Landscape of Climate Finance for Agrifood Systems

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CLIMATE POLICY INITIATIVE

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ABOUT CLIMATE POLICY INITIATIVE

Climate Policy Initiative (CPI) is an analysis and advisory organization with deep expertise in finance and policy. Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. CPI has six offices around the world in Brazil, India, Indonesia, the United Kingdom, and the United States. CPI is acting as the Secretariat for the ClimateShot Investor Coalition (CLIC).

ABOUT CLIMATESHOT INVESTOR COALITION

CLIC is an action-oriented group of investors working in agriculture and food systems. It aims to rapidly scale-up the finance necessary to shift towards low-carbon and climate-resilient agriculture and food systems globally.

This research on agrifood systems climate finance flows supports the delivery of the Breakthrough Agenda on Agriculture.

DESCRIPTORS

SECTOR
Agrifood systems, Agriculture, Forestry, Fisheries and Aquaculture, Other Land Uses

REGION
Global

KEYWORDS
Climate finance, agrifood systems, agriculture, forestry, fisheries, aquaculture, land use, AFOLU

RELATED CPI WORKS
Landscape of Climate Finance for Agriculture, Forestry, Other Land Uses, and Fisheries

Examining the Climate Finance Gap for Small-Scale Agriculture

Global Landscape of Climate Finance: A Decade of Data

The Landscape of Methane Abatement Finance

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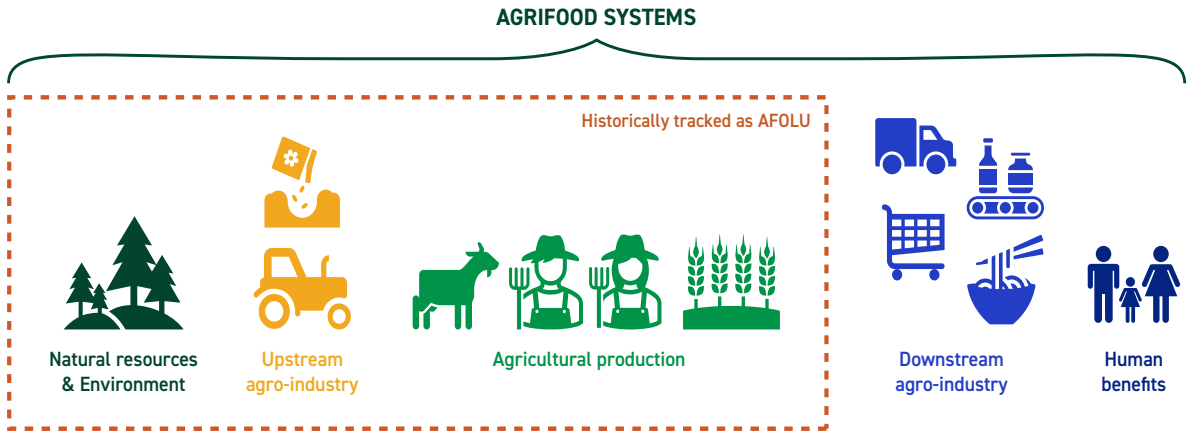
EXECUTIVE SUMMARY

Low-carbon and resilient agrifood systems are vital to ensure the food security of a growing human population and global economic development. This report presents the first comprehensive analysis of climate finance flowing to these systems globally, with the aim of better informing decision-makers in this space. Establishing this baseline for financial flows can help to track action against the efforts required to mitigate and adapt to climate change.

Figure ES1. Agrifood systems concept: segments and interactions



Source: Campanhola and Pandey, 2019, adapted

Agrifood systems are the processes and actors that convert natural resources and the environment into benefits and costs for humans through agricultural production and agro-industries (Campanhola and Pandey, 2019).

KEY FINDINGS

- **Climate finance for agrifood systems is strikingly low.** In 2019/20, agrifood systems received a tiny fraction (4.3%) of total global climate finance tracked at the project level, with an annual average of USD 28.5 billion (Figure 3).
- **For the same period, only one in ten dollars of total venture capital (VC) investments in agrifood tech went to companies focused on climate change solutions.** This represents an annual average of USD 2.3 billion in VC investments.
- **Climate finance for agrifood systems must increase at least sevenfold from current levels** to reach the most conservative estimated needs for the climate transition, which is in the order of hundreds of billions of dollars annually (FOLU, 2019).
- **General finance channelled to agrifood-related sectors suggests that enough liquidity exists globally to finance this transition.** Global public subsidies for agriculture and

fisheries are estimated at around USD 670 billion per year, with most of this supporting harmful practices (World Bank, 2023b). In addition, an estimated USD 630 billion of private capital per year is available for investment in food systems (Elwin et al, 2023). Partly repurposing these flows to support climate interventions could provide a major boost in moving towards the levels of climate finance needed. (Section 3)

How to read our numbers: Figures presented in this report are from two distinct datasets: project-level and company-level data (recording VC invested in agritech). Given the different granularity of these datasets, we do not aggregate the numbers and distinguish between them throughout this report.

Data limitations: Despite efforts to improve the coverage of data collected, significant gaps persist for public domestic financial flows as well as domestic and international flows from private sector actors. This is largely due to a lack of standardized disclosure practices and transparency. The findings presented should be interpreted with these data constraints in mind.

CLIMATE FINANCE TO AGRIFOOD SECTORS

Investments in agriculture and forestry activities form the bulk of the USD 28.5 billion of agrifood systems climate finance tracked at the project level (42% and 41%, respectively). Components of agrifood systems that are essential for climate mitigation (food loss/waste, and low-carbon diets) collectively receive less than 1% of tracked investment. However, investments in these areas are prominent among the climate finance tracked at company level, representing 50% of total VC finance (or USD 1.1 billion). (Section 4)

Agriculture: At USD 11.9 billion per year in 2019/20 in project-level finance and nearly USD 1 billion per year in VC investments, climate finance for agriculture remains far below the estimated needs of USD 30-218 billion per year. (Section 4.1)

Forestry: This sector attracted the second-largest share of project-level climate finance, with an annual average of USD 11.7 billion in 2019/20. However, tracked VC investments were only USD 0.03 billion over the same period. These amounts fall short of estimated annual investment needs of USD 55-753 billion per year. (Section 4.2)

Food loss/waste, and low-carbon diets: Opportunities to finance food loss/waste and low-carbon diets remain untapped, with only USD 0.1 billion at the project level and USD 1.1 billion at the company-level annually in 2019/20. This represents a minor fraction of annual needs, estimated at USD 48-50 billion. (Section 4.3)

Fisheries and aquaculture: Similarly, project-level climate finance to fisheries and aquaculture was USD 0.1 billion per year, and USD 0.06 billion in VC, while an estimated USD 11 billion is needed each year. (Section 4.3)

CLIMATE OBJECTIVES

Mitigation finance in agrifood systems at the project-level in 2019/20 was USD 14.4 billion. This represents only 2% of the total project-level climate finance tracked across all sectors for this period, despite agrifood systems contributing nearly one third of global greenhouse

gas (GHG) emissions. In addition, USD 1.5 billion (equivalent to over two thirds of VC funds tracked) was mitigation focused. (Section 5)

Adaptation finance reached USD 7.3 billion of project-level climate finance for agrifood systems in 2019/20. This represents only 1.11% of the total climate finance tracked for the same period across sectors, even though agrifood systems and farmers are highly vulnerable to climate risks. On the VC side, only 21% of tracked investments went to adaptation-focused agrifoodtech startups (or USD 0.48 billion).

Dual benefits: The remaining USD 6.7 billion representing 23% of project-level climate finance for agrifood activities, and USD 0.27 billion representing 12% of tracked company-level VC investments went to activities with dual mitigation and adaptation objectives. This highlights a missed opportunity, considering that agrifood systems are uniquely positioned to deliver double wins by using climate-smart agriculture integrative approaches.

GEOGRAPHIC DESTINATIONS

More than one third of the total project-level climate investments in agrifood systems, equivalent to USD 10.4 billion, target the East Asia and Pacific region, including a substantial portion of domestic finance in China. Sub-Saharan Africa is the second-largest recipient at USD 4.4 billion (16%). With USD 2.9 billion, the US and Canada constitute the third destination region (10%). (Section 6)

When compared to their contributions to global GHG emissions from agrifood systems, South Asia (10% of emissions), and Latin America and the Caribbean (16%) are particularly underserved by climate agrifood finance, attracting 5% and 8% respectively. Sub-Saharan Africa and South Asia are the regions with the greatest climate vulnerability for food and agriculture production but receive only 16% and 5% of finance, respectively.

In addition, the US and Canada are the destination markets for the bulk of tracked VC investments, receiving nearly 75% of the USD 2.3 billion total. Western Europe is the second largest recipient (17%). This points to an opportunity to tap other markets, like India, which is one of the largest agrifoodtech markets globally, but only received 0.3% of climate agrifood VC. This disconnect stems largely from a nascent market for upstream agri-technologies.

FINANCIAL INSTRUMENTS AND SOURCES

Debt accounted for the largest share (44%) of project-level finance to agrifood systems in 2019/20, followed by grants (38%) and equity (4%). Among tracked adaptation projects, grants constitute almost 50% of all finance, whereas project-level market-rate debt accounts for 50% of mitigation financing.

In 2019/20, public sources accounted for 85% (USD 24.2 billion) of total project-level climate finance tracked for agrifood systems, with development finance institutions being the highest contributors. Private sources accounted for only 12% of project-level finance, amounting to USD 3.3 billion. Commercial finance institutions accounted for the largest share, with exclusive focus on renewable energy for agrifood use. On top of that, we also tracked USD 2.3 billion of private VC investments to agrifood tech companies.

OPPORTUNITIES FOR ACTION

Actors across the board must work together to achieve the financial uplift needed to make our agrifood systems part of a climate resilient and low-carbon future.

Table ES.1 outlines effective actions for different key stakeholders to urgently increase and improve climate finance mobilization.

Table ES1. Opportunities for climate finance mobilization and deployment

Principle/ Actors	Policymakers and Regulators	Development Finance Institutions	Private Financial Institutions (FIs)	Multinational Corporations
Foster integrated sustainability objectives	• Mandate deforestation-free supply chains to tackle both climate change and biodiversity loss.	• Build in-house capacity to mainstream climate and nature in all agrifood development projects.	• Tackle climate and nature risks simultaneously in agrifood portfolios, by adopting the TCFD and TNFD frameworks.	• Investments in regenerative agriculture (for carbon sequestration and biodiversity) should be inclusive and in alignment with scientific evidence to prevent greenwashing.
Leverage virtuous cycles	• Place agrifood systems as a top priority on the global climate agenda. • Accurately reflect agrifood system finance needs in Nationally Determined Contributions and National Adaptation Plans.	• Collaborate with development agencies to bundle finance with technical assistance for supply chain actors. • Invest in innovative climate tech for agrifood systems, leveraging a successful VC pipeline.	• Leverage their creditor/ shareholder power to incentivize climate investments by agrifood corporates.	• Jointly invest in capacity building of suppliers on Scope 3 emissions reduction, measurement, and reporting. • Facilitate access to climate finance for suppliers.
Strive for efficiency & improved implementation	• Repurpose public finance and use it catalytically to attract private contributions.	• Use de-risking financial instruments innovatively to attract private finance.	• Local FIs should build their internal technical knowledge on climate risks and relevant technologies for agrifood systems.	• Adopt and implement voluntary value chain GHG emission targets. • Assess value chain climate risk exposure in and act to increase resilience.
Think globally, act locally	• Encourage consumer shift to low-carbon diets and food waste reduction. • Incentivize domestic and regional FIs to fund climate actions in agrifood supply chains.	• Provide concessional capital and climate capacity building to local FIs.		• Jointly invest in capacity building of suppliers on Scope 3 emissions reduction, measurement, and reporting.

In addition, more data and evidence is required to enable financial flows:

- **Governments and private actors need to urgently step up tracking and disclosure of their climate-related spending**, amid growing calls for climate transparency and accountability. Data-driven approaches are required to determine needs and allocate scarce financial resources efficiently.
- **Research organisations and technical assistance providers need to continue building an evidence base to enable improved climate finance in agrifood systems**, by documenting and analysing climate finance flows to identify gaps and opportunities and to strengthen the business case for climate investments in agrifood systems.

CONTENTS

1. INTRODUCTION

Global food availability and quality has been affected in recent years by crises unprecedented in modern history. The COVID-19 pandemic in 2020/21 followed by Russia's illegal invasion of Ukraine in 2022, compounded by the overall climate crisis, have exposed the vulnerability of global food supply chains to health, geopolitical, and environmental shocks and stresses. Supply chain disruptions triggered by the pandemic have been prolonged and amplified by the war in Ukraine, causing record high food prices in 2022 (Reuters, 2023a). Food price inflation still exceeds 5% across the world, with many countries experiencing double-digit inflation (World Bank, 2023a). Climate change has already reduced agricultural production (Steiner et. al, 2020) and increased the frequency of extreme weather events that damage crops and agricultural assets at large scale, thus putting additional pressure on food systems (IFPRI, 2023). On top of record prices for food and agricultural inputs, the 2022 flooding in Pakistan caused the loss of over 735,000 livestock and damaged about 2 million acres of crops (FAO, 2022a). The multi-year drought affecting the Horn of Africa since 2018 has killed 7 million livestock (UN, 2022).

With these shocks came the realisation that the world needs to adopt a more systemic view to mitigating socio-economic and environmental underperformance in food systems. Food systems are the source of around one third of total GHG emissions per year, mostly from agriculture production and land-use activities, followed by other supply chain activities (retail, transport, consumption, etc.) (Crippa et al., 2021; FAO, 2023). Traditionally, food insecurity has been addressed mainly by boosting production to increase supply. However, this approach does not account for the complexity of relationships, actors, sectors, and natural resources interacting in the agriculture and food space, at various geographic levels as well as within supply chains.

