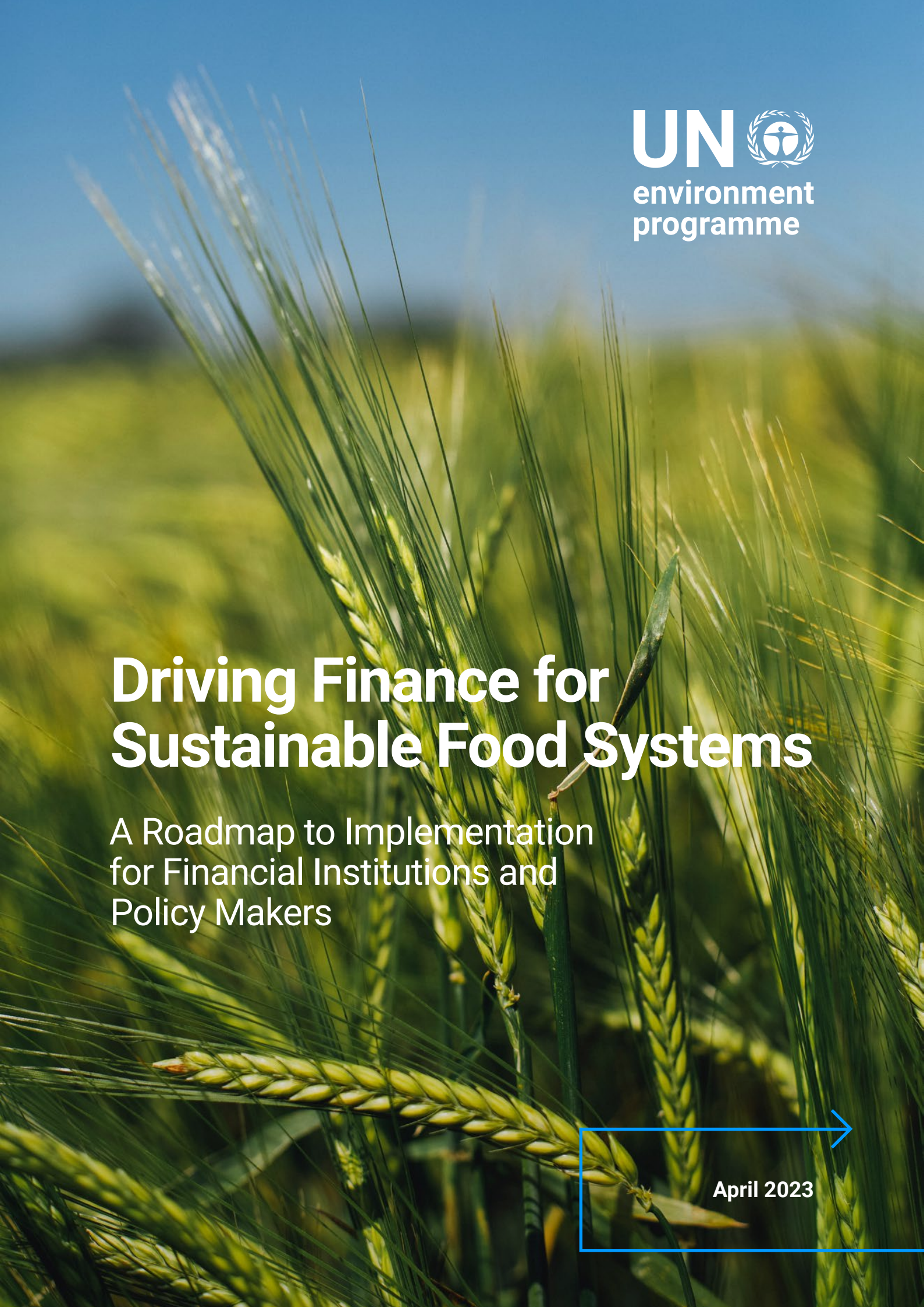

UN environment programme

Driving Finance for Sustainable Food Systems

A Roadmap to Implementation for Financial Institutions and Policy Makers

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Authors

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Vanesa Rodríguez Osuna | Author, Food Systems Lead, UNEP FI
Alexander 'Sasha' Wiese | Author, Senior structuring specialist, UNEP CFU
Tommaso Buso | Author, Senior analyst, Bankers without Boundaries
Baris Karapinar | Author, Senior policy specialist, UNEP CFU

Jessica Smith | Nature Lead, UNEP FI
Remco Fisher | Climate Lead, UNEP FI
Ivo Mulder | Head, UNEP CFU
Gretel Gambarelli | Project Manager, UNEP CFU

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List of abbreviations and acronyms

ABS	Asset-Backed Securities
AFOLU	Agriculture, forestry and other land use
BIS	Bank for International Settlements
B4ICA	Banking for Impact on Climate in Agriculture
CBI	Climate Bonds Initiative
CISL	Cambridge Institute for Sustainability Leadership
CLO	Collateralised Loan Obligations
ECB	European Central Bank
EDF	Environmental Defense Fund
ESG	Environmental, Social and Governance factors
ESRS	European Sustainability Reporting Standards
FAO	Food and Agriculture Organization of the United Nations
FLAG	Forest, Land and Agriculture
FOLU	Food and Land Use Coalition
GBF	Global Biodiversity Framework
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFFN	Good Food Finance Network
GHG	Greenhouse Gas
HLPE	High Level Panel of Experts on Food Security and Nutrition
ICMA	International Capital Market Association
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IWMI	International Water Management Institute
KPI	Key Performance Indicator
LEAP	Locate, Evaluate, Assess, Prepare
MRV	Measurement, Reporting and Verification
NBS	Nature-Based Solutions
NYDF	New York Declaration on Forests

NZAOA	Net-Zero Asset Owner Alliance
NZBA	Net-Zero Banking Alliance
NZIA	Net-Zero Insurance Alliance
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PCAF	Partnership for Carbon Accounting Financials
PRI	Principles for Responsible Investment
PRB	Principles for Responsible Banking
SBTi	Science Based Targets Initiative
SDGs	Sustainable Development Goals
SFDR	Sustainable Finance Disclosures Regulation
SFS	Sustainable Food Systems
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SMEs	Small and medium-sized enterprises
SPVs	Special Purpose Vehicles
TCFD	Taskforce on Climate-Related Financial Disclosures
TNFD	Taskforce on Nature-Related Financial Disclosures
UoP	Use of Proceeds
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UN DESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNEP WCMC	United Nations Environment Programme World Conservation Monitoring Centre
WBCSD	World Business Council on Sustainable Development
WFP	World Food Programme

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Executive summary

Section I: The challenge

Food systems are key to achieving the Sustainable Development Goals (SDGs), yet their current trajectory is unsustainable. The way we produce and consume food contributes greatly to climate change. At least one third of total global greenhouse emissions from human activities can be attributed to the way we produce, process, transport and package food. The expansion of agricultural commodities is the largest driver of deforestation worldwide and food systems remain a key contributor to global nature loss with profound implications for people (e.g. related to food security, employment, public health and gender).

A food systems lens draws attention to multiple environmental, social and governance (ESG) factors—such as diets, climate and nature—and goes beyond a siloed approach. A rapid transition to sustainable food systems is key to achieving all 17 SDGs. Sustainable food systems could contribute to the fight against poverty, food insecurity and eradicating gender inequality by creating jobs, improving access to adequate nutrition, and supporting healthy communities. They can also help empower and support women and bolster their livelihoods by increasing women's access to capital, improving employment conditions or supporting businesses or investments that empower women, thereby improving their quality of life as well as that of their families and communities. While sustainable food systems are critical to addressing all major development challenges, the transition requires additional financial resources of up to USD 350 billion per year by 2030 (IFPRI 2022). Public financial resources, including multilateral development assistance, are not sufficient. **Private finance is essential to fill the funding gap to support the rapid transition of food systems**.

There is great potential for driving positive impacts from the financial services industry: Financial institutions with significant portfolio exposure to the agrifood sector have a fundamental role to play in addressing the world's most pressing challenges. They can influence clients and suppliers across value chains to improve their policies and practices, demand accurate quantitative monitoring and reporting from investees and drive financial flows towards more sustainable food systems. These efforts can underpin strong economic recovery, climate action, nature protection and public health and make food systems more sustainable, resilient, and fair.

Channelling private finance to food systems is a major challenge: Information asymmetries exist between financial institutions and potential borrowers or investee companies. The sector is prone to high transaction costs and small ticket sizes for

agribusiness financial transactions upstream at the farm or production level. A significant proportion of actors operate in the informal sector, which lacks access to formal finance channels. The institutional capacity to set and enforce regulations to around financial transactions is often limited in countries where access to finance is most needed. In addition, food systems exhibit growing risks—they are exposed to increased frequency and intensity of extreme climate events, high volatility of commodity prices, heightened macro-economic challenges (inflation, recession) and geopolitical risks (local and regional conflicts, disruptions in international trade). Directing adequate volumes of private finance to sustainable food systems remains a major challenge. This report addresses how private finance can overcome significant hurdles on the path to fostering sustainable food systems.

Section II: Institutional changes needed

Identify and assess impact, set targets, monitor progress and achieve impact: The roadmap for implementation for private financiers starts by identifying—systematically and holistically—both the positive and negative impacts of loans, investments, and operations across environmental, social and economic impact areas. Next steps include assessing and measuring performance, setting targets, monitoring and disclosure. Boosting implementation in the agrifood sector requires capitalizing on the opportunities that this sector brings including investing in new projects and businesses that tackle food-related issues, making concessional finance available, developing innovative financial products, and raising institutional investor capital for sustainable food systems.

Deliver on commitments: After setting targets, financial institutions require concrete action plans to deliver on their commitments. Only the implementation of targets can result in tangible impacts for people, climate and nature.

Time for action: Financial actors can leverage the socio-economic opportunities of the food systems transition and mitigate the increasing financial risks they face if the current food system challenges are not addressed.

Good practices demonstrated and promoted by the Good Food Finance Network: The first tranche of targets under the Good Food Finance Network exemplify how finance can be redirected towards sustainable food systems through concrete, timebound steps and by addressing different ESG dimensions and geographies. Targets include a wide range of measurable environmental and social goals to build a sustainable food system, such as: increasing the use of technology to modernize agricultural practices, avoiding deforestation, investing in climate adaptation, and unlocking smallholder farmer income through incentivising carbon removal. Promoting gender equality and human rights-based approaches is a crucial element of environmental sustainability and this should be specifically reflected in social targets.

Section III: Credit risk mitigation and financial innovation

Blended finance offers great opportunities as an interim measure until new, sustainable food production and processing models are fully commercially viable: Blended finance is a way to de-risk investments by using concessional funding and the effective combination of public and private financing sources. Blended finance tools can be used to shift a portion of the risk from the issuer of the loan to the public sector, and to lower a lender's potential initial losses from default. Other forms of blended finance structures incorporate performance-based guarantees, such as the allocation of finance to the target clients of the vehicle (e.g. smallholders), or the condition of reduced collateral requirements, or a longer term repayment period.

Developing a strong portfolio of blended finance vehicles is particularly important for food systems to attract private investments to projects that exhibit high levels of risk while offering high potential for positive impacts. However, drawbacks include a perceived tedious and lengthy process that is unacceptable to some clients and often, a lack of consideration of the different risk appetites of participating institutions. Ultimately, any business model ought to be able to stand on its own without the use of subsidised loans or other forms of risk mitigation, which means that public funding in blended finance transactions has to decrease over time as and when it becomes clear that there is a market and financial institutions are able to correctly price the risks and cash flows of new, sustainable food production models.

Develop novel models of risk management for the food value chain: The public sector can develop and be part of new investment vehicles aiming to diversify the risk/return profiles of private investors. The design of new vehicles can also incorporate performance-based guarantees, such as the allocation of finance to the target clients of the vehicle (e.g. smallholders), or the condition of reduced collateral requirements, or a longer-term repayment period.

Promote financial vehicles to support the penetration and coverage of insurance services across food systems: The public sector can provide capital to cover certain segments of food systems in circumstances where the individual and collective purchasing capacity is low but the insurance need is high (e.g. small scale farmers, small businesses that are un(der)-covered by private insurers).

Financial innovations are fundamental to channelling private finance to sustainable food systems: A combination of innovative new instruments and financing techniques and those that have proven effective in other sectors will foster the development of sustainable finance in food systems. The past few years have seen a growing appetite of financial institutions—banks, investors, and insurers—for green products. The market now offers innovative investments that are linked to sustainability performance indicators, and financial vehicles designed for special purpose securitisation. The critical features of innovative instruments are scalability, replicability, and the versatility of the instrument.

Section IV: Develop an enabling policy environment

Developing an enabling policy environment is key to channeling sustainable finance to food systems. An enabling environment for sustainable finance consists of regulatory frameworks, policy instruments, and the provision of public services directed at both financial and non-financial actors to promote sustainable finance in food systems. It may involve direct policy actions in the form of market interventions, or indirect incentives and signals that aim to encourage market participants to invest in sustainable activities. It may also take the form of provisioning transparency (e.g. disclosures and reporting), and publicly available data and information that allow actors to make informed decisions about their financial transactions. The enabling policy environment can be structured in three pillars.

Pillar I. Develop a risk framework for the food value chain

Public policy needs to be dynamic and innovative in designing and instituting new mechanisms and models to manage chronic and emerging risks around food systems.

- **Set up specialised risk agencies (public or public-private partnerships)** that can institute technically suitable guidelines, metrics and methodologies to assess and monitor risks in food systems.
- **Set up a designated finance agency as a one-stop shop of blended finance for food systems** to develop and disseminate new investment vehicles that diversify the risk-return profiles of individual and institutional investors.
- **Support the penetration and coverage of insurance services across food systems** by providing capital to subsidize stakeholders that are un(der)-covered by insurers. Develop forms of risk sharing for segments of food systems where the collective purchase capacity is low, but the insurance need is high.

Pillar II. Repurpose and develop an incentive framework

Setting up an effective and efficient incentive framework—or adjusting existing ones to generate and re-direct flows of capital to sustainable activities—is a key component of an enabling policy environment.

Repurpose **agricultural support policies** by:

- **phasing out distortive policies,** especially those linked with agricultural input use, such as chemical fertilizers and pesticides
- **repurposing public funds** to provide services that promote sustainability, resilience, and biodiversity
- **intensifying support for green activities** such as crop rotation, green irrigation, soil protection, ecological reserves and compensation areas

Generate higher public financial flows through new instruments, including sovereign green bonds, which offer great potential to support sustainable activities.

Pillar III. Market signaling

Setting up effective and efficient signalling mechanisms to inform and influence behaviour of market participants around sustainable activities and investment areas is a key component of an enabling policy environment.

- **Re-direct investment flows through food-system-sensitive green taxonomies** to signal markets about sustainable activities and investment areas and attract financial capital.
- **Apply green monetary policies while avoiding additional constraints on food system finance**.
- **Set mandatory disclosure requirements** that require companies to disclose information on how they manage their ESG practices and operations.

I. Introduction: Interwoven challenges and impact opportunities in food systems

Food systems[1] play a central role in all societies and are fundamental to sustainable development. Sustainable food systems (SFS)[2] are vital to addressing issues of food security, social equity, poverty alleviation and healthy diets, and are key to building resilience in communities facing a rapidly changing global environment.

The environmental and social impacts of the global food system are interconnected and affect diverse impact areas ranging from climate change mitigation, adaptation, biodiversity, resource efficiency and the circular economy, as well as social dimensions including human rights, labour conditions and gender equality.

Ongoing crises resulting from the Covid-19 pandemic and related supply chain disruptions, the war in Ukraine and the high frequency of extreme climate events are disrupting food systems and increasing the costs of food (FAO *et al.* 2022).

Financial institutions with significant portfolio exposure to food and agriculture have a fundamental role to play in addressing the world's most pressing challenges. They can influence clients and suppliers across value chains to improve their policies and practices and drive financial flows towards more sustainable food systems. At the same time, these efforts can underpin strong economic recovery, climate action, nature protection and public health and make food systems more sustainable, resilient, and fair.

This roadmap aims to: 1) raise awareness of the importance and role of the agrifood sector in solving the triple planetary crisis as well as contributing to sustainable development; 2) provide an overview of the key opportunities for financial institutions to enhance financial flows to sustainable food systems (through impact management and targets, risk mitigation strategies and financial innovation); and 3) foster an enabling environment for driving capital towards sustainable food systems.

1 "Food systems embrace the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption, and disposal (loss or waste) of food products that originate from agriculture (incl. livestock), forestry, fisheries, and food industries, and the broader economic, societal, and natural environments in which they are embedded. Production includes pre-production actors, for example input industries producing fertilisers or seeds" (Von Braun *et al.* 2021). A "food system gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes" (HLPE 2014).

2 A sustainable food system "ensures food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition of future generations are not compromised" (Von Braun *et al.* 2021).

The primary target audience is financial institutions from the private and public sector that have an agriculture and food sector exposure but also policymakers that play a role in fostering the enabling conditions for these institutions to drive significant flows of capital towards making food systems more sustainable.

This document consists of five sections. Section I introduces the interlinked challenges and opportunities in food systems and how the agrifood sector is key to achieving the Sustainable Development Goals (SDGs) and the global climate and nature goals of the Paris Agreement and the Kunming-Montreal Global Biodiversity Framework (GBF).

