing, forestry and agribusiness sectors in Mexico.
- **Use of proceeds:** **Aligned with Mexico's Sustainable Finance Mobilization Strategy**, proceeds were allocated to projects that improve the resilience of agricultural producers and agrifood value chains, targeting climate-smart practices such as no-till farming, integrated soil fertility management, water conservation and water efficient infrastructure. Loans are paired with technical assistance to ensure that farmers and agri-SMEs can effectively adopt new practices and technologies. Technical assistance includes training, capacity building, advisory services, and project management and monitoring services to support producers, companies and financial intermediaries in implementing projects for agrifood system resilience (FIRA Sustainable Bond Framework, 2024).

Model 5
Private financing with public support to implement national strategies

Issued by a private entity with significant public support, with bond proceeds allocated to implement national strategies for climate-smart agriculture and agrifood systems.

Example: Viet Nam IDI Sao Mai Green Bond (2024)

- Overview: Overview: The first green bond for seafood in Asia, issued in 2024 that raised VND 1,000 billion (approximately USD 40 million) with an 8-year tenor (2032) and a record low 5.58% coupon rate, listed on the domestic market (Spirit of Mumbai, 2023).
- Issuer: International Development and Investment Corporation, asubsidiary of Sao Mai Group and a leading sustainable fish export company in Viet Nam (IDI Sao Mai)
- Use of proceeds: Advancing Viet Nam's Green Growth Strategy and Action Plan and the country's broader net-zero target by 2050, proceeds were allocated to sustainable aquaculture infrastructure, environmentally friendly fish farming and processing practices, and adherence to international standards, including the Aquaculture Stewardship Council (ASC) and Best Aquaculture Practices (BAP). The bond received significant public and multilateral institutional support through a guarantee provided by GuarantCo, a development finance institution working with the government, and technical assistance provided by the Global Green Growth Institute (GGGI), funded by the Government of Luxembourg through the Viet Nam Green Bond Readiness Program.

Model 6
Regional bond with public support to implement multi-country regional priorities

Issued by a regional development finance institution or through a special purpose vehicle (SPV), with bond proceeds allocated to implement regional priorities for climate-smart agriculture and agrifood systems.

Example: Green Rice Bond for Sub-Saharan Africa (planned issuance in 2026)

- **Overview**: An innovative regional bond to revolutionize the rice sector in Sub-Saharan Africa by catalysing development of local rice value chains to enhance farmer livelihoods and food security while reducing environmental impact. Starting with Kenya, Tanzania, Ghana and Senegal, an initial USD 25 million bond issued by a SPV will be privately placed in 2026, followed by a second issuance targeting USD 50 million with a potential public listing in 2028.
- **Partners:** Supported by donors and foundations through the SDG Impact Finance Initiative, Kenya's SDG Partnership Platform, and Convergence (a global blended finance network), the bond is being designed by iGravity (an impact investment manager) and Helvetas (an international non-governmental organization) (United Nations Kenya, 2025).
- **Use of proceeds: Aligned with regional priorities for sustainable rice production**, the bond aims to empower smallholder rice farmers with tailored finance and technical support for adoption of sustainable practices such as alternate wetting and drying (AWD), small-scale mechanization and improved water management to reduce methane emissions. It will promote gender inclusion by prioritizing women farmers, who comprise a significant portion of the agricultural workforce. Proceeds will also directly finance SMEs that manage processing, distribution and logistics in the rice value chain, as well as micro, small and medium-sized finance institutions that serve as "farmer-allied intermediaries" (FAIs) to smallholders, cooperatives and communities.

  The bond includes an attached grant-funded Technical Assistance Facility of USD 2.5 million for capacity-building activities to ensure adoption of climate-smart practices, which will improve productivity, reduce post-harvest losses and enhance product quality to create economic incentives for smallholders and to strengthen the region's value chains (Convergence, 2025). The bond also integrates circular economy principles, including utilization of by-products such as rice husks for biochar production.

  The bond is expected to benefit 1.5 million smallholder rice farmers and contribute to regional food security by promoting local production, reducing imports and fostering sustainability through adoption of climate-smart practices. Drawing on the above models and examples, issuers can develop Food Security Green Bonds or similar instruments following the initial guidance provided below. The guidance focuses on structing a bond aligned with the ICMA Green Bond Principles (GBPs), which are voluntary process guidelines used by 97% of issuers. (International Capital Market Association, 2025) Each step in the guidance includes examples from recent bond issuances illustrating good practices.

"This is an opportunity to move from reliance on grants to sustainable financing mechanisms. We need to shift from boutique grant funded projects that fizzle out once the grant funding stops, to scalable, long-term sustainable investments." – *Arif Neky, Founding Coordinator of the SDG Partnership Platform in Kenya*

Arif Neky (right) and Vimal Shah, Chairman of Bidco Africa, at the Green Rice Bond Launch in Nairobi in February 2025.

Drawing on the above models and examples, issuers can develop Food Security Green Bonds or similar instruments following the initial guidance provided below. The guidance focuses on structing a bond aligned with the ICMA Green Bond Principles (GBPs), which are voluntary process guidelines used by 97 percent of issuers. Each step in the guidance includes examples from recent bond issuances illustrating good practices.

PLANNING A FOOD SECURITY GREEN BOND

A green bond differs from a conventional bond in its alignment to the ICMA GBPs, which require the issuer to identify the types of green projects the bond will finance (use of proceeds) and how it will select those projects, manage the proceeds, and report on the allocation and impact of the proceeds. Sovereign and quasi-sovereign Food Security Green Bonds and similar instruments also align with national priorities for climate-smart agriculture and agrifood systems transformation. These linkages and requirements are described in a Green Bond Framework developed by the issuer with support from an internal team and external partners.

Supporting implementation of national priorities and pathways for agrifood system transformation

As a first step, the issuer should identify the strategic objectives that the bond aims to achieve, such as supporting implementation of a specific national policy or programme aligned with national climate action plans (e.g. a NDC or NAP). Strategically connecting the bond to country priorities for agrifood systems transformation enhances the bond's credibility and investor confidence, which can broaden and diversify the investor base. Issuers can also align the bond with national or regional sustainable finance taxonomies, which define green or sustainable activities or investments, further enhancing transparency and investor confidence in the bond.

BOX 7

Key questions to guide planning for a Food Security Green Bond

Define objectives aligned with national priorities

- Which national strategies or commitments will the bond contribute to?
- How will the bond support implementation of national policies, NDCs, NAPs or pathways for agrifood systems transformation?
- What priority areas, populations or value chains will the bond target?

Determine eligible green activities and frameworks

- What constitutes a "green" activity for the bond?
- Are there national or regional sustainable finance taxonomies that define eligibility?
- Which international standards or principles will the bond align with or draw from?

Identify potential projects and pipeline

- What existing or planned projects meet the bond's green eligibility criteria?
- How can TA or PPFs be used to build investment-ready project pipelines?
- How will smallholder farmers, small-scale producers and agri-SMEs be reached through these projects?

Source: Authors' own elaboration.

Engaging partners and establishing a green bond team

Once objectives of the bond are defined, the issuer engages entities responsible for those objectives to form a team for developing the Green Bond Framework. For sovereign issuers, this could occur through a committee comprising representatives from key ministries, such as Finance or Treasury, Agriculture, Environment and Planning Ministries, and defining roles for each ministry. For quasi-sovereign issuers such as state-owned banks, the internal team could include key departments including Treasury, Sustainability and Loan Administration responsible for structuring and managing proceeds, as well as lending units and bank branches that will promote the bond's loan programmes locally and disburse funds to smallholder farmers, small-scale producers and agri-SMEs.[2] Central banks also play key roles in promoting green finance (see **Box 8**) and can support planning, development and issuance of sovereign and quasi-sovereign bonds, contributing technical expertise to the green bond team related to market opportunities and risk management, and in some cases serving as fiscal agents for sovereign issuers.

BOX 8

Examples of central bank support for green bonds in Asia and the Pacific

- **Bangladesh Bank:** Promotes green finance through refinancing schemes for green bond-eligible projects and issuing green banking guidelines encouraging financial institutions to support environmental investments.
- **Reserve Bank of India:** Strengthens financial sector climate resilience through climate-related disclosure frameworks, encouraging green bond issuance by improving transparency and risk assessment for sustainable investments.
- **Bangko Sentral ng Pilipinas:** Fosters green bond market growth by providing Sustainable Finance Framework guidelines and offering incentives for green bond-related project financing.
- **Bank Negara Malaysia:** Supports green bond development through a Climate Change and Principle-based Taxonomy and including a green sukuk identifier in its automated issuance system, facilitating market transparency.
- **Bank Indonesia:** Incentivizes green financing through policies allowing banks to fulfill inclusive financing requirements by purchasing green bonds and actively supports development of green sukuk.
- **ASEAN Central Bank Governors:** Together with ASEAN Finance Ministers, endorses the ASEAN Green Bond Standards and Sustainable Finance Taxonomy to catalyse green bonds region-wide.

Source: Authors' own elaboration.

Once the team is formed, it can engage external advisors and partners to support bond development and issuance. These include entities to independently review the Green Bond Framework and its alignment with the GBPs and to provide a second party opinion (SPO) for the bond, enhancing its credibility for investors. Financial advisors can support bond structuring, market assessment and investor outreach, and technical assistance partners can provide capacity strengthening for the issuer and team in developing the Green Bond Framework and building investment-ready pipelines of projects for bond funding. Advisors and partners for Food Security Green Bonds and similar instruments could include FAO, MDBs such as the World Bank and ADB, other United Nations organizations, Climate Bonds Initiative and additional partners supporting sustainable finance for agrifood systems transformation. An illustrative team for developing a sovereign Food Security Green Bond is summarized in **Table 2**.

2 The International Finance Corporation (IFC) provides a Green Bond Handbook designed specifically to support banks, available here: https://documents1.worldbank.org/curated/en/099854406222232086/pdf/IDU07c8498af092330405d0b43101bc10ba9c88d.pdf

Table 2. Example team for developing a sovereign Food Security Green Bond

Entity	Role and responsibilities
Ministry of Finance or Treasury	Overall coordination for Green Bond Framework development, financial structuring, proceeds management, allocation reporting, legal compliance, investor relations.
Ministry of Environment or Climate Change	Definition of green eligibility criteria, alignment with national climate change policies and plans (e.g. NDCs, NAPs), technical assessment of environmental benefits, environmental impact monitoring.
Ministry of Agriculture or Food Security	Identification of eligible agriculture and agrifood system projects, technical assessment of climate-resilient agriculture practices, alignment with food security goals, social co-benefits assessment.
Ministry of Planning or Development	Integration of the green bond programme with national development plans, strategic oversight, long-term impact assessment.
Central Bank	Technical expertise on market opportunities and risk management, may serve as a fiscal agent to facilitate operational aspects of bond issuance.
Legal counsel (internal or external)	Drafting and review of legal documentation, ensuring compliance with national and international securities laws.
Financial advisor (external)	Financial expertise on market conditions, bond structuring, transaction terms, credit rating presentations, investor outreach.
Second Party Opinion provider, verifier or certifier (external)	Independent external review of the Green Bond Framework's alignment with principles and standards (e.g. ICMA GBPs, Climate Bonds Standard) and validation or certification of project eligibility and processes.
Underwriters	Financial institutions that facilitate the bond issuance process, including structuring, pricing, market placement and distribution of the bond to investors.
Investor relations team	Managing communications with investors, conducting roadshows, addressing investor inquiries, maintaining transparency.
Technical assistance partners (e.g. FAO, MDBs)	Supporting development of the Green Bond Framework, identification of eligible expenditures for sustainable agriculture and food security, or methodologies for tracking and reporting impact.

Source: Authors' own elaboration.

An illustrative team for developing a quasi-sovereign green bond can be found in the example provided by Thailand's Bank for Agriculture and Agricultural Cooperatives (BAAC), which engaged key internal and external partners to support the development and issuance of its green bond in 2020, as summarized in **Table 3**.

Table 3. Example team for developing a quasi-sovereign green bond for sustainable agriculture, from Thailand's BAAC Green Bond

Entity	Role and responsibilities
Ministry of Finance (MoF)	BAAC is 99.8 percent owned by the MoF, which supported BAAC in the underwriter selection process.
Public Debt Management Office (PDMO), MoF	The PDMO joined BAAC in the bidding process for selecting the underwriters.
Securities and Exchange Commission (SEC)	Thailand's SEC provided approval for the green bond and capacity building support to BAAC employees through a 'Green Bond Bootcamp' organized with the UK Prosperity Fund under the ASEAN Low Carbon Energy Programme and EY Singapore.
ASEAN Low Carbon Energy Programme (ALCEP)	Under the UK Prosperity Fund, ALCEP provided technical assistance support to BAAC through the green bond issuance process.
British Embassy in Bangkok	The British Embassy supported BAAC during the external review process by engaging EY Singapore to conduct pre- and post-issuance assessments.
HSBC, Government Savings Bank, Krungthai Bank	Selected to serve as underwriters, this group of banks supported bond structuring and communication of the issuance to target investors.
BAAC branches nationwide	The BAAC head office engaged its 1 272 branches across Thailand to promote the green bond's loan programs locally and to disburse funds to farmers.
EY Singapore (external reviewer)	Provided an independent Second Party Opinion confirming the bond's alignment with ICMA Green Bond Principes and the ASEAN Green Bond Standards.

Source: Authors' own elaboration.

Aligning with international standards and criteria

In addition to aligning with the ICMA GBPs and national or regional taxonomies, issuers can consider aligning green bonds with international standards such as the Climate Bonds Standard, which offers a certification for issuers seeking additional climate credibility and sector-specific guidance (see the section on Climate Bonds Agriculture Criteria available to support use of proceeds for additional information). *Mexico's Fideicomisos Instituidos en Relación con la Agricultura* (FIRA) was the first entity globally to issue bonds certified under the Climate Bonds Agriculture Criteria, as summarized below.

For Food Security Green Bonds that include nature-based solutions (NbS), issuers can also consider alignment with ICMA Nature Bond Guidance issued in June 2025. The guidance includes a category for bonds targeting sustainable forestry and agribusiness land management and production practices, including projects that conserve and restore biodiversity, natural ecosystems or the services they provide within productive agricultural landscapes. Also included are projects that regenerate soil, reduce agrichemical input use, sustainably improve productivity or reduce crop losses, produce alternative proteins, promote deforestation- and conversion-free (DCF) practices, restore degraded landscapes with native or naturalized species or enable natural assisted regeneration, use diversified crops, and promote sustainable non-timber forest products.

Example: Certified agricultural green bonds issued by Mexico's FIRA (2018–2019)

Mexico's Trust Funds for Rural Development (FIRA) is a pioneer in certified agricultural green bonds and was the first entity to use the Climate Bonds Protected Agriculture Criteria. FIRA issued two green bonds in 2018 and 2019 to support climate-smart agriculture, including greenhouses and protected agriculture, sustainable irrigation systems, solar projects and sustainable forestry. Together the bonds raised MXN 5 billion (approximately USD 260 million) and targeted proceeds to smallholder farmers, aggregating small loans to finance small-scale, low-carbon and climate-resilient assets and practices (Global Center on Adaptation, 2021). The Climate Bonds certification demonstrated that the bonds met climate change adaptation, mitigation and resilience requirements for both water and protected agriculture. An assessment methodology supported by the Inter-American Development Bank (IDB) demonstrated the environmental and social benefits of bond-funded activities, including increased productivity, reduced vulnerabilities and GHG emissions, and improving efficiency in water, energy and input use (Pratt and Ortega, 2019). FIRA's reporting in the IDB Green Bond Transparency Platform provides an example of how to present harmonized and standardized allocation and impact reporting for projects benefiting smallholder farmers (IDB, 2025a).

For Food Security Green Bonds that include nature-based solutions (NbS), issuers can also consider alignment with ICMA Nature Bond Guidance issued in June 2025. The guidance includes a category for bonds targeting sustainable forestry and agribusiness land management and production practices, including projects that conserve and restore biodiversity, natural ecosystems or the services they provide within productive agricultural landscapes. Also included are projects that regenerate soil, reduce agrichemical input use, sustainably improve productivity or reduce crop losses, produce alternative proteins, promote deforestation- and conversion-free (DCF) practices, restore degraded landscapes with native or naturalized species or enable natural assisted regeneration, use diversified crops, and promote sustainable non-timber forest products (ICMA, 2025).

DEVELOPING THE GREEN BOND FRAMEWORK

Following initial planning for the bond, the team develops a Green Bond Framework to describe eligible green expenditures (use of proceeds), a process for project evaluation and selection, management of proceeds, and reporting on the allocation and impact of proceeds. The Green Bond Framework is the key document that the external reviewer uses to determine whether the bond complies with the ICMA GBPs and any other selected criteria, standards or taxonomies. Issuers typically publish and use their Green Bond Framework, paired with the external review, as marketing documents to engage investors.

Sovereign issuers often develop broader frameworks for their green or sustainability bond issuances, specifying types of projects that can be financed across a number of sectors (which can include agriculture), enabling multiple bonds to align with the framework.

Five sections of the Green Bond Framework are described below with examples from recent issuances illustrating good practices.

Section 1

Introduction

This initial section of the Green Bond Framework introduces the issuer to potential investors, providing an overview of the issuer's organization, mission and strategic vision. It also provides context for the bond by describing its alignment with national programmes or policies for climate-smart agriculture and agrifood systems, as well as relevant objectives in the country's national climate action plans. The introduction also specifies any taxonomies, standards or certifications that the bond aligns with, ensuring investors understand the criteria that will govern use of proceeds and anticipated bond impact.

Example: Indonesia Sovereign Green Bond (2023)

The Government of Indonesia is an active issuer of sovereign green bonds in domestic and international markets, with more than USD 11 billion in green, blue and sustainability bond and sukuk issuances since 2018. In 2023, Indonesia issued a USD 1 billion green bond with proceeds allocated to green investments including agricultural infrastructure for efficient water management, financing programs for agri-SMEs and R&D for sustainable agricultural practices. The excerpt below from Indonesia's framework guiding its 2023 green bond and other green, blue and sukuk issuances provides an example for how an **Introduction section** can clearly present the issuer's mission, vision and goals, as well as the principles and standards that the framework aligns with (Republic of Indonesia, 2021).

Figure 2. Example Introduction section

1.1 Introduction

Over 30 years, Indonesia has made significant economic progress – as indicated by its real GDP which has nearly quadrupled from USD 794.027 Billion (constant 2010, constant PPP) in 1990 to USD 3.046 Trillion (constant 2010, constant PPP) in 2018 (OECD, 2019). Indonesia's real GDP is projected to keep growing at USD 5.163 Trillion in 2030 (constant 2010, constant PPP), which will place Indonesia among the five most powerful economies in 2030. This is in line with Indonesia Vision 2045 in which Indonesia is estimated to be a high-income country in 2036 and the 5th largest GDP in 2045. This notable economic progress has been followed by an improvement in standards of living – shown by the steady increase in real GDP per capita, as well as the enormous reduction in poverty rate by more than half from 23.4% in 1999 to 9.78% in 2020, qualifying the country to reach the upper middle-class status.[4]

Background about the issuer's identity

Indonesia has a pivotal role to play in combating climate change. Its extensive tropical landscape and seascape with high biodiversity, high carbon stock values and energy and mineral resources are all contributing factors for the nation to be at the forefront of climate action and environmental protection. On the other hand, Indonesia's close position to the global ocean conveyor system makes it particularly vulnerable to natural disasters that will likely be exacerbated by climate change. Understanding such an important role and responsibility, Indonesia is strongly devoted to combating climate change and accordingly has made a number of commitments to step up its climate change adaptation and mitigation priorities.