Strategic thinking and priorities are starting to shift towards a more systemic approach to food. The UN Food System Summit in 2021 emphasized the mutual dependency between all Sustainable Development Goals (SDGs) and resilient and well-functioning food systems. Similarly, the EU Farm to Fork Strategy, a core component of the European Green Deal, takes an encompassing approach, where it aims to have positive climate, biodiversity, and human impacts. Furthermore, at COP 27, the idea of including "food systems" in the formal COP agreement was on the negotiation table for the first time (Carbon Brief, 2022). An open letter put forward at COP 27 and renewed in March 2023 by a group of 55 research and civil society organizations, called on world leaders to go beyond agricultural systems and adopt a holistic "food systems" approach. This is seen as key to ensuring food security and mitigating the effects of climate change (WWF et. al, 2022). Scientific evidence also points to the need for rapid and far-reaching systemic transitions that utilize integrated approaches and provide multiple benefits (IPCC, 2023).

Encouraging efforts are being made to design system-wide roadmaps for a shift to low-carbon and climate-resilient agrifood systems.[1] Such roadmaps provide holistic sets of

1 Work on such roadmaps includes: Planet Tracker, 2023a; Deforestation Free Finance, 2022; CBI, 2022; Loboguerrero et. al, 2020; FOLU, 2023a; IEA et. al 2022; UNEPFI, 2023a; forthcoming World Bank Flagship Roadmap on Decarbonization of the Air and Recarbonization of the Land through Agrifood System Transformation (DARL) and FAO Global Roadmap to 1.5°C for the agriculture and food system sectors.

measures to achieve climate goals and are complemented by a number of publications estimating the funding needed to implement them (Thornton et. al, 2023; UNEP, 2022; FOLU, 2019). However, there are few studies to assess the progress towards these financial goals, and these provide only a partial picture by focusing on specific solutions, technologies (FAIRR, 2019; GFI, 2021), geographies (AgFunder, 2022a), or types of funders (Galbiati and Bernoux, 2022).

In parallel, CPI has been assessing global climate finance flows through its Global Landscape of Climate Finance (GLCF) publication since 2012 (CPI, 2022a). This global and multisectoral analysis makes use of an extensive data collection on primary investment by public and private actors in activities that reduce emissions and improve adaptation and resilience to climate change. Agriculture, forestry, and other land uses (AFOLU) is one of the sectors investigated, along with energy systems, transport, buildings and infrastructure, industry, water, and waste. Two CPI publications have also taken a more in-depth look at components of the AFOLU sector: a 2020 analysis of climate finance to small-scale agriculture (CPI, 2020) and a 2022 study on finance for methane abatement (CPI, 2022b), where the AFOLU sector is featured as one of the three highest emitting sectors.

This report represents the first comprehensive analysis of climate finance flowing to agrifood systems globally. This marks an essential first step in applying an agrifood systems lens to tracking climate finance, though we acknowledge this systemic framing is still evolving in the wider research and policy-making community. This report reflects knowledge and data available as per June 2023. Its contribution is twofold:

1. **Aligning definition with tracking framework:** Reflecting emerging trends, we expand the scope of analysis of climate finance beyond the sectoral AFOLU focus to cover "agrifood systems," as a wider concept that encompasses AFOLU. The objective is to provide helpful insights to both stakeholders using an AFOLU framing and those using the agrifood systems framing. This entails creating a tracking framework that aligns the definition of agrifood systems with the CPI GLCF sectoral classification, in which AFOLU is featured as a sector. This allows us to ensure coherence between sectoral (AFOLU) and systemic (agrifood systems) climate finance tracking and place them in the context of global climate finance tracking across sectors.
2. **Data:** The report uses CPI's strong climate finance database, supplemented by additional data gathering to fill some of the historical gaps on domestic public finance for AFOLU, as well as private finance. The new private sector data, sourced through a partnership with the agrifoodtech VC firm AgFunder, captures VC investments at the company-level and is therefore analyzed separately.

We aim to improve the information available to decision-makers, capital owners and managers in this space, by establishing a baseline for climate finance to agrifood systems globally. This can be used in future to track the level of implementation against the efforts estimated to achieve climate goals. By providing crucial data-based insights on funding gaps and opportunities, we aim to inform targeted, effective, and timely resource allocation by public and private decision-makers and financiers.

The report is structured as follows:

- **Section 2** presents the methodology used for data analysis, including the definition of agrifood systems, the data and the tracking framework.
- **Section 3** provides the overview of the current landscape of climate finance in agrifood systems, highlighting the existing funding gap.
- **Section 4** presents an in-depth analysis of sector-specific financial flows
- **Section 5** focuses on the analysis of climate finance across climate objectives.
- **Section 6** analyses the geographic destination of climate finance for agrifood systems.
- **Section 7** presents an in-depth analysis of the instruments used.
- **Section 8** analyses the sources of climate finance.
- **Section 9** discusses opportunities for action in agrifood systems.

Annexes for this report, provided in a separate document, cover:

- **Methodology Annexes (1-7)** provide further detail on our methodology for tracking climate finance to agrifood systems
- **The Data Annex (8)** summarises this tracked data in tabular form

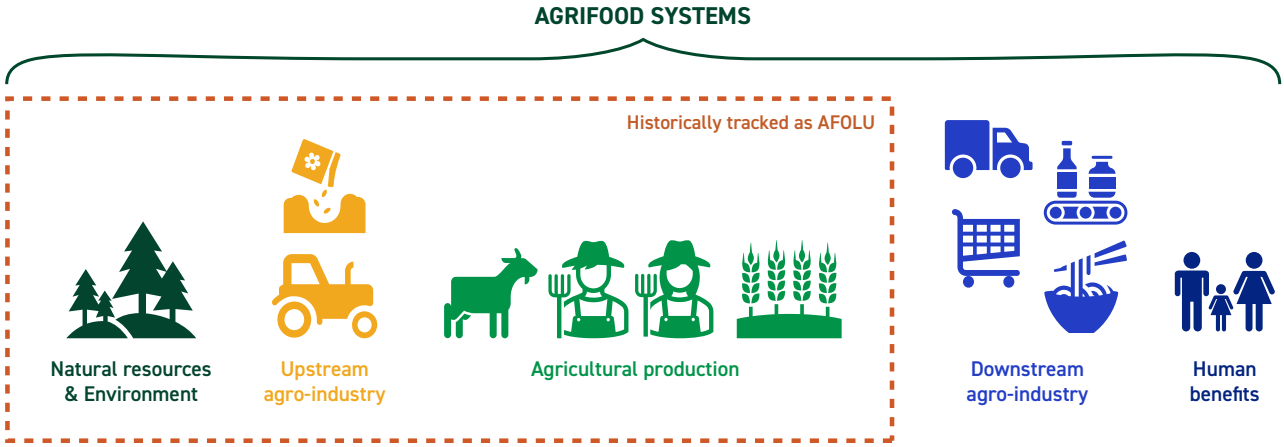
2. METHODOLOGY

2.1 DEFINITION

The concept of "agrifood systems" (Campanhola and Pandey, 2019; FAO, 2021c; HLPE, 2020) best reflects this study's objectives. For a detailed explanation of the definition and tracking framework, please refer to Annex 1).

Agrifood systems encompass the processes and actors that convert natural resources and the environment into benefits and costs for humankind through agricultural production and agro-industries (Campanhola and Pandey, 2019), as shown in Figure 1.

Figure 1. Agrifood systems concept: segments and interactions



Source: Campanhola and Pandey, 2019, adapted

Agricultural production is at the center of agrifood systems and covers both food and non-food products (e.g., biofuel, fibres, or timber), with the other system components revolving around it.

In terms of **natural resources**, agrifood systems encompass land-based systems with the sub-sectors of crop cultivation, livestock raising, hunting, gathering of products from and harvesting of forests as well as water-based systems including fisheries and aquaculture.

Upstream agro-industry includes provision of agricultural inputs like seeds, breeding stocks, fertilizers, pesticides, farm machinery, feed processing, as well as the wider enabling environment providing extension and financial services, the governmental administrations and regulatory bodies, and agricultural research.

Downstream agro-industry entails "handling, processing, preserving, transporting, and marketing agricultural products" (Campanhola and Pandey, 2019), as well as disposal through loss or waste (von Braun, 2020).

Of particular interest for this study are the agrifood benefits and costs to humans that have an impact on climate or are impacted by it. These include consumption patterns and low-carbon diets, livelihoods of rural populations, and bio-energy.

These different actors and segments of agrifood systems are in constant movement, creating complex interactions and feedback loops (FAO, 2018).

2.2 TRACKING FRAMEWORK

To apply the above definition to our data, the analysis of climate financial flows in this report is based on a sectoral classification. This maps out for each sector and solution the activities and sub-activities that are deemed to contribute to climate change mitigation and adaptation in agrifood systems. The structure of this framework, at sector and solution levels, is based on the framework used for CPI's flagship report, the Global Landscape of Climate Finance (GLCF) (CPI, 2021b). This allows us to ensure consistency in data management and comparability across periods.

Three main categories of sectors constitute the agrifood system:

- **Agriculture, Forestry, Other Land Uses and Fisheries (AFOLU)**, as derived from the Intergovernmental Panel on Climate Change (IPCC) emissions categories and historically used in the GLCF analysis.
- **Food loss/waste and low-carbon diets** is a sector to CPI's classification, newly added for the 2021 edition of the GLCF (CPI, 2021a). The creation of this stand-alone category was a first step towards a more systemic framework, intended to reflect the importance of downstream agro-industries as well as the benefits and costs they pose to humans. Data for this sector are scarcely reported and have historically been bundled under AFOLU. In this report, we reinforce the importance of this as a stand-alone segment in agrifood systems, and to underscore the related financing and data gaps.
- AFOLU intersects with other economic sectors in agrifood systems, including Energy systems, Water and wastewater, Solid waste, Industry and Transport. Interactions take place within upstream and downstream agro-industries, and typically support or are complementary to agricultural production activities.

This section presents the types of data underlying our analysis, as well as the related challenges. We have made sustained efforts to improve data coverage, but numerous data limitations remain due to insufficient transparency and reporting.

2.3 DATA

PROJECT-LEVEL DATA

Our analysis relies primarily on public and private sector, project-level datasets collected and curated by CPI for the period 2019-20 for its GLCF report. As such, project-level data management and analysis for this report follows CPI's methodology developed for the GLCF and related publications (CPI, 2021b; CPI, 2022d).

In addition, for the purpose of this study, CPI collected project-level data specific to agrifood systems covering 2019-20 from new public sector domestic and regional sources, i.e., large markets the USA, Canada, the EU, and China.

Project-level data provides the highest level of granularity and confidence in terms of the sources, climate uses and destinations of financial flows. However, such data is not collected and/or disclosed for numerous segments of the agrifood system, particularly for financial flows originating from the private sector.

COMPANY-LEVEL DATA

To complement the project-level data, we also analysed data provided by AgFunder on venture capital (VC) investments from private sources into agrifood tech companies for the period 2019-20. This is a novel approach whereby private investments into specific companies, mostly startups, were tracked and analysed. We acknowledge that VC investments are a subset of the global company-level investments that can contribute to climate action, and as such do not reflect all private finance to agrifood systems. While the decision to include VC information was made on data accessibility grounds, we do consider that they yield valuable insights on private sector-led dynamics, given the importance of innovation in transforming the sectoral landscape and improving the pipeline of solutions. Analysis of VC in agrifood tech also helps to shed light on the market segments that offer the risk/return profile private investors are interested in and which deliver climate adaptation or mitigation impacts. Such capital enables companies developing or offering innovative technologies, services, and products to bring climate mitigation and adaptation solutions to market.

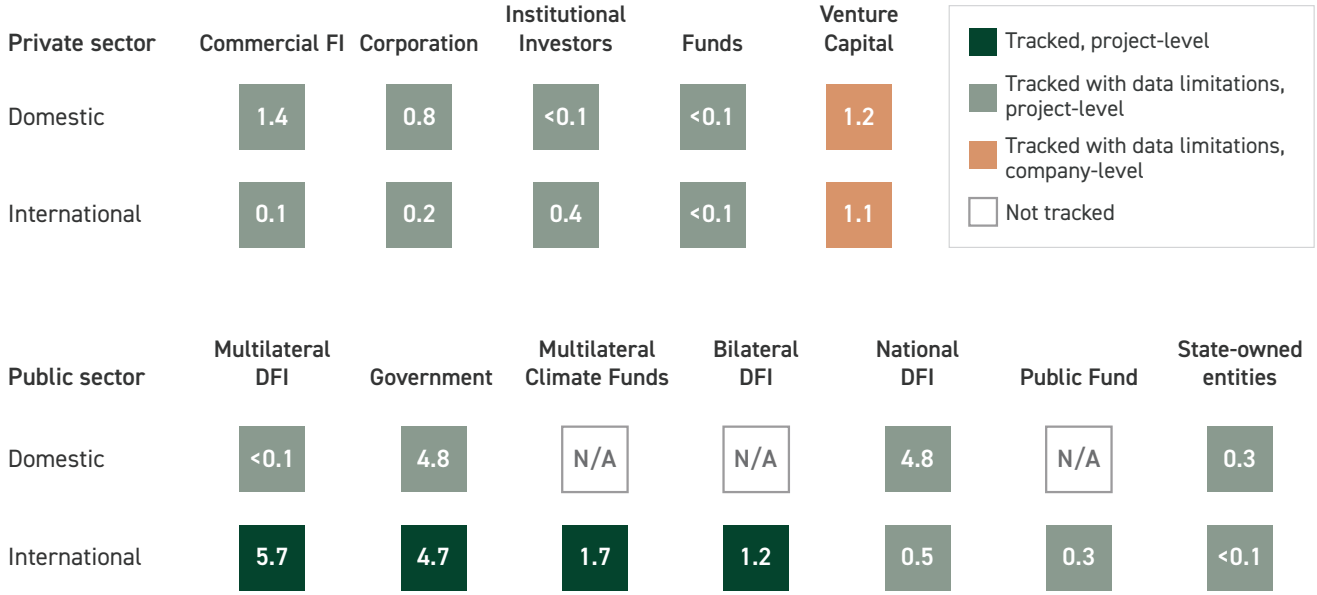
For these reasons, our analysis offers insights derived from each type of data without aggregating the project-level and company-level figures, to enhance understanding of climate financing to agrifood systems from a high-level perspective.