Section II presents the overall roadmap to implementation for private financiers to reduce negative impacts and drive significant capital flows towards sustainable food systems: identifying significant impacts of their financing activities and operations across impact areas, measuring and assessing performance, setting targets, monitoring and disclosing progress against these, while continuously adjusting the course of action as new methodologies, data and lessons learned become available. This section also provides a first tranche of targets to exemplify how finance can be redirected towards sustainable food systems and how financial institutions can boost implementation by capitalizing on opportunities such as investing in new projects that tackle food-related issues, making concessional capital available, developing innovative financial products and raising institutional investor capital for sustainable food systems.

Section III shows how a combination of innovative new instruments and financing techniques and those proven effective in other sectors can foster more capital flows for sustainable food systems. This section also shows how blended finance offers opportunities at the interface of public and private finance and elaborates on the need to develop new models of risk management for the food value chain.

Section IV addresses how policymakers can enable a policy environment to promote sustainable finance in food systems by fostering new policies and innovative regulatory approaches, green taxonomies, debt products for sovereigns and corporates, disclosure requirements for corporations and better information and communication tools for the public sector across the food value chain. Finally, Section V summarizes the main points presented in this report for financial institutions from the public and private sector as well as policymakers.

Key to achieving the Sustainable Development Goals

Human and natural systems are so strongly interconnected through how food is produced, provisioned, distributed, and consumed, that a transition to sustainable food systems is key to achieving all 17 SDGs (United Nations Food Systems Summit 2021).

Table 1: Sustainable food systems and the Sustainable Development Goals

	Nearly 700 million people live below the International Poverty Line, which is USD 2.15 per day. Sustainable food systems can contribute to the fight against poverty by creating good jobs, promoting fair terms of labour and trade, improving access to food, and supporting healthy communities.
	The prevalence of undernourishment has recently increased, with estimates of hungry people reaching between 720 and 811 million globally in 2020. This was due to the pandemic, increased frequency of extreme climate events and food price hikes. Rebuilding food systems sustainably is essential to addressing long-term hunger challenges and managing acute events, like disease outbreaks and climate extremes.
	In 2020, 45.4 million children under five were affected by wasting, while obesity is a major problem affecting many countries. Available data show that the pandemic has shortened life expectancy. Sustainable food systems will support adequate nutrition, which helps people of all ages to achieve good health.
	It is estimated that there are about 50 million children of primary school age out of school. Sustainable food systems enable students to have healthy, balanced diets, which is critical to educational performance.
	Globally, women make up only 13% of agricultural landholders. Progress towards gender equality has been adversely affected by the social and economic impacts of recent global developments (pandemic, inflation, food price hikes, etc.). Women are up to 11% more likely than men to face food insecurity. Sustainable food systems can empower women and bolster their livelihoods.
	In 2020, two billion people lacked safely managed drinking water, of which 771 million were without basic drinking water. Sustainable food systems can ensure the sustainable use of water, increase access to drinking water, and also reduce the amount of pollution in natural water systems.

7 AFFORDABLE AND CLEAN ENERGY 	Currently, 759 million people do not have access to electricity. Investing in sustainable food systems that maximize the use of clean, renewable sources will reduce the food sector's environmental impact and improve access to clean and affordable energy. Similarly, the food systems offer opportunities for food-waste-related renewable energy production.
8 DECENT WORK AND ECONOMIC GROWTH 	Government spending on agriculture has remained stagnant compared to the share of agriculture in global GDP, at levels markedly lower in the early 2000s. On average, the productivity and incomes of small-scale producers are lower than those of larger food producers. Sustainable food systems can create decent jobs and support the incomes of billions of people worldwide.
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Small-scale industries are the backbone of many economies. Between 2006 and 2020, almost one in three small industrial enterprises needed and benefited from a loan or line of credit, but access to credit remains uneven across countries. By scaling up innovations and investing in infrastructure (both grey and green, including forests), sustainable food systems can deliver widespread benefits to people and the planet.
10 REDUCED INEQUALITIES 	Income inequality is a global challenge. Nearly 25% of the population lives on less than half the median income, and 1.6 billion workers in the informal economy are in danger of losing their livelihoods. Sustainable food systems can help reduce inequalities by fostering decent employment and labour conditions and providing training opportunities.
11 SUSTAINABLE CITIES AND COMMUNITIES 	Food crises have disproportionately affected low-income households and those working in the informal sector. Inequalities in accessing basic services are seen in urban areas where more than 800 million people are living in slum conditions. The urban poor are particularly vulnerable to financial crises and food price hikes. Sustainable urban agriculture creates opportunities for innovation, greater local food reliance, and better use of nutrients in cities, among others.
12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	By 2020, 83 countries and the European Union reported a total of 700 policies and implementation activities under the 10-Year Framework of Programmes on Sustainable Consumption and Production. Sustainable food systems reduce waste and spoilage and enable people to make better choices in their food shopping.

	By December 2020, emissions had fully rebounded from a temporary reduction during the pandemic, and registered 2% higher than in December 2019. Greenhouse gas concentrations reached new highs in 2020, with globally averaged mole fractions of CO_2 exceeding 410 parts per million. Sustainable food systems can reduce this impact by lowering emissions of critical gases, including methane, nitrous oxide and carbon dioxide.
	More than 3 billion people rely on the ocean for their livelihood and more than 80% of merchandise trade is by sea. Every year, an estimated 5 to 12 million metric tonnes of plastic enter the ocean, costing roughly USD 13 billion annually—including clean-up costs and financial losses in fisheries. Sustainable food systems can ensure the long-term viability of the world's fisheries and protect the health of the ecosystems that host them.
	Between 2000 and 2020, there was a net loss of almost 100 million hectares forest area. Sustainable agriculture can reduce deforestation, support healthy terrestrial ecosystems, and provide critical sustenance to people around the world.
	At the end of 2020, about 1% of the global population—82.4 million people—had been forcibly displaced because of persecution, conflict or generalised violence, and intensified inequality and discrimination. Sustainable food systems can reduce the critical stresses families, communities, and nations are facing worldwide, preparing the ground for peace and strong institutions to take hold.
	Between 2017 and 2019, the worldwide weighted tariff average remained stable at around 2%, and exports of developing countries and Least Developed Countries received preferential treatment from developed countries. Agriculture, which is of particular concern to developing countries, accounted for the highest tariff imposed by developed countries in 2019 at 7.9%. Partnerships to overcome hurdles and foster sustainable food systems bringing together policymakers, the scientific community, civil society, private sector institutions and other key stakeholders can deliver tangible benefits to communities around the world.

Source: Adapted from United Nations Food Systems Summit 2021

Besides the essential role of food systems to achieve the SDGs, there are other important international agreements on climate and nature that cannot be met without accounting for the agrifood sector. This includes the Paris Agreement, the United Nations Convention to Combat Desertification (UNCCD) and related targets for land degradation neutrality by 2030 and the new Kunming-Montreal Global Biodiversity Framework, which will set

the course for the conservation of biodiversity and the necessary transformative change over the next seven years.

Impact areas across food systems

Food systems sit at the intersection of environmental and social challenges. They are drivers of—and are impacted by—the triple climate, nature and pollution crises. The environmental, economic and social impacts of the global food system are interconnected and influence diverse impact areas and topics ranging from climate change mitigation, adaptation, nature (biodiversity and ecosystems), resource efficiency and the circular economy, as well as socio-economic dimensions including food security, labour conditions and gender equality.

Food systems contribute to climate change but also to land use change and biodiversity loss, depletion of freshwater supplies and the pollution of ecosystems (UNEP 2022a).

Climate

At least one third of total global greenhouse gas emissions from human activities can be attributed to the way we produce, process, transport and package food (Crippa *et al.* 2021). This amounts to about 18 $GtCO_2e$/year. The largest contribution comes from agricultural production (7.1 $GtCO_2e$, 39%), which entails the production of inputs such as fertilizers, followed by land use changes (5.7 $GtCO_2e$, 32%), and supply chain activities (5.2 $GtCO_2e$, 29%) (UNEP 2022a). Meat production accounted for around 54% of greenhouse gas (GHG) emissions from agriculture in the period between 2018 and 2020 (OECD and FAO 2021). Beef has a higher median GHG intensity compared to pork and poultry (5–10 times) and is 50–100 times higher than plant-based protein products such as lentils and beans (UNEP 2022a). Supply chain activities comprise retail, transport, consumption, fuel production, waste management, industrial processes and packaging. Emissions from food systems could reach 30 $GtCO_2e$/year by 2050, driven by current trends of population growth and increased animal-source diets, particularly in low- and middle-income countries (UNEP 2022a).

Globally, 14% of the food produced is lost between harvest and retail and around 17% is wasted in retail at the consumption level (FAO 2023). Food loss and waste generates 8–10% of global greenhouse gases (GHG) emissions (UNEP 2021a).

The increasing deforestation rate and agricultural-production-related GHG emissions are heading in the wrong direction. The agriculture sector needs to reduce its agricultural production emissions—including those from livestock, fertilizers, rice production and energy use (Boehm *et al.* 2021).

Climate-related extremes have changed the productivity of agricultural and fishery sectors with associated negative effects for food security and livelihoods. The impacts on the availability of food and nutrition quality will put more people at risk of hunger, malnutrition and diet-linked mortality (Bezner Kerr *et al.* 2022).

Nature

The expansion of agricultural commodities is the largest driver of deforestation worldwide and food systems remain one of the key contributors to global nature loss (IPBES 2019; Chatham House 2021). More than one third of the world's land surface and nearly 75% of freshwater resources are currently used for crop or livestock production (IPBES 2019). This puts ecosystems under pressure as the degradation of biodiversity results from loss, fragmentation or deterioration of habitats (often because of deforestation, land degradation, rangeland or freshwater degradation) (IPBES 2018).

On average, annual tropical tree cover loss between 2014 and 2018 emitted 4.7 $GtCO_2$ per year—more than all the European Union's 2017 GHG emissions (NYDF 2019). Agricultural systems account for between 75–95% of total deforestation globally (FAO and UNEP 2020).

More than 90% of deforestation took place in the tropics, where the highest levels of biodiversity are found. Between 1980 and 2000, one hundred million hectares of tropical forest were lost, mainly as a result of cattle ranching in Latin America and plantations in Southeast Asia (80% of which are for palm oil) (IPBES 2019). Mangrove forests, highly carbon-rich ecosystems, are also subject to degradation and deforestation, to a large extent, driven by aquaculture and agriculture (Goldberg *et al.* 2020). A rising global aquaculture demand, accompanied by economic and political support for its development, has led to the large-scale clearing of mangroves, especially in Southeast Asia and West Africa (Friess *et al.* 2019). The loss and degradation of such natural ecosystems, including the conversion of peat swamp forest to agriculture, result in increased emissions and biodiversity loss (Cooper *et al.* 2020).

Among financial institutions most exposed to deforestation, 62% do not have a deforestation policy covering their investments and lending to companies in key forest-risk commodity supply chains. These financial institutions provide USD 2.5 trillion in finance to companies with the highest exposure to deforestation risk (Global Canopy 2022). Companies exposed to degraded land are more likely to face negative financial impacts following extreme weather events, which may pose a significant risk of asset value decline for investors that do not consider these factors as long-term material risks (Robeco and CISL 2022).

Pollution

Cropping and livestock systems as well as aquaculture have expanded and intensified to meet the rising food demand for a growing population with changing dietary patterns (FAO and IWMI 2017). The intensification of land management often results in pollution due to nitrogen and phosphorus run-off from fertilizer and manure application (IPCC 2019).

Since 1961, inorganic nitrogen fertilizer use grew nearly ninefold (IPCC 2019). Fertilizer run-off entering coastal ecosystems has largely contributed to eutrophication and more than 400 ocean 'dead zones' (IPBES 2019).

Because of food production and the need to meet global food demand, pesticides are extensively used but often become environmental pollutants and lead to negative effects

on biodiversity, water quality and human health (Tang *et al.* 2021). It is estimated that global pesticides use in agriculture in 2019 was 4.2 million tonnes, equivalent to 0.6 kg/person (FAO 2021a).

Links to social aspects (food security, employment, public health and gender)

While reducing the environmental footprint from food systems is critical, it is also crucial to understand the key role of this sector in the world's food security, employment and its implications for gender and public health.

The agriculture sector, dominated by more than 500 million smallholder farmers globally, produces food, feed, and fuel for 8 billion people (FAO, UNDP and UNEP 2021). A growing population, which is expected to reach nearly 10 billion by 2050 (UN DESA 2022), will increase the global demand for food, fuel and feed. Therefore, it is important for financial institutions to ensure equitable outcomes to allow for a just transition.

The global food system employs the biggest share of population in developing countries and this trend is likely to continue for the foreseeable future (Townsend *et al.* 2017). But at the same time, millions of food system workers often deal with high levels of working poverty, poor health, malnutrition, unsafe conditions, and lack of labour rights and protection (ILO 2020). They are regularly exposed to workplace injuries, poisoning by pesticides, and occupational disease. Ensuring the health and safety of workers from the agrifood sector—including improved protection and wages—is necessary to protect public health, save lives and contribute to food security and livelihoods (ILO 2020).

There are several issues related to public health and diets. Since 1961, global per capita food calories has increased by one third, and the consumption of vegetable oils and meat has more than doubled (IPCC 2019). Around 2.8 million people die each year because of overweight or obesity. Once associated with high-income countries, obesity is now also widespread in low- and middle-income countries (FAO *et al.* 2021). Demand for natural resources and availability of food depend—to a large extent—on dietary choices. Decreasing or avoiding consumption of low efficiency animal-based products can save resources, resulting in more food being available for people (Shepon *et al.* 2016). Shifting towards healthier diets with a diversity of foods including fruit, fish, nuts, and vegetables can significantly reduce the risk of some preventable diseases that account for 20% of premature deaths globally (IPBES 2019).

As a result of the high cost of healthy diets, coupled with persistent high levels of income inequality, around three billion people were unable to afford a healthy diet in 2019 (FAO *et al.* 2021). Some people struggle to cover the minimum caloric intake and experience food insecurity. According to the Food Aid Foundation, "821 million people—one in nine—still go to bed on an empty stomach each night. Even more—one in three—suffer from some form of malnutrition" (Food Aid Foundation 2020).

Another issue of concern is antibiotic use in farming reaching the environment and leading to microbial resistance, which poses a serious public health risk (Mulchandani *et al.* 2023). This occurs when there is inadequate disposal and management of antibiotics administered to animals to promote growth and prevent infections (e.g. from livestock

or aquaculture practices). The Coller FAIRR Protein Producer Index, which evaluates 60 of the world's largest meat, fish and dairy production companies on the most material ESG issues, ranked 70% of companies as "high risk" for antibiotics, showing extremely poor levels of antibiotic stewardship (FAIRR 2022).

Gender aspects

Women play a key role in food security as they supply most of the labour force for food crops in many countries and they often manage the use and sale of food produced. Yet, there are several gender disparities in terms of their access, ownership and control of assets including land, water, energy, credit, information and labour (United Nations Women Watch 2012).

FAO estimates that women constitute more than 37% of the global rural agricultural labour force (around 48% in low-income countries) (FAO 2020). Women are key actors in food systems as producers, wage workers, processors, traders, and consumers. However, they often lack access to important resources such as land, water, pasture, seeds, fertilizers, chemical inputs, technology and information, extension and advisory services and finance.

Women smallholders tend to produce less food per hectare when compared to their male counterparts because of disadvantages in terms of farm size, land quality, labour inputs and household types (Mukasa and Salami 2015).

These constrains limit their potential to be effective participants in the food and agriculture sector. Empowering women to make strategic decisions and act on them, while easing their access to finance and supporting them to build up financial resilience can unlock the contribution of a large proportion of emerging economies' population. In addition, capacity building and community dialogue sessions on food production enable women's voices to be heard and their concerns listened to (UNEP 2021b).

Achieving gender equality and women's empowerment in food systems finance can result in greater food security, better nutrition and more just, resilient and sustainable food systems for all.

Transition towards more sustainable food systems

An urgent and profound transition to more sustainable food systems is necessary (FOLU 2019; Nature Finance 2021). The Food and Land Use Coalition (FOLU) coalition proposes ten critical food systems transitions with the potential to deliver food security and healthy diets for a growing global population, while at the same time addressing climate, biodiversity, pollution and socio-economic challenges (FOLU 2019). Transitions will vary depending on the geographical context, but all institutions, countries and communities can derive significant benefits from these transformations that foster healthy diets and are within planetary boundaries. Consumption patterns are an essential factor for the evolution of food systems. There is a need to empower consumers to make better

and healthier decisions. Furthermore, nature-based solutions[3] (NBS) can be mobilised to foster more regenerative and productive food production practices, innovative approaches to protect critical ecosystems (FOLU 2019). Some examples of NBS related to agriculture and grasslands include avoided grassland conversion, biochar, cropland nutrient management, conservation agriculture, trees in croplands, improved rice cultivation and different grazing practices related to animal management, optimal intensity, legumes in pastures and improved feed (Mirralles-Welhelm 2021).

Chronic constraints in finance

Apampa *et al.* (2021) identified four factors that contribute to the current SFS funding gap. These include: "(1) high country and sector specific risks, (2) poor primary data and information asymmetries between financial institutions and potential borrowers in rural financial markets, (3) the mismatch between investment needs of farmers and producing companies and different pools of capital, e.g. development finance institutions, banks, pension funds, insurance capital, and (4) high transaction costs and small ticket sizes." These constraints result in an insufficient pipeline of bankable projects to attract financial institutions.

Despite the vast environmental and social benefits that could be unlocked by a food system transition towards more sustainable practices, rapid transitions are financially risky. Table 2, adapted from Apampa *et al.* (2021), highlights some of the risks common to agricultural financing, from project-level risk to country-risk issues.