Mission statement

Indonesia has developed a strong commitment to successfully implement the SDGs and achieving the 2030 Development Agenda. The action plans and roadmap serve as important tools to guide all stakeholders on the directions and targets of the Indonesian 2030 agenda and requires strong collaboration among stakeholders and commitments in both project implementation and financing (see appendix 2 for the implementation plan).

Strategic vision and how this aligns to overarching goals of the country

Green and SDGs Securities issued under the Framework will be aligned to the respective applicable market standards:

- 2021 Green Bond Principles (footnote 10) ("GBP"), 2021 Social Bond Principles (footnote 11) ("SBP") and 2021 Sustainability Bond Guidelines (footnote 12) ("SBG") or as they may subsequently be updated.
- Green Bond Standards ("GBS"), Social Bond Standards ("SBS") and Sustainable Bond Standards ("SuBS") from the ASEAN Capital Markets Forum ("ACMF").

Clear structure with reference to principles that govern the framework

Each Green and SDGs Securities will adopt:
1) Use of proceeds;
2) Process for project evaluation and selection;
3) Management of proceeds; and
4) Reporting

Source: Authors' own elaboration.

Section 2
Use of Proceeds

The cornerstone of a green bond is the allocation of proceeds to eligible green projects. In this section of the Framework, the issuer describes eligible expenditures and projects that contribute to climate-smart agriculture and agrifood systems transformation, aligned with any selected taxonomies, standards or criteria for the bond. Eligible projects may include, for example:

- CSA practices that improve soil health, reduce GHG emissions and enhance carbon sequestration.
- Efficient water management and irrigation systems that reduce water use and increase climate resilience.
- Organic farming and reduction of synthetic inputs (e.g. fertilizers, pesticides).
- Sustainable land management, agroforestry, reforestation and afforestation linked to agriculture.
- Financing of infrastructure for climate-smart agriculture (e.g. renewable energy-powered irrigation, cold storage facilities).
- Projects supporting biodiversity conservation, nature-based solutions and protection of ecosystem services in agricultural landscapes.

Example: Colombia Sovereign Green Bond (2021)

Colombia issued a 10-year sovereign green bond in 2021 that raised COP 750 billion (approximately USD 200 million) to fund a portfolio of 27 eligible projects including sustainable, low-emission agriculture adapted to climate change (Green Finance for Latin America and the Caribbean, 2021). The **Use of Proceeds section** in Colombia's Green Bond Framework defined eligible green categories and projects with clear linkages to SDGs and associated environmental goals (Republic of Colombia, Ministry of Finance and Public Credit, 2021).

Figure 3. Example of eligible green categories and projects

Green category	Definition and types of eligible green projects in Colombia[19]	SDG and associated environmental goal
Non-conventional energy sources, energy efficiency, and connectivity	» Generation, improvement, and access to energy from non-conventional sources* (solar, wind, and other) **See footnote at the end** » Energy efficiency or connectivity » Policy, laws and research on energy transition » Energy transmission from non-conventional sources » Energy storage	**ODS:** 7, 11 and 13 » Mitigation » Pollution prevention and control
Ecosystem services and biodiversity	» Reforestation, deforestation control, and forest governance » Protection, conservation and sustainable use of biodiversity and ecosystem services » Protection and conservation of natural resources management » Management of ecosystems associated with water provisioning » Research and capacity building for the management of ecosystem services and biodiversity	**ODS**: 3, 6, 14 and 15 » Adaptation » Conservation and management of natural resources » Biodiversity conservation
Sustainable agricultural production, with low emissions and adapted to climate change	» Silvo-pastoral and agroforestry systems » Other primary low emission production activities » Protection against climate risks » Agroclimatic information and early warning systems » Sustainable commercial reforestation or soil restoration » Sustainable agricultural production focused on protecting ecosystems, biodiversity and water resources » Sustainable or low impact agriculture	**ODS:** 2, 6, 12, 13 and 15 » Adaptation » Mitigation » Pollution prevention and control » Conservation and management of Natural Resources

Identification of eligible categories for use of proceeds

Clear description of eligible project types

Alignment with key SDGs and goals

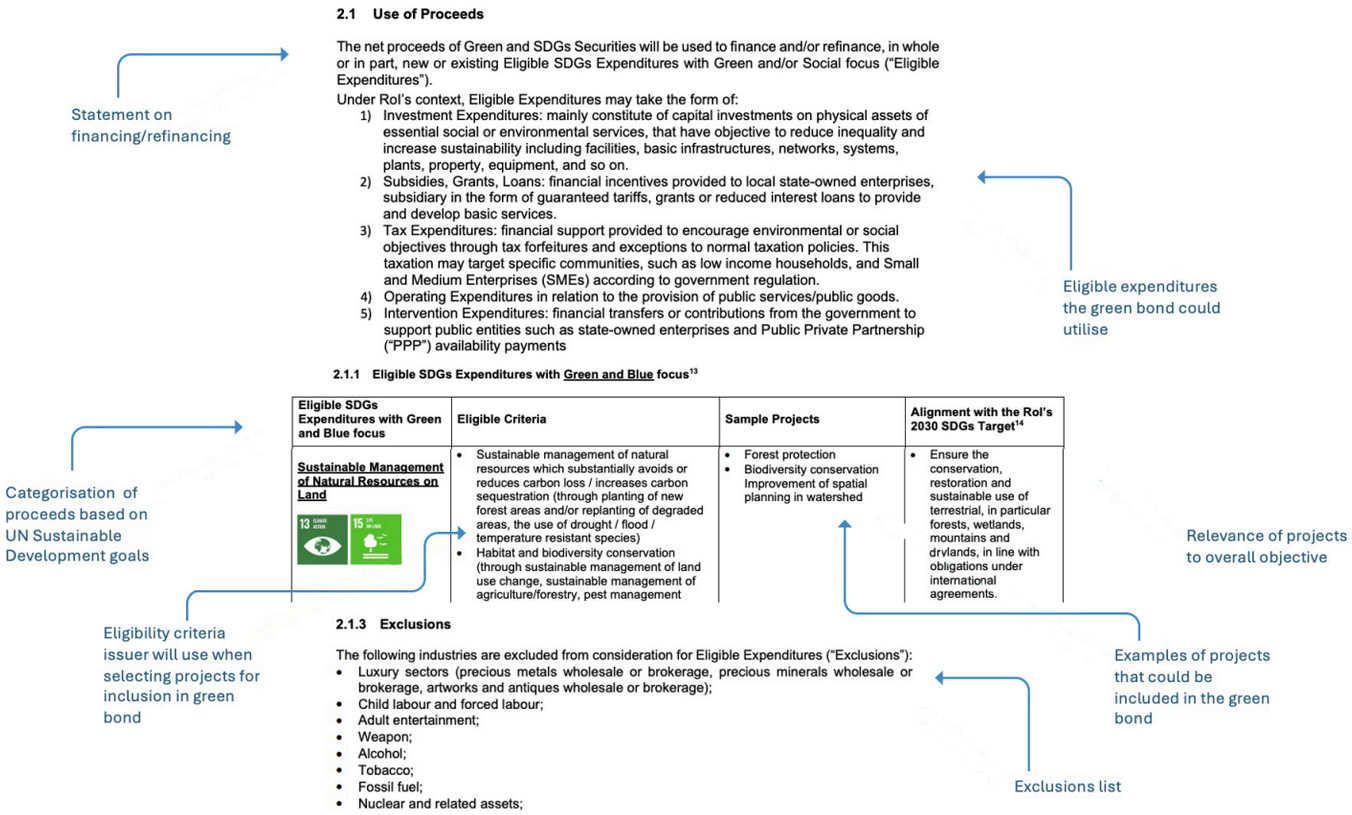
Source: Authors' own elaboration.

Issuers should clarify in the Use of Proceeds section the extent to which proceeds will refinance previously implemented agricultural projects or assets, stating the age range of those assets (i.e. the expected look-back period) and their eligibility criteria. In addition, the issuer should specify activities or sectors that are explicitly excluded from financing, such as conventional agricultural practices that cause environmental harm or projects leading to deforestation or biodiversity loss. Issuers can also refer to established resources such as the IFC Exclusion List (International Finance Corporation, 2007).

Example: Indonesia SDGs Government Securities Framework (2021)

The **Use of Proceeds section** in Indonesia's framework for sovereign green, blue and sukuk issuances defines the types of investments that may be supported and criteria that will be used to assess whether projects are eligible for inclusion. It also describes sample projects that may be financed with use of proceeds and how they align with national objectives, targets and commitments (Republic of Indonesia, 2021).

Figure 4. Example Use of Proceeds section



2.1 Use of Proceeds

The net proceeds of Green and SDGs Securities will be used to finance and/or refinance, in whole or in part, new or existing Eligible SDGs Expenditures with Green and/or Social focus ("Eligible Expenditures").

Under RoI's context, Eligible Expenditures may take the form of:

1) Investment Expenditures: mainly constitute of capital investments on physical assets of essential social or environmental services, that have objective to reduce inequality and increase sustainability including facilities, basic infrastructures, networks, systems, plants, property, equipment, and so on.
2) Subsidies, Grants, Loans: financial incentives provided to local state-owned enterprises, subsidiary in the form of guaranteed tariffs, grants or reduced interest loans to provide and develop basic services.
3) Tax Expenditures: financial support provided to encourage environmental or social objectives through tax forfeitures and exceptions to normal taxation policies. This taxation may target specific communities, such as low income households, and Small and Medium Enterprises (SMEs) according to government regulation.
4) Operating Expenditures in relation to the provision of public services/public goods.
5) Intervention Expenditures: financial transfers or contributions from the government to support public entities such as state-owned enterprises and Public Private Partnership ("PPP") availability payments

2.1.1 Eligible SDGs Expenditures with Green and Blue focus[13]

Eligible SDGs Expenditures with Green and Blue focus	Eligible Criteria	Sample Projects	Alignment with the RoI's 2030 SDGs Target[14]
Sustainable Management of Natural Resources on Land	• Sustainable management of natural resources which substantially avoids or reduces carbon loss / increases carbon sequestration (through planting of new forest areas and/or replanting of degraded areas, the use of drought / flood / temperature resistant species) • Habitat and biodiversity conservation (through sustainable management of land use change, sustainable management of agriculture/forestry, pest management	• Forest protection • Biodiversity conservation Improvement of spatial planning in watershed	• Ensure the conservation, restoration and sustainable use of terrestrial, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

2.1.3 Exclusions

The following industries are excluded from consideration for Eligible Expenditures ("Exclusions"):

- Luxury sectors (precious metals wholesale or brokerage, precious minerals wholesale or brokerage, artworks and antiques wholesale or brokerage);
- Child labour and forced labour;
- Adult entertainment;
- Weapon;
- Alcohol;
- Tobacco;
- Fossil fuel;
- Nuclear and related assets;

Source: Authors' own elaboration.

Section 3
Project Evaluation and Selection

Building on the eligibility criteria for use of proceeds, this section of the Framework documents the evaluation and selection process for eligible green projects. This includes describing the governance structure and teams responsible for project assessment, the roles and responsibilities of relevant teams and individuals in project evaluation and decision-making, and internal procedures for identifying, screening and approving projects that meet the eligibility criteria. The Project Evaluation and Selection section also outlines methods for identifying and managing potential environmental, social or governance risks and describes measures to mitigate and monitor potential risks. Two examples of Green Bond Frameworks that provide clear, well-structured approaches for project evaluation and selection are provided below.

Example: Fiji Sovereign Green Bond (2017)

The **Project Evaluation and Selection section** from the framework for Fiji's sovereign green bond describes a transparent process for evaluating and selecting projects aligned with Fiji's national climate change and sustainable development objectives. It identifies the committee responsible for overseeing the process, roles and responsibilities of committee members and individuals, and a methodology to ensure alignment with the framework's eligibility criteria (Republic of Fiji, 2017).

Figure 5. Example Project Evaluation and Selection section

2. Process for Project Evaluation and Selection

Identification of committee representatives to oversee process

Fiji has established a Green Bond Steering Committee, consisting of regulators and representation from the Ministry of Economy, the Office of the Attorney-General and includes environment experts, to oversee the Green Bond implementation and allocation process as per the adopted Framework.

The project identification process is managed by the Director of Climate Change, Ministry of Economy, who is responsible for coordinating with the Chief Accountant, Director, Debt Management Unit, Ministry of Economy and the Governor of the Reserve Bank of Fiji, and with all line ministries in identifying potential green expenditures. The Ministry of Economy has ultimate responsibility for determining the list of Eligible Projects, while line ministries must promptly respond to requests for any further information to verify eligibility.

Responsability of each stakeholder defined

The Director of Climate Change will assess and recommend to the Steering Committee potential Eligible Projects in line with:

Underlying methodology to ensure alignment with framework and government objectives

(a) The identified Eligible Sectors defined in this Framework and Fiji's climate change and environment policy;

(b) The Fijian Government's budget commitments, ensuring they are not double counted;

(c) The projected timeline of investment and its fit with the Green Bond time horizon; and

(d) Capacity to provide reporting in compliance with this Framework's requirements.

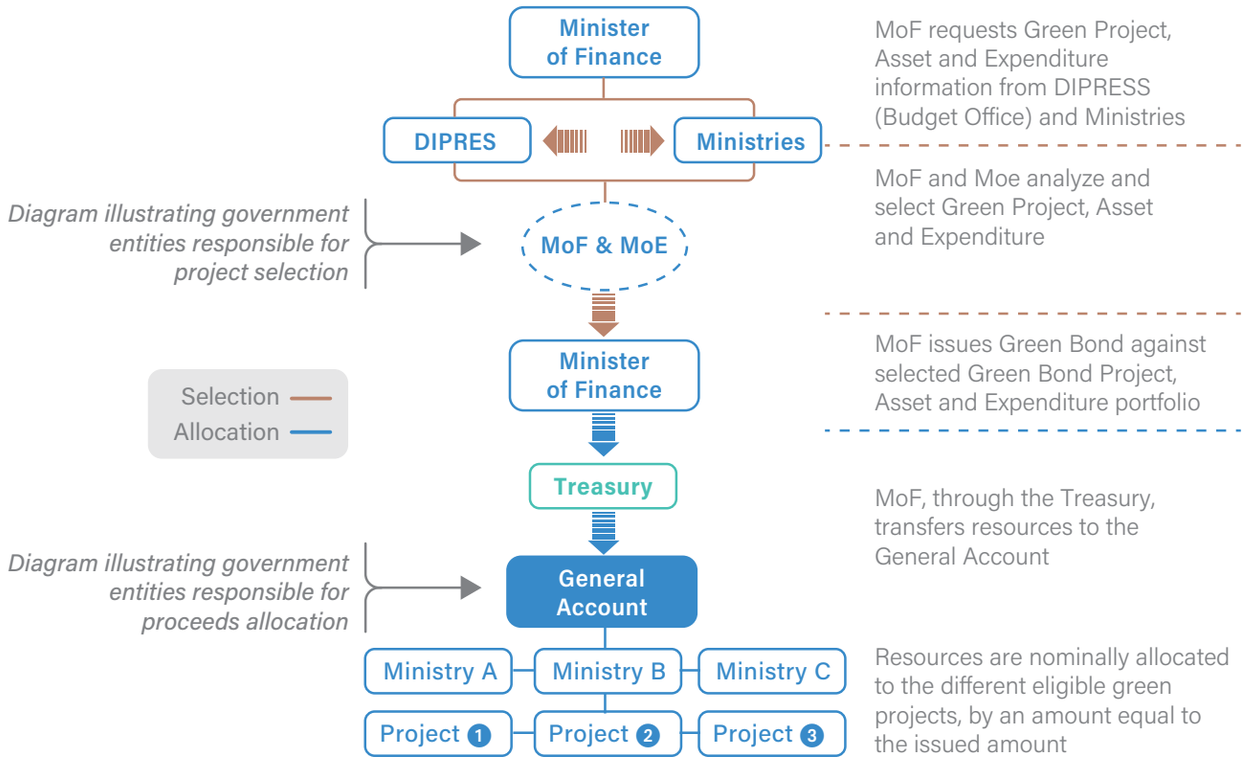
Line ministries must promptly respond to requests for any further information to verify eligibility. While the Steering Committee will endorse potential Eligible Projects, the Ministry of Economy has ultimate responsibility for determining the list of Eligible Projects.

Source: Authors' own elaboration.

Example: Chile Sovereign Green Bond (2019)

In 2019, Chile became the first sovereign issuer of green bonds in the Americas, issuing a USD 950 million green bond certified by the Climate Bonds Initiative. Use of proceeds supported clean transportation, energy efficiency, renewable energy, living natural resources, sustainable land use, marine protected areas, water management and green buildings, contributing to the government's target to reduce GHG emissions by 30 percent by 2030 (Environmental Finance, 2020). The **Project Evaluation and Selection section** from Chile's Green Bond Framework defines the governance structure and institutional responsibilities for project selection and proceeds allocation, assigning roles to specific ministries to ensure accountability and effective oversight (Republic of Chile, 2019).

Figure 6. Example governance structure for project selection and proceeds allocation



Source: Authors' own elaboration.

Section 4
Management of proceeds

Ayer outlining the process for project evaluation and selection, the issuer commits to tracking proceeds through a dedicated mechanism and describes how proceeds will be managed. This can be done through "ring-fencing," where proceeds are credited to a sub-account, transferred to a sub-portfolio or otherwise tracked using appropriate internal systems to ensure they are exclusively used for eligible projects or assets; or "earmarking," which allows the issuer to allocate an amount equal to the bond proceeds to eligible projects or assets and to estimate the proportion of financing and refinancing supported by the bond. The issuer should also state its intention to allocate proceeds within a defined timeframe (over 1-2 years) and describe how any unallocated proceeds will be temporarily invested, including the types of financial instruments that may be used and exclusions for temporary investments, such as those involving fossil fuels or polluting sectors.

Proceeds can be managed either on a bond-by-bond basis or aggregated across multiple green bonds under a portfolio approach, depending on the issuer's strategy. For sovereign green bonds, this often involves tracking capital allocations within government budgets, typically using a budget tagging mechanism. Such tagging can also be applied to future expenditures during the budget approval process, helping to streamline future green bond issuances by pre-identifying eligible green projects or expenditures. Two examples of Green Bond Frameworks that provide clear, transparent descriptions of proceeds management are provided on the following page.

Example: African Development Bank Green Bond (2024)

African Development Bank (AfDB) issued a USD 327 million green bond in 2024 to advance a ten-year strategy to support African countries in transitioning to green, inclusive growth. Use of proceeds include finance for CSA practices and technologies, agroforestry and soil carbon sequestration, financing for agri-SMEs, and microfinance to support sustainable business development and capacity building for farmers. The **Management of Proceeds section** of the AfDB Sustainable Bond Framework (which combines the Bank's prior Green and Social Bond Frameworks), describes a portfolio approach with a defined timeline for allocation and a process for investing unallocated proceeds (African Development Bank, 2023).

