



Wageningen Economic Research | Whitepaper

# Finance for low-emission food systems

For the CGIAR Research Initiative on Low-Emission Food Systems

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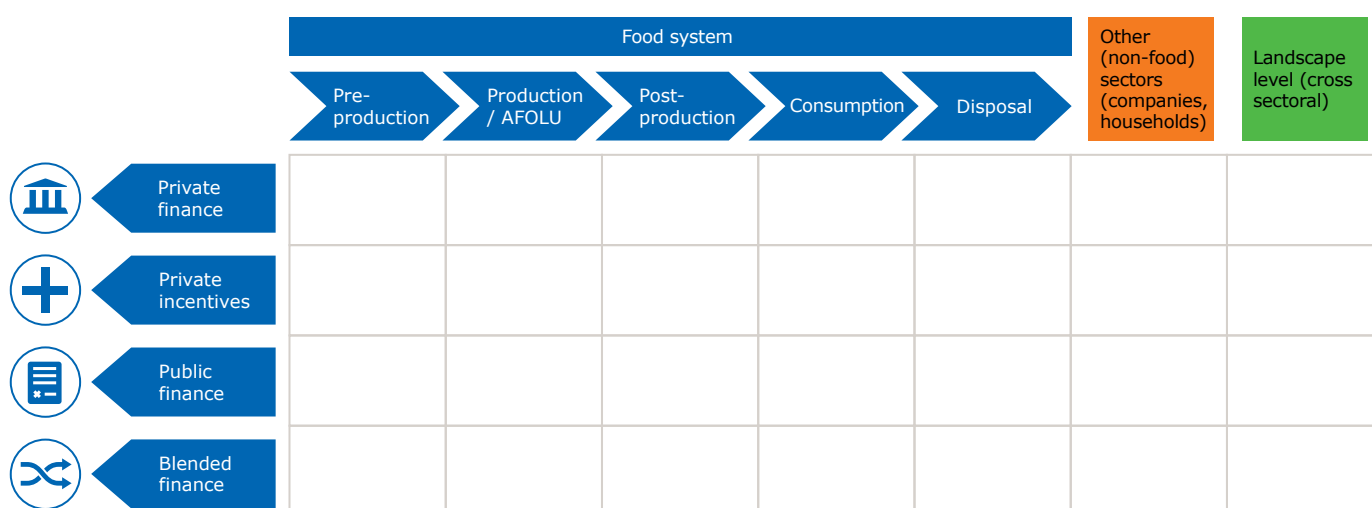
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## Key messages

The objective of this note is to map the global finance landscape that is relevant to the CGIAR Research Initiative on Low-Emission Food Systems (the Project). The note is part of the initial research phase of the project's work stream on financial instruments as a tool for scaling of measures for achieving lower emissions in food systems (WP4). The objective of this research phase is to develop a typology of most adopted financial instruments for low-emission investments.

Key messages from this note are the following:

- The Agriculture, Forestry and Other Land Uses (AFOLU) sector and the wider food system contribute substantially to climate emissions (in the order of 23% for both sectors, which partly overlap). At the same time there is a wide array of response options that can reduce the climate impact of the food system, while also contributing to climate adaptation, food security and other co-benefits.
- The AFOLU sector is strongly under-represented in global climate finance flows (roughly 2.5%). This is due to classical hurdles of agri-finance and smallholder finance (aggregation challenges, transaction costs, risks). Most climate finance is directed at mitigation actions, in particular towards renewable energy and transport.
- There is a wide array of financial instruments that could be mobilised to enable the scaling of low-emission innovations in the food system. This includes not only private financial products, but also private incentives and public finance instruments. Private incentives, public finance instruments and blended finance, with dual purposes of mitigation and adaptation, seem most promising to achieve intended benefits for smallholder farmers. The adaptation and other developmental co-benefits may attract the farmers' interest, whereas the mitigation components may raise the appetite of the financiers.
- Financial instruments need to be embedded in well-developed scaling strategies and enabling policy frameworks, customised to specific innovations and the needs of value chain actors and target groups involved.



**Figure 1** Analytical framework: financial instruments in different levels of the food system.



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## Introduction

This Info Note is part of the initial research phase into financial instruments as a tool for scaling. The objective of this research phase is to develop a typology of most used financial instruments for low-emission investments.

The Info Note summarises a mapping of the specific global climate finance landscape that is relevant to the goals of the CGIAR Research Initiative on Low-Emission Food Systems (see Box 1). It results in a global typology of relevant financial instruments, as well as their typical financial intermediation structures to reach target clients on the ground (smallholders, agro-food companies). The mapping is focused on financial instruments that are relevant to the development of low-emission food systems. This transition to low-emission food systems refers to climate mitigation benefits, in terms of reduced emissions and carbon sequestration.<sup>2</sup> But it also encompasses wider Sustainable Development Goals (SDGs) co-benefits, such as a stronger prioritisation of SDGs by climate finance investors, adaptation and resilience effects in the Global South, and inclusion of smallholders and women. We focus primarily on the AFOLU domain, but also show financial instruments that apply to agri-food value chains and the wider food system.

The Info Note begins explaining why finance is relevant for scaling low-emission food systems, and what methods were used in the research. Subsequently the note addresses two knowledge gaps. First, a general typology of the relevant financial instruments is developed, enriched with available figures about their investment volumes and characteristics. Second, the note lists the mitigation measures to which the financial instruments can be applied, and the scaling strategies to which financial instruments can contribute. The note ends by discussing the main research results and sketching next steps in the research process.

### Box 1: The CGIAR Research Initiative on Low-Emission Food Systems

This CGIAR initiative aims to reduce annual global food systems emissions by 7% by 2030. It will work closely with key actors in the target countries to ensure they are equipped to make evidence-based decisions and address challenges in food systems discourse, policy development and implementation to reduce greenhouse gas emissions. The Project will work in four focus countries (Colombia, Kenya, Vietnam, China), possibly followed by three more (Peru, Ethiopia, Bangladesh). One of the work packages in the Project focuses on scaling a selection of proven innovations. These key innovations and technologies aim to achieve climate mitigation and co-benefits<sup>3</sup> in the AFOLU domain, in the framework of the wider food system. Financial instruments are treated as one of the ingredients that contribute to the scaling objective.

*Source: CGIAR (2022).*

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<sup>2</sup> The used definition of climate mitigation is given in Box 2. More details about climate mitigation measures in the AFOLU domain are given in the section on Measures.

<sup>3</sup> As applicable in the wider CGIAR Research Initiative on Low-Emission Food Systems, we will embed the concept of innovations for climate mitigation into a broader view on co-benefits for farmers, including climate adaptation, farmer income and productivity, potentially connected to developmental, humanitarian and peace-building goals as the context requires.





## 1 Background

Finance is a crucial ingredient of any scaling strategy for climate action. Finance can be relevant as a direct source of funds for climate investments. But financial instruments can also take the shape of incentives for climate-positive decisions and behaviour (for example in the form of carbon credits and payments for ecosystem services, generating additional revenue streams for farmers and agribusinesses and thus stimulating them to invest in climate-relevant measures). At a higher macro level, the greening of existing investment portfolios and capital flows can have a large influence on climate-related decisions of companies and households, both urban and rural.