Table 2: Risk and non-risk challenges impeding agricultural financing

Project/firm level risks	Constraints in financial absorption capacity	Country risks
Business risks: New untested business models or transition risks related to sustainability	**Informal sector:** A significant proportion of food sector participants, especially in low-income countries, operate in the informal sector which lacks access to formal channels of finance	**Macroeconomic risks:** Global emerging markets risk, geopolitical risks, supply chain vulnerability, fiscal constraints, inflation, etc.
Agronomical risks: Unpredictable farm output and revenue due to unsustainable agronomic practices that affect product quality/quantity	**Lack of conventional security for lenders:** Limited or lack of collateral available to lenders, especially in jurisdictions where land rights are not well established	**Policy risks:** Limited domestic policy capacity in relation to food systems (domestic support, trade policies, infrastructure policy etc.)

3 UNEA Resolution (2022) "nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits" wedocs.unep.org/handle/20.500.11822/39752

Natural hazards: High exposure to increased frequency and intensity of extreme climate events in the form of droughts, wildfires, hurricanes, and floods etc.	**Small ticket size:** The average ticket size for agribusiness loans is small (compared to other industries)	**Political risks:** domestic instability, political violence, lack of clear political leadership on sustainable development
Commodity market risks: Increased volatility of commodity prices, which affect costs, revenues and profitability	**Shallow domestic financial markets:** Local financial resources are undersupplied, and then only small amounts are available to food systems	**Inadequate enabling environment and regulatory capacity:** Insufficient capacity to institute and enforce regulations to enable sustainable finance

Source: Apampa *et al.* 2021

Mind the funding gap

The vast opportunities to transform food systems are linked to their contribution to tackling the impacts of climate change, safeguarding biodiversity, fostering healthy diets, providing food security and supporting more inclusive rural economies. FOLU (2019) estimated that the societal return of ten critical food transitions by 2030 is more than 15 times higher than the associated investment cost and would generate new business opportunities of up to USD 4.5 trillion each year (FOLU 2019).

A recent study by the International Food Policy Research Institute (IFPRI) estimates that transforming food systems to achieve climate mitigation and adaptation targets and to meet other Sustainable Development Goals would require additional financial resources up to USD 350 billion per year by 2030 (IFPRI 2022).

According to UNEP's 2022 State of Nature Finance Report around a quarter of additional investment needed in 2025 to limit climate change to 1.5°C, stop biodiversity loss and reach land degradation neutrality will need to be directed into sustainable agriculture activities that improve soil fertility and prevent land degradation based on agroforestry practices, cover crops and optimal managed grazing in pastureland (UNEP 2022b). The importance of these activities increases to 45% by 2050 (UNEP 2022b).

Global, national and local food systems operate on six main financial flows, namely: consumer spending, financial flows through food trade and retail, funds allocated through official development assistance, public financing through fiscal policies, financing through the banking systems, and investment flows from capital markets (IFPRI 2022).

II. Financiers: Identify and assess impact, set targets, monitor progress and achieve impact

Financial institutions with significant portfolio exposure to food and agriculture systems have an important role to play in addressing the world's most pressing challenges—underpinning strong economic recovery, climate action, nature protection and public health, and making food systems more sustainable, resilient, and fair. They can influence clients and suppliers to improve their policies and practices, demand accurate quantitative monitoring and reporting from investees and drive financial flows towards more sustainable food systems.

How to manage impact

A starting point is to identify systematically and holistically both the positive and negative impacts of loans, investments, and operations across environmental, social and economic impact areas (UNEP FI 2017). This section provides a high-level overview of the full impact management process across multiple sectors, including the agrifood sector.

The Impact Management Platform—a collaboration between providers of sustainability standards and guidance—has agreed on key steps to manage sustainability impacts. These include identify, assess impacts, set targets, act and monitor impacts (Figure I). Impacts by investors and financial institutions are mostly driven by their portfolios (investments, loans, insurance). At the centre of this figure (Strategy and Governance) there are actions occurring at the institutional level only, while all the steps (Identify, Assess, Set Targets, Act, Monitor, Disclose) can be both taken at the institutional level but also for funds, individual portfolios, clients or assets. Benchmarking actions to compare performance against peers can be applied to identify best and worst performers, using the best available science-based information and tools.

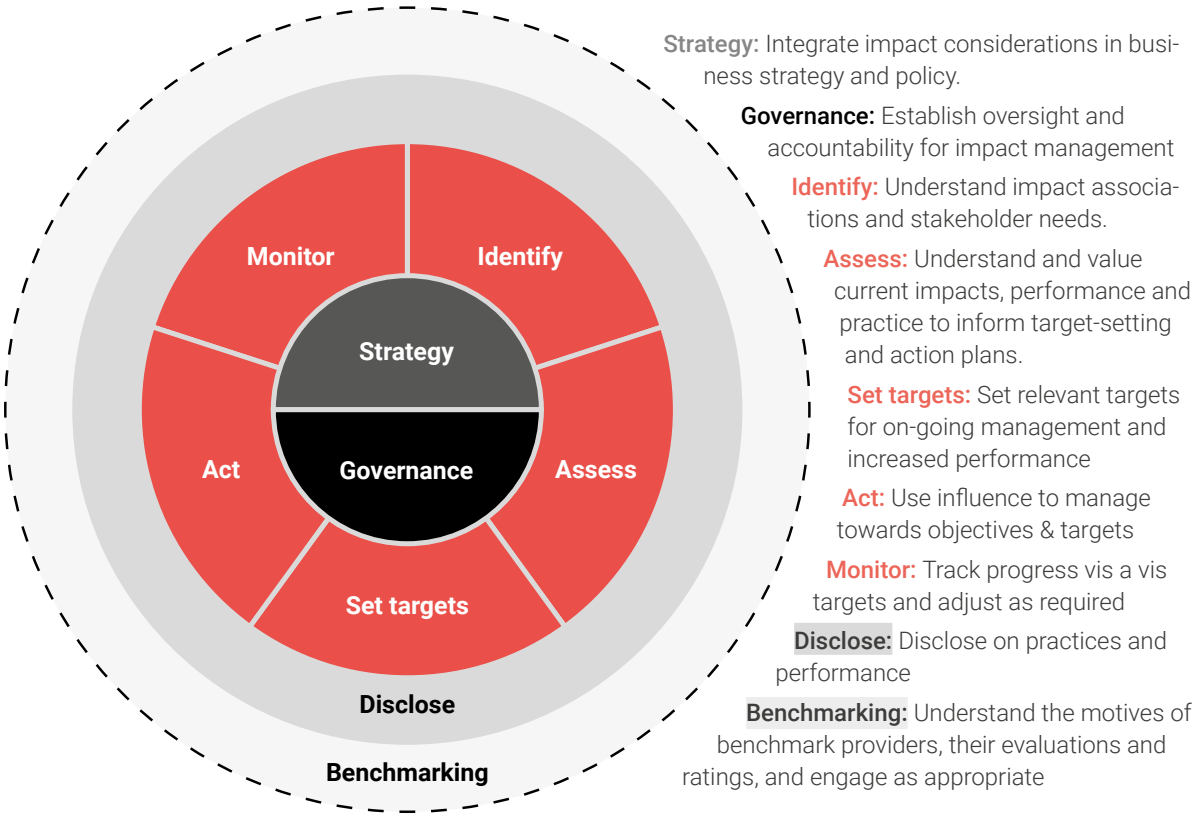

Figure I: Impact management actions for investors and financial institutions

Source: Impact Management Platform 2022

This impact management approach logic is supported by the United Nations Environment Programme Finance Initiative's (UNEP FI) Principles for Responsible Banking (PRB). The Principles require signatory banks to align their core strategy, decision-making, lending and investment with the UN Sustainable Development Goals and international agreements such as the Paris Climate Agreement. To achieve this, PRB's Principle 2 requires banks to conduct an impact analysis of their portfolios, identify their most significant impact areas, to set impact targets and define action plans accordingly to manage their positive and negative impacts (Figure II) (UNEP FI 2022a).

UNEP FI's Impact Protocol provides all necessary steps to analyse and manage bank portfolio impacts and in conformity with the requirements of the Principles for Responsible Banking (UNEP FI 2022a).

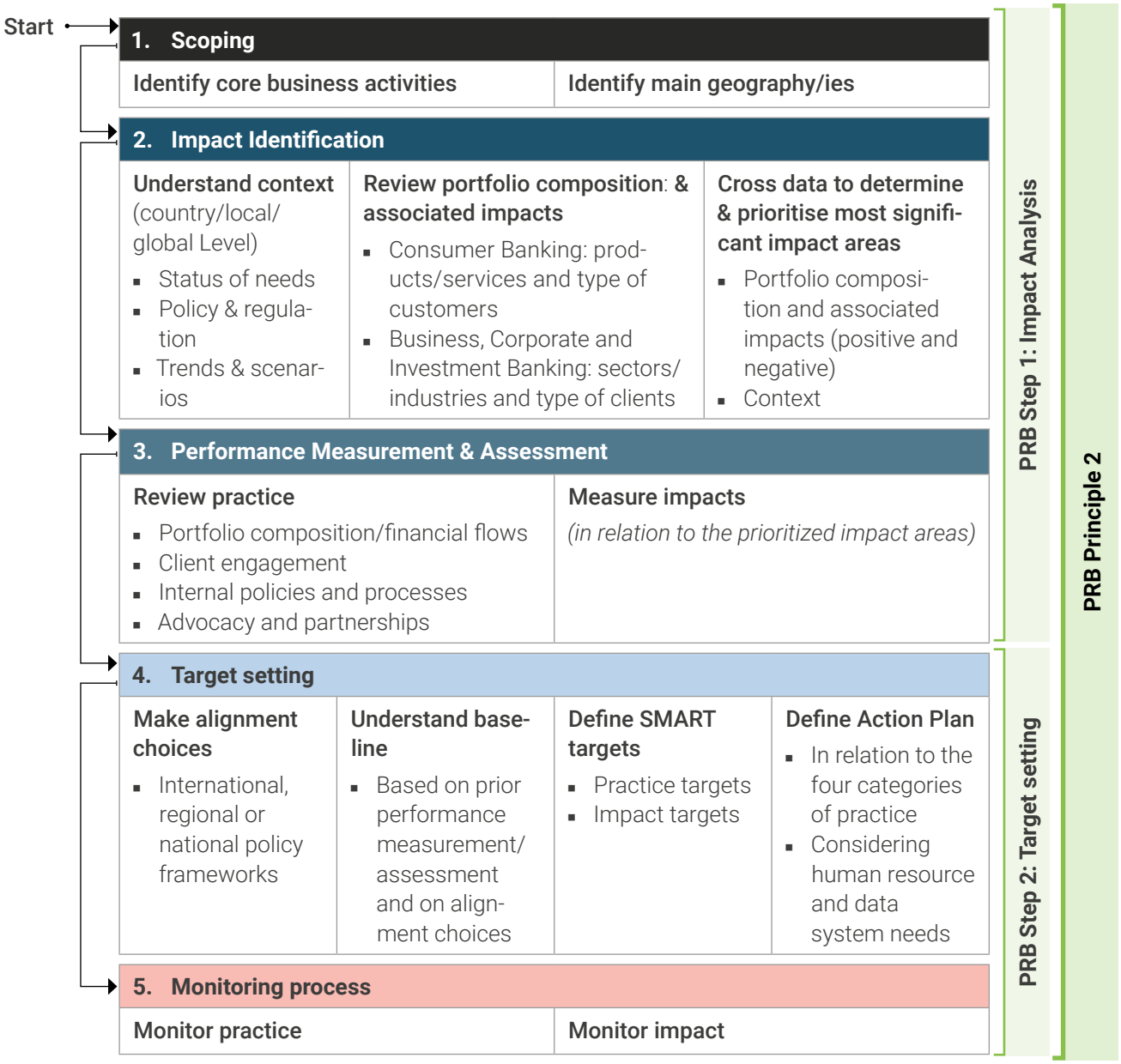

Figure II: Schematic overview of holistic impact management for banks

Source: UNEP FI 2022a

Identify the most significant impact areas

The first step is to understand context, which includes identifying the main challenges in terms of sustainable development in the countries of operation, starting with the largest country exposures of the financial institution and its clients relative to different impact areas (e.g. climate change mitigation, biodiversity and ecosystems, resource efficiency, water availability, human rights).

A review of the financial institution's portfolio composition broken down by sectors, types of products, clients or customers and the understanding of context will allow the

institution to determine the most significant impact areas (UNEP FI 2022a). Financial institutions can use the UNEP FI Impact Protocol and related resources to help link portfolio information on sector distribution to impact areas and combine this with country specific information.

Countries of operation matter because the main driver of a certain impact can be determined not only by the specific sector, but also by the local context. For example, while farm-gate activities and supply chains are the main drivers of agrifood system emissions in various developed and emerging economies including USA, China and India, land use change associated emissions (especially due to deforestation) is the largest component in Brazil and Indonesia (FAO 2021b).

The most significant positive and negative impact areas in an institution's portfolio will vary depending on its business activities, the context in which it operates and its clients. For example, the agricultural portfolio of a global bank may include clients across different regions. Each region's portfolio may include a certain degree of lending to activities such as dairy, horticulture, pork and flowers. The share of emissions will vary depending on the share of lending to these activities and may have a larger footprint in certain regions (WBCSD 2022).

Assess and measure performance

It is essential to understand the financial institution's current practice and its operating context to be able to assess the impacts of its actions, products and services to human beneficiaries and environmental systems (Vörösmarty *et al.* 2019). This is critical to setting up action plans and defining the metrics and key performance indicators (KPIs) that will be needed to support the financial institution's objectives and targets. The types of actions will vary by financial institution, depending on their lending and investment activities across asset classes, geographies, and economic sectors with different time horizons.

The UNEP FI Impact Protocol (2022) classifies actions by banks to manage their impacts in the following four categories. Together these actions constitute a bank's 'practice':

- the steering of the **bank's portfolio composition and financial flows** (including volume and proportion of key sectors, and types of customers and products)
- the **engagement of its clients** (whether clients from key sectors are identified, the scope of engagement activities and the nature of engagement)
- the **development and tailoring of the bank's internal policies and processes** (degree of coverage and integration of the most significant impact areas in the policies and processes of the bank, including sector and thematic policies, exclusion lists, risk management systems, due diligence, know-your-customer processes, and credit policy)
- **advocacy** and the establishment of **partnerships** (public position towards identified sustainability issue, proactive communication, e.g. through statements, initiatives, commitments and coherence between these efforts and other policy-influencing activities such as participating in industry lobbying practices)

There is an important distinction between emissions reductions in an investment portfolio and in the real economy. For investors to drive and foster progress towards real world emissions reductions, the UN-Convened Net-Zero Asset Owner Alliance seeks to use effective, legally compliant action and strategies, which include engagement, capital allocation strategies and investment opportunities (UNEP 2022c).

- **Engagement** can be a structured dialogue with a company that aims to improve the enterprise's sustainable value creation and support its transition to low-carbon and net-zero business strategies. Shareholders can use this mechanism by submitting shareholder resolutions and voting at annual general meetings. Moreover, bond investors can influence due diligence processes.
- **Capital allocation strategies** support capital re-distribution between companies, sectors and asset classes depending on certain restrictions and factors related to investment goals aligned with climate targets. These strategies include **divestment** and **sector weighting and best-in-class strategies**. Sector weighting and best-in-class strategies refer to capital distribution within or between sectors, often relying on companies' performance on ESG topics compared to peers.
- **Investing in climate solutions** refers to investments in solutions that substantially contribute to either climate mitigation or adaptation. The Net-Zero Asset Owner Alliance considers within this category the possibility for members to set 'financing transition targets', which include the contribution of its members towards activities, for example that provide enhanced transparency, provide solutions or foster the reporting of climate solutions.

Considering the different types of practice and strategies available to banks and investors in the agrifood sector, the next step is to measure and assess their performance on the most significant impact areas.

There are several impact areas and themes related to agrifood systems that are relevant to financial institutions across environmental, economic and social realms. The Impact Radar—a set of impact areas and topics across the three pillars of sustainable development—provide a classification and resources to help operationalise the impact management approach for practitioners.

Impact areas related to the natural environment include climate stability, biodiversity and ecosystems and circularity. For the agrifood sector, these areas may include activities related to climate change mitigation and adaptation, avoid deforestation, manage water use, reduce/avoid food loss and waste, reduce/avoid pollution, foster sustainable production and food processing practices and circular approaches and technologies, and improve traceability of supply chains.

Impact areas and topics in the socio-economic realms include integrity and security of persons (e.g. modern slavery and child labour), health and safety, equality and justice (e.g. gender equality), livelihood (e.g. employment, wages and social protection), availability, accessibility, affordability, quality of resources and services as well as convergence, infrastructure, healthy economies, strong institutions, and peace and stability.

Acknowledging the great diversity of impact areas and topics that can be relevant for different types of financial institutions, in this section we start by providing insights in

measuring performance related to climate change mitigation and nature. However, work related to other impact areas and themes is developing quickly and more resources are becoming available (e.g. in terms of working groups in the banking industry related to climate change adaptation and target-setting guidelines on resource efficiency and the circular economy, financial health and inclusion, gender equality).

Measuring performance related to climate change mitigation and adaptation

Financial institutions can certainly play a major role in supporting their clients to reduce their GHG emissions from the agrifood sector. Climate mitigation efforts are the most widely and often addressed among environmental issues for the financial sector. This is evidenced by the various commitments from Net-Zero Banking Alliance (NZBA), the Net-Zero Asset Owner Alliance (NZAOA), the Principles for Responsible Banking (PRB) and the Partnership for Carbon Accounting Financials (PCAF), among others.