Figure 7. Example of Management of Proceeds section

2.3 Management of Proceeds

Proceed will be managed via a portfolio approach

The Bank will manage the proceeds of the Sustainable Bonds through a portfolio approach. An amount equal to the net proceeds of the Sustainable Bonds will be allocated to the Sustainable Project Portfolio in accordance with the Use of Proceeds eligibility criteria and selection process presented above. Over time, the Bank will strive to achieve a level of allocation for the Sustainable Project Portfolio which matches or exceeds the balance of net proceeds from the outstanding Sustainable Bonds. Additional Eligible Sustainable Projects will be added to the Portfolio to the extent required to ensure that an amount equal to the net proceeds from outstanding Sustainable Bonds will be allocated to Eligible Sustainable Projects.

Timeline of allocation

The net proceeds from the Sustainable Bonds will be kept within the Bank's treasury liquidity portfolio and will be allocated to the Sustainable Project Portfolio within 36 months. The Bank will ensure that the allocation of proceeds is tracked in an appropriate manner through an attested formal internal process that assures the link of an amount equal to the Sustainable Bonds net proceeds to lending operations to Eligible Sustainable Projects.

Process for unallocated proceeds

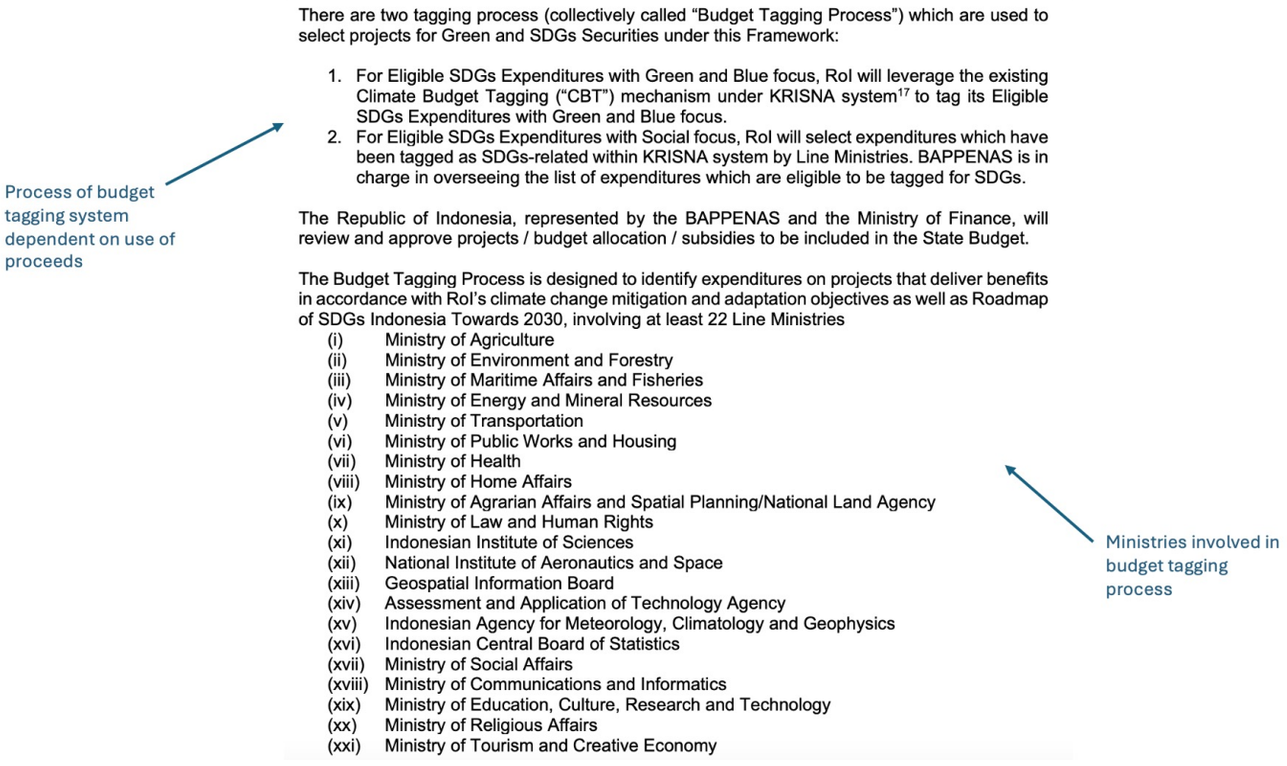
So long as the Sustainable Bonds are not fully allocated, the net proceeds from any Sustainable Bonds will be held in the Bank's liquidity treasury portfolio and invested under the same conservative investment guidelines as is done for general proceeds, which focuses on highly rated bond instruments.

Source: African Development Bank, 2023

Example: Indonesia SDGs Government Securities Framework (2021)

Indonesia's framework for sovereign green, blue and sukuk issuances describes a **climate budget tagging system** that supports management of proceeds contributing to climate change mitigation and adaptation. The environmental benefits of each project are assessed by line ministries and the Climate Change Secretariat of BAPPENAS (the Ministry of National Development Planning), validated by the Ministry of Environment and Forestry for alignment with Indonesia's national climate change commitments, and then officially "tagged" for budget allocation by the Ministry of Finance. Tagged projects are selected for funding under green bond and sukuk issuances (Republic of Indonesia, 2021).

Figure 8. Example climate budget tagging system for management of proceeds



Source: Authors' own elaboration.

Section 5
Reporting

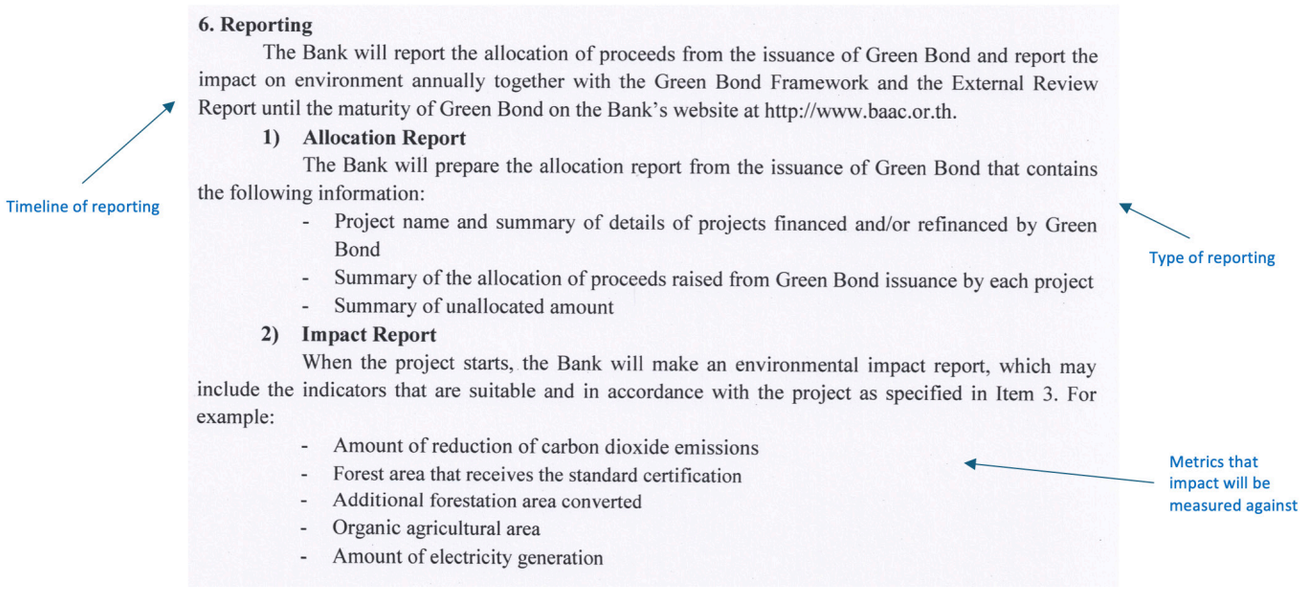
One of the most important elements of a green bond is reporting. In this section of the Framework, issuers commit to publishing annual reports until the proceeds are fully allocated and describe the types of reporting that will be provided, including allocation and impact reporting. For allocation reporting, the issuer should describe the process that will be used for annually reviewing the use of proceeds and plan to provide in allocation reports a list of projects that received allocations, brief descriptions of each project, the amount of proceeds allocated and the expected impact. For impact reporting, the issuer should provide qualitative and quantitative impact indicators related to the use of proceeds, such as GHG emissions reduced, agricultural area under enhanced management, water savings gained, or soil health improved.

Reporting also provides an opportunity for issuers to describe any unexpected developments affecting the use of proceeds, such as changes to the eligibility of assets or unforeseen events affecting allocation (e.g. climate shocks or severe weather events affecting crop harvests). Where confidentiality agreements, competitive considerations, or a large number of underlying projects limit the amount of detail that can be provided in reporting, information can be presented in generic terms or on an aggregated portfolio basis (e.g. percentage allocated to certain project categories). Examples of clear reporting descriptions from a Green Bond Framework and annual report are provided below.

Example: Thailand BAAC Green Bond (2020)

In the Green Bond Framework for its 2020 issuance, Thailand's Bank for Agriculture and Agricultural Cooperatives presented a clear and structured approach to **reporting** on the allocation of proceeds and associated impact. BAAC specified the timeline for reporting, types of reporting and impact indicators to be used (Bank for Agriculture and Agricultural Cooperatives, 2020) .

Figure 9. Example Reporting section



6. Reporting

The Bank will report the allocation of proceeds from the issuance of Green Bond and report the impact on environment annually together with the Green Bond Framework and the External Review Report until the maturity of Green Bond on the Bank's website at http://www.baac.or.th.

1) Allocation Report

The Bank will prepare the allocation report from the issuance of Green Bond that contains the following information:

- Project name and summary of details of projects financed and/or refinanced by Green Bond
- Summary of the allocation of proceeds raised from Green Bond issuance by each project
- Summary of unallocated amount

2) Impact Report

When the project starts, the Bank will make an environmental impact report, which may include the indicators that are suitable and in accordance with the project as specified in Item 3. For example:

- Amount of reduction of carbon dioxide emissions
- Forest area that receives the standard certification
- Additional forestation area converted
- Organic agricultural area
- Amount of electricity generation

Source: Authors' own elaboration.

After issuing the bond, BAAC published **annual reports** demonstrating the impact of the proceeds, presenting the data in a clear and quantified way (Bank for Agriculture and Agricultural Cooperatives, 2024). BAAC also disclosed the underlying methodology it used to calculate impact, which represents a best practice in green bond issuance.

Figure 10. Example annual report demonstrating impact of proceeds

Credit Fund	Allocation of the Green Bond Proceeds[1/] (million THB)	Cumulative Lending Amount[3/]			Outstanding Balance			Available Green Bond Proceeds[2/]	
		No. of Loan Contracts	Amount (million THB)	(%)	No. of Loan Contracts	Amount (million THB)	(%)	(million THB)	(%)
1. Go Green: Forest Credit Project	400.00	1,231	290.35	72.59	735	190.32	47.58	209.68	52.42
2. Green Credit Project									
2.1 Production of organic or safe food products.	4,400.00	6,290	10,785.89	245.13	2,787	3,309.13	75.21	1,090.87	24.79
2.2 Use of alternative / renewable / clean energy.	650.00	1,900	812.76	125.04	1,187	291.77	44.89	358.23	55.11
2.3 Natural resource and environmental conservation.	550.00	1,098	1,190.03	216.37	365	277.23	50.41	272.77	49.59
Total	**6,000.00**	**10,519**	**13,079.03**	**217.98**	**5,074**	**4,068.45**	**67.81**	**1,931.55**	**32.19**

Credit Project	Project Environmental Impact Performance[2/]						
	Accumulated Project Credit Disbursement (million THB)	Production Area (rai)	No. of Trees	Carbon Sequestration (tons of carbon equivalents)[1/]	Production Volume (tons)	Amount of Electricity Generated (MW)	No. of Production Plots/Facilities/ Factories
1. Go Green: Forest Credit Project	290.35	12,148.36	980,409	30,607.07	-	-	-
2. Green Credit Project							
2.1 Production of organic or safe food products.	10,785.89	166,874.67	-	-	893,477.84	-	-
2.2 Use of alternative / renewable / clean energy.	812.76	26,312.07	-	-	-	3,569.96	1,619
2.3 Natural resource and environmental conservation.	1,190.03	11,781.34	-	-	-	-	523
Total	**13,079.03**	**217,116.44**	**980,409**	**30,607.07**	**893,477.84**	**3,569.96**	**2,142**

Remarks: [1/] CO2e Sequestration Formula (T-VER Project by the Thai Greenhouse Gas Management Organization): Carbon Sequestration Amount (Carbon Dioxide Tons-Equivalent) = Number of Trees x Number of Years of Operation (from the year of planting) x 9.5 Kilocarbon Dioxide x 10^{-3}

[2/] The performance of green bond proceeds disbursement has excluded the clients who are not in line with the bank's criteria.

Source: Authors' own elaboration.

ISSUING A FOOD SECURITY GREEN BOND

Once the Framework is complete, satisfactory to both the issuer and underwriter, and ready for publication on the issuer's website, the lead underwriter guides the issuer through the final stages of the process to issue the bond, as summarized below.

Prepare legal documentation: Ensure all necessary legal documentation is in place based on market, currency and issuance type for the bond. The underwriter coordinates closely with the issuer's legal team in preparing the documentation.

Timing the issuance: Identify optimal timing for the issuance, considering market conditions and the issuer's credit profile to maximize investor engagement and pricing efficiency.

Plan for investor engagement: Leverage the green bond issuance as an opportunity to expand the issuer's investor base. Consider approaches for investor engagement, such as a series of meetings or presentations following formal announcement of the bond. A deal-specific "roadshow" such as this can target investors interested in green bonds for sustainable agriculture, providing an opportunity to explain the bond's use of proceeds, contributions to national priorities for climate resilience and food security, and alignment with selected taxonomies, standards or principles.

Alternatively, the issuer could conduct a general non-deal roadshow to introduce its green initiatives without a commitment to an immediate issuance, allowing for feedback-driven adjustments. This enables the issuer to build relationships with investors and refine the Green Bond Framework prior to the issuance. To accommodate investors unable to attend roadshows, issuers can arrange a global investor call to enhance the issuer's visibility more broadly.

Develop an investor presentation: Develop a concise investor presentation to support marketing the green bond, highlighting the bond's alignment with national priorities for climate-smart agriculture and agrifood systems and presenting the bond's use of proceeds, selection criteria, expected impact and reporting commitments. The presentation should also provide an overview of the issuer's credit profile, including credit ratings, financial position and any recent developments.

Decide financial characteristics: Once sufficient demand has been built and investor interest is established, confirm the final issuance terms (e.g. pricing, interest rate, allocations) based on investor feedback and market conditions. Rating agencies formally assign the bond's rating.

Arrange listing or private placement: If the bond is to be listed, select an appropriate stock exchange, focusing on liquidity and visibility goals, and complete the exchange documentation and formal listing process. For private placement, confirm allocation and settlement with the investors.

Media and stakeholder communications: After settlement, implement a communications strategy highlighting the bond's focus on climate-smart agriculture and agrifood systems aligned with national goals.

CLIMATE BONDS AGRICULTURE CRITERIA AVAILABLE TO SUPPORT USE OF PROCEEDS

In developing use of proceeds, Food Security Green Bonds and similar instruments can draw from or align with sector-specific criteria provided by the Climate Bonds Initiative to further enhance transparency, climate impact and access to a growing pool of investors interested in CSA. The criteria define agricultural activities and measures that can be considered "green," enabling bonds aligned with the Criteria to be classified as green in the most credible way. Specific criteria are available for agricultural production, food value chains, protected agriculture, alternative proteins, forestry, and agri-food deforestation- and conversion-free sourcing, providing science-based standards for eligible projects, assets and investments that support climate change mitigation, adaptation and resilience (Climate Bonds Initiative, 2025a). Aligning with the Climate Bonds Agriculture Criteria can offer benefits for both issuers and investors as summarized below.

BOX 9

Benefits of aligning Food Security Green Bonds to the Climate Bonds Agriculture Criteria

Benefits to the issuer

- **Market credibility and investor confidence: Alignment with the Climate Bonds Agriculture Criteria s**ignals that bond proceeds will finance projects meeting rigorous science-based standards for climate change mitigation and adaptation in agriculture, enhancing transparency and investor trust.
- **Alignment with international climate goals:** The Criteria align with UNFCCC Paris Agreement targets by promoting projects that reduce agricultural GHG emissions, enhance carbon sequestration, and improve the climate resilience of agrifood systems.
- **Support for sustainable agricultural development:** The Criteria cover a wide range of eligible activities, including crop and livestock production, waste management, climate change adaptation measures and capacity strengthening, enabling issuers to finance comprehensive agricultural sustainability initiatives.
- **Enhanced reporting and transparency:** Issuers benefit from a structured reporting framework that requires clear disclosure on use of proceeds and environmental impact, improving governance and stakeholder engagement.

Benefits to investors

- **Assurance of environmental impact:** Investors gain confidence that their capital supports projects with verified climate change benefits in agriculture, including emission reductions and resilience, backed by independent third-party verification.
- **Risk mitigation:** Investing in climate-resilient agriculture reduces exposure to climate-related risks such as crop failure and supply chain disruptions, supporting more stable returns over time.
- **Contribution to sustainable development:** Investors are able to align their portfolios with global sustainability goals, supporting rural livelihoods, biodiversity conservation and ecosystem services critical to food security and climate change adaptation.
- **Transparency and comparability:** The Climate Bonds Agriculture Criteria provide a clear framework that enables investors to compare green bonds and assess their climate credentials consistently.

Source: Authors' own elaboration.

This section provides a simplified version of the Agriculture Production Criteria that issuers can use in designing use of proceeds for climate-aligned agricultural projects to reduce emissions, enhance climate resilience and support smallholder farmers in adopting climate-smart practices (Climate Bonds Initiative, 2025b). Despite the simplification, the included measures represent the most credible, science-based interventions with the highest climate change mitigation and adaptation potential, reflecting the latest scientific consensus as determined by the Climate Bonds Initiative and its Technical Working Group.

To determine "green" eligibility of measures for a bond, the Agriculture Production Criteria apply a three-step process that involves (1) ensuring that target agricultural production areas are deforestation- and conversion-free, (2) selecting measures from a menu of options, and (3) checking safeguards. These steps are summarized below.

Step 1: Ensure agricultural production units are deforestation- and conversion-free

The precondition for any green investment in agricultural production is to ensure that farming is deforestation- and conversion-free (DCF). This can be done through demonstrating that the target agricultural production units (APUs) for the bond's use of proceeds have not been converted from forest or other natural ecosystems since 2020.[3] Recent regulations such as the European Union Deforestation Regulation (EUDR) will also require commodity suppliers to show proof of non-deforestation since 2020, linking market access for commodities such as coffee, cacao and palm oil to verifiable DCF status. As such, any efforts to support this level of disclosure would benefit agricultural communities that are supplying products globally.