Financial institutions use different sustainable financial and technical instruments, the choice of which is guided by their own incentives and by their key client and investor portfolios. Public entities participate in financial instruments, among others through development banks and blended finance models. They also deploy other financial incentives for scaling mitigation measures and innovations, such as subsidies or tax measures. In most cases, such private and public financial instruments involve multiple layers of intermediation and aggregation, before reaching the actual operators on the ground (farmers, agribusinesses). In these layers of aggregation, choices are made regarding their focus clientele, sectoral and geographic focus, finance propositions and conditions, and risk management arrangements. These choices do not always lead to an efficient allocation of capital through market mechanisms, for example because of social and environmental externalities or because of transaction costs. This may create a case for additional government intervention.



## 2 Methods

This note uses an approach based on open information from fund-level databases and data sources, supplemented by grey and academic literature as well as interviews. These sources are combined to explore the typology, use and characteristics of relevant financial instruments for low-emission food systems.

We first define the **typology** of the financial instruments, combining knowledge from grey and academic literature as well as our learnings from a few case studies (see Boxes 3-5), and fund database analysis. The note next analyses the usage levels of the relevant financial instruments using data from the 2021 Global Landscape of Climate Finance, providing an overview of instruments, and categorises climate finance flows used, activities and sectors for the years 2019 and 2020 (CPI, 2021). Using this data, we present the total amount of climate finance instruments by region and sector to understand the importance of the AFOLU sector relative to other sectors and mitigation finance relative to climate adaptation finance.

And finally, to investigate the characteristics of the instruments, we conducted a **fund database analysis** using the OECD Climate Finance Inventory Database and the ODI's Climate Funds Update, two publicly available databases on climate finance covering a wide range of funds financing climate mitigation activities. These public databases cover funds flowing from higher income nations to low and middle income countries under the Kyoto Financing mechanism. From the databases, we identified 13 funds<sup>4</sup> financing activities that contribute to carbon mitigation activities in the AFOLU sector in the Global South. Nine out of 13 included non-research projects, financing sector activities relevant for the goals of low-emission food systems. We focused on one project from each of the 9 funds. Using the fund and project websites, we collected information on the type of financial instruments used, the type of activities financed (e.g. afforestation, forest preservation, climate-smart agriculture), costs of the instrument (e.g., interest, certification and reporting costs), co-benefits (e.g., nutrition, food security, poverty reduction), and key conditions to access (e.g., certification, reporting, disclosure, due diligence, collateral). We note that these databases do not include private funds. For that reason, we may not detect some financial instruments (e.g., equity) relevant for the CGIAR Research Initiative on Low-Emission Food Systems. To also cover private financial market funds,

a third database was investigated to explore blended finance examples that are climate-related: the Convergence database of historical blended finance transactions. Related to the focus countries of the Project, we found 35 examples of blended finance in AFOLU sectors, originating from a variety of capital funds: Kenya (12), Colombia (11), Vietnam (11), China (1).

In addition to the review of literature and databases, **interviews** were held with the Project's country liaisons in Kenya, Vietnam, Colombia and China, to identify relevant financial instruments in their countries. This information was used to complement the typology, and will later be further exploited for more in-depth case research.

### Box 2: Focus on climate change mitigation

Climate change mitigation means avoiding, reducing and sequestering emissions of heat-trapping greenhouse gases (GHG) into the atmosphere to prevent the planet from warming to more extreme temperatures (Source: UNFCCC). Three types of GHG are emitted by the AFOLU sector: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). The AFOLU sector and the wider food system contribute substantially to climate emissions, with an estimated 23% by the AFOLU sector and a roughly similar portion by the food system.<sup>5</sup> At the same time there is a wide array of response options that could reduce the climate impact of the food system, while also contributing to climate adaptation, food security and other co-benefits (IPCC 2020). Mitigation actions will take decades to affect rising temperatures. To define relevant mitigation measures we identified the central policies, regulations, safeguards and conditions in place to determine GHG mitigation. To explain whether a specific measure or investment has a substantial contribution to climate change, different organisations, such as the EU taxonomy or USDA, have defined assessment criteria (see the section on Measures). Scientific definitions help to identify what works to reduce carbon and other emissions.

In this note, only the funds and instruments with mitigation objectives were selected. The mapping will narrow down the financial products and instruments relevant to low-emission food systems. It will include a special focus on co-benefits in terms of additional value-added towards SDGs by climate investors and that particularly benefit smallholders in the Global South, directly or indirectly.

4 Those 13 funds are ADB Climate Change Fund, Canada Fund for African Climate Resilience, Carbon Finance for Agriculture, Silviculture, Conservation, and Action against Deforestation CASCADE Africa, Clean Technology Fund, Climate and Land Use Alliance, FMO Entrepreneurial Bank (IDF and AEF), International Climate Fund (UK), KfW Development & Climate Finance, Nordic Climate Facility, UNDP Green Commodities Facility, World Bank Carbon Funds and Facilities, Amazon Fund, Global Climate Change Alliance (GCCA).

5 Following IPCC classifications, the food system would include the AFOLU sector, except forestry, plus the non-AFOLU sectors active in pre- and post-production (IPCC 2020).