The Land Sector and Removals Initiative related to the GHG Protocol classifies the types of emissions, removals and sequestration related to the land sector in the following categories (Greenhouse Gas Protocol 2022):

- Carbon emissions and removals from land use (e.g. forest management, crop and livestock production, bioenergy feedstock production, soil carbon, etc.)
- Carbon emissions and removals from land use change (e.g. deforestation, afforestation, wetland conversion, etc.)
- Agricultural GHG emissions (e.g. livestock methane emissions, soil nitrous oxide emissions, etc.)
- Biogenic removals and temporary to long-term storage in biogenic products/materials (e.g. furniture, building materials, etc.)
- Biogenic carbon dioxide emissions and removals from bioenergy production and consumption (e.g. biomass, biofuels, biogas)

There are considerable challenges in assessing agrifood-related GHG emissions in financial institutions' portfolios in line with achieving the objectives of the Paris Agreement. These challenges include the complexity of agricultural systems (degree of variation of soil type, land management practices and crops/livestock) making emissions highly variable and difficult to estimate, the lack of standardised methodologies and available data as well as several complexities related to the accounting of GHG emissions and transition pathways compared to other sectors.

Some recent relevant efforts (appendix 1) to overcome these hurdles for companies and banks include the GHG Protocol, the Science-Based Target Initiative for Forest, Land and Agriculture (FLAG) and the Banking for Impact on Climate in Agriculture (B4ICA). Asset owners' members of the NZAOA published a call for sector-specific data from real economy companies indicating that current data (or lack of it) is unreliable, not sufficient and difficult to compare, which limits investors' ability to drive investment portfolios in line with sectoral decarbonisation pathways or set sectoral science-based targets (UNEP FI and PRI 2022). This Alliance also requests data providers to strengthen the collection

and distribution of various sector-relevant metrics, including tCO_2/tonne of agricultural product, CH_4/tonne of agricultural product and NO_2/tonne of agricultural product, which are relevant for the agriculture sector (UNEP FI and PRI 2022).

Undoubtedly adaptation to a changing climate is a critical challenge. The agrifood sector is particularly prone to the physical impacts of climate change and needs to adapt to changing chronic and acute weather patterns. But measuring future climate risks and adaptive capacity remains difficult because of various uncertainties in future scenarios, the frequency of physical hazards, the local nature of the impacts from climate hazards and the disproportionate effect on the poor and most vulnerable people. Adaptation benefits are still hard to capture (UNEP FI 2022c).

For financial institutions, this means concretely that analysing the degree of exposure and then setting targets on climate adaptation will become increasingly relevant. For this reason, a PRB Working Group is being set up to work towards delivering guidance on how to set adaptation targets for banks.

Measuring nature-related performance

A starting point for financial institutions to measure their nature-related performance is to understand the materiality of nature-related risks and the way nature degradation/loss manifests in an investment/lending portfolio (CISL 2021). To this end, it is essential to consider where operations take place to understand what type of dependencies and impacts are generated either directly or indirectly.

The Taskforce on Nature-Related Financial Disclosures (TNFD) aims to build a risk management and disclosure framework for all types of organisations to provide a consistent way to identify, assess, manage and disclose nature-related dependencies, impacts, risks and opportunities (TNFD 2022). Within TNFD, an approach based on Locate, Evaluate, Assess, Prepare (LEAP framework) is provided as voluntary guidance to support internal, nature-related dependencies, impacts, risk and opportunity assessments for companies and financial institutions (Figure III).

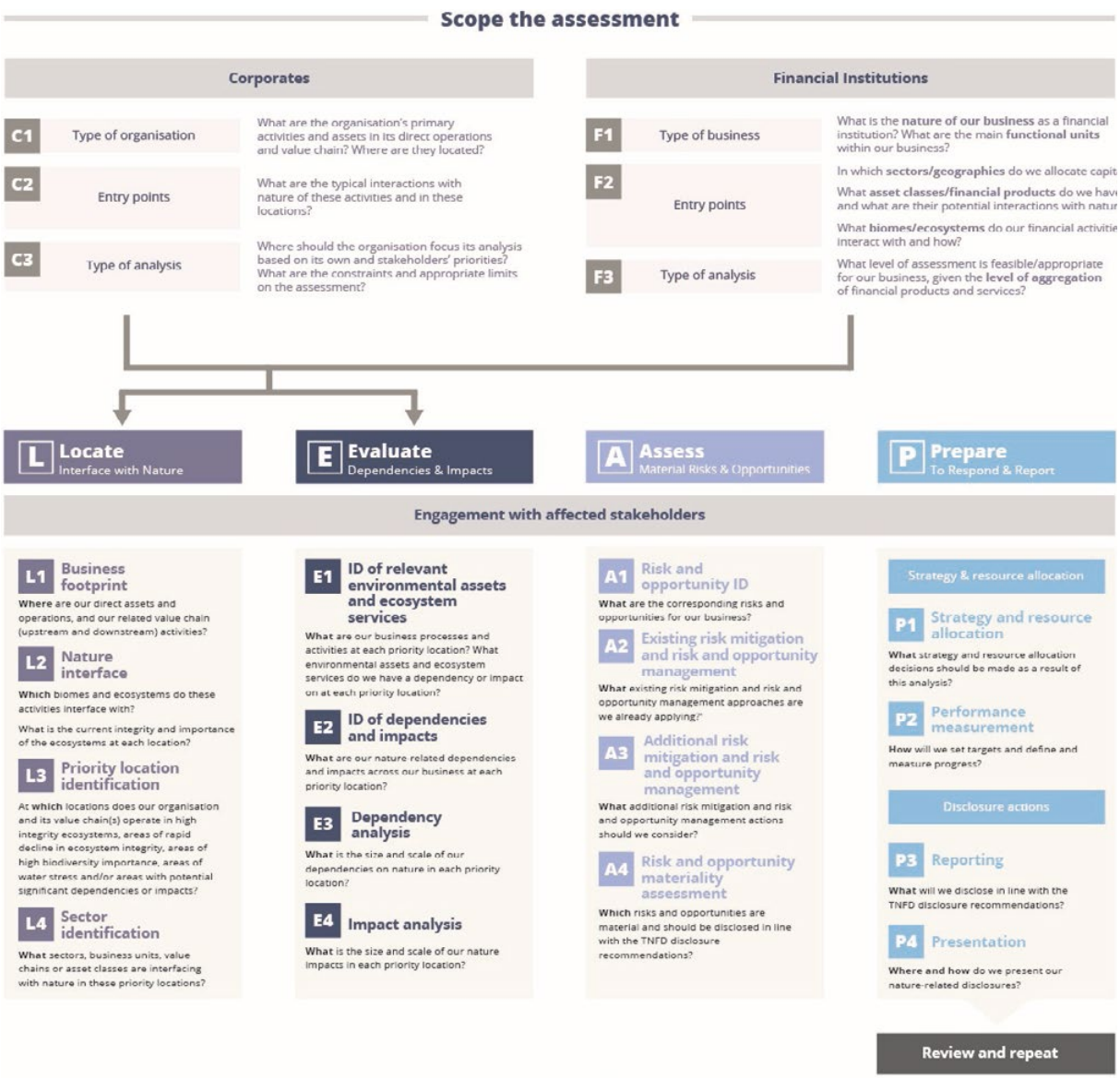

Figure III: The TNFD's revised risk and opportunity assessment approach (LEAP) in v.04 of the beta framework

Source: TNFD 2023

There are several evolving approaches and tools in this field (Finance for Biodiversity 2022). Some examples include the Exploring Natural Capital Opportunities, Risks and Exposure ENCORE tool, which can help financial institutions and agribusinesses to identify their most important nature-related risks (e.g. water scarcity issues at certain facilities for a beverage company as part of an investment portfolio) but also opportunities in investing/lending alternatives (e.g. in nature-based solutions). There are other tools that further breakdown the analysis into specific ecosystem services (e.g. water regulation) relevant to particular businesses and assess dependency/impact risk in relation to those ecosystem services.

The UN-convened Sustainable Blue Economy Finance Initiative works on the intersection between private finance and ocean health. It provides guidance and frameworks to ensure investment, underwriting and lending activities are aligned to the UN Sustainable Development Goal 14 (SDG 14), 'life below water'. Their practical guides for financial

institutions "Turning the Tide: How to finance a sustainable ocean recovery" and "Diving Deep: Finance Ocean Pollution and Resilience" outline how to avoid and mitigate environmental and social risks and impacts and identify opportunities when providing capital to companies or projects within the blue economy. "Turning the Tide" has a dedicated chapter on seafood with recommendations on how to deal with activities such as wild-capture fisheries, aquaculture, and processing value chains. There is also an overview of activities that are recommended to be excluded from financing due to their damaging impact on the ocean and high risk. The Initiative is also developing a seafood reporting framework for its financial institution membership.

Set targets

Once there is a solid understanding of a financial institution's current practice in its most significant impact areas, the next step is to identify opportunities for improvement aligned with the company's strategy and vision by setting targets. The process includes looking for alignment of targets with relevant global, regional and national efforts, including net zero by mid-century, the Sustainable Development Goals or nature positive goals as part of the Kunming-Montreal global biodiversity framework.

A baseline needs to be carefully measured to provide a starting point against which to set targets and monitor progress. "The baseline (or reference) is any datum against which change is measured". It might be a 'current baseline,' in which case it represents observable, present-day conditions (IPCC 2007).

The Principles for Responsible Banking has developed target setting guidance for the following impact areas:

- Climate change mitigation
- Resource efficiency and the circular economy
- Biodiversity
- Financial health and inclusion
- Gender equality

Net-Zero Asset Owner, Banking and Insurance Alliances

For the Net-Zero Asset Owner Alliance (NZAOA) targets shall be set on their members' own scope 3 emissions related to investments (referred to as 'portfolio emissions'), especially for 'priority sectors', which includes agriculture. In addition, "Alliance members should set net-zero targets on their own scope 1 and 2 emissions. Members shall set targets on scope 1 and 2 emissions for their underlying holdings and should do so on scope 3 of underlying holdings for 'priority sectors'". At the portfolio level, Alliance members are expected to track portfolio company scope 3 emissions but are not yet required to set targets until data becomes more reliable (UNEP 2022c). While there is a target setting guidance for oil & gas, and utilities—including coal, transportation and steel—no guidance is available for the agriculture, forestry and fisheries sector yet. Members of this asset owner alliance are requested to explain their constraints if they

are not able to set targets in all required sectors and shall make sure that—at a minimum—70% of their total owned emissions are covered by 2025. They are also encouraged to use productivity-based metrics before using economic-intensity metrics, which in the case of agriculture refers to three metrics: tCO_2/tonne of agricultural product, CH_4/tonne of agricultural product and NO_2/tonne of agricultural product (UNEP 2023).

In the first Net-Zero Banking Alliance (NZBA) progress report, published in November 2022, out of 62 member banks whose submissions were considered, only three banks had set targets in the agricultural sector (UNEP FI 2022b). The report indicates that the agricultural sector poses various challenges related to data gathering and setting targets. All targets set for the agriculture sector were for banks' lending portfolios and cover their clients' scope 1 and 2. A good practice for this sector is for targets to cover all GHG including methane and nitrous oxide.

In the recently published Net-Zero Insurance Alliance (NZIA) Target-Setting Protocol, it is expected that members set their first individual targets within six months of the publication of the Protocol, or within six months of joining the NZIA (UNEP FI 2023). Agriculture is considered a line of business in scope of this protocol.

Financial industry groups (e.g. asset owners, banks, insurers) have access to different guidelines applicable to their industries (NZAOA, NZBA, NZIA, PRB). In terms of impact areas that are material for a financial institution and where they may have positive or negative impacts on people and natural systems, targets are recommended beyond climate change mitigation and may include, where relevant, biodiversity, adaptation, resource efficiency and circular economy as well as social aspects.

The Good Food Finance Network's High Ambition Group: leading by example

Given the lack of guidance around target-setting efforts in the agrifood sector, an important leadership initiative has been working to show how various types of financial institutions can set impactful targets in practice.

The High Ambition Group of the Good Food Finance Network (GFFN) is a leadership initiative, led by UNEP FI and the Climate Finance Unit of UNEP, composed of financial institutions and agribusinesses. The High Ambition Group members' objective is to set and work towards achieving ambitious, institution-specific targets and hence be at the forefront of the industry in driving change to make food systems more sustainable. The GFFN's High Ambition Group comprises various types of financial institutions from public sector and environmental funds to the banking industry, asset managers and agribusinesses. Its members are working on setting specific and time-bound targets across significant impact areas and geographies, putting a roadmap for implementation into place, and pioneering sustainable finance solutions.

The High Ambition Group is showing how institutions can:

1. Significantly **improve the assessment and management of material environmental and social risks** on the institution's portfolio/business.

2. Assess and significantly **reduce material negative environmental and social impacts** of investments/operations and **increase positive impacts**, including, but not limited to:
   - Implementing a zero-deforestation policy
   - Actively promoting socially responsible practices (e.g. living wages, gender equality policies)
   - Incentivising/mainstreaming: climate change mitigation and adaptation practices, reduction of pollution through improved resource efficiency, production of nutritious, affordable, and healthy food, reduction of food loss and waste

3. Significantly **increase** the absolute amount of **capital invested** in sustainable food systems, as well as **the share of sustainable investment relative to the total capital** invested in the sector.

Considering insights and lessons learned from various relevant initiatives, financial institutions need to consider the following aspects when setting agrifood sector targets:

- Targets should be set in all areas where the financial institution has a significant negative impact or the greatest lever to influence positive change towards more sustainable food systems through its financing activities.
- Targets should be specific, measurable, achievable, relevant and time-bound (SMART) and ambitious.
- Targets should be science-based and aligned with the internationally agreed sustainability objectives (e.g. Paris Accord, Kunming-Montreal biodiversity agreement, a 'just transition', the SDGs).
- In alignment with the above international agreements, targets should embed gender equality and human rights approaches to ensure no one is left behind (designing gender-sensitive programmes that aim to increase women's access to technology, finance, and knowledge resources while increasing women's leadership and participation in agricultural solutions).
- A clear baseline should be established, against which progress is measured.
- Clear monitoring and reporting metrics should be identified, and it should be made explicit whether absolute or intensity-based metrics are used.
- Targets should show increasing ambition over time (e.g. by 2025, 2030 and latest by 2050 for net-zero ambitions).
- A roadmap should include all necessary elements, management steps and actions to achieve the desired change or outcome (e.g. net-zero GHG emissions by 2050 through X, Y, Z measures) as well as milestones and interim targets.
- A clear strategy on how to assess and monitor progress against targets should be specified.
- Progress towards targets should be disclosed publicly to foster transparency and accountability.

The first targets under the Good Food Finance Network (GFFN) exemplify how finance can be redirected towards sustainable food systems through concrete, time-bound steps (short term to 2023, medium term to 2025, and long term to 2030) and by addressing different ESG dimensions and geographies from Malawi to Mexico. Targets include a wide range of environmental and social goals to build a sustainable food

system including increasing use of technology to modernize agricultural practices, avoiding deforestation, investing in adaptation, and unlocking new smallholder farmer income through incentivised carbon removal.

The GFFN's High Ambition Group members are also working on targets for areas such as labour conditions, food security, nutrition, nature, food loss and waste, regenerative and climate-smart agriculture—which are currently constrained by a lack of standardised technical guidance, metrics or capacity. For nature-related targets, it is expected that the Kunming-Montreal global biodiversity agreement, together with the pilot TNFD disclosures, will underpin many members' targets and policies in future—as several members, including Nuveen Natural Capital, Signature Agri Investments, Phatisa and Rabobank are currently in the process of establishing baselines for future measurement.

The first tranche of targets was released by seven members of the GFFN's High Ambition Group (Rabobank (NL), Nuveen Natural Capital (US), Signature Agri Investments (NL), Global Environment Facility-GEF (US), Phatisa (Mauritius), Yara (Norway), and Trust Funds for Agricultural Development (FIRA) (Mexico)) in November 2022, covering USD 108 billion of business volume (table 3 and appendix 2).

Table 3: First tranche of targets of members of the Good Food Finance Network's High Ambition Group

Examples of targets by members of the High Ambition Group of the Good Food Finance Network

Global Environment Facility (GEF): Restore 420,000 hectares of degraded land, improve land management practices in more than 20 million hectares, mitigate 223 million tons of CO_2 while at the same time reducing the use and waste of chemicals of global concern by 21 million tons by 2030. GEF will also promote innovative financial mechanisms, including microfinance for SMEs, and blended finance for investments to scale nature-positive production and achieve landscape regeneration.

Rabobank (Netherlands): Support millions of smallholder farmers to transition to agroforestry, growing trees with annual crops and livestock through its Agroforestry Carbon Removal Units for the Organic Restoration of Nature (ACORN) programme. It uses remote sensing techniques and artificial intelligence to measure carbon sequestration. Under this initiative, 80% of revenue flows directly to smallholder farmers. The programme has an ambition for total sequestration of 100 megatons of CO_2 per year by 2030. As an example of a climate mitigation target aligned with the UN-convened Net-Zero Banking Alliance (NZBA), it has disclosed reduction targets for its financed emissions from eight sub-sectors: dairy, pig farming and horticulture in the Netherlands, beef in Australia and United States, dairy in New Zealand, soy in Brazil and tractors internationally. This accounts for around 70% of their climate-material loan portfolio.