The list of sources for 2019-20 data is included in Table A.4 in Annex 4.

DATA LIMITATIONS

Despite efforts to improve data collection, coverage of AFOLU and agrifood systems has historically mainly captured public development finance. There are persistent data gaps on flows originating from public domestic actors, as well as domestic and international private actors (Figure 2). This is largely due to a lack of standardized disclosure practices and, in many cases, lack of country-level data on overall climate spending. In addition, agrifood projects and assets are smaller and more fragmented than those in other sectors like infrastructure or renewable energy. For the same reasons, financial flows are also more difficult to estimate in agrifood systems than in sectors that depend on the deployment and sale of identical assets (e.g., electric vehicles).

Figure 2. Tracked climate finance for agrifood systems by source and data coverage (2019/20)



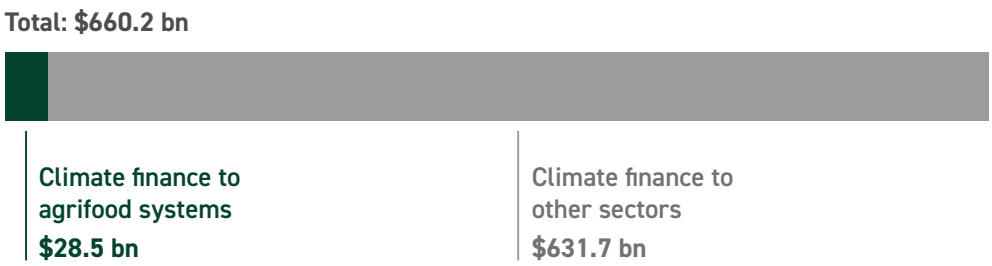
This study aimed to bridge some of the above gaps by collecting project-level data on public domestic financial flows in large markets and VC investment in agri-food tech firms.

This is an incremental data coverage improvement, which we hope to advance in the future.

3. OVERVIEW OF CLIMATE FINANCE TO AGRIFOOD SYSTEMS

Climate finance to agrifood systems is strikingly low, representing just 4.3% of total climate finance tracked at the project level in 2019/20, with an annual average of USD 28.5 billion (Figure 3).

Figure 3. Share of project-level climate finance allocated to agrifood systems.

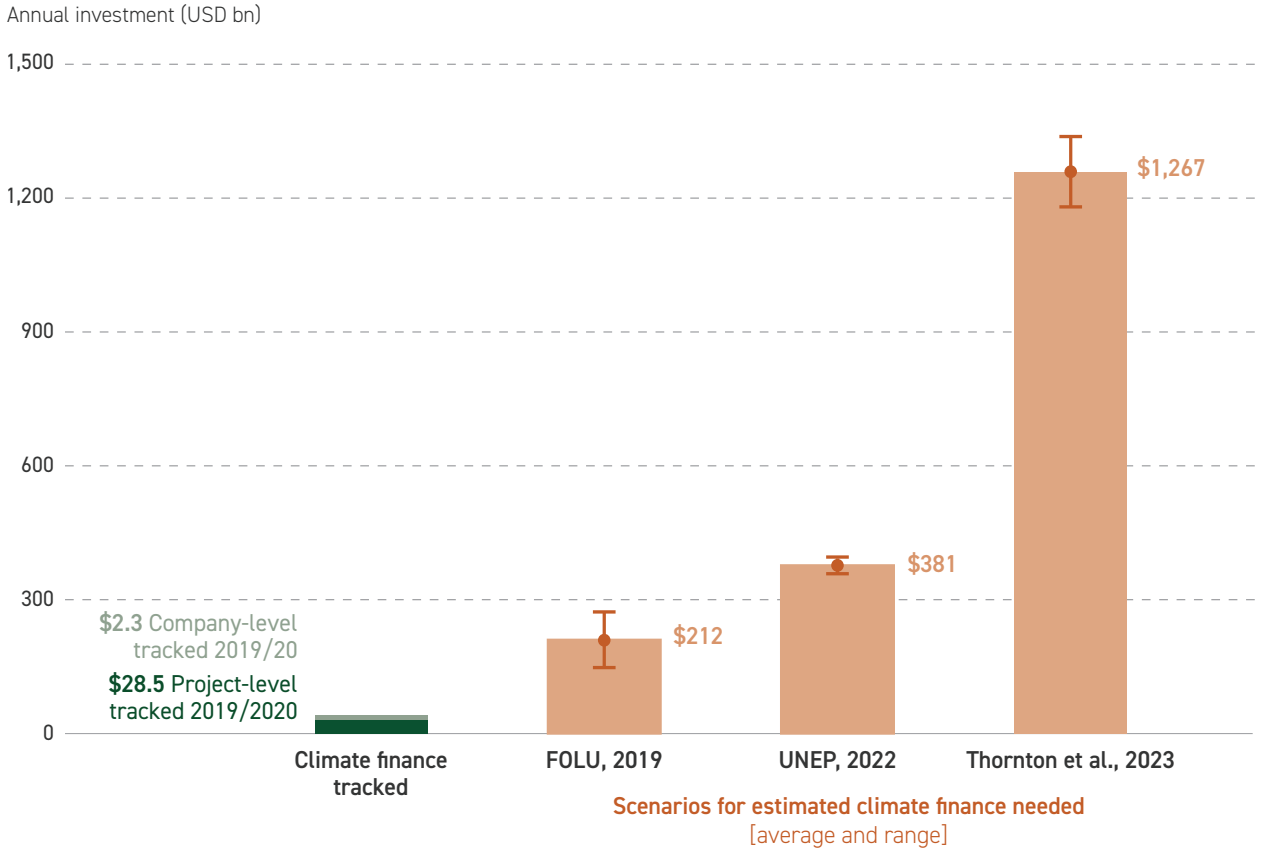


In addition, for the same period, only one in ten dollars of the total VC investments in agrifood tech is directed towards companies focused on climate change solutions. This represents an annual average of USD 2.3 billion in VC investments. Many of the VC recipient firms provide climate-relevant offerings to make food consumption and diets more sustainable.

Despite their central role in the transition to net zero and a climate-resilient future, agrifood systems are marginal in current financial commitments for climate action. There is urgency to increase focus on agrifood sectors, given that they contribute a significant share (31%) of global GHG emissions (FAO, 2023). Furthermore, reductions in agricultural yields due to climate change may cause great economic losses and food insecurity (Kalkhul and Wenz, 2020).

Investments in agrifood systems require at least a seven-fold increase from 2019/20 levels to match the needs estimated by the most conservative climate transition scenarios (Figure 4).

Figure 4. Current tracked climate finance compared with needs in agrifood systems.



According to three available studies (Figure 4), climate-related investment needs for agrifood systems could range from USD 212 billion (FOLU, 2019) all the way up to USD 1.3 trillion (Thornton et al., 2023) each year through 2030.[2] While these studies vary in terms of methodology, they are aligned with the climate finance and agrifood definitions and tracking framework used in this report. As such, they provide valuable insights on the scale of the current investment gap (see Annex 6).

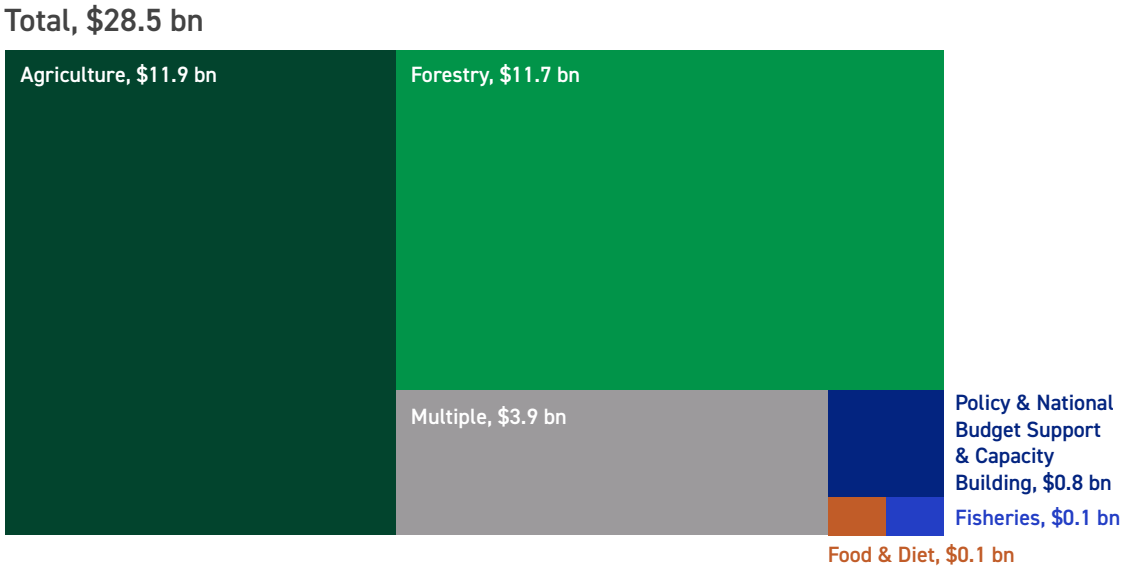
Partly repurposing public and private current spending in agrifood systems could significantly boost climate interventions, bringing them closer to the levels needed. Public subsidies to agriculture and fisheries are estimated at around USD 670 billion per year, with a majority supporting harmful practices (World Bank, 2023b). Also, estimates suggest that private capital of USD 630 billion per year is available for investments in food systems (Elwin et al, 2023).

2 For the purpose of this analysis, we extracted from each study the needs figures that best matched the definitions used for climate finance, agrifood systems and tracking framework.

4. DISTRIBUTION ACROSS SECTORS

The bulk of the USD 28.5 billion of agrifood systems climate finance we tracked at the project level were in agriculture (42%) and forestry activities (41%) (see Figure 5)**. Crucially, components of agrifood systems that are essential for climate mitigation, like food loss/waste and low-carbon diets, received together less than 1% of financing, based on available data.**

Figure 5. Breakdown of project-level climate finance by agrifood sector



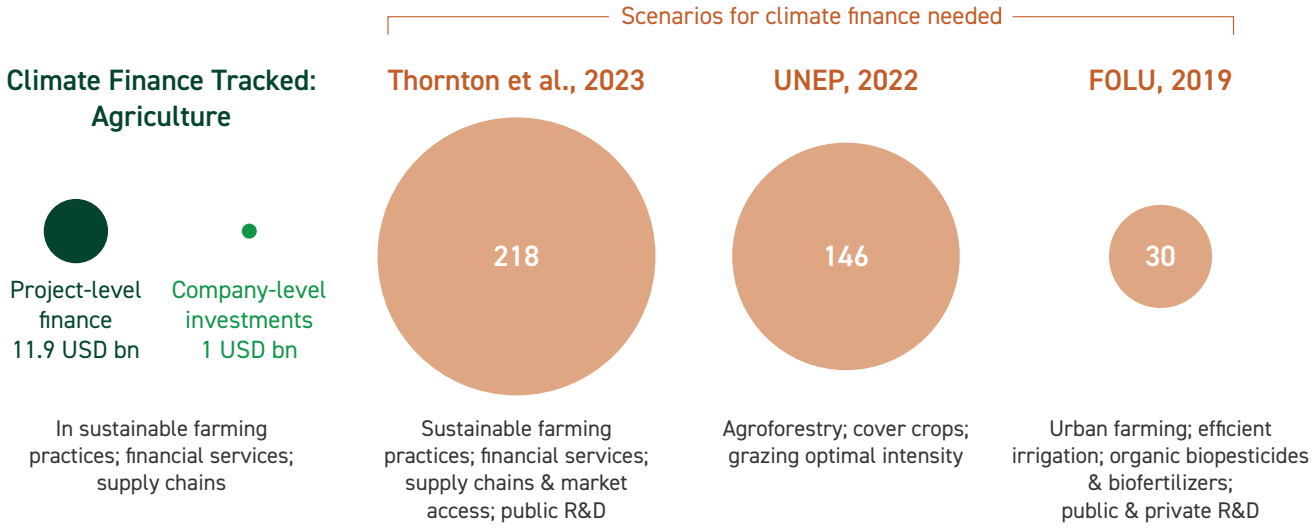
However, investment in food loss/waste and low-carbon diets is much more prominent among tracked VC climate finance, representing 50% of total (or USD 1.1 billion). This points to an opportunity for increased public funding in these areas, particularly by leveraging and scaling up early-stage innovations supported by VC.

4.1 AGRICULTURE

At USD 11.9 billion average per year in 2019/20, project-level finance supporting agriculture activities is dwarfed by the global estimated needs of USD 30-218 billion per year. Company-level data shows almost USD 1 billion in additional finance per year. However, even in the most conservative scenario (FOLU, 2019), current finance levels are less than half of what is needed. According to the more comprehensive scenarios (Thornton et al. 2023; UNEP, 2022), annual figures would need to increase 11- to 17-fold.

The vast majority (70%) of agriculture-related investments tracked at the project level target agricultural production. These include climate-smart measures at the farm level such as agro-forestry, shifting to lower-carbon emission fertilizers and cover crops. Such measures are implemented in the form of farmer trainings or provision of agricultural inputs and equipment.