Issuers can use a range of digital, geospatial and monitoring platforms to demonstrate and monitor DCF status in APUs, as summarized in **Table 4**. Used individually or combined, these tools can also provide data for bond reporting, such as annual updates on land-use conditions and stability.

Table 4. Platforms and technologies for ensuring deforestation- and conversion-free (DCF) agricultural production

Platform / technology	Application for DCF monitoring	Examples of use
Global Forest Watch (GFW)	Free, open-source platform providing near-real-time satellite data on forest cover loss and land use. Can be used by issuers to verify DCF in APUs aligned with 2020 or 2010 requirements.	Used by Indonesia's Ministry of Environment and Forestry and the Philippines Forest Management Bureau for national deforestation monitoring and REDD+ MRV.
FAO SEPAL (System for Earth Observation Data Access, Processing and Analysis for Land Monitoring) (FAO, 2025f)	Cloud-based platform enabling analysis of satellite imagery to assess land-use change. Supports National Forest Monitoring Systems (NFMS) and produces spatial evidence for DCF compliance.	Adopted by Viet Nam, Lao PDR and Indonesia for national forest monitoring and land-use mapping.
National Forest and Land-Use Monitoring Systems (NFMS) (FAO, 2025g)	Government-led systems integrating geospatial data, remote sensing, and ground verification to track land-use change. Can be linked to agricultural databases to confirm DCF compliance.	Examples include Indonesia's SIPKEBON and Malaysia's One Map initiative integrating forest and agricultural land data.
Sentinel / Landsat / Planet satellite imagery[4]	Publicly available imagery allowing low-cost, direct verification of land-use status. Used to classify land use in forest area mapping, establish baseline maps and monitor annual changes for DCF verification and reporting.	Used by GFW, Environmental System Research Institute (ESR), European Space Agency (ESA), and Thailand's Geo-Informatics and Space Technology Development Agency (GISTDA) for land-use, forest and crop monitoring.

[3] For certification under the Agriculture Production Criteria, issuers must demonstrate that APUs, at the time of certification, are deforestation- and conversion-free since 31 December 2020 to be in 'transition' to the 1.5°C pathway of the Paris Agreement. Alternatively, if issuers demonstrate that APUs are DCF since 31 December 2010, the Criteria recognize this as fully 'aligned' with the 1.5°C pathway.

[4] Sentinel satellites are operated by the European Space Agency (ESA) and Landsat satellites are operated by the United States National aeronautics and Space Administration (NASA).

Deforisk (CIRAD and FAO, 2025)	Publicly available toolkit that downloads global forest change or tropical moist forest data from Google Earth Engine, calibrates four spatial risk models (iCAR, GLM, Random Forest, Moving Window) against historic forest-cover change, and produces JNR-compliant deforestation-risk maps for any country or project area.	Developed by FAO and the French Agricultural Research Centre for International Development (CIRAD) under the UK-funded AIM4Forests initiative and applied globally for forest-cover-change mapping and REDD+ planning.
Whisp (Open Foris, 2025)	Open-source digital public platform combining multiple global land-cover/change datasets (e.g. forest, tree cover, crops, conservation areas, deforestation before and after 2020) into a single, transparent convergence-of-evidence report for any plot.	Used by smallholders, cooperatives, traders, governments and authorities along commodity supply chains to demonstrate compliance with EU/UK deforestation-free regulations, perform due-diligence checks, and generate standardized evidence for REDD+ and jurisdictional forest monitoring programmes. Developed by Open-Foris/FAO under the Forest Data Partnership and UK-funded AIM4Forests programme; applied globally at farm-to-national scales.
Trase (Transparency for Sustainable Economies)	Platform linking commodity supply chains to specific geographies of production. Helps trace commodities back to DCF-compliant areas.	Used by Indonesia and Malaysia to strengthen transparency of palm oil supply chains.
GLAD Alerts (Global Land Analysis and Discovery)[5]	Weekly satellite-based forest loss alerts integrated into GFW. Provides early warning and ongoing monitoring of potential land conversion linked to financed APUs.	Incorporated into regional monitoring systems under ASEAN's Peatland Management Strategy.
Regional forest observatories (e.g. ASEAN)	Regional platforms that aggregate national data and remote sensing to track land-use change and forest condition. Supports cross-border consistency and harmonization for bond issuers.	ASEAN Forest Clearinghouse Mechanism supports harmonized land monitoring and regional transparency.
Private-sector systems (e.g. Satelligence, Nadar, Planet Labs, EarthDaily, BanQu)	Commercial services that provide higher-resolution or tailored monitoring. Often procured by sovereign issuers or state agricultural banks for high-value commodity projects.	Used by the Asian Development Bank and partners in the Philippines and Indonesia for sustainable finance monitoring.

Source: Authors' own elaboration.

Step 2: Select eligible measures from a menu of options

After establishing that target APUs not linked to deforestation or natural ecosystem conversion, the next step is identifying eligible activities and investments for the bond, including activities that are available and appropriate for the target types of smallholder farmers and small-scale producers.

Step 2a: An easier way to qualify for green finance (proxies).
To make it easier for smallholders to access green finance, simple rules called "proxies" can be used instead of choosing from a more complex list of measures. These proxies in the Climate Bonds Agriculture Production Criteria apply until 2030 to support smallholders in accessing the finance they need to grow more food sustainably, while providing time to develop systems and capacities for measuring GHG emissions and other climate-aligned impact metrics at the smallholder level.

5 The GLAD system is developed and operated by the University of Maryland.

For smallholder farmers in low-income areas, any project that helps increase crop yields in a sustainable way — without harming the environment or communities — is automatically eligible for green finance under the Agriculture Production Criteria. This includes organic farming, agroecology and other projects that increase agricultural productivity and efficiency sustainably (see **Table 5**). The proxies enable compliance to be demonstrated through qualitative requirements, rather than quantitative impact metrics, as summarized below.

"For smallholder farmers, any project that helps increase crop yields in a sustainable way – without harming the environment or communities – can be automatically approved for green finance. These rules apply until 2030 to support smallholders in low-income areas in accessing the finance they need to produce more food sustainably, while capacities are being developed for monitoring and reporting climate impact."

Reyes Tirado, Global Agrifood Lead, Climate Bonds Initiative

Table 5. Proxies for automatic eligibility of green expenditures for smallholder farmers

Category	Example projects and practices	Demonstration of compliance
Organic farming (certified, plant-based or mixed production systems)	◗ Using compost, manure, cover crops and/or other organic fertilizers instead of chemical fertilizers ◗ Using less chemical fertilizers ◗ Using natural pest control (e.g. neem oil, traps, companion planting) ◗ Certification support for organic producers, including capacity building and training	◗ Third party certification for organic agriculture under IFOAM or equivalent certification scheme. ◗ Should apply to 90 percent of the applicant's production unit(s). ◗ Not applicable to intensive livestock production operations and factory farms, following definitions from EU Industrial Emissions Directive. ◗ Should include a commitment to full GHG accounting by 2030.
Agroecology principles and practices (plant-based or mixed production systems, applied in production units)	◗ Intercropping (e.g. planting legumes with rice or maize) ◗ Maintaining native trees and hedgerows on farms ◗ Integrating animals with crop systems for soil fertility	◗ Following definition from **CGIAR HOLPA framework**. ◗ Should apply to 90 percent of the entity's production unit(s). ◗ Not applicable to intensive livestock production operations and factory farms, following definitions from EU Industrial Emissions Directive. ◗ Should include a commitment to full GHG accounting by 2030.
Improved production systems for vulnerable contexts to increase productivity and efficiency sustainability (for small-scale producers, including investments for capacity building)	◗ Introducing climate-resilient seeds (e.g. drought-tolerant rice) ◗ Providing small-scale solar pumps for irrigation ◗ Farmer training in low-emission high-yield practices (e.g. improved feed for livestock, improved soil management) ◗ Farmer expenses needed to grow more food by purchasing better fertilizers, smarter irrigation, training or technical assistance ◗ Farmer expenses to expand farmland by buying or restoring degraded farmland with the intention of producing more food	◗ Should apply to 90 percent of the entity's production unit(s). ◗ Not applicable to intensive livestock production operations and factory farms, following definitions from EU Industrial Emissions Directive. ◗ Should include a commitment to full GHG accounting by 2030. *Note: "Production systems in vulnerable contexts" is defined as those located in a low-income country (defined by World Bank standards) or production systems that fall below the World Bank poverty line based on the average expected annual yields sold from the farm; and those producing agricultural products used only for domestic consumption in the country (not exported).*

Source: Climate Bonds Initiative. 2025. London.

Step 2b: Select specific measures from four categories of climate change objectives.
Alternatively, Issuers can use the tables below to identify eligible green expenditures that are relevant and appropriate for the target agricultural production systems. Any measures from following four categories – reducing GHG emissions, sequestering carbon, adapting to climate change, and funding supporting activities – can be selected and combined to create an investment framework for the bond's use of proceeds, with clear impact metrics for monitoring and reporting.

Category 1: Reducing GHG emissions

Table 6. Eligible climate change mitigation measures to reduce GHG emissions in agriculture production units, including methane, nitrous oxide and carbon dioxide emissions

Eligible expenditures for measures towards:	Impact metric:
Organic fertilizers, compost, manure, cover crops and/or other organic fertilizers (or low-emission fertilizers) to substitute chemical fertilizers (without reducing yields).	Percent of organic fertilizer used (or chemical fertilizer substituted) and/or GHG emission reduction (estimated)
Production of organic fertilizer on-farm and application in crops and pastures (without reducing yields).	Percent of organic fertilizer used (or chemical fertilizer substituted) and/or GHG emission reduction (estimated)
Equipment and improvements in flooded rice systems to decrease number of days under flooding, including alternate wet-dry techniques, straw removal, short-duration seed varieties, laser land levelling before planting.	Percent reduction in number of days of flooding and/or GHG emission reduction (estimated)
Transition farm income towards reduced cattle herd size, including diversifying to other livestock systems (e.g. from beef to chicken), diversifying to crop systems or to alternative proteins.	Percent reduction in herd size and/or GHG emission reduction (estimated)
Equipment and improvements in harvest, post-harvest, and storage to reduce food loss. Including improved storage facilities, cold storage, warehouses, and increasing circularity (e.g. rice husk utilization across the value chain).	Percent reduction in food loss (recommended food loss rates < 10 percent and <5 percent for grains) and/or GHG emission reduction (estimated)
Renewable energy use installation or improvement, and energy-efficient machinery (e.g. traction). Including solar irrigation pumps, agrivoltaics, electrical farm vehicles, EVs for farm-to-market routes.	Renewable energy (solar, wind) and/or In top 25 percent of energy efficiency rates for equipment available in-country
Precision agriculture, use of technology and data to optimize farming practices to increase yield, reduce waste, and improve sustainability. Include digital solutions (e.g. to achieve the right amount of water for irrigation or fertilizer use). Include agroecological solutions (e.g. intercropping, agroforestry, cover crops).	Percent change in efficiency (increase in production/decrease in input use) and/or GHG emission reduction (estimated)

Source: Climate Bonds Initiative. 2025. London.

Category 2: Sequestering carbon

Table 7. Eligible climate change mitigation measures to sequester carbon in agriculture production units

Eligible expenditures for measures towards:	Impact metric:
Reforestation and/or restoration of degraded land, including peatland, mangroves/wetlands, overgrazed grasslands with depleted soil organic carbon.	Hectares of restored land and/or Increased carbon input or carbon sequestration (estimated)
Implement or maintain agroforestry (e.g. incorporating woody perennials into agriculture production units).	Density of trees per hectare and/or Increased carbon input or carbon sequestration (estimated)
Apply biochar to agricultural lands.	Application rate per hectare and/or Increased carbon input or carbon sequestration (estimated)
Improve soil carbon management in grasslands and pasturelands including: ◗ Vegetation management: improved grass varieties/sward composition, deep rooting grasses, increased productivity (without additional fossil-fuel fertilizer inputs). ◗ Livestock management: aligning stocking densities with carrying capacity, fodder banks, and fodder diversification. ◗ Fire management: improved use of fire, including fire prevention and improved prescribed burning to other livestock systems (e.g. from beef to chicken), diversifying to crop systems or to alternative proteins.	Increased carbon input or carbon sequestration (estimated)
Improve soil carbon management in croplands. Including: ◗ Crop management: e.g. improved crop varieties, crop rotation, use of cover crops, shifting to perennial cropping systems (including agroforestry), crop diversification. ◗ Nutrient management: fertilization with organic amendments/green manures. ◗ Reduced tillage with residue retention.	Increased carbon input or carbon sequestration (estimated)

Source: Climate Bonds Initiative. 2025. London.

Category 3: Adapting to climate change

Table 8. Eligible climate change adaptation measures in agriculture production units

Eligible expenditures for measures towards:	Impact metric:
Organic management, including use of certified organic practices (e.g. no/low tillage or crop residue retention to increase soil health).	Third-party certification (IFOAM) and/or Significant Adaptation and Resilience (A&R) benefit
Adjustment of planting dates and crop switching, including changes in cropping pattern and crop systems (e.g. shifting planting schedules in response to the early or late onset of the rainy season), and marketing to facilitate crop switching.	Significant Adaptation and Resilience (A&R) benefit
Shifting cropping location in response to climate hazards.	Significant Adaptation and Resilience (A&R) benefit
Flood risk reduction measures, including floodplain restoration, saltmarshes, mangroves or peat re-naturalization.	Hectares impacted by flood risk reduction and/or Hectares restored
Diversification to mixed production systems, including a combination of crops and livestock and/or fish and/or trees (e.g. incorporating fruit trees in rice systems).	Agriculture diversification effect (estimate)
On-farm irrigation and water management, including measures to adjust water management based on seasonal and spatial patterns of present and projected water availability, with proof of no maladaptation (e.g. rainwater storage and deficit irrigation techniques)	Water savings and improved water-use efficiency and/or Proof of no maladaptation for irrigation practices
Training and capacity building on climate change responses, such as "Adaptation Clinics" (e.g. one-stop agricultural service centers designed to help farmers in climate-vulnerable areas manage the impacts of climate change).	Significant Adaptation and Resilience (A&R) benefit
Economic/financial measures, including incentives towards livelihood diversification and social protection such as crop insurance, new crop insurance schemes based on changes in weather patterns.	Significant Adaptation and Resilience (A&R) benefit
Use of climate-resilient cultivars and/or breeds and/or breeding of climate-resilient traits, including traits for resistance to biotic and abiotic stress, including drought tolerance, heat tolerance, flood tolerance and pest resistance.	Significant Adaptation and Resilience (A&R) benefit
Community seed/feed/fodder banks, including to strengthen regional production capabilities, share costs and de-risk individual producers (e.g. Village Resource Centers).	Significant Adaptation and Resilience (A&R) benefit
Improved weather forecasting and early warning systems, including measures to forecast, predict and communicate timely and meaningful warning information (e.g. integrating information from multiple sources at different scales), participatory collection and analysis of climate data, making forecast information available in local languages and for the non-literate, contributing to disaster risk reduction management and accuracy in decision-making on farms.	Significant Adaptation and Resilience (A&R) benefit

Source: Climate Bonds Initiative. 2025. London.

Category 4: Supporting activities

Table 9. Eligible supporting activities on or off-farm to enable climate change mitigation and adaptation within or outside of agricultural production units

Eligible expenditures for measures towards:	Impact metric:
Training and capacity building on climate change responses.	Estimation of specific benefits for climate mitigation and/or adaptation
Collective resource management, including community seed/feed/fodder banks.	Estimation of specific benefits for climate mitigation and/or adaptation
Climate services, including GHG assessment, measuring and accounting for GHG emissions, monitoring and reporting systems, digitalized platforms for data tracking and impact assessment.	Estimation of specific benefits for climate mitigation and/or adaptation
Land-use change monitoring or traceability systems, including traceability software or hardware systems, digital solutions, satellite monitoring systems.	Estimation of specific benefits for climate mitigation and/or adaptation

Source: Climate Bonds Initiative. 2025. London.

More specific information about the above measures and impact metrics can be found on the Climate Bonds Agriculture Production Criteria website at **www.climatebonds.net.**

Step 3: Safeguards to ensure eligible measures do no significant harm

Once eligible measures have been selected, issuers should assess safeguards to ensure that implementation of the measures will not cause significant harm related to key considerations, including climate change adaptation, biodiversity, water management, social impacts and animal welfare (if applicable). Checking these safeguards can be done through a common methodology for identifying and minimizing risks of negative impacts (except for animal welfare).[6] The methodology consists of a four-step process adapted to each of the key considerations:

1. Understanding and identifying the context: setting boundaries and interdependencies of the activities in the farm that might reach beyond the farmgate.
2. Identifying specific risks to the given environmental or social consideration.
3. Addressing and mitigating specific risks by undertaking risk-reduction measures and adopting management plans to (i) minimize direct risks from the projects, and (ii) minimize risks of harming the wider system in which the projects occur.
4. Undertaking regular monitoring and evaluation of the performance of risk reduction measures and adjusting the measures over time as needed.

This four-step process provides a starting point for assessing and avoiding unintended negative impacts of bond-funded activities for the key considerations (climate change adaptation, biodiversity, water management, social impacts and animal welfare) and for identifying and applying risk-reduction measures. Costs associated with safeguards assessments and risk-reduction measures can be included in the Green Bond Framework as use of proceeds. Additional guidance on assessing risks and developing risk-reduction measures for the key considerations is available on Climate Bonds Agriculture Production Criteria website at **www.climatebonds.net**.[7]

Annex 4 provides an example template for developing use of proceeds aligned with the ICMA Green Bond Principles and Climate Bonds Agriculture Production Criteria.

[6] The animal welfare safeguard only applies to activities and/or production units with livestock production, and it does not follow the four-step methodology. Instead, it follows a set of guiding principles that can be found in the Climate Bonds Agriculture Production Criteria website.

[7] The issuer is also responsible for review and compliance with applicable national and local safeguards and standards (e.g. environmental impact assessments, permits, licenses and other legal requirements in the relevant jurisdictions).

STRATEGIES FOR REACHING SMALLHOLDER FARMERS, SMALL-SCALE PRODUCERS AND AGRI-SMES WITH BOND PROCEEDS

In the bond's use of proceeds, issuers can consider strategies for delivering finance and associated support to smallholder farmers, small-scale producers and agri-SMEs for implementing eligible activities. Supporting smallholders and agri-SMEs in adopting climate-smart practices and technologies requires integrated programmes that combine financing, TA and capacity building. Technical support is also needed for effective monitoring at the smallholder level to enable bond impact reporting.

Food Security Green Bonds and similar instruments can incorporate proven strategies to effectively reach and support small-scale producers and agri-SMEs with bond proceeds, as demonstrated by the innovative bond issuances summarized below.

Food Security Green Bonds can incorporate proven strategies to reach and support smallholder farmers, small-scale producers and agri-SMEs with bond proceeds, as illustrated by innovative issuances globally.