FIRA (Mexico): Grow its USD 350 million climate adaptation and resilience portfolio (guided by a taxonomy built with Carbon Trust) 5% year-on-year, starting 2023, with the target of increasing the flow of financing towards adaptation and resilience to USD 540 million by 2030, which means FIRA would finance around USD 3.6 billion across eight years.

Nuveen Natural Capital (US): The land-focused asset manager with approximately 3 million acres (1.2 million hectares) in assets under management, has set a target to, by 2023, upgrade its existing zero deforestation policies and roll them out to all product lines and regions, with a focus on materiality, while completing a natural capital inventory of all properties to identify opportunities for further improvement.

Signature Agri Investments (Netherlands): With holdings across Africa, beyond committing to zero deforestation in the short-term, has set targets to transition their African farms to regenerative farming principles for its whole portfolio by 2030 and plans for climate-resilient restoration of degraded lands.

Phatisa (Mauritius): Plans for 100% of portfolio companies to have a gender policy and stretch targets to increase female employment across different skill levels by 2025.

Monitor and disclose

Similar to any management process, impact management requires that the monitoring of progress is evaluated regularly to check whether the targets that were set and measures and action plans put in place lead to the expected results and adjust the course of action, if necessary (UNEP FI 2022a). It is also important to monitor on a regular basis whether:

- The scope of the impact management process needs to be expanded or adjusted to cover additional business activities
- There is a need to adapt to changes in the portfolio composition and geographies of operation
- The suitability of targets set and indicators to monitor progress and the need to set additional targets in other material impact areas

Appropriate indicators that capture progress (or the lack of it) are essential for the effective monitoring and implementation of targets. Some initial efforts to map sustainable food system metrics available to financial institutions identified the following constraints: a) a lack of common understanding of what a sustainable food system entails, b) no clarity on which metrics are most relevant, c) insufficient reliable, high-quality data from food companies to enable setting a baseline and monitoring performance over time, d) limited technical expertise and e) lack of clear responsibility associated with the reported performance (UNEP WCMC 2023).

Priority actions to advance these deficits include: improving coordination among developers of metrics and between financial institutions and metric developers, increasing funding and collaboration for developing metrics, fostering widespread testing of metrics and frameworks, and increasing engagement from regulators and policymakers.

To ensure transparency and accountability, it is recommended to disclose the impact management journey of a financial institution, their targets, action plans and progress made on a regular basis according to relevant disclosure frameworks like the Taskforces on Climate- and Nature-related Financial Disclosure (TCFD and TNFD). To ensure alignment with the SDGs, targets should focus not only on environmental dimensions—but also social and economic dimensions –as these are indivisible and are seen as critical ingredients for making progress towards sustainability. Within the socio-economic dimension, gender equality and human rights are key to ensuring no one is left behind within a climate- and nature-related financial context (United Nations 2021).

TCFD is leading the development of climate-related financial risk disclosures for companies, banks, and investors. Since 2017, UNEP FI launched a series of TCFD pilot projects for banks, insurers, and investors to explore physical and transition risks and pioneer practical ways to evaluate these risks. With these initiatives, UNEP FI has been leading the development of good practice around climate risk in the financial sector.

A similar process is being followed by the Taskforce on Nature-related Financial Disclosures (TNFD). The TNFD is set to develop a common reporting framework to mainstream nature-related disclosures just as TCFD has served to mainstream climate-related disclosures. The TNFD framework is being tested and piloted (including food-relevant topics in the global south) by financial institutions to help strengthen disclosure of nature-related risks and opportunities in specific countries and sectors aiming to (TNFD 2022):

- Help drive alignment with the emerging global reporting baseline and best practice standards and tools already in use by market participants.
- Provide an adaptable and flexible approach to materiality so that preferences and regulatory requirements for reporting can be used from organisations of all sizes and across all jurisdictions.
- Encourage early action by companies and financial institutions to begin reporting nature-related dependencies, impacts, risks and opportunities.
- Provide a structured way to increase disclosure ambition over time, recognizing that while this area is new to many organisations, it is growing rapidly and becoming a prerequisite for sound governance, strategy, risk management and capital allocation.

Boost implementation

After setting targets, financial institutions require concrete plans to deliver on their commitments. For example, the NZBA requires that members set their first targets within 12 months of joining the initiative, after which they must develop, disclose, and start implementing measures and milestones to meet their targets. These plans and measures differ by institution, but include lending and investment guidelines, transition plans, and thematic/sectoral policies (UNEP FI 2022b).

There are several opportunities for the financial sector to accelerate the deployment of private capital flows towards more sustainable food systems (Apampa *et al.* 2021), including:

1. Investing in new commercially viable projects and businesses that tackle food-related issues (e.g. solutions in the areas of food loss/waste avoidance, and the promotion of healthy diets, circular economy, and resource efficiency gains in the value chain)
2. Jointly with public institutions, making concessional finance available (e.g. through blended finance) to accelerate the transition to SFS
3. Creating innovative gender-responsive financial products that link financing with the attainment of environmental and social impacts by clients
4. Raising institutional investor capital for sustainable agriculture, forestry, seafood, and other nature-based solutions with clear and predictable flows of revenues
5. Development finance institutions operating within the agrifood space can adapt their structural processes and risk specifications to approve investment in impactful and innovative projects

Companies and financial institutions can work together to set and implement strong commitments, policies and targets that cover key dimensions of food systems including climate change mitigation and adaptation, biodiversity and social issues, and join multi-stakeholder efforts to raise awareness and enable collaboration.

Only the implementation of targets can result in tangible impacts for people, climate and nature. Financial institutions play an important role in influencing clients and suppliers to improve their policies and practices and drive financial flows towards more sustainable food systems. By acting now, financial institutions can leverage the economic opportunities of the food systems transition and mitigate the continued and rising financial risks faced if we fail to address food system challenges.

III. Credit risk mitigation and financial innovation for sustainable food systems

There are few sectors that touch on as many sustainability challenges as food and agriculture. The sector is turning to the sustainable finance market to raise capital. The challenge for both companies and financial institutions is understanding what sustainability in the food system and agriculture looks like, what the associated risks and opportunities are, and how private finance can channel additional flows beyond public finance. Because of the low level of knowledge and understanding of the sector as well as the lack of track record and steady revenue streams, there are currently limited private financial flows towards sustainable food and agriculture (World Bank 2021). Therefore, there is a strong need for financial innovation including several layers of credit risk mitigation. Scalable, replicable and innovative financial products can encourage and support the financing of sustainable food systems. Several clear opportunities for innovation exist, which build on emerging practices within the financial markets.

This section will explore an array of financing techniques and tools, with respective relevant examples, showing significant potential to expand and support SFS. Through blended finance, innovative debt instruments, securitisation techniques and blockchain-enabled tools, this section illustrates multiple approaches that financial institutions can deploy to direct capital into promising SFS ventures and projects.

Risk mitigation through blended finance

Among the internal (waterfall structure, first loss provisions, over-collateralisation and excess spread) and external (letter of credit, cash collateral accounts, security bonds, guarantees, insurance and credit derivatives) mitigation techniques to lower the risk from commercial banks, blended finance is considered a helpful tool to de-risk investments by using concessional funding.

Blended finance is the strategic use of government/public and impact capital (including that of a philanthropic nature) to mobilize private investments into markets or projects with excessive levels of risk or below market rate of return, but with high potential for strong impact (Convergence 2022).

Conventionally, blended finance is built on three key pillars, which align the interests of both private and public investors:

- **Leverage:** use of public or concessionary capital to attract private capital into transactions
- **Impact:** projects or transactions that provide measurable social, environmental, and economic benefits for their communities
- **Returns:** commercially attractive financial returns for some contributors to the capital stack

This structuring technique is used most frequently in the following circumstances:

1. **Risk Mitigation:** If the risk of a transaction is higher than is deemed bearable for a bank or investor, blended finance can be utilised to reduce the risk by combining or 'blending' capital from public, impact, or philanthropic funders in the capital structure of the transaction. Guarantee or first loss capital can be obtained from public or impact sources to provide risk protection to private capital.
2. **Yield or Return Enhancement:** When transitioning towards sustainable food systems, the return generated by the transaction may not justify the effort required for private investors to be able to invest. Blending different capital with different return profiles may help to increase the return of the private sector investor above a certain minimum threshold.
3. **Multiple linked Beneficiaries:** Transactions may have different and interrelated beneficiaries in the food sector (e.g. end consumers, local farmers, society at large etc.), which will benefit from the financial intervention in the form of reduced hidden cost or externality such as habitat destruction, soil erosion, water contamination, and chronic health issues. The investors benefiting from hidden cost reduction may have a more flexible approach on risk return profile of the transaction and accept higher risk or lower return compared to a base scenario investment.

More specifically, in blended finance structures, public sector concessional capital can be blended to non-concessional capital thereby de-risking a portion or the totality of the capital supplied by private investors. This allows higher sums to be invested in risky projects to reduce the overall risk.

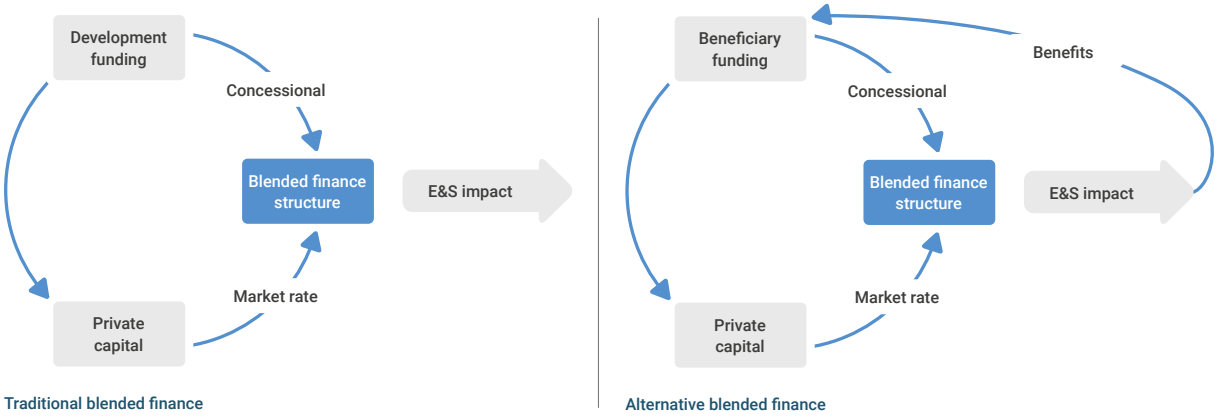

Figure IV: Alternative blended finance model from beneficiary perspective

Source: Bankers without Boundaries

This type of blended finance thinking allows participants to recognize separate benefits and outcomes within an overall transactional structure.

Convergence (2022), the global network for blended finance, has compiled a database of 650+ blended finance transactions in developing countries. According to this database, since 2015, on average 13 blended transactions each year have targeted agriculture, accounting for around USD 1.2 billion in financing annually. Overall, the Convergence database records 146 blended transactions that have targeted the agriculture sector or SDG 2, representing aggregate financing of USD 13.4 billion (Apampa *et al.* 2021). The OECD reports that blended finance can also be used to promote gender equality while at the same time pursuing nature- and climate-related goals. Based on a 2020 survey of blended finance funds and facilities (OECD 2022):

- Sixty-five per cent responded that they integrate gender equality aspects as the main objective (USD 49 billion).
- Only 1% of assets under management were dedicated to gender equality and women's empowerment as the main objective.

The AGRI3 Fund is an example of a fund that uses blended finance transactions. The fund aims to mobilize USD 1 billion of financing by providing credit enhancement tools and technical assistance to support a transition to more sustainable agricultural value chains and avoid deforestation. The AGRI3 Fund encourages commercial banks and other financial institutions to mobilize financing by de-risking and catalysing transactions that stimulate more sustainable agricultural production, rural livelihoods and reforestation. To date, this fund has provided guarantees to enable various deals financed in Brazil (forest and pastureland recovery) and China (chili peppers), among others.

Blended finance structures offer an interim measure until new, sustainable food production and processing models are fully commercially feasible. They provide a means to re-risk investments by using concessional funding and combining public and private financial sources. However, they are not exempt from drawbacks, some of which include:

- Blended finance and de-risking with non-commercial (concessional) capital can frequently result in tedious and lengthy bureaucratic processes, often longer than clients can afford to wait. In practice, blended finance has been found to work mostly at the portfolio/fund level, which requires long negotiation periods, or for previously issued and simply reproduceable structures.
- It is often complicated to correctly match different risk appetites across public and private institutions and the choice is strictly dependent on the type of transaction which is undertaken. Attention must be paid on a discretionary, case-by-case basis to ensure the correct blend of risk appetites.

A set of novel debt instruments, linked to performance and the attainment of environmental objectives, can offer a significant opportunity to inject capital into promising projects related to SFS.

New debt instruments

New debt instruments offer alternative financing mechanisms, including sustainability linked loans and bonds, environmental impact bonds, use of proceeds bonds, and diverse securitisation techniques.

Sustainability-linked loans and bonds

Sustainability-linked fixed income instruments or **Key Performance Indicators (KPI) bonds** are another solution to improve the risk-return-sustainability of investments in sustainable food systems. They can have the coupon or principal adjustment in both directions, e.g. a punitive increase in coupon rate if targets are not met, or conversely a decrease in coupon rate if targets are met. Such links to performance are not limited to environmental outcomes, or debt and equity asset classes.

Sustainability-linked bonds provide another way for debt markets to support companies and sovereigns looking to improve their sustainability objectives and targets. They can be deployed as required by the issuer as long as the final KPIs are attained. They tend to have limited applications and scalability and relatively limited penalties, especially in the case of corporate ones.

KPIs and associated targets should be:

- relevant and material to the issuer's overall activities
- measurable on a consistent basis
- externally verifiable against the baseline and scientifically verifiable
- ambitious in terms of materiality of improvement

Sustainability-linked instruments can offer a strong lever to encourage creditors to achieve targets linked to sustainable food systems. By achieving the performance targets, in the case of a step-up or step-down coupon, the debtor would also benefit from a relief on debt servicing costs. If the correct KPIs are selected (e.g. pesticide and water use efficiency, output per hectare, GHG emissions) this instrument has the potential to encourage more sustainable practices in the agrifood sector.

Impact bonds

Impact bonds are an innovative type of multi-stakeholder contract that aim to redistribute both risk and benefits from investments to generate impact in multiple areas. Depending on what kind of impact they are trying to generate, impact bonds can be classified as development impact bonds, environmental impact bonds or social impact bonds, among others. Impact bonds are results-based financing tools used to link socially conscious private investors with enterprises that aim to deliver social, environmental or developmental outcomes. In other words, they incentivise creditor parties to deliver impact goals to obtain more desirable financial outcomes.

According to Qualified Ventures (2022), issuing an impact bond can benefit issuers, citizens, and ratepayers by:[4]

- expanding a bond's potential investors to include funds and accounts where ESG factors play a key role
- demonstrating commitment to innovation and transparency
- funding nature-based solutions
- enabling smarter capital spending decisions by utilizing data on project outcomes

From the investors' and asset managers' perspective, the crucial benefits are:

- streamlining of impact reporting
- provision of clear and consistent standards to measure and report outcomes
- commitment to post-issuance impact reporting, not limiting to pre-issuance proceeds reporting as with the use-of-proceeds bonds

The mechanics of an impact bond are shown in Figure V. For example, EUR 100 million are invested in a project (step A) in which stakeholders have contractually agreed on an outcome with a potential impact (e.g. the planting of 100,000 trees in the city with the scope of reducing urban temperatures and removing CO_2 from the atmosphere), to be achieved over a certain time (e.g. two years). The performance-based payments will depend on whether the expected outcome is achieved. Investments are collected by an intermediary and transmitted to the service providers as working capital (step B). After the predefined time, the outcomes are evaluated by an independent body, generally known as a third-party reviewer.

Unlike a Use of Proceeds (UoP) bond, impact bonds offer performance payments on top of the interest payments that are disbursed upon the achievement of the impact goals.

4 quantifiedventures.com/what-is-an-environmental-impact-bond

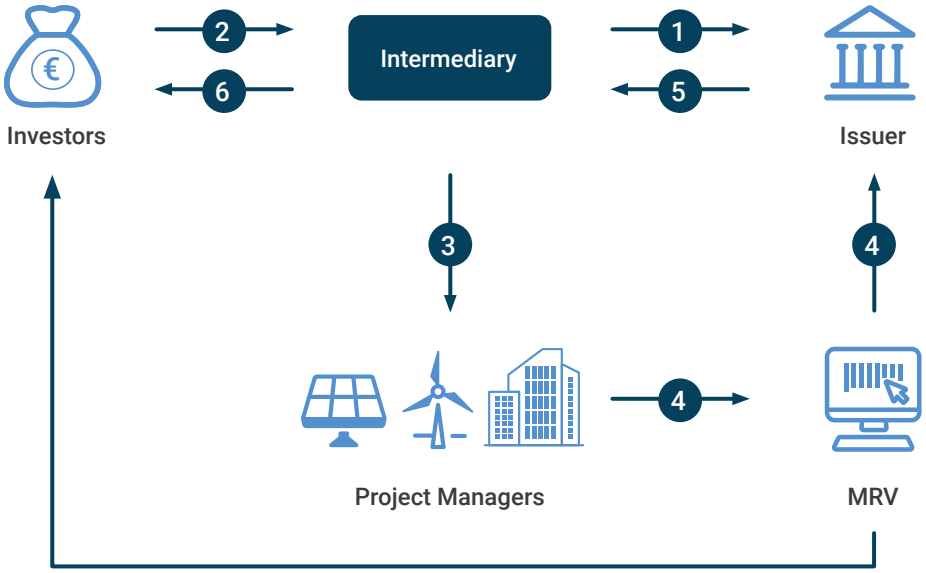

Figure V: Structure of an impact bond

Source: Bankers without Boundaries

Use of proceeds bonds

Belonging to the larger category of thematic bonds, use of proceeds (UoP) bonds include covenants tying the proceeds of a bond to the issuer's progress on environmental or social goals. They apply a transparent project selection process, both pre- and post-issuance, to make visible the impact generated from the proceeds. This step is required because proceeds are invested on the condition that they are funnelled to projects aligned with the bond theme. As their name indicates, UoP bonds require the proceeds to be invested in pre-approved projects and regular reporting on such investment must be performed. Conversely, KPI bonds do not require such a strict review of proceeds usage as long as the overall KPIs are eventually achieved.