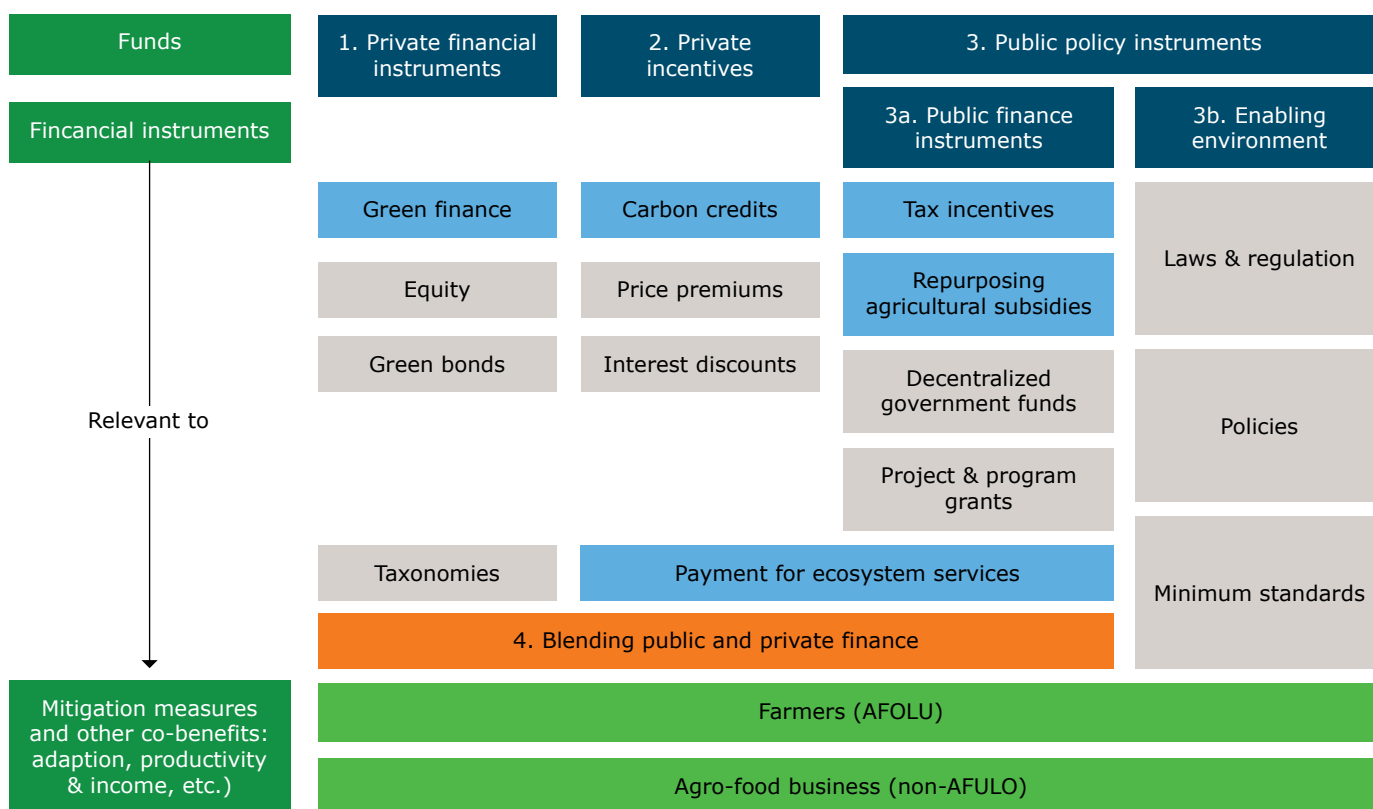


### 3 Typology

The global typology of financial instruments for low-emission food systems considers those instruments that are relevant to GHG mitigation in the food system, that is, in the AFOLU sector and the wider agro-food domain. It considers all investments from financial institutions, investors and public entities that are made into businesses and farms with the goal to redirect existing capital flows towards a low-emission transition. Figure 2 provides a graphical presentation of the typology.

The typology covers three large groups of instruments (see the upper row of Figure 2):<sup>6</sup>

- 1 Private financial instruments
- 2 Private incentives
- 3 Public policy instruments, including the sub-group of public finance instruments



**Figure 2** Global typology of financial instruments for low-emission food systems.

#### Private financial instruments

In the first group, the financial sector offers financial products and services such as loans, equity investments, insurances, guarantees and bonds.<sup>7</sup> These financial products have a commercial basis: they are reimbursable and carry a cost in the form of interests, fees, insurance premiums or dividend payments. Under the general heading of private financial instruments, many different financial products exist, each with their own purpose and target clients: some are more intended for smallholders

farmers, other are meant to serve commercial farmers, agribusinesses and food companies, or are designed to operate in the world of capital markets and investors.

In the space of climate and environment, financial institutions can offer specific products such as sustainability linked loans to farmers and agribusinesses, as well as green products for retail clients (e.g. green investment funds, green credit cards).

<sup>6</sup> The grey boxes in the diagram are part of the typology, but will not be treated further in this Info Note. The blue boxes will be treated as case examples. The financial instruments shown in this diagram are examples of each type and do not constitute an exhaustive list.

<sup>7</sup> In this note, loans and debts are used as equivalents: they bear a fixed interest rate and need to be repaid in a pre-defined period. Equity investments refer to investments in capital shares of a company: the investor receives a dividend if the company makes a profit and can sell the shares after a certain period. Bonds are a flexible variant of loans: larger companies can raise debt capital by issuing bonds; investors gain a fixed interest on the bond and can buy and sell the bonds on the capital market.



Green finance (see Box 3) refers to investments that provide environmental benefits (IFC/World Bank 2017). It helps businesses to obtain capital for an environmentally friendly purchase, project or investment at as low as possible costs. And it helps small investors, but also institutional investors such as pension funds or insurance funds, who are looking for more green investments in their financial portfolios.

### Box 3: Green finance in Kenya

Typical examples of green finance with the intention that the financing will accrue positive benefits to the environment (World Economic Forum 2021) are renewable energy loans from international financial institutions. In addition, some forms of green financing exist at domestic financial institutions, for example targeting climate-smart agriculture, renewable energy, sustainable supply chain solutions, waste management.

An example from China is the Green Investment Fund (GIF) of the Asian Development Bank (ADB). GIF makes market-based equity investments into small and medium-sized enterprises (SMEs) in eco-tourism and eco-agriculture in the watershed of the Xin'an River and Huangshan region, whereas its sister fund Green Incentive Mechanism (GIM) provides incentives of ecological compensation to farmers. Both funds together work with the objective of better watershed management and green development (Fan et al. 2022).

Examples in Kenya are the Green Bonds programme and Green Climate Fund on-lending through domestic banks. The Kenya Bankers Association (KBA) which is a lobby group for banking institutions in the country has recently been steering sustainable finance transformation in the sector. The sustainable finance products, instruments and services all have the consideration of environmental, social and governance (ESG) as a criterion in investments decisions of the members of the association. The Government also plans to issue its first sovereign green bond and speeds up the formation of the Kenya Green Investment Bank to allow easier access to finance for government and private projects.

In the sphere of capital markets, more sophisticated instruments appear such as green bonds, investment funds that are ESG screened and fossil free, responsible investment funds registered on the stock exchange, and

so-called yield companies operating wind or solar energy parks, all just examples of financial instruments to accelerate the low-emission transition. Financial institutions also engage in market transactions to reduce the risk of (climate-related) price fluctuations for their clients; futures, options or debt swaps are linked to sustainable funding instruments, such as green bonds.<sup>8</sup> This also includes low emission certified soft commodities such as agricultural produce and livestock.

All these financial instruments should make it easier for investors to put their capital into more environmentally-friendly projects. In turn, this would increase the financing available for businesses and farmers who wish to operate in a climate- and nature-friendly manner. The EU taxonomy for sustainable activities and similar catalogues of sustainable measures and investments are being developed and operationalised to give this development more impetus.<sup>9</sup>

#### Private incentives

The second category of instruments consists of incentives of different types, paid by private sector parties for more sustainable products. A prominent example is carbon credits, paid by businesses or households who want to compensate for their emissions, to agricultural producers or supply chain companies who remove or reduce them (see Box 5, later in this document). Other examples are price premiums for sustainable and climate-friendly products, interest discounts on climate investments and an increasing supply of green and sustainable finance capital.

All these incentives are conditional upon clear definitions and standards for sustainable practices and measures, driven by evidence-based impact frameworks, operationalised through compliance monitoring (e.g. certification, traceability, registration) and governed by an architecture that safeguards integrity at scale. The effects of such standards have been widely studied for voluntary sustainability standards (Oosterveer et al. 2014; Troester et al. 2018). For the carbon credit market, several standards are operational but the global integrity architecture is still being upgraded (World Bank 2022; ICVCM 2023).

#### Public policy instruments

The third group of instruments are the public policy instruments. Many if not all public policies can have an impact – positive or negative – on the shift to low-

<sup>8</sup> The futures and options contract would contain a provision linking it to a green certificate. Making debt swaps green means that lending countries waive repayments in exchange for the borrowing country undertaking climate mitigating actions.

<sup>9</sup> More details about the EU taxonomy and similar catalogues can be found in the section about Measures.



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emission food systems. But a few policy domains stand out: (renewable) energy policy, carbon pricing and trading, forestry and farming policies, land use and environmental policies, nutrition and dietary policies, agricultural trade policies, corporate responsibility policies, financial sector policies and cross-sectoral innovation policies.

Under these policies a wide array of public financial instruments is applied, usually in the hands of governments, public agencies and non-profit organisations. This ranges from taxes and tax incentives to subsidies, grants and innovation funds. Many of these public financial instruments are currently constituting incentives for high-emission food systems, for example through subsidies on fossil fuels and inorganic fertiliser. In order to make public financial instruments supportive to low-emission food systems, the instruments promoting high-emission food systems need to be reoriented and new instruments to stimulate low-emission innovations need to be deployed (Feng et al. 2022).