Strategy: On-lending through local financial intermediaries with technical support and guarantees

Example: Certified agricultural green bonds issued by Mexico's FIRA (2018–2019)

- **Overview:** Quasi-sovereign green bonds aligned with the Climate Bonds Agriculture Criteria that raised MXN 5 billion (approximately USD 260 million) with proceeds targeting smallholder farmers and micro, small and medium-sized enterprises (MSMEs).
- **Issuer:** Mexico's Trust Funds for Rural Development (FIRA), a second-tier development bank supporting the agriculture, livestock, fishing, forestry and agribusiness sectors
- **Reaching smallholders:** FIRA's bonds aggregated and scaled financing for smallholder farmers by **on-lending through local financial intermediaries**, including local savings and credit cooperatives (LS&CCs) and other rural financial institutions with established service channels in small communities and underserved rural areas. LS&CCs then disbursed **small loans** tailored to the needs of family farmers and MSMEs. FIRA attached **public guarantees** to its loans to reduce risks for the financial intermediaries and incentivize them to originate and manage loans to smallholders, many of whom were first-time borrowers.

  FIRA also provided **technical support** and **standardized credit criteria** to LS&CCs to ensure loan products were suitable for small-scale agriculture, including through lower interest rates, appropriate credit amounts and flexible terms (e.g. grace periods, cash-flow-based repayment schedules, lower collateral requirements), which made loans accessible for smallholders (Smallholder and Agri-SME Finance and Investment Network, 2023).

Strategy: Grants and loans through national entities with capacity building through local cooperatives

Example: Seychelles Sovereign Blue Bond (2018)

- **Overview:** A 10-year sovereign blue bond that raised USD 15 million with proceeds supporting sustainable fisheries and development of a blue economy, strengthening food security.
- **Issuer:** Government of the Republic of Seychelles.
- **Reaching smallholders:** Proceeds capitalized a Blue **Grants Fund** (USD 3 million) administered by the Seychelles' Conservation and Climate Adaptation Trust and a Blue **Investment Fund** (USD 12 million) administered by the Development Bank of Seychelles. **Grants and loans** were channeled through local fishers' associations, cooperatives and community organizations to reach small-scale fishers and advance sustainable practices. **Capacity building** for local fisheries organizations and business planning for cooperatives was a core focus of technical assistance.

  Fishers' associations and cooperatives played key roles as **financial and knowledge intermediaries** – aggregating capacity building, ensuring community level outreach, and monitoring compliance and impact of bond-funded activities (World Bank, 2018b).

Strategy: Lending through value-chain and farmer-aligned intermediaries with technical assistance and risk sharing

Example: Green Rice Bond for Sub-Saharan Africa (planned for 2026)

- **Overview:** An innovative regional bond to revolutionize the rice sector in Sub-Saharan Africa by catalysing development of local rice value chains to enhance farmer livelihoods and food security while reducing environmental impact. Starting with Kenya, Tanzania, Ghana and Senegal, an initial issuance of USD 25 million will be scaled regionally up to USD 50 million, with proceeds supporting smallholder rice farmers to adopt sustainable practices and technologies, such as AWD, small-scale mechanization and improved water management.
- **Partners:** Supported by the SDG Impact Finance Initiative and Kenya's SDG Partnership Platform, the bond is being designed by iGravity and Helvetas.
- **Reaching smallholders:** Proceeds will be **channeled through value chain actors** including rice millers, processors, sustainable input providers and local rice traders; **farmer-aligned intermediaries** (FAIs) including rice cooperatives and extension services; and **local financial institutions** active in agricultural lending including rural banks and MFIs, enabling them to serve smallholders. FAIs will receive loans for working capital and capital expenditures to strengthen capacities.

  The bond includes a USD 2.5 million **grant-funded Technical Assistance Facility** in partnership with the Sustainable Rice Platform (SRP) that will provide training, capacity building and technical support for adoption of climate-smart practices and effective utilization of finance. TA will also support monitoring, data collection and knowledge transfer across stakeholders. The bond also incorporates **risk-sharing mechanisms** to incentivize local financial institutions and intermediaries to engage with smallholders, as well as **flexible, inclusive lending for underserved farmers** with an emphasis on women (Convergence, 2025).

Strategy: Reaching underserved farmers through local service providers and a technical assistance facility "sidecar"

Example: Uganda InvestHER Climate Resilience Bond (planned for 2025)

- **Overview:** The first gender-focused resilience bond in Africa to target sustainable agriculture, aiming to raise USD 25 million (in Ugandan Shillings) to close the gender gap in Uganda's agrifood system and strengthen the climate resilience of women farmers.
- **Partners:** Supported by the Grameen Foundation and Global Innovation Lab for Climate Finance, the bond will be issued by a local financial institution to be selected in Uganda. Grameen Foundation has near-term plans for similar bonds in Ghana and the Philippines.

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- **Reaching smallholders:** The bond will provide **on-lending through local financial service providers** (FSPs), including rural banks, MFIs, fin-techs, and savings and credit cooperatives, leveraging their local networks, knowledge and infrastructure to cost-effectively reach women farmers and women-led agri MSMEs. A **grant-funded technical assistance facility "sidecar"** delivered in partnership with NGOs and women's networks will support business resilience, adoption of CSA practices and digital financial inclusion for smallholder women farmers, as well as gender mainstreaming in MSMEs.

Strategy: Participatory and inclusive project design with local capacity strengthening

Example: Amazonia Bond Issuance Guidelines (2025)

- **Overview:** Regional guidelines developed by the World Bank and Inter-American Development Bank (IDB) to support the design and issuance of Amazonia Bonds (a subcategory of GSS+ bonds) financing projects that advance the transition to net-zero deforestation in the Amazonia region and help local communities pursue better livelihoods while preserving the ecosystem (IDB and The World Bank, 2025).
- **Issuers:** Issuers can integrate best practices from the Guidelines into their existing green, social and sustainability bond frameworks or in new frameworks developed specifically for Amazonia Bonds, including suggestions on eligible project categories, corresponding environmental and social risk management, and impact reporting. In November 2025, the IDB issued its first Amazonia bond, raising USD 100 million to fund high-impact projects for sustainable forest management, biodiversity conservation and improved local livelihoods – the first in a series of issuances under IDB's USD 1 billion Amazonia Bond Program (IDB, 2025b). The National Treasury of Brazil may also issue bonds under the Guidelines, with support from the IDB and World Bank.
- **Reaching smallholders:** One of the Guidelines' pillars for eligible project categories targets sustainable, low-carbon agriculture, livestock and forestry, with a focus on regenerative agriculture, sustainable livestock production and agroforestry with native species – aiming to empower farmers and producers to adopt sustainable land-use practices that improve productivity, reduce emissions and increase carbon stocks.

  The Guidelines encourage projects that **prioritize local capacity building** and support the development and **strengthening of community-led governance structures**, such as by providing training in participatory decision-making processes and sustainable natural resources management for the design and implementation of bond-funded projects in local communities. The Guidelines emphasize **participatory and inclusive project design** to identify the needs of smallholder farmers, small-scale producers and other beneficiaries and to ensure that sustainable financing and technical support are tailored and accessible. Projects are also encouraged to **offer local communities accessible legal support services** to strengthen capacities for engaging with external stakeholders, and to facilitate easily accessible platforms for disseminating local best practices and lessons learned, **fostering peer-to-peer learning**. For projects involving financial intermediaries, **intermediaries have explicit responsibilities** for environmental and social risk and impact assessment, management and monitoring to ensure that the sub-projects they finance achieve intended benefits for local communities.

Strategy: Digital solutions for risk management and monitoring at the smallholder level

Example: Symbiotics Green Bond for Banco Solidario (2023)

- **Overview:** A green bond listed on the Luxembourg Stock Exchange that raised USD 75 million, channeling funds from international investors to a microfinance bank in Ecuador to boost lending to smallholder farmers and agri-MSMEs for climate-smart practices, sustainable animal husbandry, sustainable farm inputs, landscape restoration, soil conservation and value chain enhancement.
- **Partners:** Issued by Symbiotics Investments (a global platform for impact investing) for Banco Solidario (a private Ecuadorian bank focused on microfinance and financial inclusion). Banco Solidario partnered with YAPU Solutions, a firm providing digital tools for risk management and monitoring.
- **Reaching smallholders:** Banco Solidario identified **25 distinct climate solutions suitable for smallholder farmers and MSMEs** in Ecuador to enhance their sustainability and strengthen resilience. A **digital platform** provided by YAPU Solutions enabled integration of climate indicators into loan origination and **supported loan portfolio monitoring down to the individual farmer level**. The platform captured field-level data, assessed climate risks and **tracked environmental impacts of loan-financed activities**. It also **facilitated periodic audits** to certify the eligibility of use of proceeds by smallholder farmers, supporting rigorous bond impact reporting. The bond is improving the productivity of smallholders and quality of production, helping to raise their income, enhance their credit risk profiles and strengthen food security (Symbiotics, 2023).

By incorporating these types of strategies in Food Security Green Bond frameworks, sovereign and quasi-sovereign issuers can leverage innovative, inclusive financing models that empower smallholders and small-scale producers in adopting climate-smart practices and technologies at scale.

CONCLUSION

As highlighted in this report, there is an urgent need to accelerate finance to safeguard agrifood systems and food security in the face of climate change. A severe financing gap limits the ability of countries in Asia and the Pacific and globally to implement national climate action plans, including NDCs and NAPs that prioritize adaptation and mitigation measures in agrifood systems.

Existing finance mechanisms are not effectively reaching smallholder farmers, small-scale producers and agri-SMEs, including independent smallholders supplying domestic markets, which are highly vulnerable to climate impacts and must be engaged for agrifood systems transformation. A major constraint to scaling climate finance for agrifood systems is the lack of investment-ready project pipelines – ranging from pipelines supporting smallholders and agri-SMEs in adopting climate-smart practices and technologies at scale, to investment-ready projects across priority value chains and agrifood system overall.

The public sector has a crucial role in financing climate action that reaches smallholders and agri-SMEs and in deploying catalytic capital that enables private investment to help close the finance gap for agrifood systems. Governments, public financial institutions and MDBs utilize grants, concessional loans and guarantees to de-risk private capital and are uniquely positioned to develop finance instruments targeting smallholders and agri-SMEs. Countries can utilize technical assistance programs and project preparation facilities to develop investment-ready pipelines of eligible projects to be funded by a bond, either for sector-specific bonds targeting agriculture or broader green or sustainability bonds that include agriculture.

Public-led green bonds represent a strategic opportunity to unlock private and institutional capital in domestic and international green bond markets, where investor demand continues to expand. Understanding this opportunity, multilateral climate funds including the GEF and GCF are scaling up support to countries for mobilizing blended finance through innovative bonds that deliver climate and environmental benefits.

Food Security Green Bonds and similar instruments offer countries a strategic mechanism to diversify the investor base, directly fund those most at risk, and signal strong commitment to attract further investment – while strengthening domestic financial capacities and delivering economic, social and environmental co-benefits. Key reasons for governments and public financial institutions consider these bonds include:

- **Urgent finance gap for implementing national plans:** National climate action plans and pathways for agrifood systems transformation include ambitious targets, but climate finance flows are too slow and insufficient to meet implementation timelines. Innovative green bonds can mobilize large amounts of investment to provide dedicated funding streams and long-term capital for implementing national plans and priorities.

BOX 10

Strategic opportunities available to countries through Food Security Green Bonds

- Diversify the investor base by engaging ESG-focused investors
- Unlock private and institutional capital in domestic and international markets
- Address the finance gap for implementing national plans and pathways
- Accelerate investment to reduce long-term losses from climate impacts
- Target finance and support to small-scale producers and agri-SMEs to enhance resilience and reduce vulnerabilities
- Signal and scale country commitments to attract further investment
- Strengthen and catalyse domestic green bond markets for agriculture
- Leverage co-benefits including job creation, income growth, food security and ecosystem restoration.

Source: Authors' own elaboration.

- **Escalating climate and food security risks:** Asia and the Pacific is one of the world's most climate-vulnerable regions and delays in adaptation and mitigation finance risk irreversible damage to agrifood systems. Mobilizing capital now can reduce long-term economic and social losses from climate impacts.
- **Unlocking private and institutional investment:** Green bonds mobilize finance from domestic and international investors seeking ESG-aligned assets, complementing limited public and donor funding. Innovative sovereign and quasi-sovereign green bonds can broaden a country's investor base and reduce borrowing costs through credit enhancements, guarantees and partnerships.
- **Targeting support to smallholders and agri-SMEs:** Food Security Green Bonds can leverage proven strategies to deliver finance and associated support to smallholder farmers, small-scale producers and agri-SMEs for adopting climate-smart practices and technologies at scale. This also helps governments deliver on inclusive growth and poverty-reduction goals while enhancing resilience in the most vulnerable segments of the agriculture sector.
- **Scaling commitments and attracting further investment:** Issuing green bonds for sustainable agriculture demonstrates a country's commitment to climate-aligned growth, strengthening investor confidence. Transparent reporting and measurable impact can attract follow-on investments from development finance institutions, impact investors and climate funds.
- **Strengthening domestic capital markets:** Sovereign and quasi-sovereign green bonds targeting sustainable agriculture can foster domestic green finance markets, creating models, frameworks and capacities to catalyse local green bond issuances aligned with national priorities.
- **Leveraging co-benefits:** Beyond climate benefits, green bonds for sustainable agriculture can drive job creation, rural income growth, improved food security and ecosystem restoration.

Models and examples presented in this report from recent and upcoming bond issuances demonstrate strong momentum and the potential for countries to leverage these innovative instruments. Aligning Food Security Green Bonds with the Climate Bonds Agriculture Criteria can further enhance climate impact.

FAO and key partners stand ready to support countries in developing public-led bonds to accelerate private sector investment in agrifood systems transformation – addressing the finance gap and unlocking the potential of agriculture as both a climate solution and a foundation for resilient, inclusive development.

Models and examples presented in this report demonstrate strong momentum and the potential for countries to utilize Food Security Green Bonds and similar instruments to scale private sector investment for agrifood systems transformation.

ANNEX 1
MODEL TERM SHEET FOR ON-LENDING FACILITIES SUPPORTED BY FOOD SECURITY GREEN BONDS

On-lending facilities engaging farmer-aligned financial intermediaries and local financial institutions (FIs) are a proven strategy to reach smallholder farmers, small-scale producers and agri-SMEs with bond proceeds. Food Security Green Bonds and similar instruments can include on-lending facilities with credit terms designed to meet smallholders' needs, paired with aggregation models, risk-sharing and technical assistance (TA) for both participating FIs and borrowers. Below is a model term sheet that sovereign and quasi-sovereign issuers can use to design on-lending facilities, providing indicative terms that should be tailored to the local context, national priorities and eligibility criteria for the bond's use of proceeds.

Indicative model term sheet

Item	Indicative terms / options	Notes
Facility size [i]	USD 10-200 million in local currency equivalent (scalable; tranche-based disbursement)	Tranche releases are tied to capacity, performance and safeguards
Concentration limits	Maximum disbursement to: single obligor (_)percent; aggregator (_) percent; crop/region (_)percent; at least (_) percent of the portfolio to smallholders	Include concentration limits to manage risk and guide allocation of facility funds aligned with bond use of proceeds
Sub-loan sizes [ii]	Micro/farm level needs: USD 50-1,000 Agri-SMEs: USD 10,000-500,000 Aggregators/value chain needs: USD 0.5-2 million	Reflects financing needs across the value chain aligned with bond use of proceeds
Tenor	Working capital: up to 5 years Capital expenditure/infrastructure: 5-12 years	Match tenor to use, with longer tenors reducing refinance risk
Grace periods [iii]	Provide 3-9 months for seasonal loans, tailored to crop or harvest cycles	Standard in agricultural finance to avoid repayment stress
Pricing to FIs iv	Issuer's all-in cost of borrowing plus a margin (such as 2-5 percent) covering FI administrative and operational costs	Ensure margin considers FI costs for lending to smallholders
Pricing to end-borrower/APR	Annual Percentage Rate (APR) to end-borrowers is capped, aligned with affordability tests	Ensure smallholders' access to finance on sustainable terms; include caps and pricing disclosures in FI sub-agreements
Collateral	Assets, receivables, warehouse receipts, offtake contracts; group/association guarantees	Avoid overreliance on land titles; enable flexible security
Guarantees/risk-sharing	Partial portfolio guarantees (typical 50 percent) First-loss tranche (10-30 percent) if donor-supported	Encourages FI participation and mitigates perceived lending risks
FX and hedging mechanisms [v]	Local-currency preference; acceptable hedges include CB swap, TCX, etc.	Hedge costs are borne by the issuer, FI or shared, with any pass-through capped to protect loan affordability
Eligibility and exclusions	Projects/loans must adhere to safeguards, eligibility criteria and exclusions for bond use of proceeds, including deforestation- and conversion-free (DCF), no peatland drainage, etc.	Projects/loans must also comply with applicable national and local safeguards and standards
TA/project preparation	Allocate 5-15 percent of the facility to technical assistance (TA) or project preparation support, addressing needs of FIs and borrowers	TA can be delivered through a separate agreement with milestone-based disbursements (system upgrades, staff training, borrower outreach)
Disbursement conditions [vi]	Link tranche release to FI reporting, TA milestones, safeguards compliance, and adherence to eligibility criteria for bond use of proceeds	Ensures quality and transparency for safeguards, eligibility criteria and TA delivery linked to lending
Reporting requirements (loan tape fields) [vii]	Quarterly loan tape: unique loan ID, geography, borrower type, ticket, tenor, grace period, product, sector/crop, FX, interest basis, PAR30/PAR90, write-offs, rescheduling policy	Specify minimum quarterly reporting fields
Reporting frequency	Require FIs to provide quarterly allocation and NPL reports; annual allocation and impact verification	Ensures credibility, integrity and investor confidence in the green bond

Source: Authors' own elaboration.

IMPLEMENTATION NOTES

1. Ensure transparent pricing and end-borrower affordability: Link facility pricing to actual bond cost of funds and ensure terms and interest rates offered by FIs are appropriate and sustainable for smallholder farmers, small-scale producers and agri-SMEs.

2. Provide seasonal grace periods: Structure repayment schedules around harvest cycles to reduce defaults. For example, if a rice farmer takes a seasonal loan in April for inputs and labor and the crop will be harvested in October, a six-month grace period enables repayments after the harvest, aligning loan servicing with farmer cash flows.

3. Risk-sharing mechanisms: Use partial guarantees (e.g. 50 percent coverage) or donor-backed first-loss tranches (e.g. 10-30 percent) to incentivize FI participation.

4. Local-currency lending: Prioritize on-lending in local currency. If bond proceeds are in hard currency, ensure hedging or a sovereign foreign exchange (FX) backstop to cover risk of unfavorable FX rate changes.

5. Technical assistance/project preparation: Allocate 5-15 percent of the facility size to TA to strengthen FI and borrower capacities for improved risk profiles, finance utilization and impact. TA examples include development of digital credit scoring, monitoring and reporting systems; upgrades to FI management information systems (MIS) for allocation and impact reporting; outreach to borrowers; training for loan officers and borrowers on climate-smart agriculture (CSA) practices and technologies; and project preparation support aligned with eligibility criteria for bond use of proceeds. TA can be delivered through a separate agreement with milestone-based disbursements (e.g. MIS upgrades, staff training, borrower outreach).