Thematic bonds can be classified according to the issue they tackle. **Green** bonds—the most popular type—finance green projects such as investments in renewable energy, green buildings, or clean transportation. Similarly, **blue** bonds finance eligible blue projects, such as sustainable fisheries. **Social** bonds are reserved for social projects, such as tackling or mitigating a specific social issue or achieving positive social outcomes. **Gender bonds** have been used to specifically improve women's access to financing and to close the gender gap. The International Finance Corporation has also demonstrated the use of a combination of gender and green bonds to simultaneously promote women's financial inclusion and environmental sustainability.[5] Lastly, **SDG** bonds finance earmarked projects aimed at achieving one or more of the SDGs. Although the definitions tend to define quite clear-cut boundaries between the different

5 An example of notable gender bonds issued by the International Finance Corporation (IFC) was the issuance of an investment of USD 200 million, in privately placed gender and green bonds issued by an Indonesian bank, OCBC NISP, as part of the bank's Sustainability Bond Programme. The proceeds from the gender bond would then be used by the bank to increase lending to women entrepreneurs and women-owned small and medium enterprises (WSMEs). smart-energy.com/regional-news/asia/ifc-invests-200m-in-a-gender-bond-to-empower-women-owned-smes/

types of UoP bonds, in practice each one of these products present overlapping features and can include a mixture of KPI categories.

UoP thematic bonds are issued in four steps, which are codified and abide by the International Capital Market Association (ICMA) green or social bond principles (ICMA 2021):

1. Use of Proceeds
2. Process of Project Evaluation and Selection
3. Management of Proceeds
4. Reporting

These instruments tend to display an overall premium, also called greenium,[6] compared to traditional vanilla bonds and their rigorous structure reassures investors on the effective deployment of capital. According to the Climate Bonds Initiative (CBI), on average, both EUR and USD green bonds studied achieved lower risk exposure and volatility compared to vanilla equivalents (CBI 2022).

6 According to the UNDP, the 'greenium', or green premium, refers to pricing benefits based on the logic that investors are willing to pay extra or accept lower yields in exchange for sustainable impact. undp.org/blog/identifying-greenium

A 2021 report by the International Finance Corporation (IFC) stressed that investor appetite for innovative financial instruments addressing social issues, which also includes social and gender bonds, might help reduce financial and economic inequalities between men and women by providing capital to fund projects that create better social outcomes for target populations in education or healthcare.[7] Such outcomes could potentially translate into agriculture, with explicit support for SFS projects and ventures.

According to the World Bank (2018) potential drawbacks to thematic UoP bonds include:

1. Despite the identified greenium, savings for issuers are in large part almost insignificant, and the final costs will be still strictly tied to creditworthiness as measured by credit rating agencies.
2. It is impossible to determine whether the borrowing government or corporation already has funding to pay for some projects and wants to raise further capital to pay for non-green activities.
3. The combination of promises to bond buyers and fiscal austerity may have unintended consequences such as having to cut down on other budget items.
4. Even when the proceeds of a bond can be shown to increase a particular expenditure, proving that the extra spending has a desired impact is complex.
5. Linking bond proceeds to specific public expenditures ('ring-fencing') can lead to more expensive funding, or even underfunding.

Despite the potential drawbacks listed by the World Bank and other actors in the field, UoP bonds can support further developments, especially for large projects given the relatively high fees such bonds require. Yet, the increasing interest of investors and the measurement, reporting and verification (MRV) processes that are being put in place for the achievement of the objectives can stimulate the field of sustainable food systems as they scale.

Securitisation

This section presents two securitisation instruments (micro-financing through special purpose vehicles and loan securitisation) including case studies.

Micro-financing through Special Purpose Vehicles

Credit or loan facilities can provide a suitable solution to support smallholder farmers, given the high costs associated with case-by-case investments for traditional lending. These credit facilities can be structured using a form of blended finance, or they can simply work on a portfolio approach where all investors have the same risk-return profile. Debt to local farmers is provided on an individual basis, but as part of a large portfolio that achieves a level of risk mitigation through the portfolio approach. Usually, these are set up for a multi-year period (e.g. 20 years) or are rolled into a new facility on a yearly basis. Special Purpose Vehicles (SPVs) are often used for this type of financial instrument. An SPV is defined as a legally distinct entity created specially to carry out

7 ifc.org/wps/wcm/connect/publications_ext_content/ifc_external_publication_site/publications_listing_page/sustainable-bonds-to-bridge-the-gender-gap

pre-specified activities for a sponsor company. Within this financial structure, the capital is paid into the SPV when it is set up, then used to provide loans to local farmers for a predetermined purpose and in line with pre-defined MRV criteria and financial risk assessment. The facility is typically put in place by the consortium of institutions prior to the individual loan disbursement.

Loan securitisation

Another way to approach the challenge of making large numbers of small-scale loans viable for large institutional investors is through asset securitisation. This process involves repackaging portfolios of cash-flow-producing financial instruments (e.g. loans) into securities or tradable capital market instruments for transfer to other investors. In other words, securitisation is a process to change non-liquid assets into securities. In January 2019, the EU's new regulatory framework for securitisations—the Securitisation Framework—came into force. This framework sets common standards and defines criteria for "Simple, Transparent and Standardised" securitisations,[8] positioning securitisations as a key tool for growth and development.

Applicable sustainability-focused securitisation in relation to food systems, includes:

- **'Sustainable' collateral:** securities are backed by portfolios of sustainable assets—for example, loans to finance sustainable food or agricultural practices. In this case, the loans themselves are the assets used to build such portfolios.
- **Sustainable 'use of proceeds':** the proceeds of the asset-backed securities are invested in sustainable food projects.
- **Freed-up capital or leverage:** the originator uses freed-up capital or leverage from capital relief as a result of a significant risk transfer, thereby freeing up regulatory capital for use in other sectors of the business to invest in 'sustainable food' production.

This section will focus on two types of securitisation instruments: asset-backed securities and collateralised-debt obligations.

8 Cox, A. (n.d.). Simple, Transparent and Standardised (STS) Securitisations: What you need to know. arthurcox.com/knowledge/simple-transparent-and-standardised-sts-securitisations-what-you-need-to-know/

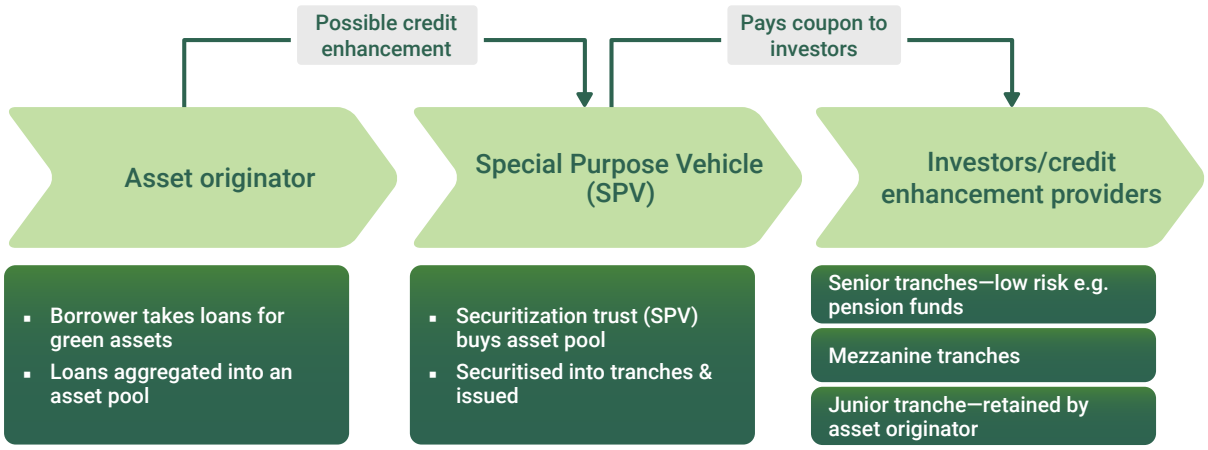

Figure VI: The role of Special Purpose Vehicles in credit finance instruments

Source: Vaze *et al.* 2019

Asset backed securities

Asset backed securities (ABS) are tradable securities backed by a pool of non-tradable instruments (e.g. loans and microloans). This way of securitisation enables lenders, such as local commercial banks and other financing companies, to sell pools of loans, leases, or other receivables, to institutional investors to generate new lending capacity, thus overcoming funding constraints and continuing to provide loans to its customers. In the context of sustainable food systems, ABS can be used to offload loan books of local commercial banks to international financial institutions at scale, where the risk-return profile is adapted to investor needs. ABS could be used to channel large scale inflows into local companies and projects involved in sustainable food production. Again, the MRV process is crucial to get the right inflows into the products.

According to the Climate Bonds initiative (CBI 2020) the two key benefits of green securitisation are:

1. **Improved access to capital.** Such access to capital is provided through the aggregation of small-scale projects which are then aggregated and securitized. Additionally, tagging the securitisation as green enables issuers to take advantage of the increasing demand for securities displaying environmental benefits.
2. **Lower capital costs.** ABS issued in bond markets, especially in high-interest environments, can help to lower costs of capital compared to traditional financing provided by banks. This benefit could be particularly significant for low-carbon projects, which normally have high capital expenditure.

The most promising sustainable ABS include loans to local farmers, microfinancing and other kinds of sustainable food-systems-related operations. Having collateral is instrumental for obtaining loans, and women face barriers to accessing finance due to lack of collateral such as property. This limits women's ability to fund their entrepreneurial activities and is further compounded by underlying issues such as level of education and income, which continue to widen the gender gap in financing. The influence of gendered social and cultural norms and discriminatory practices limit women's progress in accessing and controlling resources. Banks and other financing institutions should consider women's needs through a gender lens to ensure that women are not left behind.

The UNEP FI publication "Gender, climate and finance: how investing in women can help combat climate change" stresses how investing in women smallholder farmers not only helps women to better adapt to the impact of climate change, but also supports positive effects on reducing carbon emissions. UNEP FI argues that closing the gender productivity gap in farming would increase the overall output of smallholder farmers, leading to less deforestation and consequently fewer carbon emissions.[9]

Collateralized loan obligations

Collateralized loan obligations (CLO) are a special form of ABS where the risk/return profile of the tradable instrument is segmented according to a waterfall structure, which indicates the order in which the fund pays out distributions after the investment has been liquidated. The portfolio of loans is managed by an external asset manager, the CLO manager. With a CLO, debt payments from the underlying loans are pooled together and distributed to investors in tranches. The CLO has several tranches, and investors can choose to invest in which tranche meets their risk/return profile. The more highly rated the tranche, the less risky and lower the return. Debt payments made on the underlying loans are pooled together and distributed to investors starting at the top of the tranche and going to the bottom.

The main reasons why CLOs could support sustainability commitments, and in particular sustainable food systems, are:

1. The food systems financing landscape is characterised by requirements for large number of small-scale loans by farmers and smallholders.
2. Large institutional investors are looking for less risky investment avenues in the food value chain with modest returns expectations. CLOs cater to investors with various risk/return profiles.
3. CLOs are a more efficient and expeditious set-up as they package pre-existing sets of microloans and microcredit.
4. Microfinance institutions and other small-loan lenders require freed-up capital lines for new local loans and to increase financing sustainable and social ventures.

In identifying disadvantages to this kind of structure, investment specialists report:

- Difficulty in identifying the added value that the CLO structure could bring in terms of ESG engagement and sustainability objectives. However, the impact this instrument can deliver is directly attached to the users by supporting them to access capital more effectively, in this case small farmers.
- A bad reputation developed since the 2008 financial crisis might discourage investors, although this issue might be overcome by clear due diligence, improved credit ratings and verification of what CLOs contain.

9 unepfi.org/themes/climate-change/gender-climate-and-finance-how-investing-in-women-can-help-combat-climate-change/

Other financing instruments: Blockchain-based tools

Increasingly, advanced blockchain technology mechanisms are infiltrating the financial tools' sphere. Among the instruments, several categories can be distinguished (Pennino *et al.* 2022):

- **Guaranteed payments and funds unlocking**. This allows users to constrain the unlocking of funds to the fulfilment of specific criteria and have so-called 'smart contracts' to operate the fund transfer as the events occur, through agreed mechanisms. This could happen in food systems where the product is monitored across the blockchain for quality control, supply chain control and potentially real-time payment of producers as certain conditions are met. This type of tool could also be used as micro-insurance for smallholders which contains guaranteed payouts in the event of certain outcomes rather than relying on proven loss.
- **Tokens**. Digital assets whose ownership is recorded in a blockchain. Operators in the food and agriculture system might use such tokens to attract users into their payment ecosystem (see example below), to certify the ownership of a good or service in an alternative way, or to provide a security payment.
- **Incentives**. They are usually provided as tokens that reward a positive behaviour and that can be converted into something valuable (e.g. fiat money or services) for whoever expressed that behaviour.
- **Exchanges and offsetting of exchange rates**. Exchanges allow one to buy/sell tokens, either for other tokens or for fiat currency. Food systems and organisations operating across different geographies and being paid in several currencies could make use of such instruments to hedge against currency risks using a fixed or variable exchange rate.

This section has demonstrated the significant heterogeneity and variety of financing mechanisms that financial institutions can deploy to projects of different levels of maturity and size. The usage of key performance indicators, environmental measures and verification mechanisms have the potential to ensure both the development of the sector and the achievement of impact objectives.

As mentioned in the blended finance chapter, a solid and favourable policy environment is essential to ensure a swift and effective deployment of such mechanisms and financing tools. The next chapter will offer an in-depth analysis of what constitutes an enabling policy environment for SFS and what policymakers can do, at the local and national level, to develop it.

IV. Enabling policy environment to promote sustainable finance for food systems

Developing an enabling environment through public policy is key to channelling sustainable finance to food systems. An enabling environment for sustainable finance consists of regulatory frameworks, policy instruments, and the provision of public services directed at both financial and non-financial actors to promote sustainable finance in food systems. It may involve direct policy actions in the form of market interventions, or indirect incentives and signals that aim to encourage market participants to invest in sustainable activities. It may also take the form of provisioning transparency (e.g. disclosures and reporting), and publicly available data and information that allow actors to make informed decisions about their financial transactions.

New policies and innovative regulatory approaches can be positioned to overcome barriers to finance and to boost capital flows to the sector (World Bank 2016). Once the underlying structure of the enabling environment is established through guiding policies, incentives and effective regulations, the financial services industry would be able to improve its own capacity to design and provision new and innovative financial instruments and delivery channels.

We structure the enabling policy environment into three pillars:

i. Risk framework and policies to manage food-systems-specific risks
ii. Incentive framework to promote green activities and investments
iii. Market signalling and transparency measures

In each pillar, a mix of direct and indirect policy instruments and regulations can be instituted to promote sustainable finance in food systems.

Figure VII: Pillars of enabling policy environment to promote sustainable finance

Pillar I. Develop a risk framework for the food value chain

Private sector financiers need holistic risk management frameworks that can represent the complexity of a food system in each market (World Bank 2016). Public policy needs to be dynamic and innovative in designing and instituting new mechanisms and models to manage chronic and emerging risks in relation to food systems. Pillar I of the enabling policy environment should be designed to help market participants identify, measure and manage food-system-specific risks in a given jurisdiction.

Set up specialised risk agencies (solely public or public-private partnerships): Create a public agency that can institute technically suitable guidelines, metrics and methodologies to assess and monitor risks in food systems. Such a public agency should also collect, validate, and disseminate credible and actionable disaggregated data as a public good to all relevant stakeholders. Gender-disaggregated data can also be collected to understand the gender dynamics, barriers and norms in a given market.

Further capacity building can provide additional services in the form of performance assessment, monitoring and rating of borrowers who are looking to attract sustainable finance. The mandate of the agency can cover activities of a broad range of market participants—including farmers, financial and non-financial institutions—upstream and downstream of agrifood systems. Financial institutions can also advocate for changes or policy shifts to end norms/systems that are detrimental to women's empowerment to make sure women have equitable access to capital. As part of a country's overall financial supervisory architecture, such an agency could be placed under a ministry of development or agriculture.

Set-up a designated finance agency as a one-stop-shop of blended finance for food systems in the jurisdiction: Create a specific financial entity (**solely public or public-private partnerships)** with a specific mandate to develop and disseminate new investment vehicles that diversify the risk-return profiles of individual and institutional investors. Developing vehicles to share a portion of the risk from the issuer of the loan will expand the uptake of financing by the private sector. The agency can also collaborate with multilateral development banks to lower a lender's potential initial losses from default, by providing guarantees to generate appetite for private financiers. Guarantees could cover—depending on the nature of vehicle—minimum returns, and right to be the first paid in a layered capital structure (World Bank 2016). The design of new blended finance instruments could also incorporate performance-based guarantees, such as the allocation of finance to the target clients of the vehicle (e.g. smallholders), roll-out of sustainable farming practices (e.g. organic, no-tillage, and vertical farming etc.) (Nature Finance 2021) or the condition of reduced collateral requirements, or longer-term repayment periods.