Figure 6. Tracked climate finance for agriculture compared with estimated annual needs



Upstream and downstream agro-industries received a low proportion of project-level climate finance flowing to agriculture. Of the sector's climate finance, around 7% (USD 0.8 billion) supports agri-businesses to build low-carbon and resilient supply chains (e.g., through energy efficiency and low-carbon fuels). An additional 6% (USD 0.7 billion) goes to bioenergy facilities that use energy crops[3] or agricultural residue as feedstock. Only 2% is directed to financial services that support sustainable agricultural supply chains. Due to data limitations, our figures only partly capture farm-level renewable energy projects (e.g., only USD 64 million is tracked as going to solar PV).[4] Such finance is almost certainly under-recorded, given that renewable energy use in agriculture has reportedly grown from 10% up to 15% in the last decade (REN21, 2023).

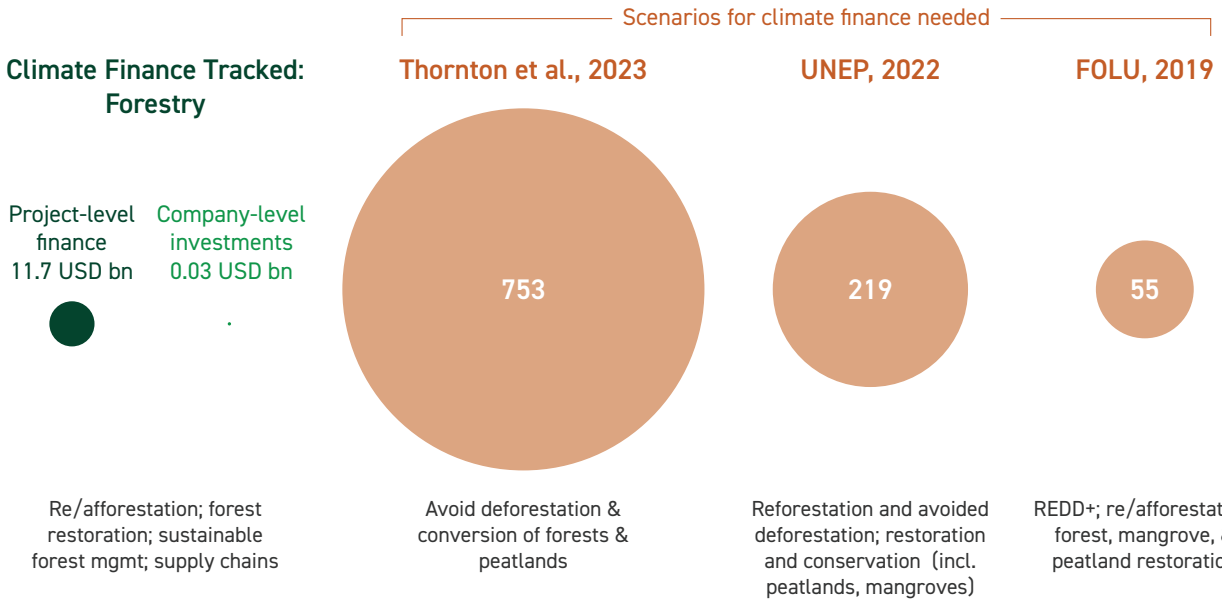
On the other hand, a substantial share of VC investments flowing to agriculture (80% of the total, or USD 0.8bn) went to businesses engaged in upstream or downstream agro-industries. These companies develop novel farming systems such as indoor farming, and insect and algae production (AgFunder, 2022a); biotechnologies for inputs for crops and animals; and bioenergy and biomaterial technologies.

4.2. FORESTRY

Forestry attracted the second-largest share of project-level climate finance, an annual average of USD 11.7 billion in 2019/20. Tracked VC investments reached only USD 0.03 billion in the same period. These amounts fall short of the estimated investment needs of USD 55-753 billion per year.[5]

3 Crops specifically grown to produce feedstock for bioenergy facilities.
4 See section 4.2.
5 The annual USD 753 billion need figure estimated in the Thornton et al. (2023) study, is driven by the expected costs of avoiding further deforestation and conversions of natural habitats into agricultural land.

Figure 7. Tracked climate finance for forestry compared with estimated annual needs



Direct investment in forest management constituted around 75% of tracked project-level finance for forestry (USD 8.6 billion). These activities include afforestation, sustainable forest management (selective thinning), and forest conservations projects.

Some 20% of forestry sector investments (USD 2.2 billion per year in 2019/20) overlap with the energy sector. These are bioenergy projects that use forestry residue and by-products as feedstock.

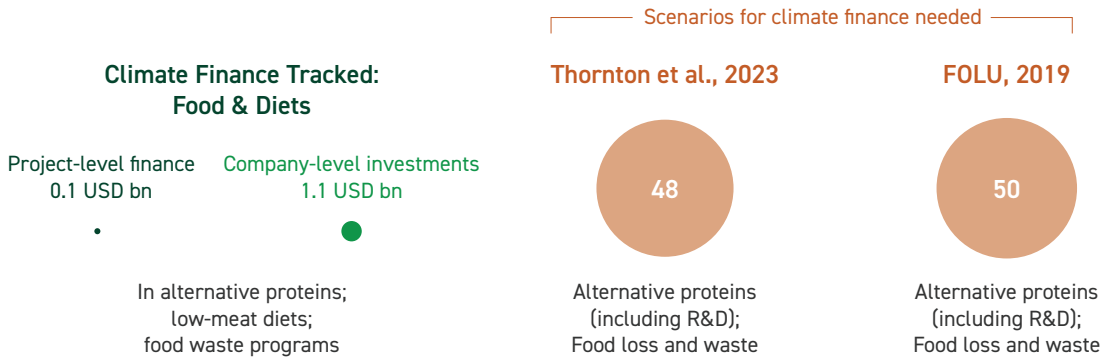
More than half of tracked forestry-related finance went to domestic investments in China (USD 6.3 billion), given the country's long-running programs to promote forest conservation and afforestation (see Box A in Section 4.3). Overall, the East Asia and Pacific region received three-quarters of global finance, with Japan as the second-largest destination of finance. The remaining share of forestry-related finance largely went to three regions: Latin America and the Caribbean (7%, mostly from public international sources), Sub-Saharan Africa (4%, all from international public sources), and the US and Canada (4%).

4.3. OTHER SECTORS

Food loss/waste and low-carbon consumption projects remain untapped investment opportunities, with only USD 0.1 billion invested annually in 2019/20. We also captured an annual average of USD 1.1 billion of VC investments.

Tracked investment in food loss/waste and low-carbon diets is a minor fraction of the annual needs, which are estimated at USD 48-50 billion (Figure 8). Action is needed to reduce post-production loss and food waste, and to promote low-carbon diets. These segments typically cover downstream agro-industry, as well as benefits and costs for humans and planet (see Annex 1).

Figure 8. Tracked investments in food loss/waste and low-carbon diets compared with estimated annual needs

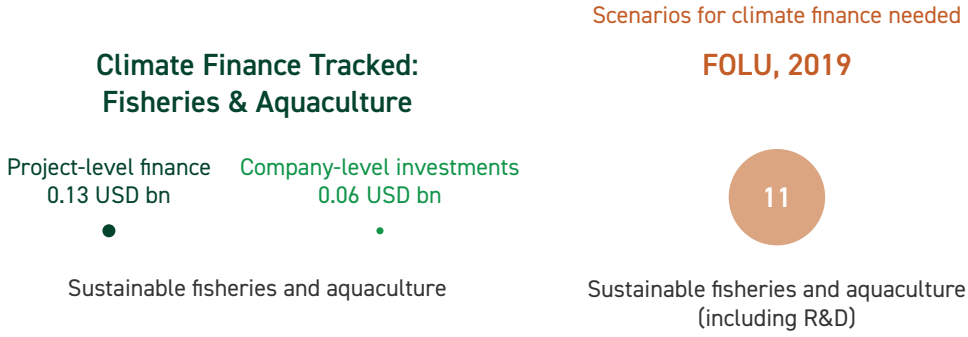


Most startups receiving tracked VC investment aim to reduce food waste or offer alternative proteins. They are highly concentrated in developed markets, with more than two-thirds in the US and close to a quarter in Europe.

Shifting food consumption habits is an essential yet overlooked climate change mitigation lever. Production of certain foods (such as beef, pork, and rice) results in high carbon and methane emissions, and poor food waste management leads to large quantities of food ending up in landfills (CPI, 2022b; CCAC and UNEP, 2021).

Similarly, **climate finance for fisheries and aquaculture stands at roughly USD 130 million per year in project-level finance and USD 60 million in VC, falling significantly short of estimated annual needs of USD 11 billion**, as shown in Figure 9. The risks posed by ocean warming are compounded by overfishing, ultimately contributing an overall decrease in global maximum catch potential (FAO, 2022b). These threats put at risk the roughly 3.3 billion people for whom aquatic foods are a main protein source (FAO, 2022b). Increased finance is crucial to boost the climate resilience of fisheries, aquaculture value chains and to increase the energy efficiency of supporting infrastructure.

Figure 9. Tracked climate finance for fisheries compared with estimated annual needs



Box A: Integrating climate, nature, and development through payment for ecosystem services

In 2022, the Climate Change COP 27 and the Biodiversity COP 15 both highlighted the need to break silos in agrifood systems and for integrated finance that aligns climate, nature, and development goals. Payment for ecosystem services (PES) programs offer a solution by monetizing benefits including climate change mitigation, adaptation, and biodiversity promotion.

Existing PES initiatives, including China's Grain for Green (Bryan et al., 2018) and the US's Conservation Reserve programs (OECD, 2020), have made direct payments to landowners in return for taking improved ecosystem management measures. However, challenges remain, such as implementing the correct solutions for the given environmental context and addressing rural poverty.

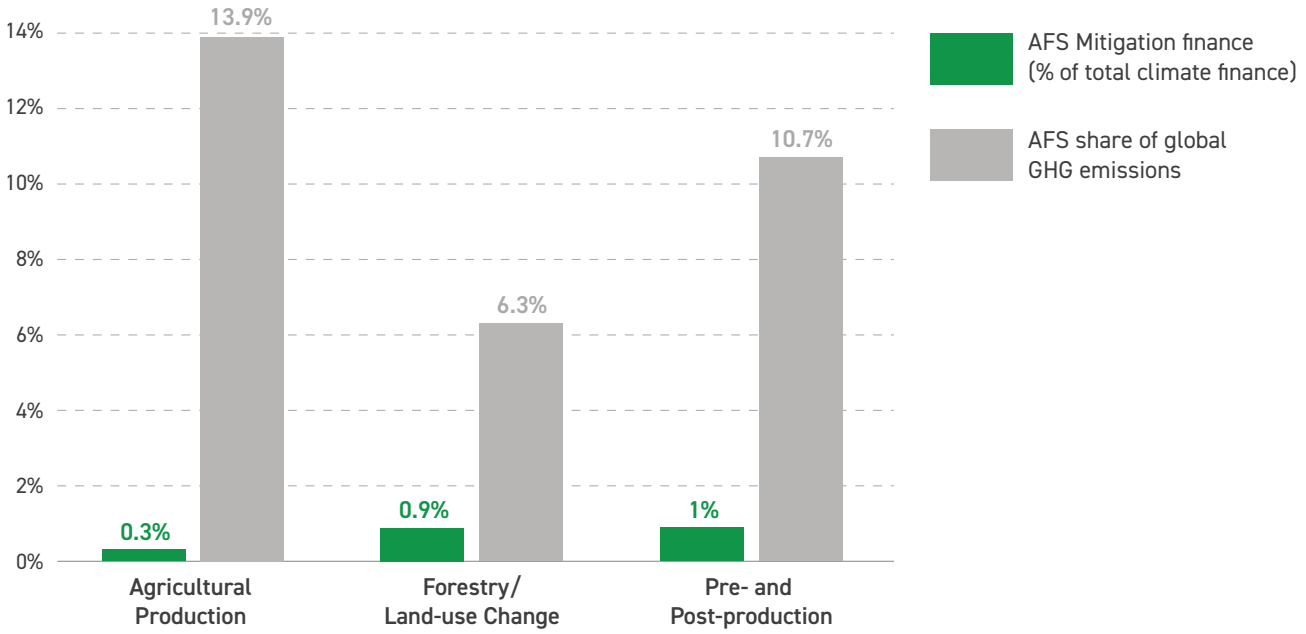
The CompensACTION initiative, launched by the German G7 Presidency in 2022, aims to reduce the silos between climate, nature, development, and provide finance through PES to small-holder farmers in low- and middle-income countries (Wollenberg et al, 2022). However, it remains to be seen how G7 countries will adopt its measures. Private finance and robust measurement systems will be vital for success.

5. DISTRIBUTION ACROSS CLIMATE OBJECTIVES

5.1 MITIGATION FINANCE

In 2019/20, project-level mitigation finance accounted for 51% of total climate finance for agrifood systems, at USD 14.4 billion. This represents just 2% of total climate finance tracked across all sectors during the same period, despite agrifood systems contributing around one third of global GHG emissions (FAO, 2023).

Figure 10. Mitigation finance across agrifood system segments, as a share of total climate finance, and corresponding proportions of global GHG emissions in 2019/20



Source: Emissions data from the FAOSTAT web-portal (FAO, 2023); Investment data from CPI analysis.

Notes: To enable meaningful comparison between mitigation finance and GHG emissions within agrifood systems, we have approximated the alignment between our sectoral data classifications and the categorizations utilized by the FAO for their GHG emissions data.[6]

The disparity between the share of mitigation finance and the respective contributions to global GHG emissions is significant across all segments of agrifood systems, even when counting in finance for dual benefits. This is particularly striking for agricultural production, where mitigation options are significantly underserved. Although responsible for 13.9% of global GHG emissions, only 0.35% (USD 2 billion) of total climate finance went to crop

6 The 'Agricultural production' component in Figure 10 includes 'crop production, agroforestry, and livestock,' aligning with the FAO's 'farm gate' category. The 'Forestry' component covers 'afforestation, reforestation, sustainable forest management, and non-timber product extraction', corresponding to the FAO's 'land use change' category. The 'Pre- and Post-production' component includes food loss/waste and diets, supply chain management under agriculture and forestry, and activities at the intersection of AFOLU and energy systems, transport, or waste, aligning with the FAO's category of the same name.

and livestock production activities in 2019/20. Of this amount, 36% financed projects in the EU. Funded primarily through grants from the European Agricultural Fund for Rural Development (EAFRD), these projects enhanced carbon sequestration, mainly through crop diversification and organic fertilisation[7] on agricultural land (European Commission, 2021).