Payments for ecosystem services (PES) is one specific example, often applied to goals of biodiversity, nature conservation and reforestation in connection with hydropower, water supply and tourism sectors. Payments for ecosystem services are performance-based incentives for communities and economic actors around certain ecosystems, in exchange for them to protect the ecosystems.

Governments also have non-financial instruments at their disposal, such as legislation, regulation and standard-setting, which can be quite influential for mitigation purposes. Regarding the financial sector policies, recent examples are the central banks' increasing interest for climate change risks in financial institutions' portfolios (OMFIF 2019), and the EU taxonomy for sustainable activities.

### **Blended finance**

A fourth group of instruments could be called blended finance. In blended finance, private and public finance instruments are combined to reach goals that none of these instruments could achieve separately. The blended finance approach usually includes a number of private and public partners that divide investment risks

according to their goals and their ability to carry risk. Hereby public finance can help reduce risks with concessional tranches in the capital structure of the asset. These can take for example the form of equity grants for project development, first-loss guarantees, credit guarantees, or capped returns (Convergence, 2022). A Convergence data brief on blended finance for food systems highlights how blended finance can support the growth of sustainable food systems, by breaking down 127 blended finance transactions into how they have been applied across the food value chain, namely growing (63%), processing (46%), storage and transport (10%), trading and market access (10%), and vertically integrated (17%) (Convergence, 2022b). See Box 4 for a typical example of blended finance.

### **Box 4: Blended finance**

As stated in the Convergence report (2022) the most frequently targeted countries by climate blended finance transactions in the period 2019-2021 have been: Kenya (13 transactions), Brazil (8), Colombia (6), India (5), and Nigeria (5). Because of its flexible definition blended finance focus not only on mitigation but also includes adaptation or is hybrid.

A typical blended finance example is the Mercon Coffee Facility, a Rabobank-led revolving credit facility for Mercon Coffee Group, to improve efficiencies across its supply chains in Latin America and Southeast Asia, with support from several Multilateral Development Banks or Development Financial Institutions. Pricing on the facility could be discounted or have a premium applied based on compliance with the sustainability performance indicators. The program started in Nicaragua and has now expanded to Guatemala, Honduras, Brazil and Vietnam (Convergence 2022a).





Financial instruments for lower emissions can be applied in different places in the food system (see Figure 3). For example, carbon credits are originated mostly in the production and supply chain stages of the food system, whereas they are bought by households and companies

outside the food system. Green bonds are issued by financial institutions or by a select group of corporate companies in the supply chain, but green loans may be applied anywhere in the supply chain including the primary production and the pre-production (providers of

	Pre-production	Production/ AFOLU	Post-production	Consumption	Disposal	Other sectors (hh's, companies)	Landscape level (cross-sectors)
Private finance			Green bonds			Green credit cards & wallets	
	Green loans & investments					Green inv. funds	
	DFI loans					Green pensions	
					Land acq. funds		
Private incentives	Carbon credit (CO <sub>2</sub> C) originators					CO <sub>2</sub> C buyers	
	Sustainability premiums / GHG labelling						
	Interest discounts based on sustainability criteria						
Public finance			GHG obligations				
		Payment 4 ecosystem services (PES)					PES
	Carbon taxes	Works 4 taxes		0-VAT for F&V	Waste recycling incentives		Landscape finance
	Energy taxes			Meat tax			
	Climate innovation subsidies & grants						Incentives for sustainable production systems
Blended finance	FLW incentives						
	Various mixes of public and private funding						

**Figure 3** Financial instruments throughout the food system: some examples

inputs, equipment and services). Some tax instruments are typically applied at consumer level (e.g. meat tax, zero VAT for fruits and vegetables), others are more applicable in the production sector (e.g. tax credits for certain sustainability activities) and elsewhere.

Whereas a large number of instruments can theoretically be applied in the primary production and in the downstream supply chain, in practice there seems to be a bias against primary production, and against informal (micro and small) enterprise and smallholder farmers. This bias is related to typical problems of aggregation, transaction costs, information transparency and risks.



## 4 Use

A wide variety of financial instruments are used to channel finance into food systems for mitigation and adaptation activities. Annual climate finance flows in 2019/2020 reached USD 653bn, 15% higher than what was raised in 2017/2018 (CPI, 2019). The 2021 Global Landscape of Climate Finance provides an overview of how the global climate finance flows were disbursed by activities across different regions and sectors for three financial instruments mainly grant, debt and equity (CPI, 2021).

**Table 1** analyses the flow of climate finance for these financial instruments at the regional and global level. The regions, mainly Global South, are purposefully selected as they include the Project's focus countries. On average the majority of global climate finance investments was mobilised for mitigation objectives (89.7%). Possibly because mitigation activities focus on GHG emissions reduction, which make it easier to define, quantify, thus

easier to invest in than finance for climate adaptation (WRI, 2022). On a global level, debt (53%) and equity (31%), both of which depend on the project's cash flow for repayment, remained the main instruments used for climate mitigation investments. Grants, which do not require repayment, represented only 2% of the total global climate finance for mitigation activities.

In contrast, debt and grants were the main instruments used for the Sub-Saharan Africa, where 32% of the climate finance is in the form of grants and 40% is going to adaptation objectives. In Latin America and South Asia there is a slightly higher portion of adaptation finance in comparison to the global average (13% and 17%, as compared with 8% global), but the shares of the funding instruments do not deviate substantially from the global picture.

**Table 1** Use of global climate finance for different climate goals, per region.

(1) Financial instruments	(2) Activities	(3) Climate Finance (USD billion)	(4) % activity/ global climate finance	(5) % activity/ total instrument	(6) Region-level Climate Finance (%)					Total (%)
					Sub-Saharan Africa	Latin America	South Asia	East Asia	Other regions	
All instruments	Mitigation	585,711	89.7		1.8	4.8	4.3	44.3	44.8	100
	Adaptation	49,319	7.6		18.1	9.7	10.8	41.6	19.8	100
	Dual	17,594	2.7		15.6	14.5	4.7	9.9	55.3	100
	<b>Total</b>	<b>652,624</b>	<b>100</b>		<b>3.4</b>	<b>5.4</b>	<b>4.8</b>	<b>43.2</b>	<b>43.2</b>	<b>100</b>
Grant	Mitigation	13,126	2.0	46.7	11.6	5.6	3.1	30.7	49.0	100
	Adaptation	9,298	1.4	33.1	44.7	6.6	9.9	8.8	30.0	100
	Dual	5,670	0.9	20.2	23.4	8.2	3.5	7.6	57.3	100
	<b>Total</b>	<b>28,094</b>	<b>4.3</b>	<b>100</b>	<b>24.9</b>	<b>6.5</b>	<b>5.4</b>	<b>18.8</b>	<b>44.4</b>	<b>100</b>
Debt	Mitigation	346,616	53.1	90	1.6	4.1	3.9	52.1	38.3	100
	Adaptation	34,562	5.3	9	12.1	9	11.2	55.4	12.3	100
	Dual	3,937	0.6	1	20.6	27.5	14.7	10.9	26.3	100
	<b>Total</b>	<b>385,115</b>	<b>59.0</b>	<b>100</b>	<b>2.7</b>	<b>4.8</b>	<b>4.7</b>	<b>52.0</b>	<b>35.8</b>	<b>100</b>
Equity	Mitigation	202,171	31.0	97.9	0.9	5.3	4.6	36.5	52.7	100
	Adaptation	1,455	0.2	0.7	0	18.7	7.8	1.9	71.6	100
	Dual	2,984	0.5	1.4	6.4	12.8	0	23.4	57.4	100
	<b>Total</b>	<b>206,610</b>	<b>31.7</b>	<b>100</b>	<b>1.0</b>	<b>5.5</b>	<b>4.6</b>	<b>36.1</b>	<b>52.9</b>	<b>100</b>
Unknown	Mitigation	23,798	3.6	72.5	7.0	10.3	8.2	4.5	70.0	100
	Adaptation	4,004	0.7	12.2	14.7	19.7	10.5	13.1	42.0	100
	Dual	5,003	0.7	15.3	8.3	12.4	1.0	3.7	74.6	100
	<b>Total</b>	<b>32,805</b>	<b>5.0</b>	<b>100</b>	<b>8.1</b>	<b>11.8</b>	<b>7.4</b>	<b>5.4</b>	<b>67.3</b>	<b>100</b>