Design and designate vehicles to support the penetration and coverage of insurance services across food systems: The public sector could play a role in transferring and sharing a portion of the growing risks associated with food supplies. The public sector, with multilateral financial institutions, could commit resources to broaden and deepen insurance coverage in food systems. It could provide capital to subsidize stakeholders

(small-scale farmers, small businesses etc.) that are un(der)-covered by insurers. Similarly, other forms of risk sharing, such as concessional capital vehicles, could be developed and assigned to certain risk areas (droughts, floods, hurricanes etc.) or certain segments of food systems where the collective purchase capacity is low but the insurance need is high. Collaboration with the reinsurance sector, for example through catastrophe (cat) bonds, where public and private insurers in a given jurisdiction transfer risks through a reinsurer, is also essential to manage top-down risks and the capital reliability of the insurance sector.

Pillar II. Incentive framework

Repurpose agricultural support policies: Covering the support policies of 54 countries, the Organisation for Economic Co-operation and Development (OECD) estimated that an annual average amount of more than USD 500 billion was provided to farmers in the form of direct support between 2017 and 2019. A substantial proportion of these support measures maintain domestic prices above international levels, at the expense of poor consumers. They also reinforce some environmentally harmful farming activities. On the other hand, the amount of public spending on the long-term sustainability of the sector through research and development, investment in green infrastructure, biosecurity, and biodiversity amounted to only USD 106 billion per year (OECD 2020a). As part of the incentive framework, governments can:

- phase out distortive policies, especially those that are linked with agricultural input use, such as chemical fertilizers and pesticides
- repurpose public funds for the provision of services that promote sustainability, resilience, and biodiversity
- intensify support for green activities such as crop rotation, green irrigation, soil protection, ecological reserves and compensation areas (OECD 2017a)

Generate higher public financial flows through new instruments, including sovereign green bonds: New debt products used and promoted by the public sector offer great potential to support sustainable activities. Green bond issuance has become a significant policy instrument for governments to finance a range of sustainability-oriented activities and investments. Sovereign wealth funds, pension funds and other private and institutional investors increasingly look to invest in thematic areas, such as climate change, food security and sustainable health. This increased demand from investors has caused the green bond market to expand significantly in recent years. The volume of sovereign green bonds issued by national and local governments amounted to nearly USD 100 billion in 2021 (CBI 2022). The list of countries that have recently issued green bonds includes Germany, Italy, Mexico, Serbia, Singapore, South Korea, Sweden, Switzerland, Thailand and the United Kingdom of Great Britain & Northern Ireland. According to a report by the OECD, the maturity of sovereign green bonds varies between 5 and 30 years, with the weighted average of 18-year maturity. The range of the size of individual bonds varies substantially too, between USD 15 million and USD 3 billion. Sovereign issuers in Europe accounted for the largest share of the total issuance of green bonds (OECD 2020b), with a growing volume of issuance from developing countries as well.

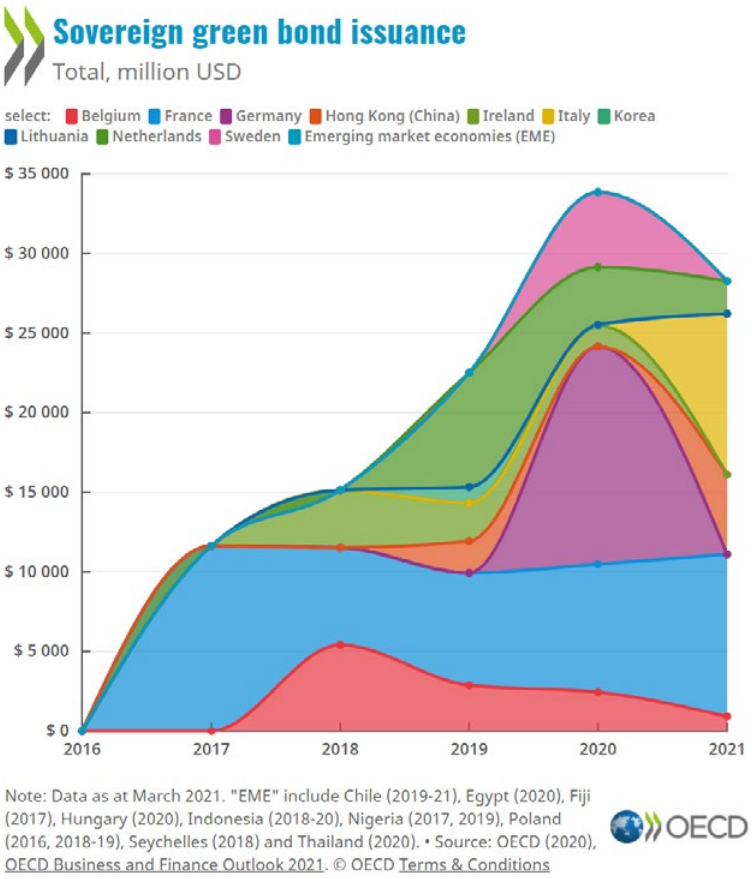

Figure VIII: Sovereign green bonds issuance

Source: OECD 2020b

The proceeds from the bond issuance are used to finance projects covering a range of sustainability activities. The volume of bonds targeting land-use activities has been growing too. The use of proceeds earmarked for land-use-related investments increased from USD 8.8 billion in 2019 to nearly 30 billion in 2021 (CBI 2022). We expect this trend to continue in the next few years and for the volume of green bonds that channel finance to activities for sustainable land-use to grow. Green bonds can finance government incentives for sustainable activities in food systems.

Issuing green bonds offer some tangible benefits to countries, compared with conventional bonds. According to a survey in OECD countries, a discount for sovereign green bonds in relation to pricing ('green premium') is still in its infancy. However, the secondary market demand for green bonds was relatively higher (relative to their overall market size) than it was for conventional bonds (OECD 2020b). In the near future, it is envisaged that as environmental, social and governance (ESG) risks become increasingly material to the risks of credit default—and hence they gain weight in risk assessments –markets will offer discounts to green bond issuers that exhibit low ESG-risk profiles.

Green bonds also improve diversification of the investor base, which is likely to reduce fluctuations in bond demand. They demonstrate the issuer's political commitment and credibility with its sustainability targets (e.g. GHG emissions reduction). It signals actors in broader financial markets about the government's goals and priorities in relation to investment activities (e.g. climate change adaptation, protection of natural resources and

renewable energy). It also functions as an example for the private sector in some geographies where sustainable finance is not yet mature. Sovereign bonds may promote corporate-oriented financial flows too (OECD 2017b). Utilizing a combination of green and gender bonds is a recommended approach that covers environmental and socio-economic issues, which are all crucial goals to meet the 2030 Agenda. In general, issuing green bonds allows countries to deepen their domestic markets for sustainable finance.

Debt-for-food swaps

A debt swap can be defined as a reduction in the claim of a creditor's debt in exchange for an investment into sovereign development of the debtor's country. The mechanism is employed to re-channel the debt service to projects or programmes with environmental or humanitarian objectives that would serve to the debtor country. Debt swaps bring an obvious financial advantage to the beneficiary country, which experiences a reduced debt burden, and simultaneously needs less additional resources to finance these projects or programmes.

Several other types of debt swaps exist. For example, the debt-for-equity structure, entailing the swap of debt owed by a company for equity in specific scenarios, or the increasingly popular 'debt-for-development' swap. This umbrella term covers a range of similar instruments, such as debt-for-nature, debt-for-food security, or debt-for-climate swaps and involves the cancellation of external debt (usually official bilateral Official Development Assistance-ODA debt) in exchange for local or foreign currency to be paid towards development projects (e.g. food security, education, environmental protection or climate actions) in the debtor country.

The World Food Programme (WFP) has been implementing debt-for-food security swaps since 2009 (WFP 2017). WFP's debt conversion work is done by The Debt Swap Task Force and forms one of three work streams in the area of innovative financing. The overall volume of debt-for-development transactions (which also include debt-for-food swaps) amounts to roughly USD 90 million since 2009, distributed between countries such as Italy-Egypt, France-Madagascar, Russia-Mozambique, Germany-Egypt and others (WFP 2021).

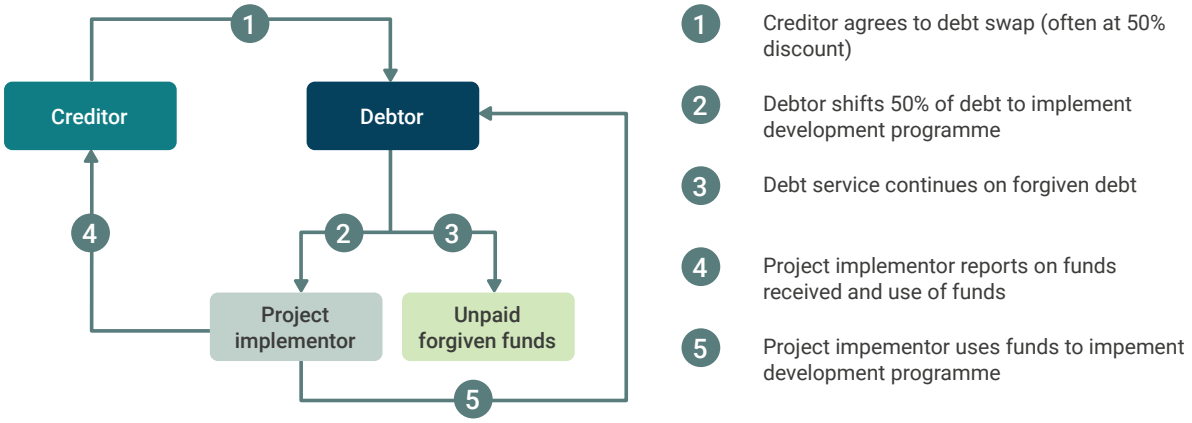

Figure IX: Structure of a debt swap

Source: Bankers without Boundaries

Pillar III. Market signalling

Redirect investment flows through food-system-sensitive green taxonomies: A major area of regulation in the field of sustainable finance has been the rapid development of green taxonomies. Over the last five years, green taxonomies have gained widespread geographic and regulatory coverage. In many countries and regions, including the EU, ASEAN, China, Kazakhstan, Colombia, Mongolia and South Africa, legislators and regulators have already developed, or are in the process of developing, green taxonomies.

The main objective of a green taxonomy is to signal and inform markets about sustainable activities and investment areas in a given jurisdiction. By providing this signal, policymakers aim to attract and direct financial capital to these activities. At the same time, green taxonomies provide a framework to define what type of investments can legitimately constitute sustainable investments, hence limiting 'greenwashing'.

The expanding geographical coverage of green taxonomies is also likely to deepen markets for sustainable finance products, such as transition and sustainability bonds, alongside green-asset-backed securities and others. However, harmonisation efforts are limited among emerging taxonomies, which leads to additional transaction costs for international financial institutions that want to align their investment flows with green taxonomies in multiple jurisdictions.

Green taxonomies may also help governments harmonize other policy tools at their disposal. Repurposing agricultural subsidies, greening of trade policies in agriculture, and greening fiscal policies could be developed and harmonised, by aligning with the framework of a green taxonomy in a given jurisdiction.

Green taxonomies are key to channel financial flows to food systems. If green activities and investment areas are defined strategically, and if they are supported by other regulations (trade, tax, etc.) they can help channel capital to the various components of sustainable food systems.

Re-mandate banking supervision: Central banks have been increasingly active in incorporating the implications of climate-related risk in their mandate to sustain price stability. Through its economic impacts in the form of productivity losses (in agriculture, labour force, infrastructure, tourism etc) and through the increased frequency and intensity of extreme events generating short-term shocks, climate change is a major driver of price instability and possibly systemic financial shocks. Hence many central banks and financial regulators look for ways to incorporate considerations of climate change into their assessment of monetary policy and risk management practices for their supervised entities.

The European Central Bank (ECB) has already conducted an EU-wide climate stress testing. The findings of the 2022 climate risk stress test indicate that many financial institutions are exposed to physical climate risks, particularly drought and heat events and flood risk (ECB 2022a). Many banks and other sectoral actors exhibit financial exposure to the food and beverage industry, which is greatly exposed to the risks of extreme events. These are largely geographical and sector-specific risks that banks are facing in relation to their investment and lending activities. The ECB estimates that the losses associated with these risks would amount to around EUR 70 billion.

The ECB stress test also showed that many banks lack clearly defined long-term strategies for credit allocation policies that reflect the transition and physical risks of climate change. It is expected that the ECB's policy initiatives in this field will lead to concrete action by financial institutions that are under its supervision. However, it must be noted that the food sector may then be exposed to additional constraints in accessing finance—as banks may be forced to take additional measures to reduce their exposure to high-risk sectors or to increase the price of financing for those sectors. Additionally, research from both the ECB and BIS highlight the importance of utilizing a gender lens not only within banks but also in accessing and dispensing finance. The ECB working paper no.2741 found that female directors influence positive lending behaviours by providing less credit to polluting firms (ECB 2022b). The BIS working paper no.931 reported that globally, women remain unbanked or underbanked compared to men (BIS 2021), yet better access to financial services can impact employment outcomes, wealth accumulation and the likelihood of starting a business—all of which are crucial for development and poverty eradication.

Set mandatory targeting and disclosure requirements: An important area of potential new regulation is disclosure requirements for corporations. Policymakers may design regulations that require companies to disclose information on how they manage their environmental, social and governance practices and operations. While these disclosure requirements signal the markets about the direction of regulation, they also inform stakeholders—investors, shareholders, consumers, employees—about the sustainability performance of these companies. The pressure for regulatory compliance, combined with companies' internal and external stakeholders, will be a major driver of transition to sustainable businesses, with significant implications for food systems. As standards and guidelines for disclosure requirements are developed, food-systems-related sectors, including agriculture, livestock, and forestry, should be prioritised, so that corporates operating in these sectors disclose their impacts on key environmental areas, such as climate, biodiversity and ecosystems, water and pollution.

Disclosure requirements for the financial services industry

Regulators develop technical standards for the financial services industry to disclose how their investment portfolio may have an impact on the environment and society. Embedding measures that promote gender equality in financial services (in terms of equal access to savings, credit, insurance, payments, and financial education) ensures that women can fully participate in the economy. New requirements will increase transparency. It will also incentivize the movement of financial capital from conventional to sustainable activities. This will reward investees that offer high sustainability performance—as they will be favoured to be included in 'green' investment portfolios.

EU Sustainable Finance Disclosures Regulation (SFDR): The European Commission has developed **technical standards** for disclosure to be used by financial market participants. They specify the scope, content, and methods of disclosure. The detailed guidelines and requirements will bring consistency and comparability of disclosures across the sector. It is a key step to measuring and hence regulating sustainability performances of both financial products and the companies in the financial services industry. The Level 1 requirements have already been in effect since 2021 on a phased basis. The Level 2 requirements started to take effect from 1 January 2023.

Swiss Climate Scores: In 2022, Switzerland introduced a new regulatory initiative designed for financial market participants, the Swiss Climate Scores. The initiative encourages institutional and private investors to use and disclose measurable and comparable information on the extent to which their financial investments are compatible with international climate goals. The regulation will enable comparisons for financial investments using six indicators and are based on widely internationally recognised standards. Some indicators reflect the current (actual) carbon profile of companies in an investment portfolio (e.g. carbon intensity, carbon footprint). The initiative will allow investors to make a climate-informed decision to channel their investment into green portfolios.

United Kingdom of Great Britain & Northern Ireland's roadmap to TCFD: Provides an example of disclosure requirements covering financial institutions and corporates through a range of approaches involving multiple government departments and regulatory bodies, including listing requirements and amendments to the Companies Act (HM Treasury 2020).

Corporate sustainability disclosures

Regulators have also been developing disclosure requirements for non-financial sectors through a range of regulatory tools and legal instruments, including listing requirements. Europe leads the regulatory efforts in this field in terms of binding and thematic scope and technical details. Policymakers in Asia are also increasingly active in developing reporting mandates for companies.

European Sustainability Reporting Standards (ESRS): The European Commission launched its first set of draft ESRS in November 2022. More than 50,000 companies are in the scope of the regulation, which will impose reporting requirements on sustainability. Companies under this regulation will have to apply the new rules in the financial year 2024, for reports published in 2025. The regulation includes five topical standards—climate change; pollution, water and marine resources; biodiversity and ecosystems; resources and the circular economy. Some of these topical standards are relevant to companies operating in food systems.

In addition, there will be sector specific standards, for five **'impact sectors' that include food/beverages** (other sectors are energy production, road transport, motor vehicle production). ESRS are likely to have substantial implications for food systems and therefore become an important regulatory driver of transition.

Japan Corporate Governance Code: The 'code' was revised in 2021 to include sustainability, with a focus on climate-change-related risks. Companies are recommended to develop a policy and disclose initiatives on their sustainability. In particular, companies listed on the stock exchange are required to disclose their climate alignment, based on the framework and recommendations of the Task Force on Climate-Related Financial Disclosures. Japan's Financial Services Agency is also working on a proposal for climate risk disclosure and disclosure guidelines.[10]

10 Financial Service Agency. Sustainable Finance. fsa.go.jp/en/policy/sustainable-finance/sustainable-finance.html

Provide access to information and technology across food systems: The role of the public sector in identifying, gathering, and providing access to credible information and technical knowledge relevant to food systems is also critical to the promotion of sustainable finance. This often requires the public sector to first build its own capacity in relation to sustainable finance, and then provide science-based information and knowledge to other stakeholders including local communities, indigenous people and women. The use of agricultural technologies and the inclusive formulation of policies and institutions by both women and men is essential in transforming food systems and creating climate resilience. Data collection, management and dissemination are important areas to fill gaps as a public good provider. Similarly, the public sector develops and disseminates information and communication tools, which could provide up-to-date information to stakeholders across the value chain.