East Asia and the Pacific was the largest recipient region of mitigation finance for forestry activities (83%), with the majority (89%) of these located in China. Primarily funded through market-rate debt, these projects supported afforestation, reforestation, and biosphere conservation efforts. In contrast, Sub-Saharan Africa and Latin America and the Caribbean received just 9% and 3% of total mitigation finance for forestry activities, respectively. This distribution is concerning, given that these regions are significant contributors of land-use-change GHG emissions globally, especially Brazil and Congo DRC (FAO, 2021a). In these regions, the projects analysed focus on restoring degraded forests by implementing sustainable land-use and forest management practices, adhering to national REDD+ strategies.[8] Notably, in Latin America, there is an emphasis on PES,[9] where projects aim to involve landowners, including indigenous communities, in preserving and rehabilitating forests.

Bioenergy projects captured the largest share (42%) of mitigation finance tracked within the pre-and post-production segment in 2019/20. Although bioenergy can offer significant emissions reductions compared to fossil fuels, its sustainability has been challenged on multiple grounds. These include unsustainable feedstock production, land use changes that negatively impact food availability and biodiversity, air quality concerns from inefficient biomass combustion, and social implications related to soil, water, land tenure, and labour rights (IRENA, 2020).

In 2019/20, two-thirds of tracked company-level investments, amounting to USD 1.5 billion, were allocated to mitigation-focused agrifoodtech startups. The food and diet sector attracted the largest portion (68%), primarily supporting startups engaged in cultured meat, novel ingredients, and plant-based proteins. Strong year-on-year growth in VC investments, coupled with the emergence of these startups in smaller markets signal growing global demand for plant-based and alternative diets (AgFunder, 2022b). Indeed, in developed markets, and increasingly in developing markets, there has been a surge in consumer awareness and interest in alternative proteins, primarily due to environmental, health, and animal welfare concerns (McKinsey & Co., 2019). According to a study by Boston Consulting Group (BCG), investments in plant-based alternatives greatly influence climate change, generating substantial CO2e savings per dollar of capital invested, outperforming equivalent investments in other high-emission sectors like transportation or construction (BCG, 2022).

There are potential environmental concerns regarding cultured meat, however. Research indicates that current and near-term production methods are energy intensive and could yield a carbon footprint that is "order[s] of magnitude" greater than that of conventional beef (University of California, Davis, 2023). In addition, cultured meat faces regulatory hurdles, with market access depending on obtaining safety and quality certifications from regulatory bodies (IDTechEx, 2023). The frontrunner in regulatory approval for cultured

7 This refers to fertiliser derived from organic matter – this avoids the use of synthetic fertilisers which can contribute to GHG emissions

8 REDD+ stands for "Reducing emissions from deforestation and forest degradation in developing countries". The '+' indicates additional forest-related activities that protect the climate, namely sustainable management of forests and the conservation and enhancement of forest carbon stocks.

9 See Box A in Section 4.3

meat is Singapore, which in 2020 became the first country to permit the commercial sale of cultured meat (AgFunder, 2020a). The US also exhibits positive signs of opening its market (Reuters, 2023b). Conversely, the EU parliament only had its first debate on cultured meat in 2022, suggesting that commercialization may take time (IDTechEx, 2023).

Box B. Innovations in carbon credits for agrifood systems

Carbon credit markets have grown significantly as carbon mitigation measures, largely driven by voluntary markets (World Bank, 2022). While such markets remain limited, at around USD 2 billion (Porsborg-Smith et. al, 2023), global demand for carbon credits is projected to increase 100-fold by 2050 (McKinsey & Co., 2021).

Forest and land use credits also saw a 159% increase in issuance in 2021 (World Bank, 2022), mostly focused on habitat conservation as avoidance credits. Direct emission cuts through reforestation, afforestation, or improved agricultural practices are less developed (World Bank, 2022).

Concerns have been raised over the overestimation of emission cuts achieved by voluntary markets (The Guardian, 2023). Robust monitoring, reporting, and verification frameworks are essential for their continued growth (Porsborg-Smith et. al, 2023).

Government emissions trading schemes (ETS) could incentivize market growth by allowing land managers to supply emission credits to targeted sectors UNEP FI, 2023b).

Other mitigation solutions for agrifood systems target methane emissions in agriculture or address emissions from food waste, though such credits accounted for only around 7% of issuances in 2020 (Berkeley Carbon Trading Project, 2022).

5.2 ADAPTATION FINANCE

Adaptation finance accounted for 26% of project-level climate finance for agrifood systems in 2019/20, representing USD 7.3 billion. Of this, agriculture accounted for just over two-thirds. Notably, 83% of adaptation finance for agriculture went to non-OECD countries, particularly in Sub-Saharan Africa. This was provided by multilateral development finance institutions (DFIs) and governments, largely representing international flows.

Tracked projects include those promoting drought-tolerant crops, providing extension services for climate-smart agriculture and water management, and establishing early warning systems to share climate and weather information. Multiple projects in Sub-Saharan Africa assisted farmers in obtaining secure land tenure rights, which can be a prevalent barrier to climate finance in developing economies (Veit, 2019). Formal property rights can promote climate change adaptation by encouraging landowners to invest in long-term, sustainable land management practices, which in turn can enhance the resilience of their land and livelihoods. Furthermore, land rights enhance their capacity to provide collateral, thereby improving their access to financing (CPI, 2020). In OECD countries, most tracked projects were domestic subsidy programs in the US, funded by the US Department of Agriculture (USDA).

Figure 11. Sectoral breakdown of adaptation finance for agrifood systems in 2019/20

Forestry projects received just 2% of total adaptation finance for agrifood systems in 2019/20. Climate change poses high risks to forest health and ultimately their existence, thereby drastically limiting their ability to act as a carbon sink and provider of other vital ecosystem services. Deployment of adaptive measures, targeting forest fire management and disease control for instance, are essential. Sub-Saharan Africa as well as Latin America and the Caribbean were the largest recipients of forestry adaptation finance, with 40% and 24% respectively. These financial flows are aligned with geographical vulnerabilities, given that the impacts of forest fires are felt most acutely in these regions (FAO, 2020). However, the scale of finance needed far exceeds current efforts. Indeed, just under a quarter of forests in Africa, and less than a fifth in South America are under forest management plans, compared to 96% in Europe and 64% in Asia, underscoring the need for greater investment in those regions (FAO, 2020).

Fisheries received just 1% of global adaptation finance for agrifood systems in 2019/20. Considering the integral role of fisheries in supporting food security, nutrition, and livelihoods worldwide, and their vulnerability to climate change, this domain appears significantly underfunded. To some degree, fisheries, and aquaculture support 600 million people's livelihoods worldwide (FAO, 2022b). At the same time, climate change has contributed to decreasing maximum sustainable yields of marine fish populations (IPCC, 2022). Current projections estimate that global fisheries' catch in tropical marine ecosystems will decline by 5 to 10% by 2050 (Steiner et al., 2020). These adverse effects are likely to threaten the food security, nutrition, and livelihoods of those who are heavily dependent on aquatic systems.

Asia represents much of global fisheries and aquaculture production (70%), food consumption (74%), and employment (84%) (FAO, 2022b). In contrast, our data tracks only USD 0.02 billion in adaptation finance going to fisheries in Asia, representing just 0.3% of total adaptation finance for agrifood systems in 2019/20.

Investments tackling food loss/waste, and low-carbon diets are negligible and represent an overlooked component of adaptation for agrifood systems. Approximately 13.3% of all food produced is lost along the supply chain, either after harvest, or at the transport, storage, wholesale, or processing stages (FAO, 2022c). Least-developed countries and small-island developing states register disproportionately greater food losses, at 18.9% and 17.3% of the total produced, respectively. This amplifies the already substantial challenges that these regions face in ensuring food availability and access (IPCC, 2022). As finance in this domain is significantly lacking, investment opportunities could include the promotion of mechanised harvesting techniques, which aim to reduce on-farm food loss, and the implementation of evaporative coolers and solar-powered cold storage units, aimed at minimising food spoilage (IEA et al., 2022).

USD 0.48 billion, or 21% of tracked company-level VC investments, were directed towards adaptation-focused agrifoodtech startups in 2019/20. Of this total, 83% went to novel farming systems, primarily indoor farming. This method, which involves growing plants in controlled environments for higher yields, offers a resilient agricultural production approach by eliminating the threats of adverse weather events, pests, and diseases. Much of the remaining share of adaptation company-level investments (14%) went to agricultural biotechnology. An increasing number of startups are focusing on the development of innovative crop and animal health solutions, through gene editing and predictive analytics tools, to boost agricultural productivity and resilience (AgFunder, 2022b).

5.3 DUAL OBJECTIVES

Climate finance targeting both mitigation and adaptation accounted for 23% of project-level climate finance for agrifood systems in 2019/20, at USD 6.7 billion. This highlights a missed opportunity, considering that agrifood systems are uniquely positioned to deliver simultaneous benefits for climate resilience and GHG emissions reduction through the use of climate-smart agriculture.

Dual objective climate finance was almost evenly distributed between agriculture (USD 3.1 billion) and forestry (USD 3.0 billion), with PES[10] programs prominently featured in both sectors. The USDA Conservation Reserve Program (CRP) accounted for USD 1.0 billion of agricultural production, while the Conversion of Cropland into Forests Program (CCFP) contributed USD 1.2 billion to forestry. Other large tracked finance flows came from China's Natural Forest Protection Program (NFPP) (USD 1 billion),[11] and water efficiency projects under the EAFRD (USD 0.57 billion).[12]

10 See Box A in Section 4.3

11 The NFPP is a national initiative focused on protecting and restoring natural forests, enhancing ecological resilience, and promoting sustainable forestry practices through measures like banning commercial logging and encouraging afforestation and re-vegetation (Wang, 2021).

12 Projects under the EAFRD optimize irrigation technologies and improved water usage efficiency in agricultural areas in EU members states (European Commission, 2021).

Figure 12. Sectoral breakdown of dual objective finance for agrifood systems in 2019/20

In addition, in 2019/20, 12% of tracked VC investments, totalling USD 0.27 billion, went to agrifoodtech startups with dual climate objectives. Dual objective investments display an emphasis on agricultural biotechnology solutions, ranging from sustainable agrochemical formulations that improve crop yields while reducing or eliminating pesticide use, to cellular agriculture, where companies work on rapid plant cell production with fewer resource constraints, providing both mitigation and adaptation benefits.

Box C: The need for prioritizing agrifood systems in the context of the Loss and Damage Fund

COP 27 in Egypt 2022 saw the establishment of a Loss and Damage (L&D) fund, acknowledging the unavoidable negative impacts of climate change (Åberg and Jeffs, 2022). The fund aims to provide additional and predictable financing for developing countries most affected by climate-related L&D.

Extreme weather events, such as floods, heatwaves, and droughts, pose significant threats to agrifood systems, and contribute to L&D. The AFOLU sector accounted for 26% of total L&D in low and lower-middle income countries between 2008 and 2018 (FAO, 2021b). Droughts have had particularly significant impacts on crop and livestock production, with agriculture absorbing 82% of drought-related L&D. This has especially severe implications for low-income countries, whose economies are often centered around agriculture (CGIAR, 2021).

The latest IPCC report (2022) emphasizes that agrifood systems are nearing their adaptation limits, meaning that losses and damages will persist despite increased adaptation efforts. Securing appropriate L&D finance is therefore crucial for agrifood system resilience.