Source: Authors construction drawing on data from Climate Policy Initiative 2021. Global Landscape of Climate Finance. (CPI 2021). Notes: The CPI database reports as 'unknown' financial instruments that have unknown sources from the different data sources they have used, which in total account for 5% of the remaining financial instruments (e.g. those 5% with the total of the three financial instruments in Column (4) add up to 100%). Column (4) describes the proportion of financial instruments allocated to activities as a percentage of the total global climate finance (e.g., USD 653bn), while column (5) is the proportion of financial instruments within the given instrument expressed in percentages.



Of the total USD 653bn in climate finance disbursed during 2019-2020, much of the mitigation investments focused on the energy (57%) and transport (28%) sectors (**Table 2**). Only 1.5% went to the AFOLU sector, despite AFOLU's major share in emissions of nitrous oxide (81%) and methane (44%) and agriculture's role in driving deforestation.

The climate finance for AFOLU increased slightly faster than for other sectors in the period since 2013, but it dropped again between 2017/2018 and 2019/2020. Most of the AFOLU investments are financed by grant and debt instruments, mainly through public sources, with very limited private investments (close to 1% of the total). To close the gap between the public and private-sector finance in AFOLU sectors, new financial instruments, such as blended finance, can provide a prospect for mobilising private investors into these sectors (CPI, 2022). In line with this, an analysis by Convergence highlighted the rise of

blended finance approaches in the agriculture sector reaching 28% of total blended finance deals in 2020, from 16% between 2015-17 (Convergence 2021). A dual purpose approach, integrating mitigation and adaptation goals, is considered more promising than trying to increase adaptation finance on its own.

Beyond AFOLU, the wider food system may attract its own share of climate finance – for example related to the energy, transport, water and industrial processing functions in the food system. But these are not separate subsectors and as such not traceable in the climate finance statistics. Nonetheless, in many LMIC countries food constitutes a relatively large share of household expenses and many industries and services are somehow related to the agricultural and food sectors. Therefore one could assume that also a certain share of climate finance flows to other sectors (e.g. energy, transport, water and industry) related to the food system.

**Table 2** Use of global climate finance for different climate goals, per sector.

(1) Financial instruments	(2) Activities	(3) Climate Finance (USD billion)	(4) % activity/global climate finance	(5) % activity/total instrument	(6) Global Sector-level Climate Finance (%)					Total (%)
					AFOLU	Energy	Transport	Water	Others	
All instruments	Mitigation	585,711	89.7		1.5	57.0	27.9	0.3	13.3	100
	Adaptation	49,319	7.6		11.4	1.2	8.7	36.9	41.8	100
	Dual	17,594	2.7		12.4	8.5	4	12.1	63.2	100
	<b>Total</b>	<b>652,624</b>	<b>100</b>		<b>2.5</b>	<b>51.5</b>	<b>25.8</b>	<b>3.4</b>	<b>16.8</b>	<b>100</b>
Grant	Mitigation	13,126	2.0	46.7	6.7	14	58.9	0.7	19.4	100
	Adaptation	9,298	1.4	33.1	25.8	0.9	3.7	12.4	57.2	100
	Dual	5,670	0.9	20.2	25.7	8.1	1.8	4.4	59.9	100
	<b>Total</b>	<b>28,094</b>	<b>4.3</b>	<b>100</b>	<b>16.9</b>	<b>8.5</b>	<b>29.1</b>	<b>5.3</b>	<b>40.1</b>	<b>100</b>
Debt	Mitigation	346,616	53.1	90	2.0	56.5	28.3	0.2	12.5	100
	Adaptation	34,562	5.3	9	8.3	1.7	11.4	42.9	35.8	100
	Dual	3,937	0.6	1	15.5	5.3	15.0	11.4	52.8	100
	<b>Total</b>	<b>385,115</b>	<b>59.0</b>	<b>100</b>	<b>2.7</b>	<b>51.3</b>	<b>26.8</b>	<b>4.1</b>	<b>15.1</b>	<b>100</b>
Equity	Mitigation	202,171	31.0	97.9	0	65.4	25.8	0	8.8	100
	Adaptation	1,455	0.2	0.7	1.4	0.5	-	94.1	4.1	100
	Dual	2,984	0.5	1.4	2.1	27.9	-	46.8	23.1	100
	<b>Total</b>	<b>206,610</b>	<b>31.7</b>	<b>100</b>	<b>0</b>	<b>64.4</b>	<b>25.2</b>	<b>1.3</b>	<b>9.0</b>	<b>100</b>
Unknown	Mitigation	23,798	3.6	72.5	3.9	12.5	20.8	4.1	58.9	100
	Adaptation	4,004	0.7	12.2	8.4		21.2	71.5	100	
	Dual	5,003	0.7	15.3	1.0			0.7	99.0	100
	<b>Total</b>	<b>32,805</b>	<b>5.0</b>	<b>100</b>	<b>4.0</b>	<b>9.1</b>	<b>15.1</b>	<b>5.6</b>	<b>66.6</b>	<b>100</b>

Source: Authors construction drawing on data from Climate Policy Initiative 2021. Global Landscape of Climate Finance. (CPI, 2021). Notes: The CPI database reports as 'unknown' financial instruments that have unknown sources from the different data sources they have used, which in total account for 5% of the remaining financial instruments (e.g. those 5% with the total of the three financial instruments in Column (4) add up to 100%). Column (6) shows the global sector-level climate finance. The hyphen in the transport sector column, mainly for equity financial instrument, indicates missing data. 'Other sectors' include the following sectors: buildings & infrastructure, industry, waste, information & communications technology, and others & cross-sectoral activities.



## Characteristics

Building on the tree databases mentioned, we identified five types of financing options, based on database search, literature reviews and interviews (**see Table 3**): grants, payment for ecosystem services, green bonds, carbon credits and blended finance transactions.<sup>10</sup> Each of the instruments has been applied in the Global South.