V. Conclusion

Food systems are fundamental to ensuring sustainable development. Human and natural systems are so strongly interconnected through how food is produced, provisioned, distributed, and consumed, a transition to sustainable food systems is key to achieving all 17 SDGs. A healthy environment underpins a reliable resource base for food systems to flourish and a transition to more sustainable food systems is critical to efforts to reduce the loss of biodiversity, land degradation, avoid deforestation, tackle climate change and pollution. They are also key to achieving the Paris Agreement targets by lowering the carbon emissions of the agricultural sector and removing greenhouse gases from the atmosphere, while also helping societies build adaptation capacity and resilience against the adverse impacts of climate change.

A substantial funding gap of up to USD 350 billion per year by 2030 exists for transforming food systems to achieve climate mitigation and adaptation targets, and to meet other SDGs. Public financial resources, including multilateral development assistance, are not sufficient. Private finance is therefore essential to fill the funding gap to support the rapidly needed transition of food systems. However, due to several hurdles—including information asymmetries, high transaction costs, weak institutional capacity to enable secure financial transactions, and increasing climate-related risks—directing adequate volumes of private finance to food systems continues to be a major challenge.

Financial institutions' actions, both private and public sector, are key to overcoming these challenges. This includes banks, asset managers and insurers, but also the policymakers responsible for instituting an enabling environment that directs green capital towards making food systems more sustainable.

This report has highlighted the great potential for driving positive impacts from the financial services industry. Banks, investors and insurers can influence clients and suppliers to improve their policies and practices and drive financial flows towards more sustainable food systems. At the same time, these efforts can underpin strong economic recovery, climate action, nature protection and public health and make food systems more sustainable, resilient, and fair.

The importance of utilizing a gender lens and implementing gender-responsive policies and strategies remains key. Women play a central role in food security, and social barriers to accessing capital, or women's exclusion from decision-making roles in food systems finance can result in unsustainable food systems and financial exclusion, which ultimately impact the achievement of the SDGs.

Through a series of steps, private financiers can drive significant capital flows toward implementation: identifying significant impacts of their financing activities and operations across impact areas; measuring and assessing performance; setting targets, monitoring and disclosing; while continuously adjusting the course of action as new methodologies, data and lessons learned become available. This report has also provided a first tranche of targets to exemplify how finance can be redirected towards sustainable food systems and how financial institutions can boost implementation.

A combination of innovative new instruments and financing techniques, including those already proven effective in other sectors, can foster more capital flows for sustainable food systems. Blended finance is a vehicle that offers great opportunities at the interface of public and private financing for projects that exhibit high levels of risk while offering high positive impacts. This report has provided examples of how the public sector can develop and be part of new investment vehicles that can diversify the risk return profiles of private investors. It has also highlighted the importance new financing requirements for providing insurance coverage to critical segments of food systems, in particular, where the individual and collective purchase capacities are low, but the insurance need is high (e.g. small-scale farmers, small businesses that are un(der)-covered by insurers).

This report has addressed the policy changes needed to create an enabling environment to channel sustainable finance to food systems. By instituting guiding policies, effective signalling and strong enforcement mechanisms, policymakers can incentivize the financial services industry to design and provision new and innovative financial instruments and delivery channels. Emerging green taxonomies will play an important role in attracting financial inflows into the sector. The harmonisation of relevant policy tools (e.g. repurposed agricultural subsidies, fossil fuel subsidies, green trade policies in agriculture, and green fiscal policies) is crucial to developing a coherent and consistent policy environment.

Ultimately, new forms of sustainable debt products for governments—in the form of green or sustainability-linked sovereign bonds and debt-swaps for nature—to finance sustainable food systems are examples of policy vehicles that help deepen domestic markets for sustainable finance. Policymakers should design regulations that require companies to disclose information on how they manage their environmental, social and governance practices and operations. While these disclosure requirements have the benefit of signalling the markets about the direction of regulation, they also inform stakeholders—investors, shareholders, consumers and employees—about the sustainability performance of the reporting entity. The need for regulatory compliance, combined with the pressure from companies' internal and external stakeholders, will be a major driver of transition to sustainable businesses, with significant implications for food systems.

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Appendix 1. Recent initiatives to support the accounting of GHG emissions from the agrifood sector

Initiative/Institutions involved	Scope/Emissions coverage	End users and sectors	Timing	Description/Goal
Forest, Land and Agriculture (FLAG) Science-Based Initiative Target setting guidance[11] This guidance was developed by the World Wildlife Fund for Nature (WWF) on behalf of the Science Based Targets initiative (SBTi).	It applies to company's GHG emissions from AFOLU,[12] including: ▪ GHG emissions associated with land use change (i.e. biomass and soil carbon losses from deforestation, conversion of coastal wetlands, conversion/draining and burning of peatlands, conversion of savannahs and natural grasslands); ▪ emissions from land management (i.e. nitrous oxide and methane from enteric fermentation, biomass burning, nutrient management, fertilizer use and manure management); and ▪ biogenic removals (i.e. forest restoration, silvopasture, improved forest management, agroforestry, and soil carbon sequestration).	▪ Agricultural commodity producers including from animal sources (e.g. meat and dairy) ▪ pulp and paper product producers ▪ wood product producers and retailers ▪ food retailers ▪ companies that use inputs derived from FLAG sectors (e.g. cosmetics, textile, leisure) ▪ companies that generally have a large FLAG-related footprint (i.e. significant AFOLU emissions per unit of product)	Version released in 2022 An updated version of the FLAG guidance will follow after the GHG Protocol Land Sector and Removals Guidance is finished to ensure alignment with the corporate accounting guidance.	This document supports companies interested in setting science-based targets for Forest, Land, and Agriculture (FLAG) related GHG emissions and removals according to the new, refined pathways in the FLAG tool.

11 WWF (2022). Forest, Land and Agriculture Science-Based Initiative Target setting guidance.

12 Agriculture, forestry and other land use (AFOLU) refers to a terminology common in the scientific community, which is also called the land sector and FLAG in the case of the SBTi. The AFOLU or FLAG category combines the LULUCF (land use, land use change and forestry) and agriculture sectors (WWF 2022).

Initiative/Institutions involved	Scope/Emissions coverage	End users and sectors	Timing	Description/Goal
The initiative is a collaboration between CDP, the United Nations Global Compact, World Resources Institute (WRI) and WWF, and is one of the We Mean Business Coalition commitments.	The SBTi provides two approaches to FLAG target setting to enable companies to calculate GHG reduction targets in line with the Paris Agreement: ▪ The FLAG sector pathway for companies with diversified FLAG emissions ▪ The FLAG commodity pathways, which include 11 pathways for specific commodities: beef, chicken, dairy, leather, maize, palm oil, pork, rice, soy, wheat, and timber & wood fibre. The FLAG target must cover at least 95% of FLAG-related scope 1 and 2 emissions. The FLAG target must cover at least 67% of FLAG-related scope 3 emissions. Companies setting FLAG targets are required to publicly commit to no deforestation covering all scopes of emissions.[13]	Land-intensive activities are likely to be relevant in the GHG inventories of companies from the following sectors: Retailing; containers and packaging; hotels, restaurants, leisure and tourism services; textiles manufacturing, spinning, weaving and apparel; textiles, apparel, footwear and luxury goods; consumer durables; household and personal products; tires; building products; home building; and construction materials. Other sectors may also be relevant for FLAG targets. For example, companies with land use change emissions related to construction and maintenance, infrastructure development, mining, roadbuilding, and resource extraction.		

13 The SBTi highly recommends that companies align deforestation commitments with the Accountability Framework initiative (AFi) guidance, particularly including a 2020 (or earlier) cutoff date- The SBTi also recommends setting no conversion and no peat burning commitments.

Initiative/Institutions involved	Scope/Emissions coverage	End users and sectors	Timing	Description/Goal
The Greenhouse Gas Protocol Land Sector and Removals Initiative[14] The GHG Protocol is a multi-stakeholder partnership of businesses, non-governmental organisations, governments, and others convened by WRI and the World Business Council for Sustainable Development (WBCSD)	This GHG corporate accounting guidance will address the following topics: 1. Removals 2. Land sector emissions and removals from agriculture, forestry, other land use, and land use change 3. Biogenic products related to biological processes such as bioenergy	Companies in the same sectors as in the FLAG-SBTi above	2020–Q2 2023	The resulting guidance is expected to be used by companies to: ▪ Inform mitigation strategies by understanding the GHG emissions/removals impacts of land use, land use change, bioenergy and carbon removal activities ▪ Set targets and track performance by including the above activities in GHG targets ▪ Report GHG inventories including GHG emissions and carbon removals and report progress toward GHG mitigation goals

14 The Greenhouse Gas Protocol (2022). Land Sector and Removals Initiative.

Initiative/Institutions involved	Scope/Emissions coverage	End users and sectors	Timing	Description/Goal
The Banking for Impact on Climate in Agriculture (B4ICA): WBCSD, UNEP FI, the Partnership for Carbon Accounting Financials (PCAF), and the Environmental Defense Fund (EDF) partnered with several leading banks to launch Banking for Impact on Climate in Agriculture (B4ICA).	This initiative brings together a coalition of banks, partners, and experts to develop credible and inclusive methodologies, tools, and best practices to help financial institutions assess and disclose the climate impact of their agriculture portfolios. A resulting guide for setting net-zero targets for farm-based agricultural emissions provides best practices for banks. The guidance complements existing reports in this space and seeks to consolidate, highlight, and clarify key issues facing banks across four key steps to setting agricultural emissions targets: 1) defining the scope, 2) selecting scenarios and pathways, 3) measuring emissions, and 4) envisioning strategies to align bank emissions to net-zero targets. This report considers a 'top-down' approach where agricultural emissions focus on farms because of the central role that farmers play in the agricultural value chain and the large share of emissions coming from farms. The focus on farmers for emissions targets addresses an important source of emissions from agriculture and a critical group of clients for banks, but further guidance on emissions targets for other aspects of the agricultural value chain which are not addressed in this report (forestry, downstream value chain activities) are needed.	Banks	2021–2023	This project expects to enable banks to account—more accurately—for agricultural-sector GHG emissions, foster framework consistency, leverage best-in-class data and transparency tools, and accelerate the use of financial solutions for net-zero, climate-smart agricultural practices in key commodity supply chains and regions. The guidance for setting net-zero targets in agriculture provides insights to help banks select scenarios and set targets for agriculture, measure emissions, and suggests ways the banking industry can encourage companies within their agricultural portfolios to reduce their GHG emissions.

Appendix 2. Selected first tranche targets from the GFFN's High Ambition Group

Financial institution	E&S target	Target coverage (USD)*	Target	Summary
Phatisa (Mauritius): Focus in Africa	Gender equality	Phatisa Food Fund 2 (USD 143 million)	**Medium-term target (2025):** By 2025 (and thereafter), 100% of portfolio companies will have a gender policy and stretching targets to increase female employment across different skill levels.	Globally, the food and agriculture industry remains male dominated. Phatisa will ask all portfolio companies to set a gender policy and ambitious targets to increase female employment across different skill levels, intervening in areas such as recruitment, capacity-building and workplace harassment.

Financial institution	E&S target	Target coverage (USD)*	Target	Summary
Signature Agri Investments (Netherlands): Focus in Africa, Southern Europe	No deforestation	USD 180 million as of 2022	**Short-term targets (2023):** Zero clearance of High Conservation and High Carbon Stock areas across whole portfolio **Medium-term targets (2025):** ▪ Net-zero deforestation across whole portfolio ▪ Implementation of Monitoring & Evaluation (M&E) system at every farm that measures impacts on biodiversity and other forms of natural capital.	Signature has set targets to develop its ability to monitor and manage its biodiversity impacts. These include plans for all portfolio farms to be run on regenerative farming principles by 2030. With a focus on natural processes and cycles, regenerative agriculture enables farms to benefit from nature while also helping support soil health, aquatic and terrestrial ecosystems. Signature is developing targets to make the area of land conserved or restored to indigenous vegetation equal to, or greater than, the area of land being actively farmed for all land under Signature control. Restoration will take place in partnership with local communities, with benefit-sharing arrangements implemented as applicable (e.g sustainable use, beekeeping, tree nursery programmes). In addition, Signature will plant a tree mix that combines the most resilience against increasing climatic hazards with high biodiversity benefits.

Financial institution	E&S target	Target coverage (USD)*	Target	Summary
Nuveen Natural Capital (United States of America): Presence in c. 10 countries	No deforestation	USD 10.5 billion of assets under management as of December 2021.	**Short-term target (end of 2023):** Roll out zero deforestation* statement to all regions/product lines, with a focus on regions of materiality. *aligned with definition according to FAO fao.org/3/ap862e/ap862e00.pdf	In 2018 Nuveen Natural Capital (NNC) signed and implemented its zero-deforestation policy in Brazil with retroactive cut-off dates per biome protecting the region where there was the highest risk of deforestation in the portfolio. A global statement will be defined and published for the rest of the portfolio. NNC also aims to implement a natural capital asset register for all properties (~500–600, combining satellite imagery and on-the-ground information) and define a 'nature-positive' baseline and targets for practices that improve biodiversity, ecosystem resilience, water optimisation, and soil health, considering evolving global definitions.
FIRA (Mexico)	Climate Change Adaptation: Increasing financial flows	ca. USD 712 million (MXN 14,247 million) as of December 2021. This represents FIRA's total sustainable financing balance.	**Short-term target (2023):** Achieve a 5% increase over the baseline amount. **Medium-term target (2025):** FIRA will support financing for a total of MXN 24,000 million (USD 1,200 million) between 2023 and 2025; Annual growth rate of 5%. **Longer-term target (2030):** FIRA will support financing for a total of MXN 73,000 million (USD 3,650 million) between 2023 and 2030; Annual growth rate of 5%.	FIRA is a public second-tier financial institution and one of the largest sources of financing in Mexico for the agrifood and rural sectors. It has developed a taxonomy to define those investment concepts that help improve adaptation and resilience in Mexican municipalities and has committed to activities that support a steady increase in financial flows to such projects. By 2030 they aim to be financing a total of USD 3.6 billion for the 2023–2030 period.

Financial institution	E&S target	Target coverage (USD)*	Target	Summary
GEF (Focus on low and middle-income countries)	Climate change mitigation; land restoration, biodiversity, climate change	USD 307 million allocated (associated with GEF-7 replenishment cycle)	**Short-term targets (2023):** GEF will support financing of projects to reach 290 million tCO_2e of greenhouse gas emissions mitigated, 2.3 million hectares of land restored, 42 million hectares of landscapes under improved practices, and 1.2 million hectares of terrestrial protected areas under improved management for conservation. **Longer-term target (2030):** As a result of the Food Systems Integrated Program (GEF-8), GEF will restore 420,000 hectares of degraded land, improve land management practices in more than 20 million hectares, and mitigate 223 million tons of CO_2 while at the same time reducing the use and waste of chemicals of global concern by 21 million tons by 2030. GEF will also promote innovative financial mechanisms, including microfinance for SMEs, and blended finance for investments to scale nature-positive production and achieve landscape regeneration.	As part of the GEF's healthy people, healthy planet approach in GEF-8, it aims to show how investing in sustainable food systems can help reverse this degradation and deliver on net-zero targets, be nature positive, and support key Sustainable Development Goals.

Financial institution	E&S target	Target coverage (USD)*	Target	Summary
Rabobank (Netherlands and global focus)	Climate change mitigation, adaptation; just transition	EUR 103 billion (USD 101 billion) total Food & Agriculture loan portfolio. Target coverage reaches 95% of this portfolio by 2025—USD 96.4 billion.	**Short-term targets (2023):** ▪ Contracts with 290,000 farmers ▪ Sequester 1,000,000 tCO_2 ▪ Generate a total additional farmer income of USD 20 million ▪ Publish climate targets for 25% of food & agriculture exposure, aligned with their commitment under the Net-Zero Banking Alliance (NZBA). **Medium-term targets (2025):** ▪ Expand the scope of finance emissions disclosure to 95% of the entire private sector loan portfolio. **Longer-term targets (2030):** ▪ Acorn ambitions to support 15 million farmers in developing countries in the transition to agroforestry. ▪ Sequester 100 MT CO_2 annually ▪ Generate an additional cash flow of USD 2 billion flowing to the Global South ▪ Have set targets and decarbonisation pathways for their complete financed emissions portfolio (scope 3 category 15).	The millions of smallholder farmers in the world should be incentivised to contribute to the sequestration of carbon from the atmosphere, with combined efforts creating a large impact. Unlocking capital for these farmers, many of which will struggle as climate change impacts the productivity of land and labour, will also help to ensure a just transition to a more sustainable food system.

* This value indicates how much of an institution's portfolio is covered by all their targets submitted as part of this initiative. Assets under management are not translated immediately into green financial 'flows/transactions'. They are 'financial stocks', already on the books of the financial institutions, that over time will be adjusted to meet the targets at hand.v

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unepfi.org
info@unepfi.org
/UNEPFinanceInitiative
UN Environment Programme Finance Initiative
@UNEP_FI