6. GEOGRAPHIC DESTINATION OF FINANCIAL FLOWS

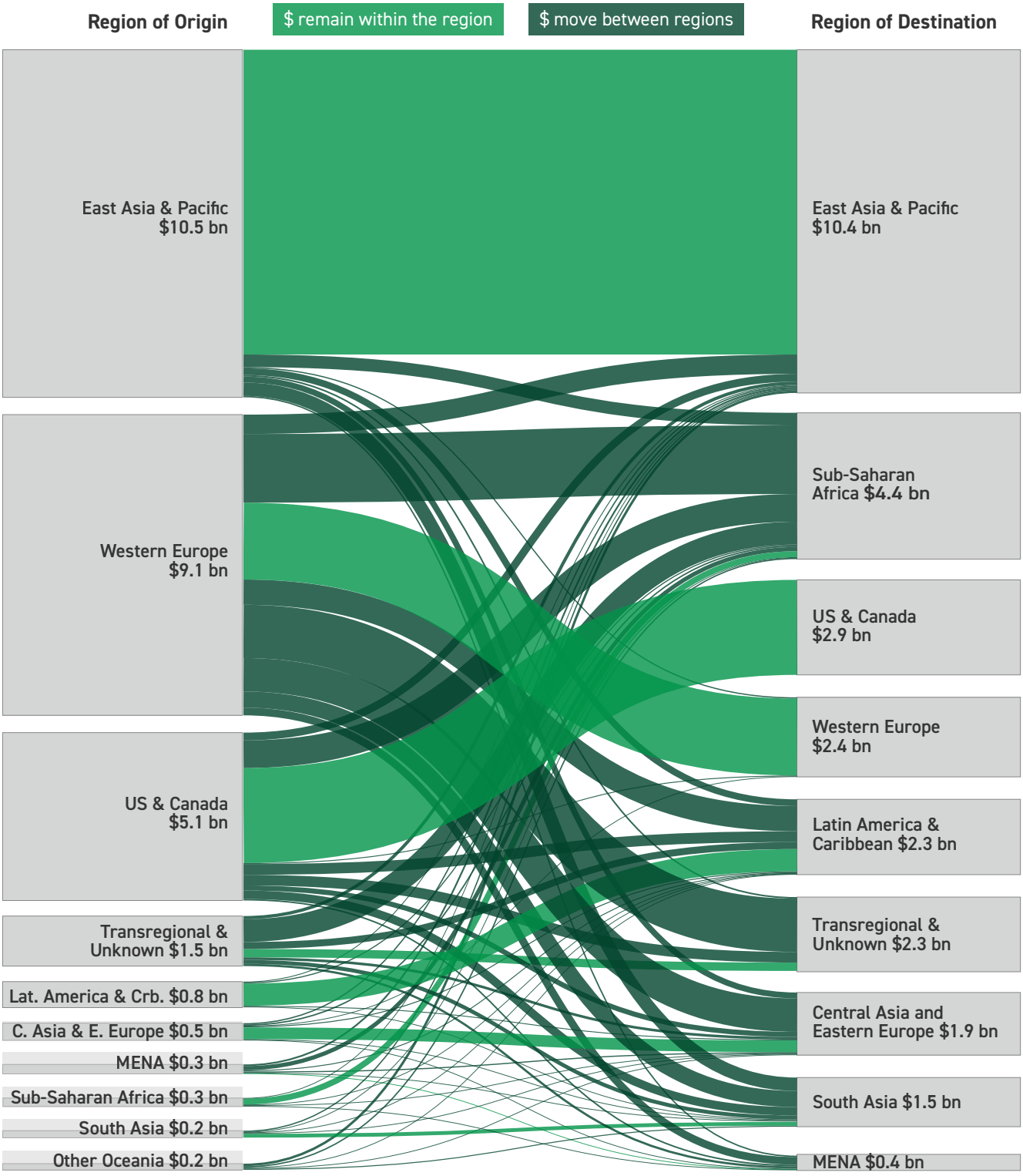
Over one-third of 2019/20 climate project-level investments in agrifood systems were in East Asia and the Pacific (USD 10.4 billion), including substantial domestic finance in China. These large domestic investments meant that 80% of investments (USD 9.2 billion) came from within the region (Figure 13).

Sub-Saharan Africa is the second largest destination of agrifood project-level climate finance, receiving USD 4.4 billion or 16% of all tracked flows. Nearly all of these flows were inter-regional, mainly from Western Europe (47%) and the US and Canada (18%). Other regions with a majority of emerging markets and developing economies typically follow similar patterns, with most finance being sourced externally.

At USD 2.9 billion, the US and Canada constitute the third destination region by volume of finance (10% of total project-level finance). Almost all of this is sourced within the region (Figure 13), though it also sends 40% of its finance to other regions. Western Europe has a similar recipient and source profile, with a great majority of the USD 2.4 billion of finance deployed there sourced regionally, as well as vast volumes of finance flowing from there to other regions – especially to developing economies.

Substantial volumes of finance are categorized as "transregional," where different regions were involved with limited information on how finance was distributed, or as "unknown', where the exact location of projects or investors were not known.

Figure 13. Origin and destination of climate finance flows for agrifood systems (project-level data, 2019/20).



To some extent, the investment trends described above reflect the fact that most of the underlying data is reported by DFIs or governments with large public domestic programs (e.g., China, the US, and in the EU). This is due to a lack of transparency and systematic reporting from other sources. This results in presenting developing economies as recipients of finance and developed economies and China as the main sources of both domestic and international flows.

When compared to their contributions to global GHG emissions from agrifood systems, South Asia (10% of global emissions) and Latin America and the Caribbean (16%) appear particularly underserved by climate agrifood finance (Table 1), each attracting 5% and 8% of total finance, respectively. Similarly, Sub-Saharan Africa and South Asia score highest on vulnerability indexes for food and agriculture production, but received only 16% and 5% of finance, respectively. This emphasizes the magnitude of the financial gap for these regions.

Table 1. Regional distribution of agrifood systems investments compared to GHG emissions, and ND-GAIN Food and Agriculture climate vulnerability index

Region of destination	% of climate finance to agrifood systems	% of global agrifood systems GHG emissions	Average Food and Agriculture Vulnerability Index (ND-GAIN)
East Asia and Pacific	36%	37%	0.47
Sub-Saharan Africa	**16%**	**14%**	**0.60**
US & Canada	10%	7%	0.30
Western Europe	8%	6%	0.23
Latin America & Caribbean	**8%**	**16%**	**0.46**
Central Asia and Eastern Europe	7%	7%	0.38
South Asia	**5%**	**10%**	**0.57**
Middle East and North Africa	2%	3%	0.43
Other Oceania	0%	1%	0.28

Sources: GHG emission data was retrieved from the FAOSTAT web portal (FAO, 2023).

The Notre Dame Global Adaptation Initiative (ND-GAIN) index measures a country's vulnerability to climate change and its readiness to adapt (ND-GAIN, 2023). The values listed above are aggregated country-level scores with respect to climate vulnerability (exposure, sensitivity, and adaptive capacity) in the food and agriculture sectors. A score of 0 indicates lowest vulnerability to climate change, while a score of 1 indicates extreme vulnerability.

Investment data is from CPI database; investments shares do not add up to 100 due to transregional and/or unknown investment locations.

In addition, the US and Canada form the destination of the bulk of tracked VC investments, receiving nearly three-quarters of the total USD 2.3 billion. Western Europe is the second-largest recipient (17%). VC flows remain largely within their region of origin, with over one third of these investors based in the US and Canada, and nearly one quarter in Western Europe. Despite the fact having nearly one tenth of VC investors, East Asia and the Pacific received just 3% of the flows.

The extremely limited VC investments in other regions point to the opportunity for investors to tap other markets. Only 0.3% of tracked climate VC flows went to startups in South Asia, despite the fact that India is one of the largest agrifoodtech markets globally (AgFunder, 2022b). This disconnect stems from a nascent market for upstream technologies. These technologies received 7% of all agrifoodtech investments in India in 2020, as opposed to approximately 30% in Europe (AgFunder, 2020b, 2023a). However, in recent years, there has been increased investor interest in Indian startups, particularly those engaged in agribusiness marketplaces and fintech platforms (AgFunder, 2023a).

7. USE OF FINANCIAL INSTRUMENTS

Debt (both low-cost and market rate) accounted for the largest share (44%) of project-level finance to agrifood systems in 2019/20, followed by grants (38%) and project-level equity (3%).

Project-level market-rate debt made up 31% of overall funding in agrifood systems in 2019/20, with DFIs being the main provider. A significant portion of this financing came from national DFIs, primarily for afforestation and reforestation initiatives in East Asia and the Pacific. Among private sources, commercial financial institutions (FIs) provided the largest share at USD 1 billion. Privately financed projects are largely at the intersection of agrifood and energy systems, primarily supporting bioenergy production.

Figure 14. Instruments used to channel climate finance to agrifood systems in 2019/20 (project-level data)

Note: BSF refers to Balance Sheet Financing

Concessional debt accounted for 13% of total climate finance for agrifood systems in 2019/20, with funds coming almost exclusively from the public sector. Multilateral DFIs were the largest providers, mainly supporting the adoption of climate-smart agricultural practices among agro-pastoralist[13] communities in Sub-Saharan Africa.

13 Communities which rely on farming and livestock for their livelihoods

Grants accounted for 38% of project-level climate finance for agrifood systems, with governments being the primary providers. Over a third of tracked grant financing, totalling USD 3.9 billion, was domestic and was primarily deployed under USDA subsidy programs[14] and China's CCFP forestry initiative.[15] Among international grants, the EAFRD deployed approximately USD 1 billion across EU member states, supporting objectives including water and energy efficiency, GHG emission reduction,[16] carbon conservation and sequestration, and renewable energy. This points to a major opportunity for development agencies to increase their climate finance to agrifood systems.

Private actors, mainly philanthropic foundations, also provided grants, albeit at a much smaller scale than public actors, accounting for 4% of total grant financing. These primarily went to promote agricultural adaptation measures in Sub-Saharan Africa, including regenerative agriculture practices, integrated pest management, and climate-resilient crops.

Equity investments are an underused financial instrument, representing only 4% of the project-level financial flows. Equity can enable investors and companies to share risks, helping them offer innovative but high-risk solutions and technologies. This is badly needed in agrifood systems, where high risks have deterred private investors. Equity investments can also help to avoid debt burdens, removing the financial stresses of interest or principal repayments, thus helping recipients maintain healthier balance sheets.

In 2019/20, concessional finance made up roughly 75% of tracked adaptation flows: 50% from grants and 25% from concessional debt. In contrast, it accounted for roughly 30% of mitigation finance; with market-rate debt making up the largest share (approximately 50%). A similar pattern is visible across all sectors: during the same period, concessional finance constituted 41% of all adaptation finance, but only accounted for 8% of mitigation finance.

Historically, several factors have limited private investment in adaptation projects, which often involve a higher degree of uncertainty and require longer horizons to demonstrate impact (GCA, 2022). These projects may not yield immediate financial returns, making them less appealing for market-rate investment and more suitable for grant or concessional financing. However, adopting climate resilience measures is increasingly viewed as good business practice, given the higher frequency and intensity of climate-related events, as well as emerging regulations (TCFD, 2023).

In contrast, forestry-related mitigation projects often present more predictable revenue generation streams, such as the sale of carbon credits or harvested biomass, making them attractive to commercial lenders. Such mitigation projects have relatively shorter payback periods and clear revenue pathways (WRI, 2019). Meanwhile, governments may be attracted by the possibility to count those as mitigation measures in their Nationally Determined Contributions. Point in case, 93% of mitigation finance deployed through project-level market-rate debt was directed to afforestation and reforestation.

Our company-level data show that agricultural biotechnology startups received substantial early-stage and growth-stage equity investments, but face consumer and regulatory challenges that limit market adoption in later stages. Approximately 50% of tracked

14 USDA CRP, EQIP, AMA,

15 See Box A in Section 4.3

16 Projects may involve a combination of GHG and ammonia (non-GHG) emissions reduction. Due to the limitations of the available reporting mechanisms in distinguishing between the two, we have included them in our tracking, as most observed projects primarily focus on GHG emissions reduction.

company-level investments went to growth-stage ventures and 18% to early-stage businesses. Startups in novel farming systems, innovative foods, and biotechnology each received considerable shares, suggesting that investors see potential for these solutions to scale up and enter new markets. However, under late-stage financing (31%), agricultural biotechnology startups constituted a much smaller share as compared to other stages, at just 3%. Despite being recognized as having considerable year-on-year growth potential, agricultural biotechnology is subject to strict regulations (O'Brien, 2019), which can hinder market adoption opportunities, ultimately affecting its representation in later stages of VC financing.

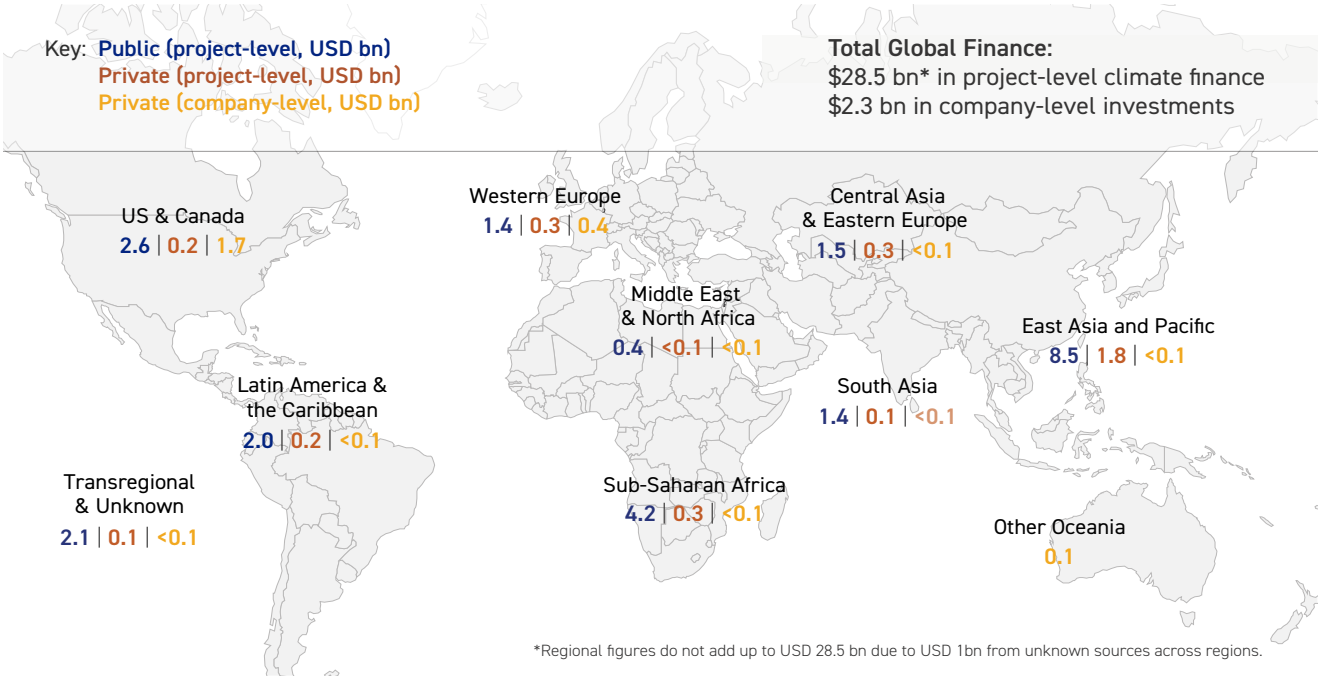
8. SOURCES OF FINANCE

During the 2019/20 period, agrifood systems exhibited significant reliance on public funding, with public entities contributing 85% (USD 24.2 billion) of total project-level climate finance. In comparison, within the energy systems and transport sectors, public funding constituted 33% and 59% respectively during the same period. Approximately 58% of public flows to agrifood systems were from international sources, while 41% were deployed domestically. Mitigation finance accounted for the largest share (46%), with the remainder almost evenly split between finance for adaptation and dual climate objectives (addressing both adaptation and mitigation).