**Table 3** Summary of financial instruments characteristics.

Type	Measures	Cost of product	Co-benefits	Type of provider	Recipient	Beneficiaries	Key condition for application	Profit orientation
Grants	Climate smart agriculture (CSA) and afforestation	No cost	Nutritious and safe food	Multilateral development banks (MDBs), governments	Government institutions, Non-governmental organisations (NGOs), private financial institutions	Small-scale farmers and forestry associations	Reporting obligations	No
	Sustainable energy production and use (e.g., charcoal and efficient biogas from agri-products., efficient cookstoves. solar home systems)	No cost	Employment, income	Multilateral development banks (MDBs), governments	Government institutions, Non-governmental organisations (NGOs), private financial institutions	Small and medium sized producers, retailers, and consumers, microfinance institutions	Reporting obligations	No
Payments for ecosystem services (blended with grants)	Afforestation and, Agri technologies in livestock farming, silvo-pastoral methods, emission-efficient household practices	Certification costs	Nutritious and safe food	MDBs (REDD+)	Government institutions	Small and large-scale farmers and landowners	Certification and training of farmers	No
Green bonds	Sourcing investments, CSA programs, infrastructure, agriculture and forestry	Interest	N/A	Funds, banks, economic actors in international capital markets	Development finance institutions (DFIs), Government, private companies, banks	Small-scale and large-scale farmers, forestry associations	Reporting obligations	Yes
Carbon credits	Afforestation, carbon sequestration, carbon removal units	Costs of certificate/account; aggregation of small-holders	Resilience of smallholders; restoration and preservation of natural ecosystems	Banks, FinTech companies	NGO lead projects	Smallholders	Certified area of afforestation (geolocation)	No
	Clean cooking	Pre-investment in equipment	Health, employment, income	Private company	NGO local implementing partner	Rural households	Certification of emission reduction (Clean development mechanism)	Yes
Blended finance (mainly debt/equity with a concessional component)	A mix public and private financing to support sustainable projects (e.g. Afforestation, agroforestry, carbon sequestration, job creation)	Varies depending on type of finance used (e.g. Interest rate, rate of return)	Rural development	Impact investment funds, development finance institutions, private investors	Impact investor, commercial investor, DFIs/MDB, development agencies, governments, banks, private companies	Smallholder farmers, SMEs, project developers/corporates, financial institutions	Disclosure requirements on concessionality (ex: IFC), rational of de-risking and of reducing transaction costs	Yes
	Waste to energy	Technical and financial investment (costly technology)	Green jobs, sustainable services (clean energy, waste management, sanitation, health)	Development finance, private investors	Government, companies	Urban households	Potential to reduce GhG emissions	Yes

<sup>10</sup> In the public databases (OECD and ODI), we did not observe the use of stand-alone loans without grants targeting AFOLU sector for low emission purposes. In line with CPI (2022), this might be because individual loans to invest in this sector for climate change mitigation are not profitable or too risky for the financial institutions and loan recipients. In the AFOLU sector, grants or concessional capital are needed to reduce risk linked to loans and are instrumental for bringing lending to scale. In the Convergence database we did find examples of blended finance for the AFOLU sector (see the explanatory text on page 14).



In the examples we identified, individuals **grants** were used to finance the training and cover fixed investment costs in climate-smart agriculture practices (CSA) (e.g., crop rotation with legumes, charcoal production) and afforestation to provide access to nutritious and safe food while reducing emissions. The grants are distributed through multilateral development banks (MDBs), governments or NGOs. Small-scale farmers and forestry associations benefit from the projects financed and implemented by governments and NGOs through grants.

**Payment for ecosystem services** is another instrument provided by MDBs within the agreement under REDD+ for climate mitigation, with improved access to nutritious and safe food as potential co-benefit. REDD+<sup>11</sup> is a product of negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) in 2015. Its objective is to create incentives for developing countries to reduce greenhouse gas emissions from forested lands. The funds we identified extend international REDD+ grants to government institutions, which allocate those funds as PES payments to farmers in return for their efforts to preserve ecosystem services. Those ecosystem services can include carbon sequestration with afforestation and silvopastoral methods bringing together trees, forage plants and livestock farming, agri-technologies reducing emissions, and use of emission-efficient household practices (e.g., efficient cookstoves instead of wood burning). In this process, independent third-party institutions certify the farmers and validate that they implement those services. Usually, these programs are supplemented by initial grant to farms – in addition to PES payments – that partially cover the fixed investments of farmers or households to uptake those services (e.g., training costs, tree plantation costs, etc.).

Development finance institutions (DFIs), banks, governments and private companies issue **green bonds** to finance investment in private companies' green sourcing schemes involving different supply chain partners, CSA programs, and mixed agriculture and forestry portfolios of investors. Green bonds are regulated through ESG reporting requirements. The bonds provide a fixed interest payment and capital amortisation (for instance, after 5 years), and are traded in international financial markets where different investors can purchase them.

**Carbon credits** (see also **Box 5**) give the owner/buyer the right to emit a certain volume of carbon dioxide or its equivalent in other greenhouse gases. Carbon credits can

be re-sold by companies who have them in excess, or they can be produced by companies or farmers who sequester carbon through their farming and forestry methods. For the latter category the carbon credits can represent a revenue stream, although these voluntary carbon credits still represent a small market.

### Box 5: Carbon markets in Colombia, Kenya and Vietnam

In 2021, there were 64 carbon pricing initiatives in place, among them the emission-trading systems for compliant markets and carbon taxes (World Bank 2021). They are a direct result of the Kyoto protocol and operate globally.

In particular Colombia is championing the nationwide development of carbon credits through broader policy initiatives including carbon taxation, carbon market regulation, knowledge development, the Partnership of Market Readiness (PMR), annual carbon caps, the RENARE registration platform, the National Environmental Fund (FONAM) and the sustainable landscape programme. Currently more than 90% of emission reductions come from the more than 80 REDD+ projects registered. In addition, as of 2022, there are 110 active Nature-based solution (NbS) voluntary carbon market projects in Colombia (Climate Focus, 2022).

In 2022 Kenya introduced a corporate tax incentive for companies operating a carbon market exchange or emission trading system, which is a first of its kind in the region. The tax incentive for companies operating a carbon market exchange or emission trading system is subject to the company being certified by the Nairobi International Financial Centre (NIFC) Authority. Examples of carbon credits on the voluntary carbon market are mangrove conservation credits and deforestation credits.

Vietnam's carbon market is expected to thrive in the near future given that the country has large forest reserves (VietnamPlus 2022). In 2022, the Vietnamese government was in the process of developing the legal framework for the creation of a domestic carbon market.

The last example is **blended finance**: the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development (Convergence 2022a). Different layers of public and private capital are blended into one fund or financial instrument. The private component is often more commercially oriented, aiming at higher revenues and

<sup>11</sup> REDD is about Reducing Emissions from Deforestation and forest Degradation. The plus in REDD+ stands for conservation of existing forest carbon stocks, sustainable forest management and enhancement of forest carbon stocks



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lower risks, whereas the public component can take higher financial risks in exchange for a high societal benefit. This implies that commercial financing can be attracted to low-emission investments that would otherwise not be profitable enough for the private investors. Also loans combined with grants for complementary purposes (e.g. training) could be examples of blended finance.

A relevant example of **blended finance** was a project to finance afforestation and a commercial forestry project that aims to reduce poverty through increasing the benefits of forestry systems to the farmers and forestry associations and at the same use forests as carbon sinks. Those loans are distributed through MDBs – sometimes through domestic development banks or funds - either to SMEs or to larger corporations who can pay back the loans with interest and have assets that they can show as a collateral to the MDBs, or to public authorities who then allocate the resources to local public and private economic agents. Farmers or forestry associations indirectly benefit from those loans, when they are working with these SMEs, corporations, and public authorities. For instance, farmers can plant commercial trees on their land with funding from those SMEs, corporations, and public authorities with the promise of selling trees after a certain period to them for wood production.