Explanatory notes

i Facility size is the total amount of capital allocated from the bond proceeds to the on-lending window or credit line. For example, if a Food Security Green Bond raises USD 200 million, the issuer might allocate USD 50 million into an on-lending facility, while other bond proceeds are allocated to climate-resilient agricultural infrastructure and TA programs supporting adoption of climate-smart practices and technologies.

ii Within the on-lending facility, FIs disburse sub-loans of suitable sizes to smallholder farmers, small-scale producers, agri-SMEs, aggregators, value chain actors and other borrowers.

iii Grace periods are the initial period after a loan is disbursed during which the borrower is not required to make principal (and sometimes interest) repayments. Grace periods are particularly important in agricultural lending because farmers and agri-SMEs often only generate cash inflows after a harvest or production cycle.

iv Pricing to FIs is the interest rate or cost charged by the on-lending entity (e.g. the issuer) to participating FIs that are borrowing from the facility in order to make sub-loans to borrowers. This wholesale pricing (the cost of funds for the FIs) is typically expressed as the bond issuer's all-in cost of borrowing (including coupon or yield, fees and any FX hedging costs) or an equivalent benchmark rate, plus a margin. The margin covers FI administrative and operational costs and may incorporate a risk-sharing premium or a concessionality adjustment. FIs then set their own lending rate to end-borrowers, subject to affordability tests and any applicable rate caps.

v The facility should lend in local currency whenever possible. If FX hedging is required, the facility may use mechanisms such as central bank (CB) swaps, currency exchange funds (TCX) or similar instruments to lock in an exchange rate or offset currency exposure risks. The cost of hedges may be paid by the issuer, participating FIs or shared, but any part of the cost that is passed on to borrowers through higher interest rates should be capped to keep loans affordable.

vi Conditions FIs must meet in order to receive subsequent disbursements (tranches) from the on-lending facility. Tranche-based disbursements help to manage risk and align the funding schedule with the pace of implementation. FIs submit regular reports on the utilization and impact of the funds, including data on loan allocation, repayment rates and Non-Performing Loans (NPLs). FIs must demonstrate that the loans they issue comply with safeguards and the bond's eligibility criteria for use of proceeds.

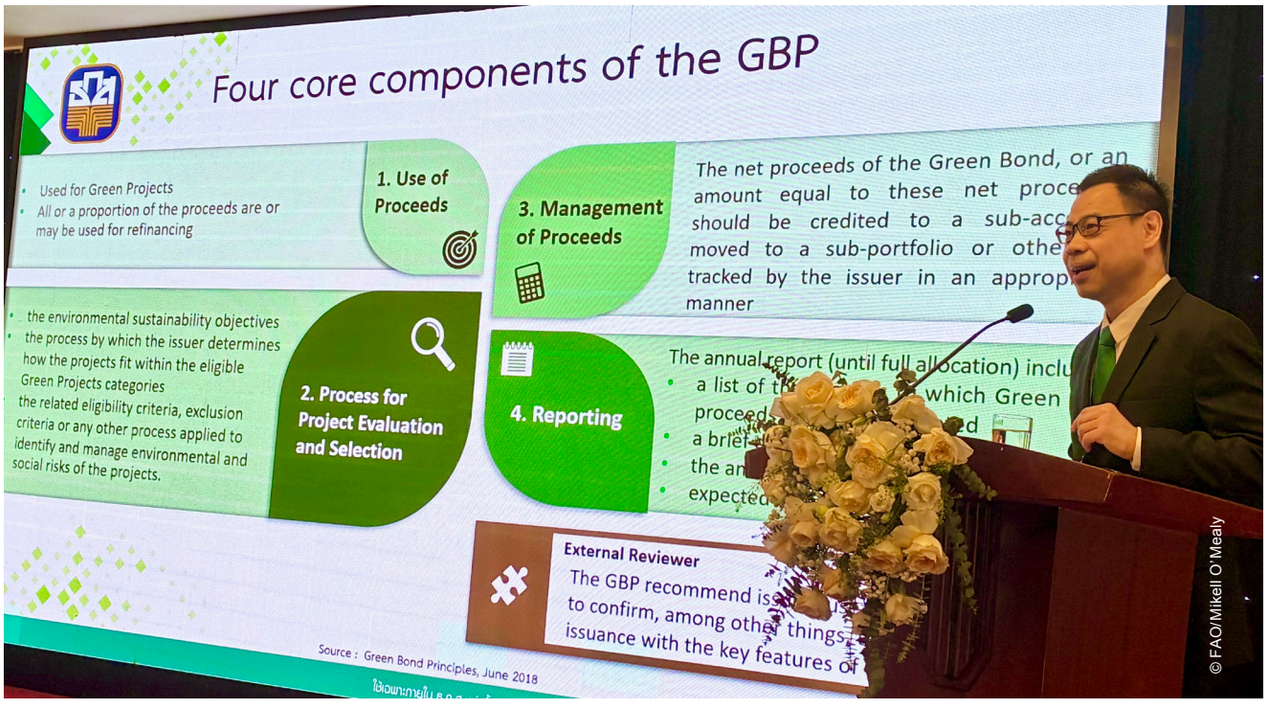
vii Loan tape refers to a standardized dataset or spreadsheet with detailed loan information reported by participating FIs to the facility manager or bond issuer. Typical fields include loan ID (a unique identifier for each loan); geography (e.g. region); borrower type (e.g. smallholder, SME, aggregator); loan amount (ticket size); tenor and grace period; product (e.g. seasonal or working capital loan, equipment or capital investment loan, value chain finance/aggregator loan, climate-smart agriculture loan, warehouse receipt finance); sector or crop; interest rate; FX exposure; performance indicators (e.g. portfolio at risk >30 or >90 days, PAR30/PAR90); write-offs (loans declared uncollectible and removed from the balance sheet); and rescheduling policy (FI rules for modifying loan terms when a borrower is struggling to repay). These reporting requirements enable transparent tracking of how green bond proceeds are allocated and used and allow auditors or verifiers to check consistency between reported data and actual lending activity.

ANNEX 2
CASE STUDY: INSIGHTS FROM THE THAILAND BAAC GREEN BOND

In 2020, Thailand's Bank for Agriculture and Agricultural Cooperatives (BAAC), a government-owned bank under the Ministry of Finance, became the first specialized financial institution in Thailand to issue a green bond. The bond raised THB 6 billion (approximately USD 192 million) with proceeds allocated through two green credit projects: the "Go Green: Forest Credit" focused on afforestation and the "Green Credit" supporting broader environmental initiatives, including sustainable agricultural practices to increase organic and safe food production and agricultural sector strengthening to enhance competitiveness, food security and food self-reliance.

This case study presents insights from BAAC's experience developing, issuing and implementing the green bond, as presented by Dusit Domethong, BAAC Vice President of Treasury Department, during a regional knowledge exchange on *Green Bonds to mobilize finance for sustainable agriculture and food securities in Asia and the Pacific*, held in Hanoi, Viet Nam on 26 March 2025.

Mr. Dusit Domethong, BAAC Vice President, Treasury Department, sharing insights from BAAC's experience during a regional knowledge exchange in March 2025.



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Key steps and timeline in BAAC's development, issuance and implementation of the Green Bond

2019

- The BAAC President appointed a BAAC Green Bond Working Group to develop the Green Bond Framework aligned with ICMA Green Bond Principles and the ASEAN Green Bond Standards.
- BAAC employees participated in a 'Green Bond Boot Camp' that provided practical guidance for green bond development and issuance, organized by Thailand's Securities and Exchange Commission (SEC) in collaboration with the UK Prosperity Fund under ASEAN Low Carbon Energy Programme (ALCEP) and EY Singapore.
- BAAC developed internal processes for preparing eligible credit projects to qualify for the bond's use of proceeds.

2020

- The BAAC Board of Directors approved the green bond issuance and the "Go Green, Forest Credit" to be funded by the bond.
- BAAC received assistance from the British Embassy in Bangkok to provide EY Singapore as an external reviewer for the green bond issuance.
- After working with EY Singapore in the Green Bond Framework review process, BAAC received a Pre-Issuance Assurance Report from EY Singapore that was incorporated in BAAC's marketing documents to engage investors.
- Thailand's Public Debt Management Office (PDMO), under the Ministry of Finance, joined BAAC in the bidding process for selecting underwriters for the bond.
- HSBC, Government Saving Bank (GSB) and Krungthai Bank (KTB) were selected as a group of underwriters.
- BAAC successfully issued the bond in August 2020, becoming the first specialized financial institution in Thailand to issue a green bond.

2021

- BAAC developed an in-house data collection and reporting system to prepare for allocation and impact reporting and to support the post-issuance assurance from EY Singapore in July 2021.
- To drive loan growth for the two eligible credit projects, BAAC appointed a special working group tasked with achieving project lending targets through leveraging the BAAC's network 1,272 branches nationwide.
- In September 2021, one year after the bond issuance, EY Singapore started verifying bond-funded projects in accordance with the post-issuance assurance process.

2022

- EY Singapore provided the Post-issuance Assurance Report confirming that the bond's Use of Proceeds, Process for Project Evaluation and Selection, Management of Proceeds, and Reporting were in accordance with criteria of the ICMA Green Bond Principles and the ASEAN Green Bond Standards.
  - Conclusion: Based on our procedures and evidence obtained, we are not aware of any material modifications that should be made to the Subject Matters as of 7 June 2022, in order for it to be in accordance with the Criteria.

Source: Authors' own elaboration.

Independent Limited Assurance Report to the Management of Bank for Agriculture and Agricultural Cooperatives ("BAAC")

Scope
With reference to the Letter of Acceptance dated 02 April 2020, we have been engaged by Bank for Agriculture and Agricultural Cooperatives ("BAAC") to perform a 'limited assurance engagement', as defined by International Standards on Assurance Engagements, here after referred to as the engagement, to report on BAAC's post-issuance processes as contained in BAAC's August 2021 Green Bond Report for the period from 19 August 2020 (bond issuance date) to 31 August 2021, as of 7 June 2022.

Subject Matter and Criteria
The Subject Matter and associated Criteria for this limited assurance engagement are set out in the table below:

Subject Matter	Criteria
Post-issuance processes for BAAC's THB 6,000M green bond issued on 19 August 2020, as described in BAAC's Green Bond Framework dated August 2020 (the "Framework") and BAAC's August 2021 Green Bond Report (the "Report"), that sets out: • Use of Proceeds • Process for Project Evaluation and Selection • Management of Proceeds • Reporting	• BAAC's Green Bond Framework dated August 2020 • Green Bond Principles (June 2021) ("GBP") by the International Capital Market Association (ICMA) • Green Bond Standards (October 2018) ("GBS") by the ASEAN Capital Markets Forum • Respective criteria found at these links: https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/ https://www.sc.com.my/api/documentms/download.ashx?id=75136194-3ce3-43a2-b562-3952b04b93f4

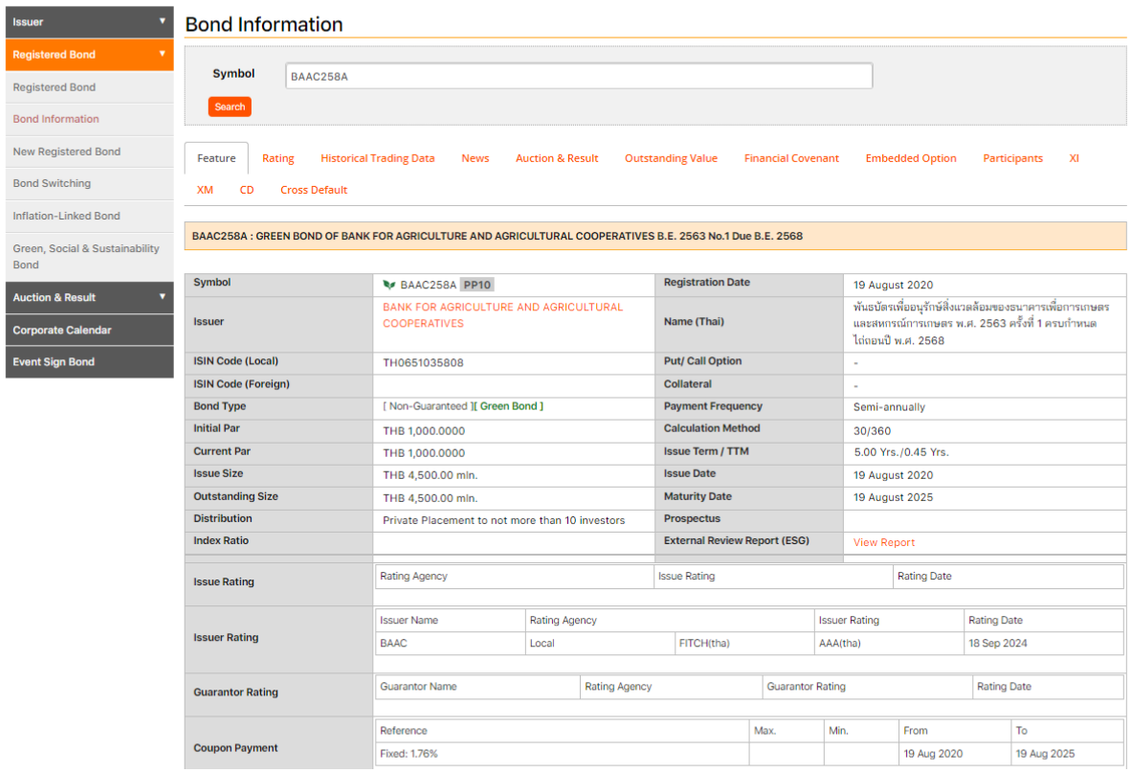
Source: EY Singapore, 2022

Overview of the BAAC Green Bond

Bond Feature	BAAC258A	BAAC308A
Issue size	4.5 billion THB	1.5 billion THB
Tenor	Five years	10 years
Maturity	August 2025	August 2030
Coupon (p.a.)	1.76	2.76
Bond holders	Institutional investors	

Source: Domethong, 2025

Bond feature: BAAC258A (5 years)



Issuer
Registered Bond
Registered Bond
Bond Information
New Registered Bond
Bond Switching
Inflation-Linked Bond
Green, Social & Sustainability Bond
Auction & Result
Corporate Calendar
Event Sign Bond

Bond Information

Symbol BAAC258A
Search

Feature | Rating | Historical Trading Data | News | Auction & Result | Outstanding Value | Financial Covenant | Embedded Option | Participants | XI | XM | CD | Cross Default

BAAC258A : GREEN BOND OF BANK FOR AGRICULTURE AND AGRICULTURAL COOPERATIVES B.E. 2563 No.1 Due B.E. 2568

Symbol	BAAC258A PP10	Registration Date	19 August 2020
Issuer	BANK FOR AGRICULTURE AND AGRICULTURAL COOPERATIVES	Name (Thai)	พันธบัตรเพื่ออนุรักษ์สิ่งแวดล้อมของธนาคารเพื่อการเกษตรและสหกรณ์การเกษตร พ.ศ. 2563 ครั้งที่ 1 ครบกำหนดไถ่ถอนปี พ.ศ. 2568
ISIN Code (Local)	TH0651035808	Put/ Call Option	-
ISIN Code (Foreign)		Collateral	-
Bond Type	[Non-Guaranteed][Green Bond]	Payment Frequency	Semi-annually
Initial Par	THB 1,000.0000	Calculation Method	30/360
Current Par	THB 1,000.0000	Issue Term / TTM	5.00 Yrs./0.45 Yrs.
Issue Size	THB 4,500.00 mln.	Issue Date	19 August 2020
Outstanding Size	THB 4,500.00 mln.	Maturity Date	19 August 2025
Distribution	Private Placement to not more than 10 investors	Prospectus	
Index Ratio		External Review Report (ESG)	View Report

Issue Rating

Rating Agency	Issue Rating	Rating Date

Issuer Rating

Issuer Name	Rating Agency		Issuer Rating	Rating Date
BAAC	Local	FITCH(tha)	AAA(tha)	18 Sep 2024

Guarantor Rating

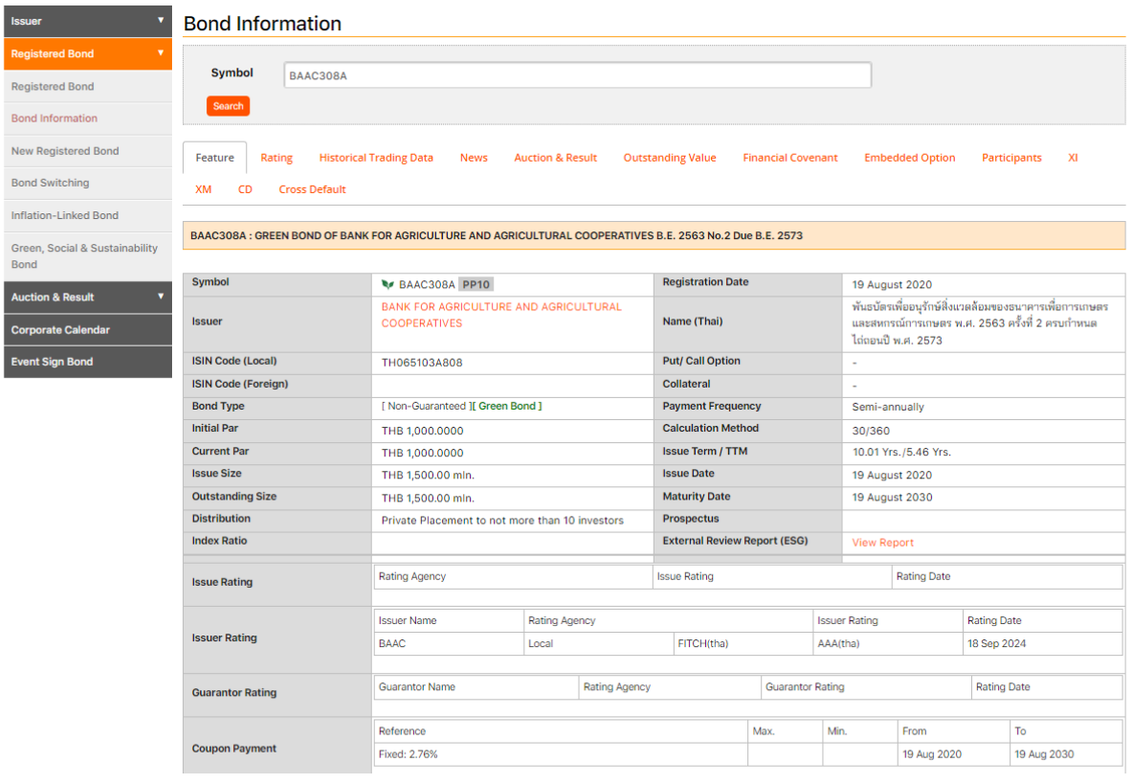
Guarantor Name	Rating Agency	Guarantor Rating	Rating Date

Coupon Payment

Reference	Max.	Min.	From	To
Fixed: 1.76%			19 Aug 2020	19 Aug 2025

Source: Domethong, 2025

Bond feature: BAAC308A (10 years)



Issuer
Registered Bond
Registered Bond
Bond Information
New Registered Bond
Bond Switching
Inflation-Linked Bond
Green, Social & Sustainability Bond
Auction & Result
Corporate Calendar
Event Sign Bond

Bond Information

Symbol BAAC308A
Search

Feature | Rating | Historical Trading Data | News | Auction & Result | Outstanding Value | Financial Covenant | Embedded Option | Participants | XI | XM | CD | Cross Default

BAAC308A : GREEN BOND OF BANK FOR AGRICULTURE AND AGRICULTURAL COOPERATIVES B.E. 2563 No.2 Due B.E. 2573

Symbol	BAAC308A PP10	Registration Date	19 August 2020
Issuer	BANK FOR AGRICULTURE AND AGRICULTURAL COOPERATIVES	Name (Thai)	พันธบัตรเพื่ออนุรักษ์สิ่งแวดล้อมของธนาคารเพื่อการเกษตรและสหกรณ์การเกษตร พ.ศ. 2563 ครั้งที่ 2 ครบกำหนดไถ่ถอนปี พ.ศ. 2573
ISIN Code (Local)	TH065103A808	Put/ Call Option	-
ISIN Code (Foreign)		Collateral	-
Bond Type	[Non-Guaranteed][Green Bond]	Payment Frequency	Semi-annually
Initial Par	THB 1,000.0000	Calculation Method	30/360
Current Par	THB 1,000.0000	Issue Term / TTM	10.01 Yrs./5.46 Yrs.
Issue Size	THB 1,500.00 mln.	Issue Date	19 August 2020
Outstanding Size	THB 1,500.00 mln.	Maturity Date	19 August 2030
Distribution	Private Placement to not more than 10 investors	Prospectus	
Index Ratio		External Review Report (ESG)	View Report

Issue Rating

Rating Agency	Issue Rating	Rating Date

Issuer Rating

Issuer Name	Rating Agency		Issuer Rating	Rating Date
BAAC	Local	FITCH(tha)	AAA(tha)	18 Sep 2024

Guarantor Rating

Guarantor Name	Rating Agency	Guarantor Rating	Rating Date

Coupon Payment

Reference	Max.	Min.	From	To
Fixed: 2.76%			19 Aug 2020	19 Aug 2030

Source: Domethong, 2025

USE OF PROCEEDS: GREEN CREDIT PROJECTS

The BAAC green bond funded two green credit projects reflecting BAAC's commitment to sustainable development and environmental conservation. By providing financial support to farmers and agricultural enterprises, BAAC's bond is fostering practices that contribute to a greener and more sustainable agricultural sector in Thailand.