Private sources accounted for only 12% of total climate finance for agrifood systems, amounting to USD 3.29 billion (project-level). Due to incomplete information on co-financed projects in existing reporting mechanisms, particularly regarding public expenditures in the EU, the US, China, and Canada, there is approximately USD 1 billion in unattributed funding.

Venture capital investments in agrifoodtech companies amounted to USD 2.26 billion and are exclusively sourced from private entities. That said, Planet Tracker estimates the value of private finance currently invested in the global food system at USD 8.6 trillion, with the potential to provide annual funding of around USD 630 billion (Elwin et al, 2023). This suggests that private capital should be available to ramp up climate interventions in agrifood systems.

Figure 15. Sources of climate finance by geographic destination in 2019/20



8.1 PUBLIC SOURCES

In 2019/20, DFIs were the leading contributors of public climate finance for agrifood systems, providing just over 50% (USD 12.5 billion). National DFIs provided USD 5.3 billion of this sum, while multilateral DFIs provided USD 5.7 billion. Approximately 34% of the flows from multilateral DFIs went to Sub-Saharan Africa, predominantly supporting climate adaptation efforts through concessional debt and grants.

Financing from national DFIs were far more geographically concentrated, and exclusively targeted mitigation projects. Approximately 91% of funds from national DFIs were directed to East Asia and the Pacific, particularly China, where they supported afforestation, reforestation, and biosphere conservation efforts through project-level market-rate debt. Most remaining flows targeted similar mitigation projects in Latin America and the Caribbean.

With USD 9.5 billion, governments provided the second-largest share (39%) of climate finance for agrifood systems among public sources in 2019/20. The vast majority of this amount was deployed through grants, with an equal split between domestic and international flows. Projects were mainly located in US and Canada (supporting primarily dual-objective agriculture), and East Asia and the Pacific region (mainly supporting forestry PES[17] programs). Practices in these projects include cover crops, irrigation management, riparian buffers, and forest stand improvement.

Box D: Repurposing subsidies for sustainable agrifood systems

Government subsidies in the agriculture and fisheries sectors reached around USD 670 billion per year in the period 2016-18 (World Bank, 2023b). However, over 60% of agricultural subsidies are market distorting, incentivizing increased production without considering negative impacts (World Bank, 2023b). This can lead to practices like soil degradation, deforestation, and excessive use of pesticides and fertilizers, contributing to environmental degradation and GHG emissions.

To promote sustainable agrifood systems, governments should repurpose agricultural subsidies by phasing out support for environmentally harmful activities and incentivizing nature-positive ones, such as agroforestry, soil conservation, and intercropping (WRI, 2021).

The EU Common Agricultural Policy (CAP) exemplifies this shift, with 80% of producer support in Pillar 2 (EAFRD) contingent on meeting environmental constraints (Chatham House, 2019). However, some regressive aspects of the CAP have been criticized (World Bank, 2023b), highlighting the importance of subsidy design that considers environmental impact in conjunction with and socio-economic benefits, particularly for small-scale farmers.

17 See Box A in Section 4.3

8.2 PRIVATE SOURCES

Private actors channeled an annual average of USD 3.29 billion in 2019/20 to agrifood systems projects, representing 12% of total project-level climate finance tracked for agrifood systems for this period. On top of that, an annual average of USD 2.3 billion of private VC investments to agrifood tech companies were climate-relevant in 2019/20.

Most project-level private finance (USD 2.81 billion) went to projects at the intersection of agrifood and energy systems. In contrast, projects that implement on-site production measures in the agriculture, forestry and fishery sectors received less than half a billion (USD 0.35 billion), indicating that they are less appealing to private investors. This distribution also reflects our underlying data, as project-level data in agrifood systems is mostly reported by public development agencies, with limited information from private actors.

COMMERCIAL FINANCE INSTITUTIONS

Commercial FIs invested USD 1.6 billion at the project-level in 2019/20, almost exclusively in renewable energy projects serving agrifood activities. This reflects global climate finance flows, where commercial FIs provide most of the capital for renewable energy (CPI, 2021a), given the sector's more stable risk-return profile (CPI, 2022c). It also shows the nexus between agriculture and renewables to be the most appealing niche for commercial investors.

The vast majority of commercial FIs' agrifood investments were made in East Asia and the Pacific (USD 1.2 billion), with lower amounts going to Western Europe, and Latin America and the Caribbean. This illustrates the climate investment, capacity and reporting gap affecting the Sub-Saharan African region. A European Investment Bank survey found that half of Sub-Saharan African banks had more than 10% of their loan portfolios in agriculture. However, only 20% of banks surveyed offered green lending products due to lack of expertise, data, and tools (EIB, 2022b).

At the global level, commercial bank loans constitute the largest source of finance for investments in agriculture (UNCTAD, 2019). This presents a major opportunity for these actors to adopt a climate lens in their portfolios. There is also a need to do so given the exposure of the agrifood system to climate risks and the potential consequences on their portfolios.

MULTINATIONAL CORPORATIONS

Corporate investments tracked through our project-level agrifood systems data total only USD 0.94 billion and almost exclusively involve energy (99% of the total tracked). Most of these investments are in bioenergy and are made by energy companies. The highest level of finance was channelled to East Asia and the Pacific, followed by Central Asia and Eastern Europe.

Box E: Role of multinational agrifood companies in climate finance

Multinational companies (MNCs) dominate global agrifood systems, with 350 companies recording total annual revenue of USD 8.7 trillion in 2020, representing over half of the market's global revenue (World Benchmarking Alliance, 2020). These companies have a significant climate impact; the cumulative GHG emissions of the top five meat and dairy companies surpass those of major fossil fuel companies (GRAIN & IATP, 2018).

Given their large geographic and emissions footprints, and the consolidation of the agrifood sector, MNCs have great potential to drive the transition to a lower-carbon and climate-resilient system. However, a lack of transparency and standardized reporting on climate finance hampers tracking the implementation of their climate-related commitments.

Based on publicly available information, agrifood MNCs' climate finance activities focus on two broad areas: sustainable supply chains and alternative proteins.

Sustainable supply chains

Investments to reduce deforestation and promote regenerative agriculture in supply chains aim to cut Scope 3 emissions, improve biodiversity, and enhance soil quality. Multi-year programs announced by six companies we analyzed total roughly USD 2.8 billion, or about USD 443.5 million on average annually. This is equivalent to only 1.25% of the combined annual net income of these MNCs (i.e., USD 35.3 billion) suggesting that they could greatly increase their climate investments. An upcoming EU regulation on deforestation-free supply chains is expected to incentivize increased investment, although many influential companies are yet to implement measures to comply with this (Forest500, 2023).

Alternative proteins

There is also a large amount of investment in alternative proteins, driven primarily by consumer demand in developed country markets (Rabb, 2022; GFI, 2021). MNCs make significant investments in acquiring and growing plant-based startups and in R&D of new products.

PHILANTHROPIC ORGANISATIONS

Of the USD 0.49 billion of climate funding that philanthropies provide to agrifood systems, USD 0.31 billion goes to agriculture-related projects. Much of this is disbursed in grants, with minor amounts channeled through equity or debt. More than half of philanthropic funding goes to Sub-Saharan Africa, followed at quite some distance by Western Europe, Latin America and the Caribbean, and South Asia. The geographic distribution and type of instruments used reflect the barriers to financing agrifood systems. Especially in predominantly small-scale agrifood systems in Sub-Saharan Africa and South Asia, commercial investors are deterred by high risks, low returns, and high transaction costs, leaving a gap for public and philanthropic finance to fill. Philanthropic finance going to Western Europe originates from either that region or from North America, and targets research.

VENTURE CAPITAL

Private VC investors provide all the climate finance tracked as going to agrifood tech startups, according to analysis of AgFunder data. These investors are mostly based in developed economies, with over one third in the US and Canada and nearly one quarter in Western Europe. While nearly one tenth of tracked VC investors are in East Asia and Pacific, Africa and South Asia display a striking lack. VC investments flow largely within the regions they originate from, with three quarters of the total targeting US and Canadian start-ups.

Recent years have seen a striking increase in VC appetite for climate tech[18] globally and across sectors, with a 3,750% increase between 2013-19 (PwC, 2020) and historically high levels for 2021/22 (PwC, 2022). Despite that, climate tech for agriculture, food and land use is under-invested compared to their share of global GHG emissions, and relative to sectors like mobility and energy. A lack of technological maturity in agrifood systems may be one reason for this gap (PwC, 2022). There is also a need for a stronger business case, as well as an enabling environment and regulations for some sectoral technologies with high climate mitigation potential. These include for food loss/waste, and alternative protein. Such efforts can increase the profitability of climate tech startups and boost VC participation.

18 Climate tech is defined as technologies explicitly focused on reducing GHG emissions or addressing the impacts of global warming. It can be grouped into three broad, sector-agnostic groups, those that: directly mitigate or remove emissions, help us to adapt to the impacts of climate change, and/or enhance our understanding of the climate (PwC, 2022).

9. OPPORTUNITIES FOR ACTION IN AGRIFOOD SYSTEMS

Global agrifood systems urgently need at least a seven-fold increase in climate finance to fulfill their potential and to deliver climate mitigation and adaptation gains to people worldwide. Our analysis points to various opportunities to drive action towards this goal. This section discusses these opportunities along three elements:

1. Guiding principles
2. Climate finance mobilization and deployment
3. Climate finance data and evidence

This section does not represent a comprehensive strategy for scaling up climate finance in agrifood systems, which is beyond the scope of this study. It rather complements existing and upcoming sectoral and system-wide roadmaps for a shift to low-carbon and climate-resilient agrifood systems.[19]

9.1 GUIDING PRINCIPLES

Stakeholders across the board should work to extend their actions to encompass system-wide perspectives, as well as delivering more meaningful impact. Actions to increase and improve climate finance for agrifood systems should be guided by the following overarching principles:

- **Foster integrated sustainability objectives.** Agrifood system actors should strive to integrate multiple sustainability objectives meaningfully into their activities to tackle climate challenges in a systemic way. Such efforts can deliver simultaneous benefits for climate adaptation, mitigation, and nature while fostering food security and development of societies.
- **Leverage virtuous cycles** between various types of actor (both public and private), at different levels (global, regional, national and local). Various types of interventions, from policies and regulations to technical assistance and investments, should also be integrated. The whole community must find innovative ways of using existing interconnections between actors and segments of agrifood systems to tackle the climate challenge.
- **Strive for efficiencies and improve implementation.** Climate action in agrifood systems is urgent and green capital is scarce. Actors at all levels should coordinate to avoid duplicating efforts and to efficiently use all human, political and financial capital available. Existing initiatives should be maximized through implementation or

19 These include: Planet Tracker, 2023a; Deforestation Free Finance, 2022; CBI, 2022; Loboguerrero et. al, 2020; FOLU, 2023a; IEA et. al 2022; UNEPFI, 2023a; the forthcoming World Bank Flagship Roadmap on Decarbonization of the Air and Recarbonization of the Land through Agrifood System Transformation (DARL); and the forthcoming FAO Global Roadmap to 1.5°C for the agriculture and food systems sector.

otherwise reformed, depending on needs. New initiatives should be solely designed to fill remaining gaps, building on previous successes and learning from failures.

- **Think globally, act locally.** While agrifood systems involve global actors and relationships, effective climate solutions need to combine global perspectives with local traditional knowledge, capacity building and ownership to have durable impact.

9.2 CLIMATE FINANCE MOBILIZATION AND DEPLOYMENT

Increased climate finance for agrifood systems must be deployed meaningfully. Our analysis emphasizes several geographic and sectoral gaps and opportunities for actors across the board:

- The private sector has great opportunities to increase their climate finance to agrifood systems. Furthermore, enhancing accountability and disclosure efforts will boost their visibility and competitive advantage in this space.
- There is scope for more climate mitigation interventions in agrifood systems in South Asia, and Latin America and the Caribbean, while adaptation finance is highly needed in Sub-Saharan Africa and South Asia.
- Interventions delivering the double benefits of climate mitigation and adaptation represent a unique opportunity in agrifood sectors and should be further explored by both public and private funders and investors.
- Food loss/waste and low-carbon diets are untapped opportunities across geographies.
- Fisheries and aquaculture are also insufficiently funded, given their economic potential, role in ensuring food security and vulnerability to climate change. This gap is particularly striking in Asia.

The rest of this section discusses actions that key actors can take to bridge these climate finance and impact gaps.

SUMMARY OF OPPORTUNITIES FOR ACTION FOR CLIMATE FINANCE MOBILIZATION AND DEPLOYMENT

Principle/Actors	Policymakers and Regulators	Development Finance Institutions	Private Financial Institutions (FIs)	Multinational Corporations
Foster integrated sustainability objectives	▪ Mandate deforestation-free supply chains to tackle both climate change and biodiversity loss.	▪ Build in-house capacity to mainstream climate and nature in all agrifood development projects.	▪ Tackle climate and nature risks simultaneously in agrifood portfolios, by adopting the TCFD and TNFD frameworks.	▪ Investments in regenerative agriculture (for carbon sequestration and biodiversity) should be inclusive and in alignment with scientific evidence to prevent greenwashing.
Leverage virtuous cycles	▪ Place agrifood systems as a top priority on the global climate agenda. ▪ Accurately reflect agrifood system finance needs in Nationally Determined Contributions and National Adaptation Plans.	▪ Collaborate with development agencies to bundle finance with technical assistance for supply chain actors. ▪ Invest in innovative climate tech for agrifood systems, leveraging a successful VC pipeline.	▪ Leverage their creditor/ shareholder power to incentivize climate investments by agrifood corporates.	▪ Jointly invest in capacity building of suppliers on Scope 3 emissions reduction, measurement, and reporting. ▪ Facilitate access to climate finance for suppliers.
Strive for efficiency & improved implementation	▪ Repurpose public finance and use it catalytically to attract private contributions.	▪ Use de-risking financial instruments innovatively to attract private finance.	▪ Local FIs should build their internal technical knowledge on climate risks and relevant technologies for agrifood systems.	▪ Adopt and implement voluntary value chain GHG emission targets. ▪ Assess value chain climate risk exposure in and act to increase resilience.
Think globally, act locally	▪ Encourage consumer shift to low-carbon diets and food waste reduction. ▪ Incentivize domestic and regional FIs to fund climate actions in agrifood supply chains.	▪ Provide concessional capital and climate capacity building to local FIs.		▪ Jointly invest in capacity building of suppliers on Scope 3 emissions reduction, measurement, and reporting.