### Box 6 Blended finance from government to government

Another example of blended finance – in this case from government to government - is the project “Climate-smart initiatives for climate change adaptation and sustainability in prioritised agricultural production systems in Colombia”. This project – with a budget of US\$ 100m for five years - is financed by the Green Climate Fund (GCF) and Corporación Andina de Fomento (CAF) with a mix of grants (48.3%), loans to the Colombian government (35.3%), and an own contribution of the implementers and producer organisations (16.3%). GCF and CAF provide the loans to the Government of Colombia, on concessional conditions (20 years duration, 5 years grace period). The project, implemented by the Ministry of Agriculture and Rural Development and Alliance BI-CIAT, will (i) modernise the agricultural extension services through digitalisation and agroclimatic services, (ii) develop scale-up technologies for lower emission agriculture, and strengthen institutional capacities and business models.

Source: GCF 2022





## 5 Measures in the food system to reduce, avoid or sequester emissions

For the AFOLU sector, there are multiple potential measures to transform the sector from GHG source to carbon sink. Most commonly known are investments into afforestation, but several well-established measures exist for crop farming and livestock farming. For crops, these are mainly reducing tillage intensity, introducing crop rotation changes, improved nutrient management as well as reducing fertiliser applications or changes in fertiliser application throughout the year and eliminating field burning. In livestock farming, many farm practices reduce GHG emissions, such as manure management, introducing anaerobic digesters, changing feed diets, separating solids from liquids in manure management and grazing land management practices (Thornton 2018). All together these farm practices can substantially contribute to GHG emission reduction (IFC, 2013).

These measures have been included in a number of taxonomies and guidelines for project and debt financing to provide companies, investors and policymakers with appropriate definitions for which mitigation measures can be considered as eligible investments. The EU taxonomy for sustainable activities also recognises structural landscape elements with GHG reducing potential, enhanced waste management practices with GHG reducing potential and high diversity landscape elements (Jongeneel et al. 2021). The People's Bank of China taxonomy (2015) does not mention any metrics or categories, but stipulates that the GHG reducing actions need to be well defined. The climate strategy of USDA includes mitigation measures to reduce, avoid or sequester carbon dioxide in the AFOLU sector, but also

stipulates climate resilient actions such as adaptation measures (USDA Climate Hubs website).

In order to allow for other measures to be eligible for financing, a number of general principles have been developed under which green financing instruments can be used. Additional measures can be financed for example under the EU taxonomy when there is a measurable, substantial contribution to GHG mitigation, which can be established through 6 relevant approaches such as carbon footprinting or Life cycle assessment (LCA) and under the condition that these are doing no harm to others. A substantial contribution is given when (a) they lead to an upscaling of already low emission activities, (b) they contribute to a net-zero emission goal or (c) they enable those. The USDA definition also recognises that farms exhibit a large range of different characteristics and that they should therefore adopt the technologies that are most suited (best available technology principle).

Throughout the wider food system, numerous GHG reduction measures can be taken (Amahnui et al., forthcoming). These are land-based approaches, land nutrient and water management or incentives for low emission production, reducing food losses and increase efficiency in industrial processing (Muller et al. 2017; Smith et al. 2014). Consumption strategies can also include market access restrictions, premium prices, access to differentiated markets, increased transparency, reductions in food waste and dietary changes. (Bryngelsson et al. 2016; Smith et al. 2013).





## 6 Finance as a tool for upscaling investments into low-emission food systems

Financial markets are characterised by underinvestment into climate mitigation and adaptation measures as the relevant revenue models have not fully emerged yet. With regard to public funding mechanisms (such as grants, subsidies and concessional loans), climate change competes with other societal goals. Public funding also depends on a democratic process based on consensus that can be slow in decision-making and implementation. With regard to private financing mechanisms, too little capital is directed towards climate change as financial markets do not fully incorporate environmental effects and because it is uncommon to consider climate risks as a factor in short-term financial stability functions of banks. The financial sector is contributing nonetheless towards GHG mitigation through many channels.

Based on our literature study and the assessment of funds, we identified six promising strategies that can accelerate investments into GHG mitigating measures, and that can scale up low-emission technologies and practices in food systems. These opportunities coincide with a change in financial practices: financial mechanisms could be moving away from merely offering reductions on interest for green finance, use of subsidies, taxes, voluntary green premiums (e.g. on credit cards) and disclosure regulations focused on asset owners (Semieniuk 2021), and could be moving towards supporting more sophisticated collaborative and inclusive stakeholders

engagement on new emerging markets. This could change farmer revenue models and the role of finance more fundamentally (Mazzucato 2016, Raworth 2017). The new financeable revenue models include:

### 1 *Enhancing carbon crediting markets*

Carbon credit trading systems exist where a reduction in GHG emission can be converted in monetary value for a farmer, nature conservator, trader or food manufacturer. This can take shape as an add-on of sustainable product certification, or by distinguishing carbon credits as a separate commodity with its own market.<sup>12</sup> The financial sector supports the development of these new business models by creating a financial infrastructure for pre-financing carbon projects, carbon credit registration and trading in the AFOLU sector, for example for afforestation measures paid by companies that want to off-set their carbon footprint.

### 2 *GHG reduction obligations for agri-trading companies*

Carbon related regulations are becoming criteria for market access and trade as social and environmental goals are integrated into due diligence processes. A recent example is the EU trade regulations for full traceability in beef and soy value chain for guaranteeing de-forestation free products (Chain Reaction Research 2022).

Under current regulations in the area of sustainable

<sup>12</sup>This would be an example of shaping a new market or 'market shaping', a concept developed by Mazzucato (2016). Mazzucato points at the need for long-run and mission-oriented strategic investments and public policies that aim to create and shape markets, rather than just 'fixing' the deficiencies of existing markets or systems. See also Ryan-Collins (2019) for an application of this concept to the regulation of financial markets in view of climate change.





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finance — as for example the different Taxonomies and the EU future Corporate Sustainability Reporting Directive (CSRD) — investors are not directly connected (yet) towards the impact of carbon mitigation. Investors might incur minor compliance costs and they are indirectly affected through the financial risks in their shareholdings, bonds, and loans. Value and dividend streams could be affected through reduced access to markets, non-compliance fines, higher financing costs, and/or reputational damage at different scales. These losses reduce profits that are the basis for financial streams (interest, loans, bonds).

### 3 *Enlarging the green finance market*

Financial institutions are aligning to GHG reduction targets through the pressure of taxonomies and ESG regulations. They want to invest or provide loans and equity with proven quantified GHG reductions resulting from real time measurements e.g. through satellite images. Farmers and other business owners are therefore also more inclined to invest in GHG reducing measures as it allows them to grow and provides them with financial incentives through loans with lower interest rates. The financial sector supports these investments with green loans and green bonds.

### 4 *Carbon labels on food products*

Retailers and brands are increasingly introducing carbon labels for their products. Such labels signal additional values to consumers that are not visible in prices. This means that farmers who sell their products to these companies will have to report GHG emissions for their products and will likely have more access to markets and finance when they can lower their GHG emissions per product. In particular e-commerce through sustainable (fossil free) online platforms and certified zero carbon trade is growing and getting more important. These platforms also often link to low-cost fintech solutions providing input credits to purchase climate smart seeds and farm equipment, impact finance or donor finance, extending B2B platforms towards fully integrated B2B2F platforms.