Go Green: Forest Credit

- Objectives: The Go Green Forest Credit supports farmers in afforestation and reforestation by providing loans for working capital and investment in land preparation for economic wood plantations, seedling planting, and supporting sustainable forest management activities.
- Client qualifications: Clients may include farmers, individuals, enterprises, farmer groups and agricultural cooperatives that have been evaluated by a BAAC officer. Applicants must produce a reasonable annual marketable surplus of farm produce or be able to improve their agricultural activities to increase their incomes enough to repay loans.
- Conditions: Projects must be located in a client's or spouse's area that has an official land title deed. Trees from project plantations can be cut and transported when they reach an appropriate age.

Green Credit

- Objectives: The Green Credit supports farmers in broader environmental initiatives, including sustainable agricultural practices that conserve natural resources and the environment, enable organic farming, integrate renewable or clean energy sources, improve water management and increase food safety to strengthen food security and food self-reliance. The programme aims to enhance farm household income while ensuring compliance with Thailand's environmental laws and regulations.
- Client qualifications: Client investments must be in activities that promote environmental conservation and do not damage natural resources or the environment, aligned with environmental laws and regulations.
- Conditions: Excluded activities include land purchase, tobacco farming, electricity production from fossil fuels, forest cutting, agricultural trade without value addition, and debt refinancing.

BAAC LESSONS LEARNED

Costs of issuing the green bond: The cost and coupon rate of the green bond was determined largely by the market interest rate, rather than by how much investors were willing to sacrifice. At the same time, there were additional costs embedded in the green bond process, including costs associated with the external reviewer, reporting, and developing internal systems for monitoring and tracking bond proceeds and impact.

Multidisciplinary team for monitoring and reporting: Monitoring environmental impact indicators and preparing the bond reports necessitated cooperation between experts from various fields. Treasury, as the provider of bond funds, was only one part of the larger process. Successful implementation and reporting on the bond required strong intention and coordination from all bank units covering upstream, middle stream and downstream processes.

ANNEX 3
REGIONAL INITIATIVE: ASEAN GREEN BOND FOR SUSTAINABLE AGRICULTURE

Context: Agriculture in Southeast Asia is both highly vulnerable to climate change and a significant contributor to GHG emissions. With growing demand for sustainable food production and regional climate change commitments under the Paris Agreement and ASEAN climate agenda, there is an urgent need to scale up investment in climate-resilient, low-carbon agriculture. The ASEAN Food, Agriculture, and Forestry Sectoral Plan 2026–2030, developed under guidance of the ASEAN Ministers on Agriculture and Forestry (AMAF), calls for innovative finance instruments to accelerate sustainable agricultural transformation in the region.

Green bonds and sukuk are emerging as a powerful tool to channel private and public capital toward green transformation. ASEAN Member States (AMS) are increasingly interested in green and thematic bonds, and national initiatives – ranging from Indonesia's portfolio of green, blue and sukuk issuances, to Thailand's green bond issued by the Bank for Agriculture and Agricultural Cooperatives (BAAC), to the upcoming green bond issuance by the Vietnam Bank for Agriculture and Rural Development (Agribank) – demonstrate strong regional momentum.

"This regional collaboration marks a pivotal moment in shaping an ASEAN-wide approach to decarbonizing agriculture through green finance."

– Dr. Pham Quang Minh, Head of Food, Agriculture and Forestry, ASEAN Secretariat

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This concept proposes the design and launch of an **ASEAN Green Bond for Sustainable Agriculture** – a regional initiative to catalyse finance for climate-resilient, low-carbon agrifood systems aligned with ASEAN guidelines and supporting implementation of national and regional strategies for sustainable agriculture and food security.

Objective: In collaboration with AMS lead demonstration countries, develop and issue an ASEAN Green Bond for Sustainable Agriculture as a model for regional replication and scaling to:

- Mobilize finance for climate-resilient, low-carbon agriculture and sustainable agrifood systems.
- Target support to smallholder farmers, small-scale producers and small-and-medium-sized agricultural enterprises (agri-SMEs) for adopting climate-smart practices and technologies at scale.
- Foster development of national and regional green bond markets for sustainable agriculture; and
- Accelerate implementation of national and regional strategies for carbon neutrality and climate resilience.

Alignment: The ASEAN Green Bond for Sustainable Agriculture will align with the:

- ASEAN Food, Agriculture, and Forestry Sectoral Plan 2026–2030.
- ASEAN Regional Guidelines for Sustainable Agriculture.
- ASEAN Strategy for Carbon Neutrality.
- ASEAN Strategies for Carbon Neutrality in Agriculture and Land Use.
- ASEAN Green Bond Standards.
- ASEAN Taxonomy for Sustainable Finance.
- Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), green finance taxonomies and agriculture sector strategies of AMS.
- Global frameworks such as the ICMA Green Bond Principles and Climate Bonds Agriculture Criteria.

The new ASEAN Food, Agriculture and Forestry Vision for 2026–2030 highlights the urgent need for investment and innovative finance instruments to accelerate the region's sustainable agricultural transformation.

PARTNERS, FACILITATORS AND ROLES

Lead facilitators:

- ASEAN Secretariat Food, Agriculture and Forestry Division (FAFD) – convening with AMS, coordination with Finance Integration Division, reporting progress to ASEAN Ministers of Agriculture and Forestry (AMAF).
- Food and Agriculture Organization of the United Nations (FAO) – technical lead on climate-resilient, low-carbon agricultural practices, mobilizing finance for sustainable agriculture and food security, engaging and convening partners.
- ASEAN Climate Resilience Network (ASEAN-CRN) – providing a platform for meetings and knowledge exchange on climate-smart agriculture.

Proposed technical partners and advisors:

- World Bank and Asian Development Bank – financial advising and structuring, regional financing instruments, investor engagement.
- Asia and the Pacific Rural and Agricultural Credit Association (APRACA) – convening and coordination with APRACA members, finance advisory targeting smallholder farmers and agri-SMEs.
- Climate Bonds Initiative – taxonomy alignment, application of Agriculture Criteria, investor engagement, bond certification support.
- Asian Farmers Association for Sustainable Rural Development (AFA) – engaging farmers organizations and aligning with smallholders' needs.

Lead demonstration countries:

- To be determined through consultation with AMS and partners.

National implementing partners:

- Ministries of Agriculture, Environment and Finance of AMS.
- Central banks and state-owned agricultural banks.
- Private sector financial institutions and investors.

Scope and Use of Proceeds: The ASEAN Green Bond for Sustainable Agriculture will finance eligible activities to reduce agricultural GHG emissions, increase climate resilience and strengthen food security, including:

- Climate-smart agriculture (CSA) practices, technologies and infrastructure.
- Resilience-building measures for climate adaptive agrifood systems, food security and nutrition.
- Sustainable water and soil management to reduce GHG emissions and sequester carbon.
- Renewable energy and energy efficiency in agrifood systems.
- Value chain support for farmer cooperatives and agri-SMEs.
- Monitoring and reporting systems for emission reductions and resilience.

Proposed activities and timeline

Phase	Activities	Timeline
Inception	Consultation with potential AMS lead demonstration countries, scoping studies, securing funding support	Q3-Q4 2025
Design	Developing the ASEAN Green Bond for Sustainable Agriculture, aligning with ASEAN standards, taxonomy and guidelines	Q1 2026
Capacity building and investor engagement	Technical workshops with national stakeholders, investor roundtables	Q2 2026
Issuance preparation	Financial advisory and external review for initial issuance with lead demonstration countries	Q3 2026
Initial issuances	Issue an initial ASEAN Green Bond for Sustainable Agriculture through listing or private placement	Q4 2026 - Q1 2027
Monitoring and scaling	Impact reporting, expanding investor engagement, roadmap for replication	2027 +

ANNEX 4
USE OF PROCEEDS TEMPLATE ALIGNED WITH THE CLIMATE BONDS AGRICULTURE CRITERIA

This annex provides a template for developing the Use of Proceeds (UoP) section in the Green Bonds Framework aligned with ICMA Green Bond Principles and Climate Bonds Agriculture Criteria. Users can fill in the grey brackets below (e.g. [Issuer/Borrower Name]) with details for the green bond that is being developed, tailoring the template to the bond's objectives, national priorities and local context for the use of proceeds.

1. Transaction overview

[Name of the green bond]

[Name of the issuer]

Transaction information	Details
Instrument type	[type of green bond]
Total amount	[e.g. USD 500 million]
Issuance/disbursement date	[insert date]
Maturity	[insert date]
Currency	[USD / local currency]
Applicable frameworks	ICMA GBPs, Climate Bonds Initiative Agriculture Production Criteria [add any others applicable]

2. Eligible use of proceeds

Aligned with the Climate Bonds Agriculture Production Criteria, proceeds will be used to finance or refinance agriculture production projects providing climate change mitigation and adaptation benefits and inclusive solutions for smallholder farmers. Eligible use of proceeds (UoP) for the [green bond name] are defined through a three-step process as summarized below.

Step 1. Demonstration that agricultural production units are deforestation- and conversion-free (DCF): The working lands and/or agricultural production units associated with UoP will be required to demonstrate deforestation-free and conversion-free status since December 2010.

Step 2. Eligible Measures: Eligible UoP measures include:

- [*Provide a list of selected measures here] – select measures from either the proxies for automatic eligibility (Table 5) or specific measures from four categories of climate change objectives (Tables 6-9)*

Eligible expenditures may include related and supporting expenditures for projects or physical assets associated with the above noted Eligible Measures; relevant installation and routine maintenance expenditures and upgrades undertaken to maintain the value and/or lifetime of assets or projects linked to the Eligible Measures; and capital expenditures undertaken to increase the value and/or lifetime of assets or projects linked to the Eligible Measures.

As examples, eligible expenditures could include capital and operating expenditures related to organic farming and agroecology inputs (e.g. compost, cover crops, native trees, organic fertilizers); capital goods to increase sustainable crop yields (e.g. purchasing equipment, housing, storage or degraded farmland to be restored); crop-based transformation processes (e.g. intercropping, planted trees); waste management on the production units (e.g. composting, manure, crop residue processing, recycling); and supporting activities that enable climate change mitigation or adaptation (e.g. farmer training in low-emission high-yield practices, capacity building on climate-smart technologies, strengthening climate services such as GHG accounting and monitoring and reporting systems).

For the avoidance of doubt, what will not be considered eligible are activities, assets or projects that do not have clear climate benefits or a clear time horizon, such as:

- Research and development programmes where climate benefits are unclear based on current science.
- Biodiversity projects with unclear climate benefits.
- Social projects with unclear climate benefits.
- General behavior-change training with unclear climate objectives.
- Any project with an unclear time horizon for climate benefits.
- Expenditures relating to general corporate purposes.

Step 3. Safeguards to ensure Eligible Measures do no significant harm: The following safeguards have been checked to ensure that implementation of the above Eligible Measures will not cause significant harm related to climate change adaptation and resilience, biodiversity, water management and social impacts.

1. Climate change adaptation safeguard: [describe the methodology used to identify and minimize risks for negative impacts related to climate change adaptation]
2. Environmental and social safeguards: [describe the methodology used to identify and minimize risks for negative impacts related to biodiversity, water management and social impacts]

See the section on **Safeguards to ensure eligible measures do no significant harm**, providing a four-step process as a starting point to assess and avoid unintended negative impacts of projects and activities. *As an example, if a bond issuer identifies a risk related to water usage, it could address and mitigate this risk by noting that: "Implementation of Eligible Measures will ensure that the production units do no harm to water availability and water quality by adopting effective water management and employing drip irrigation to reduce water usage. This will significantly improve water use efficiency, leading to reduced water consumption and preventing water pollution."*

3. Target beneficiaries

Target beneficiaries of the [green bond name] include: [describe beneficiaries or modify the table below to summarize beneficiaries].

Group	Description
Smallholder farmers	Typically cultivating less than 2 hectares, often in vulnerable contexts and reliant on rainfed systems.
Farmers organizations / cooperatives	Aggregators for providing finance and technical assistance. Women-led farming groups could be prioritized as potential aggregators/facilitators
Agri-SMEs	Input suppliers, processors, aggregators, distributors, logistics and/or training providers serving local food systems.
Climate-vulnerable communities contributing to small-scale agrifood systems	Located in flood-prone, drought-exposed or fragile environments that contribute to small-scale agricultural production and agrifood systems.
[add beneficiary groups]	[describe additional target beneficiaries]

4. Disbursement and allocation plan

Complete the table below to describe the UoP disbursement and allocation plan.

Item	Details
Initial allocation	[e.g. 40 percent at financial close]
Full allocation period	[e.g. within 24 months]
Channel	[e.g. through farmers organizations/cooperatives, partner microfinance institutions (MFIs), development banks, targeted loan programs paired with technical assistance]
Unallocated funds	[e.g. held in ESG-aligned short-term liquid assets according to issuer policies]

5. Monitoring, reporting and impact metrics

Add the selected Eligible Measures and their associated impact metrics in the table below, drawing from those provided in **Tables 5-8**. If proxies for automatic eligibility were selected (which enable compliance to be demonstrated through qualitative requirements rather than quantitative impact metrics), list the selected proxies in below, drawing from **Table 5.**

Eligible Measures	Impact metrics
[e.g. improvements in flooded rice systems to decrease number of days under flooding] *(i.e. as many measures applicable under "reducing emissions category")*	[e.g. percent reduction in number of days of flooding and/or GHG emission reduction (estimated)]
[e.g. biochar application] *(i.e. as many measures applicable under "sequestering carbon category")*	[e.g. application rate per hectare and/or increased carbon input or carbon sequestration (estimated)]
[e.g. community seed banks] *(i.e. as many measures applicable under "adapting to climate")*	[e.g. significant Adaptation and Resilience (A&R) benefit]
[e.g. climate services: GHG assessments] *(i.e. as many measures applicable under "supporting activities")*	[e.g. estimation of specific benefits for climate mitigation and/or adaptation]

Annual reporting on UoP can include allocation by category and geography, beneficiary types (e.g. number of smallholders, percent of women), and/or aggregated impact metrics calculated from the selected Eligible Measures, for example:

Metric	Unit
GHG emissions reduced or avoided	tCO_2e/year
Hectares under "green" measures	ha
Yield increase from eligible measures	Percent - tonnes/ha
Food production increase	Tonnes – tonnes/ha
For rice: reduced in flooding conditions	Percent - number of days non-flooded
Number of smallholders supported	Number
Increase in farm income or SME revenue	Percent
Estimation of climate risks avoidance/amelioration	Percent

6. Governance and External Review

Complete the table below to provide information on governance and external review components.

Component	Details
Governance team	[e.g. Green Bond Steering Committee or Sustainable Finance Unit]
Evaluation criteria	[e.g. Climate Bonds Agriculture Production Criteria]
SPO / external review	[e.g. Sustainalytics]
Post-issuance assurance	[e.g. annual third-party audit or assurance of use and impacts]

7. Disclosure Summary

Complete the table below to provide a summary of disclosure information.

Element	Disclosure
Farms are deforestation- and conversion-free	Geolocation of farms show no deforestation or natural ecosystem conversion since December 2010.
Substantial contribution to climate change mitigation and/or adaptation	[Estimate uptake rate and impact metrics resulting from implementation of Eligible Measures by smallholder farmers and other target beneficiaries].
Adaptation safeguard	[Describe assessment and interventions to minimize risks].
Biodiversity, water and social safeguards	[Describe assessment and interventions to minimize risks].