POLICYMAKERS AND REGULATORS

- **Position agrifood systems as a top priority on the international climate agenda.** The importance of these systems for climate and food security warrants a central position at international fora such as the climate change and biodiversity COPs, and related initiatives. Technical understanding of the climate challenges faced by agrifood systems is particularly important in the context of the Loss and Damage Fund, and as the international finance architecture is refined.[20]
- **Actively devise modalities to scale up domestic allocation of public finance to climate action in agrifood systems**. Global public finance for agriculture is substantial, at over USD 600 billion per year, but only a fraction aims to tackle climate issues (World Bank, 2023b). Governments worldwide have an opportunity to shift subsidies to adoption of climate-smart and regenerative farming practices. These can be used catalytically to stimulate private investments. Such support should be designed with socio-economic considerations in mind, by ensuring inclusive access, and should be coupled with extension services tailored to local conditions and specific crops.
- **Devise Nationally Determined Contributions and National Adaptation Plans that accurately reflect in monetary terms the importance of domestic agrifood systems in relation to GHG emissions, climate change vulnerability and socio-economic contributions.** This will help to mobilize the financial resources required for implementation, especially for emerging and developing economies. Building capacity of government personnel on cost estimation and the use of tools like CGIAR's Climate-Smart Agriculture country profiles or strategic plans by commodity can support this process.
- **Adopt regulations that mandate deforestation-free supply chains for globally traded commodities**, particularly for those identified as drivers of deforestation for agricultural expansion in developing countries (e.g., cattle, cocoa, coffee, palm oil, rubber, soy, and timber). Major markets' regulators should coordinate efforts to ensure enforcement and maximize effectiveness of such regulations, and to avoid spillover effects to other value chains and markets. The upcoming EU Regulation on deforestation-free supply chains (European Commission, 2022a) provides a pioneering example of this. Such regulations can generate virtuous cycles that simultaneously tackle climate and biodiversity loss in developing economies. This must be coupled with strong coordination between producer and consumer countries, and between various actors in supply chains. Capacity building is required at all levels to leverage existing voluntary programs, such as the Partnership for Forests.
- **Encourage consumer behaviour change through awareness campaigns and food labelling regulations.** Labels have been found to encourage consumption of lower-emissions foods by helping people make informed purchase decisions (The Economist, 2023). Awareness campaigns on GHG emissions from food waste could also shift consumer behavior, in turn influencing retailers, processors and farmers.
- **Devise policies incentivizing regional and domestic commercial FIs to provide climate finance to agrifood actors or to develop dedicated financial products that reward the adoption of climate-smart practices.** Those should be tailored to the needs of various

20 Through the New Global Financial Pact and the Bridgetown Initiative.

agrifood system actors, from farmers, processors, aggregators, and input suppliers through to exporters and retailers. Such policies can leverage public credit lines and create the obligation for private FIs to contribute their own funds and/or match public funds with their own.

- **Make climate transition plans and risk disclosures mandatory for investors and companies, building on voluntary frameworks like the Taskforce on Climate-related Financial Disclosures (TCFD).** Governments in developed economies should lead the way, as major investors and MNCs are under their jurisdictions. They can build momentum on support shown by the private sector, such as the 2022 Global Investor Statement to Governments on the Climate Crisis (The Investor Agenda, 2022). This is particularly pressing for agrifood systems, given the substantial proportion of GHG emissions generated (approximately 30% of global emissions) and considerable Scope 3 footprints of agrifood MNCs (Edie, 2022). Regulation of investors and large corporations can trickle down through their supply chains, to extend climate risk management to the farmer level.

DEVELOPMENT FINANCE INSTITUTIONS

- **Increase deployment of climate finance through innovative instruments that address prevalent barriers in agrifood systems.** Grants and private equity should be used as risk absorption tools and to help entrepreneurs avoid extra debt burdens. Furthermore, DFIs' equity can help to develop climate adaptation solutions, and pilot innovative agribusiness models to offer those solutions in agrifood systems and demonstrate their profitability. This can help build an investable pipeline and catalyze later-stage private investment, as exemplified by the UK FCDO Climate Public Private Partnership Programme. Similarly, DFIs can create opportunities for innovative blended finance instruments by providing first loss and concessional capital, as well as guarantees to attract private sector investors.
- **Break institutional silos and leverage relationships with development agencies to combine equity, concessional debt and guarantees with grant funding for technical assistance.** Capacity building is required at all levels of developing economies' agrifood systems, from FIs and agribusinesses to cooperatives and farmers. This can act as a strong de-risking tool for investments. DFIs should make efforts to foster collaboration with development agencies to design bundled financing solutions in their investments. For adaptation finance, these can take the form of grant funding for agribusinesses' climate risk assessments; for mitigation, grants can help set up environmental management systems.
- **Tap local FIs' potential to channel climate finance rapidly and durably.** DFIs should pioneer and promote climate capacity building for local FIs as a priority to create self-sustaining financial markets. Programs like Transforming Financial Systems for Climate (GCF, 2023) and funds like Aceli Africa (2023) should be replicated at speed across developing countries, with a focus on agrifood systems. Technical assistance bundled with concessional credit to local financial partners who on-lend to agri-businesses or cooperatives can stimulate their wider penetration in the local agrifood sector, which they typically avoid due to high transaction costs. In more developed financial markets, such publicly funded programs could require local financial partners to provide a

matching contribution, helping to catalyse private sector climate investment. Local FIs have the potential to reach larger numbers of beneficiaries, particularly in regions where small-scale agriculture is predominant and where climate finance is significantly insufficient, such as Sub-Saharan Africa and South Asia.

- **Invest in innovative climate tech for agrifood systems, to help bridge technological maturity gaps and export proven technologies to new geographies.** VC investments in segments like food loss/waste, and alternative proteins, enable new technologies in developed economies. DFIs could invest in replicating these, once proven, in emerging and developing economies.
- **Build in-house capacity to mainstream climate and nature in all agrifood development projects.** To rapidly and meaningfully fill the climate finance gap in agrifood systems, DFIs and development agencies should move beyond partial targets for climate finance and design all interventions with climate and nature considerations. Climate-nature dependencies are essential in agrifood systems. As awareness around these interconnections gains ground, DFIs can lead the way in applying learnings from climate finance to nature-positive finance to take both forward in an integrated manner, together with social development objectives.

PRIVATE FINANCIAL INSTITUTIONS AND INVESTORS

- **Leverage their creditor or shareholder power to incentivize climate investments by agrifood corporates.** This could include setting clear conditions related to general company-wide science-based targets and climate transition plans with milestones (AgFunder, 2023b).
- **Local FIs should build their internal technical knowledge on climate risks and relevant technologies for agrifood systems.** As major lenders to agrifood sectors in developing economies, local FIs should adopt institution-wide climate strategies, embed staff incentives, and adopt voluntary climate risk reporting, in line with the TCFD. This will help to climate-proof their portfolios by encouraging their agrifood borrowers to take climate adaptation measures. It will also enable them to expand their products in line with climate goals (CPI, 2022c).
- **Seize the opportunity to tackle climate and nature risks jointly.** This is essential for their agrifood portfolios, where nature and climate are closely connected. Private FIs should build on the learnings from using TCFD frameworks to rapidly adopt the TNFD framework and tools.

MULTINATIONAL CORPORATES

- **Increase investments to reduce GHG emissions and enhance resilience of businesses to climate change, thus contributing to resilience of supply chains, farmers, and farm ecosystems.** This can be done by:

    1. Adopting and implementing voluntary value chain GHG emission targets (Scope 3 targets) represents the largest opportunity for climate mitigation, as the average supply chain network of a large agrifood MNC generates emissions 11.4 times greater than its own operations (Edie, 2022).

2. Assess value chain climate risk exposure in line with the TCFD and act to increase the climate resilience of agrifood system supply chains.

- **Leverage synergies between corporates with overlapping or shared supply chains by jointly investing in capacity building of their suppliers** on Scope 3 emissions reduction, measurement, and reporting. This is exemplified by the Supplier Leadership on Climate Transition consortium.[21] Such collaboration enables more efficient use of resources, since member companies use many of the same suppliers. It also allows for more rapid and concerted action on Scope 3 emissions, as suppliers are trained to follow consistent approaches (Draucker and Kobayashi, 2022).
- **Facilitate access to climate finance for suppliers.** Modalities can include brokering deals with commercial banks for sustainable supply chain finance at scale. For example, a program agreed between PVH Corp and HSBC Bank USA[22] allows suppliers of large corporates to access funding to implement climate and sustainability targets. The loans can be conditional on companies' compliance with Scope 3 emissions targets decided by the MNC, thus helping with their implementation.
- **Increasing financial investments towards regenerative agriculture need to be aligned with emerging scientific evidence to prevent greenwashing risks.** While gaining in popularity amongst agrifood companies, the concept of regenerative agriculture is used as an umbrella term that lacks a universally accepted definition (FOLU, 2023b). While some specific practices considered as regenerative are found to produce benefits in terms of farmland biodiversity, carbon sequestration and yield, MNCs should foster evidence gathering to help further build the knowledge base and facilitate their investments at scale. It is also particularly important that implementation of regenerative agriculture commitments is inclusive and fair, and creates improvements for farmers' livelihoods.

9.3 CLIMATE FINANCE DATA AND EVIDENCE

To guide increased and impactful climate action in agrifood systems, accurate data and evidence on spending as well as remaining gaps is essential.

GOVERNMENTS, AGRIFOOD MNCS, PRIVATE FIS AND INVESTORS

Urgently step-up systematic tracking and disclosure of climate-related spending. Voters and consumers are increasingly impacted by the effects of climate change on food supply and are calling for transparency and accountability from decision-makers. Furthermore, data-driven approaches are essential to determine requirements and efficiently allocate scarce financial resources.

Therefore, reforms aiming to integrate climate change into national budgets and fiscal policies need to be backed by strong tracking and reporting. Experiences from early adopter countries (UNDP, 2022; FAO, 2021d) as well as platforms like The Coalition of Finance Ministers for Climate Action should help to build capacity within governments for

21 The Supplier Leadership on Climate Transition consortium was created in 2021 by Mars, PepsiCo and McCormick & Company, and has been joined by General Mills, The Coca-Cola Company, Keurig Dr Pepper, Mondelez International and Nestle, among others including restaurant brands and cosmetics companies.

22 https://pvh.com/news/pvh-hsbc-partnership

tracking and disclosure of climate spending. Public and private actors should coordinate to define reporting principles and tools that account for needs and priorities of private sector entities. This can enable future consistent reporting across both private and public sectors (CPI, 2020). Existing frameworks and standardized tools like the Sustainability Accounting Standards Board (SASB), TCFD, Global Reporting Initiative (GRI), and green finance taxonomies such as the EU Sustainable Finance Taxonomy provide a basis for private actors to report climate finance data in a way that is aligned with international efforts (CPI, 2022c).

RESEARCH ORGANISATIONS AND TECHNICAL ASSISTANCE PROVIDERS

Continue to build the evidence base enabling improved climate finance in agrifood systems:

- Document and analyse climate finance flows to identify gaps and opportunities and track progress on commitments.
- Build the business case for climate investment in agrifood systems, particularly around actual and perceived risks, as well as adaptation and resilience investments.
- Drive reflection on modalities to replicate successful approaches from other sectors to agrifood systems and from one market to another.

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LIST OF ACRONYMS

AFOLU	Agriculture, Forestry, Other Land Uses, and Fisheries
EU CAP	European Union Common Agricultural Policy
CBI	Climate Bonds Initiative
CCFP	Conversion of Cropland into Forests Program
CGIAR	Consultative Group on International Agricultural Research
CRP	Conservation Reserve Program
OCED DAC	OECD Development Assistance Committee
DFI	Development Finance Institution
EAFRD	European Agricultural Fund for Rural Development
EIB	European Investment Bank
ETS	Emissions Trading Schemes
FAIRR	Farm Animal Investment Risk and Return
FAO	Food and Agriculture Organization
FOLU	Food and Land Use Coalition
GFI	Good Food Institute
GHG	Greenhouse gas
HLPE	High Level Panel of Experts
IATP	Institute for Agriculture and Trade Policy
IEA	International Energy Agency
IFPRI	International Food Policy Research Institute
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
L&D	Loss and Damage
MDB	Multilateral Development Bank
ND-GAIN	Notre Dame Global Adaptation Initiative
NFPP	Natural Forest Protection Program
OECD	Organisation for Economic Co-operation and Development
PES	Payment for Ecosystem Services
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SDG	Sustainable Development Goal
TCFD	Taskforce on Climate-Related Financial Disclosures
TNFD	Taskforce on Nature-related Disclosures
UNCTAD	United Nations Conference on Trade and Development
UNEP FI	United Nations Environment Programme Finance Initiative
USDA	United States Department of Agriculture
VC	Venture Capital
WWF	World Wildlife Fund

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