### 5 *Including GHG emissions in certification of food products*

Certification systems such as the Round Table on Sustainable Palm Oil (RSPO) are including GHG effects of products in their certification system. For example Colombia wants to distinguish itself from Indonesia, Malaysia, and other countries in the cocoa trade through carbon certificates and therefore actively supports farmers in the development of relevant revenue models. Certification is also important for access to financial markets.

### 6 *Remunerating ecosystems services*

Farmers providing emission-related eco system services become eligible for additional remunerations through governmental or value chain carbon reduction schemes. These schemes usually provide additional income during the transition phase. A prominent example is the Ben & Jerry's 'Caring Dairy' programme (Ben & Jerry's 2022).

These new revenue models will require financial actors to assume other responsibilities and mandates, in particular state investment banks and development banks should broaden their narrow role of ensuring financial stability and incorporate climate change under their mandate (Mazzucato et al. 2018). What is needed is a socio-technological paradigm shift of financial markets (Perez 2002), which stakeholders are beginning to shape (Ryan-Collins 2019).

Across these six strategies, blended finance instruments and strategies are used with increasing frequency. Also, governments and stakeholders are looking for more clarification on what is considered a GHG mitigating measure in taxonomies and guidelines. While early stage research into GHG emission reductions through governmental funding is still necessary and should not be limited to technology deployment, market failures of financial markets in later stages of the innovation chain can possibly also legitimise further reaching interventions into regulatory approaches for the financial sector (Mazzucato, 2022). This concurs with the recommendation to continue innovating capital delivery models for rural and agricultural finance:

'As innovation in service provision creates more viable service delivery models, the capital market will need to respond in lockstep. This requires more effective connections between capital need and right-fit capital supply, as well as advances in the structures used to deploy capital.' (ISF Advisors 2019)

The building blocks for achieving this are blended finance, financial consortium building, creating pathways from early stage innovation funding up to larger-scale commercial funding, and aggregation of small capital needs into larger portfolios.

In the course of the Project we expect to gain further insights into the opportunities, drivers and bottlenecks of new emerging strategies and their potential for upscaling mitigation measures.



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## 7 Conclusions

The above analysis leads to the following conclusions:

- a Financial instruments for low-emission food systems cover a **wide range of potential instruments**, ranging from private financial products and private incentives to public finance instruments. Each of these instruments serves very specific purposes and is directed towards very specific target groups, including smallholders, but also larger farmers, agribusinesses, value chain companies and international food companies. Blended finance is emerging to combine the financial power of private finance with the risk-bearing capacity and societal goals of public financing.
- b Several instruments operate **out of the sight of the farmers and value chain companies**, for example on wider capital markets, but are potentially relevant to them. Tax benefits and carbon taxes may not directly affect smallholders, but may have indirect effects on them. Also the upcoming taxonomies for sustainable finance in the EU, USA and China, as well as climate policies of central banks, can potentially change finance flows towards more sustainable purposes.
- c **Mitigation finance** is by far the largest category in climate finance, but little of it is destined to the Global South. Adaptation finance and dual purpose finance are far smaller categories, but with somewhat fairer shares for the Global South, in particular Sub-Saharan Africa. In dual purpose climate finance, the adaptation and other developmental co-benefits may attract the farmers' interest, whereas the mitigation components may raise the appetite of the financiers.
- d Despite its major share in emissions of nitrous oxide and methane, and its role in driving deforestation, **AFOLU** is a very small sector in global climate finance. The energy and transport sectors are absorbing much larger amounts of climate capital. Climate finance for AFOLU is strongly leaning on public finance, both grants and debt, and with very minimal private investments. The wider food system may attract its own share of climate finance – also related to energy, transport, water and industrial processing functions in the food system –, but hard figures about this are not available.
- e Based on our database analysis of funds, **five financial instruments for low-emission food systems** stand out: grants, payments for ecosystem services, green bonds, carbon credits and blended finance. Each of these has a specific profile, potential and challenges, that can be evaluated only for specific innovations in their context (client profile, crop, market, value chain, financial landscape).
- f From our analysis of emerging revenue models for carbon, we can conclude that finance can play a role in at least **six finance-related strategies for scaling** of low-emission food systems: enhancing carbon crediting markets, GHG reduction obligations for agri-trading companies, enlarging green finance markets, GHG labels on food products, inclusion of GHG reduction in the certification of food products, and remuneration of ecosystem services.

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## 8 Next steps

The following next steps are foreseen for the finance work stream in the Project:

- The Project will select specific climate innovations – both AFOLU- and non-AFOLU-related – with potential to scale and to have impact on mitigation and other co-benefits in the focus countries.
- For these selected innovations, the project will explore the potential of financial instruments to contribute to the scaling of these innovations. Available knowledge will be collected about cost-benefit profiles of the innovations, drivers of adoption and relevant financial and value chain stakeholders.
- Finance strategies will be formulated which are expected to support the scaling of the selected innovation. These 'finance2scale strategies' will be developed in collaboration with key partners for the scaling efforts, and will involve a combination of financial instruments, financing actors, recipient and intermediary structures and cost-benefit calculations of the model; where relevant, linkages with enabling policies will be made (WP1). In this process, also knowledge gaps will be identified to create an agenda for more in-depth research.



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## Acronyms

Alliance	Alliance of Bioversity International and the International Centre for Tropical Agriculture	KBA	Kenyan Bankers' Association
BI-CIAT	Tropical Agriculture	KfW	Kreditanstalt für Wiederaufbau
ADB	Asian Development Bank	LCA	Life Cycle Assessment
AEF	Access to Energy Fund of FMO	LMIC	Low and Middle Income Countries
AFOLU	Agriculture, Forestry and Land Use	MDB	Multilateral Development Bank
B2B2F	Business to Business to Farmer	MITIGATE+	CGIAR Research Initiative on Low-Emission Food Systems (the Project)
CGIAR	Consultative Group for International Agricultural Research	NGO	Non-Governmental Organisation
CPI	Climate Policy Initiative	ODI	Overseas Development Institute
CSA	Climate-Smart Agriculture	OECD	Organisation for Economic Co-operation and Development
DFI	Development Finance Institution	PES	Payments for ecosystem services
ESG	Environmental, Social and Governance	REDD+	Reduces Emissions from Deforestation and Forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks
FAO	Food and Agriculture Organisation	RENARE	National Registry for the Reduction of GHG Emissions, Colombia
FMO	Dutch Entrepreneurial Development Bank	SDG	Sustainable Development Goals
GCCA	Global Climate Change Alliance	SME	Small and Medium-sized Enterprise
GHG	Greenhouse Gas	UNDP	United Nations Development Program
GIF	Green Investment Fund (ADB)	UNEP	United Nations Environment Program
GIM	Green Incentive Mechanism (ADB)	UNFCCC	United Nations Framework Convention on Climate Change
IDF	Infrastructure Development Fund of FMO	USDA	United States Department of Agriculture
IFC	International Finance Corporation (World Bank Group)	WP4	Work Package 4 (Scaling low-emission food systems) of the Project
IFPRI	International Food Policy Research Institute	WRI	World Resources Institute
ILRI	International Livestock Research Institute	WUR	Wageningen University & Research
IPCC	Intergovernmental Panel on Climate Change		
IRRI	International Rice Research Institute		

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