REFERENCES

African Development Bank. 2023. *Sustainable Bond Framework.* [Cited November 2025]. https://www.afdb.org/sites/default/files/2023/09/12/230912_afdb_sustainable_bond_framework_final.pdf

AgFunder and ISF Advisors. 2024. Climate Capital: Financing Adaptation Pathways for Smallholder Farmers. Supported by the Bill & Melinda Gates Foundation. In: *AgFunder.* [Cited November 2025]. https://agfunder.com/research/climate-capital-financing-adaptation-pathways-smallholder-farmers/

Asean Capital Markets Forum (ACMF). 2024. The ACMF at 20: Enhancing Connectivity, Sustainability and Resilience across the ASEAN Capital Markets. In: *ASEAN Capital Markets Forum*. [Cited November 2025]. www.theacmf.org/media/news-release/the-acmf-at-20-enhancing-connectivity-sustainability-and-resilience-across-the-asean-capital-markets

Asian Development Bank. 2024. *ADB Supports Asia's First Sovereign Sustainability-Linked Bond in Thailand.* In: *Asian Development Bank*. [Cited November 2025]. www.adb.org/news/adb-supports-asia-first-sovereign-sustainability-linked-bond-thailand

Asian Development Bank. 2025. *Promoting Capital Markets for a Sustainable and Inclusive Southeast Asia.* In: *Asian Development Bank*. [Cited November 2025]. www.adb.org/publications/promoting-capital-markets-southeast-asia

Bank for Agriculture and Agricultural Cooperatives. 2020. *BAAC Green Bond Framework.* [Cited November 2025]. www.baac.or.th/file-upload/15345-1-Green%20Bond_Framework.pdf

Bank for Agriculture and Agricultural Cooperatives. 2024. *Green Bond Report 2024.* [Cited November 2025]. www.baac.or.th/file-upload/018210-2-Green%20Bond%20Report%202024.pdf

CIRAD and FAO. 2025. Deforisk QGIS plugin. In: *Deforisk.* [Cited November 2025]. https://deforisk-qgis-plugin.org/index.html

Climate Bonds Initiative and ClimateWorks Foundation. 2019. *ASEAN Green Financial Instruments Guide.* [Cited November 2025]. www.climatebonds.net/files/documents/publications/ASEAN-Green-Financial-Instruments-Guide.pdf

Climate Bonds Initiative. 2023. *India's debut in the sovereign green bond market: First deal landed a greenium!* [Cited November 2025]. www.climatebonds.net/news-events/blog/indias-debut-sovereign-green-bond-market-first-deal-landed-greenium

Climate Bonds Initiative. 2024a. *A five-point agenda for financing NDCs.* [Cited November 2025]. www.climatebonds.net/news-events/blog/five-point-agenda-financing-ndcs

Climate Bonds Initiative. 2024b. *Transition in Action Agri-Food.* [Cited November 2025]. www.climatebonds.net/data-insights/publications/transition-action-agri-food

Climate Bonds Initiative. 2025b. *Agriculture Production Criteria.* [Cited November 2025]. www.climatebonds.net/our-expertise/climate-bonds-standard-and-certification-scheme/sector-criteria/agriculture-production

Climate Bonds Initiative. 2025a. *Sector Criteria.* [Cited November 2025]. https://www.climatebonds.net/expertise/standard-sector-criteria-certification/sector-criteria

Climate Policy Initiative. 2023. *The Climate Finance Gap for Small-Scale Agrifood Systems.* [Cited November 2025]. www.climatepolicyinitiative.org/publication/the-climate-finance-gap-for-small-scale-agrifood-systems/

Climate Policy Initiative (CPI). 2023. *The Climate Finance Gap for Small-Scale Agrifood Systems.* [Cited November 2025]. www.climatepolicyinitiative.org/publication/the-climate-finance-gap-for-small-scale-agrifood-systems/

ClimateShot Investor Coalition (CLIC). 2025. *Landscape of Climate Finance for Agrifood Systems 2025.* [Cited November 2025]. https://climateshotinvestor.org/publications/landscape-of-climate-finance-for-agrifood-systems-2025

Convergence. 2025. *Design of a Green Bond for Sustainable Rice Production in Africa.* [Cited November 2025]. www.convergence.finance/accelerator/grant-portfolio/68xWl0ZIP0kgT34UzrujJc/view

Domethong D. 2025. *Sharing Insights from BAAC's Green Bond Issuance.* Presented at the 26 March 2025 Regional Knowledge Exchange on Green Bonds to mobilize finance for sustainable agriculture and food securities in Asia and the Pacific. [Cited November 2025].

Environmental Finance. 2020. *Green bond of the year (sovereign): Republic of Chile.* [Cited November 2025]. www.environmental-finance.com/content/awards/green-social-and-sustainability-bond-awards-2020/winners/green-bond-of-the-year-sovereign-republic-of-chile.html

Environmental Finance. 2024. Green bond of the year – sovereign; Award for innovation – bond structure (green bond): Republic of Indonesia. In: *Environmental Finance*. [Cited November 2025]. www.environmental-finance.com/content/awards/environmental-finances-sustainable-debt-awards-2024/winners/green-bond-of-the-year-supranational-award-for-innovation-bond-structure-(green-bond)-republic-of-indonesia.html

ESG Today. 2023. India's Inaugural Green Bond Earns 'Greenium' on Solid Demand. In: *ESG Today*. [Cited November 2025]. www.esgtoday.com/indias-inaugural-green-bond-draws-greenium-on-solid-demand/

EY Singapore. 2022. Post-issuance Assurance Report. https://www.baac.or.th/file-upload/16540-1-Green%20Bond%20Post-issuance%20Assurance%20Report%20%287%20June%202022%29.pdf

FAO, IFAD, UNICEF, WFP and WHO. 2024. *The State of Food Security and Nutrition in the World 2024 – Financing to end hunger, food insecurity and malnutrition in all its forms.* Rome. [Cited November 2025]. https://doi.org/10.4060/cd1254en

FAO. 2021a. *Small family farmers produce a third of the world's food.* [Cited November 2025]. www.fao.org/family-farming/detail/en/c/1398060/

FAO. 2021b. *The state of the world's land and water resources for food and agriculture – Systems at breaking point.* Synthesis report 2021. Rome. [Cited November 2025]. https://doi.org/10.4060/cb7654en

FAO. 2023. *Asia and the Pacific - Regional Overview of Food Security and Nutrition 2023: Statistics and trends.* [Cited November 2025]. https://openknowledge.fao.org/items/50e89fe4-95fa-49e4-b8a7-074e3a7e062d

FAO. 2024b. *Agrifood systems in nationally determined contributions: Global analysis – Key findings.* [Cited November 2025]. https://doi.org/10.4060/cd3210en

FAO. 2024a. *State of Food and Agriculture 2024 – Value-driven transformation of agrifood systems.* Rome. [Cited November 2025]. https://openknowledge.fao.org/items/65139780-d06c-4b7c-a2cd-3ed4256eaa1c

FAO. 2025a. *Agrifood systems in NDCs in Asia and the Pacific – Policy brief.* [Cited November 2025]. https://openknowledge.fao.org/items/e0a9d327-7644-41e4-8c22-d65d03d7b924

FAO. 2025c. *FAO Investment Centre 2024 at a glance.* [Cited November 2025]. https://openknowledge.fao.org/items/b93d1620-e82e-4368-a229-e97f5d2db41c

FAO. 2025b. *Increasing direct access to the Green Climate Fund for agriculture in Southeast Asia: A regional assessment of existing and potential Direct Access Entities.* [Cited November 2025]. https://openknowledge.fao.org/items/731b1292-45fb-4fc1-a8ef-2b2db59050da

FAO. 2025g. *REDD+ Reducing Emissions from Deforestation and Forest Degradation.* [Cited November 2025]. www.fao.org/redd/areas-of-work/national-forest-monitoring-system/en/

FAO. 2025e. *Regional Knowledge Exchange: Green bonds to mobilize finance for sustainable agriculture and food security in Asia and the Pacific.* [Cited November 2025]. https://openknowledge.fao.org/items/be625824-3389-45bb-af48-b4c38a3fe18c

FAO. 2025f. *SEPAL Forest and Land Monitoring for Climate Action.* [Cited November 2025]. www.fao.org/in-action/sepal/en

FAO. 2025d. *Technical workshop to support planning for a green bond to mobilize finance for sustainable agriculture in Viet Nam.* [Cited November 2025]. https://openknowledge.fao.org/items/11ecc0c5-8e39-4c2e-9fe5-4baefd3526f8

FAO. 2026b. Agriculture Sector Readiness for enhanced climate finance and implementation of Koronivia Joint Work on Agriculture priorities in Southeast Asia. In: *FAO and the Green Climate Fund (GCF).* [Cited November 2025]. www.fao.org/gcf/projects-map/project-detail/agriculture-sector-readiness-for-enhanced-climate-finance-and-implementation-of-koronivia-joint-work-on-agriculture-priorities-in-southeast-asia/en

FAO. 2026a. *Climate-Smart Agriculture*. [Cited May 2026]. www.fao.org/climate-smart-agriculture/en/

FAO. 2026c. *Hand-in-Hand Initiative.* [Cited May 2026]. https://www.fao.org/hand-in-hand/en

FIRA Sustainable Bond Framework. 2024. [Cited November 2025]. www.fira.gob.mx/Files/FIRA_SustainableBond_FrameworkSecond-PartyOpinion2024.pdf

GCF. 2025. GCF's investment into the Global Green Bond Initiative (GGBI). In: *Green Climate Fund.* [Cited November 2025]. https://www.greenclimate.fund/project/fp276

Global Center on Adaptation (GCA). 2021. *Green Bonds for Climate Resilience: State of Play and Roadmap to Scale.* [Cited November 2025]. https://gca.org/wp-content/uploads/2021/10/Green-Bonds-for-Climate-Resilience_State-of-Play-and-Roadmap-to-Scale.pdf

Global Green Growth Institute (GGGI). 2024. GGGI supports IDI Sao Mai's USD 40 million green bond issuance, boosting sustainable finance in Viet Nam's seafood industry. In: *Global Green Growth Institute.* [Cited November 2025]]. https://gggi.org/gggi-supports-idi-sao-mais-usd-40-million-green-bond-issuance-boosting-sustainable-finance-in-viet-nams-seafood-industry/

Green Finance for Latin America and the Caribbean. 2021. Colombia to place first green bond issuance in local market in September. In: *Green Finance for Latin America and the Caribbean.* [Cited November 2025]. https://greenfinancelac.org/resources/news/colombia-to-place-first-green-bond-issuance-in-local-market-in-late-september/

IDB and The World Bank. 2025. *Amazonia Bond Issuance Guidelines.* [Cited November 2025]. https://openknowledge.worldbank.org/server/api/core/bitstreams/61f12efe-d10c-4a0c-b547-bcdf00719699/content

IDB. 2025a. *Green Bond Transparency Platform.* Issuer profile: Fondo Especial para Financiamientos Agropecuarios (FEFA). [Cited November 2025]. www.greenbondtransparency.com/issuer-profile/?handle=f7c5e008f9e343d7b582b196c185bb09

IDB. 2025b. IDB Issues Its First-Ever Amazonia Bond for $100 Million to Finance Sustainable Development. In: *IDB*. [Cited November 2025]. www.iadb.org/en/news/idb-issues-its-first-ever-amazonia-bond-100-million-finance-sustainable-development

IMF. 2023. *Sovereign ESG Bond Issuance: A Guidance Note for Sovereign Debt Managers.* [Cited November 2025]. www.elibrary.imf.org/view/journals/001/2023/058/article-A001-en.xml?

International Capital Market Association (ICMA). 2024. *The Asian International Bond Markets: Development and Trends.* [Cited November 2025]. www.icmagroup.org/assets/ICMA-The-Asian-International-Bond-Markets-Developments-and-Trends-March-2024.pdf

International Capital Market Association (ICMA). 2025. *Sustainable Bonds for Nature: A Practitioner's Guide.* [Cited November 2025]. www.icmagroup.org/assets/documents/Sustainable-finance/2025-updates/Sustainable-Bonds-for-Nature-A-Practitioners-Guide-June-2025.pdf

International Capital Market Association (ICMA). 2025. *The Asian International Bond Markets: Issuance Trends and Dynamics.* [Cited November 2025]. www.icmagroup.org/assets/documents/About-ICMA/APAC/ICMA-Report-The-Asian-International-Bond-Markets-Issuance-Trends-and-Dynamics-Fifth-Edition-March-2025-110325.pdf

International Finance Corporation (IFC). 2007. *IFC Exclusion List.* [Cited November 2025]. www.ifc.org/content/dam/ifc/doc/mgrt-pub/ifc-exclusion-list.pdf

International Finance Corporation (IFC). 2020. *The Green Bond Handbook: A Step-By-Step Guide to Issuing a Green Bond.* [Cited November 2025]. https://documents1.worldbank.org/curated/en/099854406222232086/pdf/IDU07c8498af092330405d0b43101bc10ba9c88d.pdf

IPCC. 2019. Climate Change and Land: Food Security. In: *Intergovernmental Panel on Climate Change.* [Cited November 2025]. www.ipcc.ch/srccl/chapter/chapter-5/

IPCC. 2022. *Climate Change 2022: Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* First edition. Cambridge University Press. [Cited November 2025]. https://doi.org/10.1017/9781009325844

Khan Bank. 2023. *Green Bond Framework.* [Cited November 2025]. www.khanbank.com/uploaded/documents/2023/Sep/Khan%20Bank%20LLC%20GBF%20final%20(1).pdf

Labonte, D. 2021. *Blue Bond: The Seychelles Experience.* [Cited November 2025]. www.cabri-sbo.org/uploads/files/Documents/Session-3-Presentation-of-Dick-Labonte-Seychelles.pdf

Malaysia Ministry of Finance. 2021. *Malaysia's Sustainability Sukuk oversubscribed by 6.4 times, allocation well-spread globally.* [Cited November 2025]. www.mof.gov.my/portal/en/news/press-citations/malaysia-s-sustainability-sukuk-oversubscribed-by-6-4-times-allocation-well-spread-globally

Mexico Business News. 2023. FIRA Places First Green Resilience Bond in Latin America. In: *Mexico Business News*. [Cited November 2025]. https://mexicobusiness.news/agribusiness/news/fira-places-first-green-resilience-bond-latin-america

Ministry of Finance, Republic of Indonesia, and United Nations Development Programme (UNDP). 2020. *Indonesia's Green Bond & Green Sukuk Initiative.* [Cited November 2025]. https://climatepromise.undp.org/sites/default/files/research_report_document/undp-ndcsp-green-sukuk-share.pdf

Ministry of Finance, Republic of Indonesia. 2023. *Republic of Indonesia Issues (Settlement) JPY 104.8 billion and Inaugural Blue Bonds.* [Cited November 2025]. www.djppr.kemenkeu.go.id/en/republicofindonesiaissues%28settlement%29jpy104.8billionandinauguralbluebonds

Moody's. 2025. What's in store for sustainable finance and ESG in 2025. In: *Moody's*. [Cited November 2025]. www.moodys.com/web/en/us/insights/credit-risk/outlooks/esg-sustainable-finance-2025.html

OECD. 2025. *Asia Capital Markets Report 2025.* [Cited November 2025]. www.oecd.org/en/publications/asia-capital-markets-report-2025_02172cdc-en/full-report/sustainable-bonds_21e9a353.html

Open Foris. 2025. Whisp. In: *Open Foris*. [Cited November 2025]. https://openforis.org/solutions/whisp/

Pratt, L., & Ortega, J. M. 2019. *Protected Agriculture in Mexico: Building the Methodology for the First Certified Agricultural Green Bond.* Nieto, E., & Braly-Cartillier, I. (Eds.). Inter-American Development Bank. [Cited November 2025]. https://doi.org/10.18235/0001705

Republic of Chile. 2019. *Green Bond Framework.* [Cited November 2025]. www.sbfnetwork.org/wp-content/assets/policy-library/320_Chile_Green_Bond_Framework_2019.pdf

Republic of Colombia, Ministry of Finance and Public Credit. 2021. *Colombia Sovereign Green Bond Framework.* [Cited November 2025]. https://data.sbfnetwork.org/sites/default/files/2024-04/ShowProperty_0.pdf

Republic of Fiji. 2017. *Fiji Green Bond Framework – October 2017.* Reserve Bank of Fiji. [Cited November 2025]. https://investinfiji.today/wp-content/uploads/2018/01/Fiji-Green-Bond-Framework-October-2017.pdf

Republic of Indonesia. 2021. *SDGs Government Securities Framework.* [Cited November 2025]. https://sdginvest.jointsdgfund.org/sites/default/files/2022- 02/Indonesia%20SDG%20%20Bond%201%5B4%5D.pdf

Smallholder and Agri-SME Finance and Investment Network (SAFIN). 2021. *Learning brief: agri-SME taxonomy.* In: *SAFIN.* [Cited November 2025]. https://safin.theagencydev.co.za/internal_resources/learning-brief-agri-sme-taxonomy/

Smallholder and Agri-SME Finance and Investment Network (SAFIN). 2023b. *Strengthening the Family Farm in Mexico.* In: *SAFIN.* [Cited November 2025]. https://safin.theagencydev.co.za/internalresources/blended-finance-case-study-strengthening-the-family-farm-in-mexico/

Smallholder and Agri-SME Finance and Investment Network (SAFIN). 2023a. Why agri-SMEs: Championing the hidden middle of agricultural value chains. In: *SAFIN.* [Cited November 2025]. https://safin.theagencydev.co.za/why-agri-smes/

Spirit of Mumbai. 2023. NABARD Successfully Lists First of its Social Bonds with a Size of Rs 1040 Crores on BSE. In: *Sujatawde*. [Cited November 2025]. www.sujatawde.com/2023/09/nabard-successfully-lists-first-of-its.html

Sutton, William R., Alexander Lotsch, and Ashesh Prasann. 2024. *Recipe for a Livable Planet: Achieving Net Zero Emissions in the Agrifood System. Agriculture and Food Series.* Washington, DC: World Bank. http://hdl.handle.net/10986/41468

Symbiotics. 2023. Symbiotics Investments supports sustainable agricultural and climate-adapted financing in Ecuador by arranging a Green Bond for Banco Solidario. In: *Symbiotics*. [Cited November 2025]. https://symbioticsgroup.com/symbiotics-supports-sustainable-agricultural-financing-in-ecuador/

The World & Viet Nam Report. 2024. Announcement Ceremony of IDI's successful issuance of the first seafood green bond in Asia and the Pacific. In: *The World & Vietnam Report.* [Cited November 2025]. https://en.baoquocte.vn/announcement-ceremony-of-idis-successful-issuance-of-the-first-seafood-green-bond-in-asia-pacific-295492.html

UNICEF. 2025. Acute food insecurity and malnutrition rise for sixth consecutive year in world's most fragile regions. In: *UNICEF.* [Cited November 2025]. www.unicef.org/press-releases/acute-food-insecurity-and-malnutrition-rise-sixth-consecutive-year-worlds-most

UNDP. 2022. *Demystifying Green and Blue Bonds for the Pacific Island Countries.* [Cited November 2025]. www.undp.org/sites/g/files/zskgke326/files/2022-08/demystifying-green-and-blue-bonds-for-the-pacific.pdf

United Nations Kenya. 2025. UN-Supported Green Bond Initiative to Transform Africa's Rice Sector. In: *United Nations Kenya.* [Cited November 2025]. https://kenya.un.org/en/291126-un-supported-green-bond-initiative-transform-africa's-rice-sector

World Bank. 2018a. Seychelles launches World's First Sovereign Blue Bond. In: *World Bank.* [Cited November 2025]. www.worldbank.org/en/news/press-release/2018/10/29/seychelles-launches-worlds-first-sovereign-blue-bond

World Bank. 2018b. Sovereign Blue Bond Issuance: Frequently Asked Questions. In: *World Bank.* [Cited November 2025]. www.worldbank.org/en/news/feature/2018/10/29/sovereign-blue-bond-issuance-frequently-asked-questions

World Bank Treasury. 2022. *Sovereign green, social and sustainability bonds: Unlocking the potential for emerging markets and developing economies – Insights based on World Bank surveys of public debt management offices and international investors.* H. Dill & F. I. Hussain. [Cited November 2025]. https://thedocs.worldbank.org/en/doc/4de3839b85c57eb958dd207fad132f8e-0340012022/original/WB-GSS-Bonds-Survey-Report.pdf

World Bank Treasury. 2025. *Labeled Sustainable Bonds, Market Update – July 2025.* [Cited November 2025]. https://thedocs.worldbank.org/en/doc/9a258e226b80204053eabdd50ed1bc08-0340012025/original/Labeled-Bond-Quarterly-Newsletter-Issue-No-12.pdf

CONTACT

FAO Regional Office for Asia and the Pacific (FAORAP)
FAORAP-CCRLW@fao.org

Food and Agriculture Organization of the United Nations
Bangkok, Thailand

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