DEFORESTATION-FREE COMMODITIES

INVESTING IN DEFORESTATION-FREE SUPPLY CHAINS AS A STRATEGIC IMPERATIVE

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TECHNICAL ANNEX

MFF
managed by FMO

DEFORESTATION-FREE COMMODITIES: INVESTING IN DEFORESTATION-FREE SUPPLY CHAINS AS A STRATEGIC IMPERATIVE

Technical Annex

The Mobilising Finance for Forests (MFF) program is managed by FMO and jointly funded by the UK and Dutch government.

Palladium and Systemiq have delivered this work as part of the MFF Learning, Convening and Influencing Platform.

FMO Entrepreneurial Development Bank

UK Government

Ministry of Foreign Affairs of the Netherlands

Palladium MAKE IT POSSIBLE

SYSTEMIQ

ABOUT MFF

Mobilizing Finance for Forests (MFF) program is funded by the UK government and the government of the Kingdom of the Netherlands. MFF was established in 2021 by the UK government and FMO as a blended finance investment program to combat deforestation and other environmentally unsustainable land use practices contributing to global climate change. The Netherlands' Ministry of Foreign Affairs joined MFF as a second funder in 2024.

As part of the MFF Technical Assistance Facility, the Learning, Convening & Influencing Platform (LCIP) seeks to increase the scale, in terms of size and impact, of investments in forests, sustainable land use and nature. The LCIP does this by delivering and disseminating research, briefing papers, guidance and investment blueprints to increase the capacity and motivation of investors to invest in forests and sustainable land use.

CONTENTS

1. OVERVIEW

This annex outlines the methodology used to estimate the investment needs to transition to deforestation-free agricultural supply chains by 2030. The analysis categorizes investment needs into three primary areas: production system transformation, midstream accountability infrastructure, and the enabling environment explained in detail in section 1.1.

1.1 INVESTMENT CATEGORIES

Investments have been grouped into the following categories:

Category of Investment/Finance Need	Explanation
Production System Transformation	Investments that reduce deforestation by sustainable land management (agroforestry, improved soil health, sustainable agriculture). This includes technical assistance, access to inputs, and agroecological practices where they support deforestation-free outcomes.
Midstream Accountability Infrastructure	Investments associated with traceability platforms, certification schemes, and verification systems that ensure commodity sourcing is compliant with deforestation-free standards. *Given the fragmented nature of current traceability solutions, scaling these systems remains one of the most underfunded yet crucial steps toward accountability.*
Enabling Environment	Investments in public governance, policy development, regulatory enforcement, and institutional capacity-building that create the conditions necessary to implement and sustain deforestation-free supply chains. *This foundational layer ensures national and sub-national systems can monitor, enforce, and incentivize compliance, especially in regions where forest governance is weak.*

Note: We have excluded any **downstream measures out of scope** because we have assumed that there are no concrete areas to map downstream investments (it is mostly demand driven which is out of the scope of our target audience).

1.2 ESTIMATION APPROACH

The total investment need by 2030 is estimated based on the following:

- **Current Baseline**: Investment flows from 2022–23 were mapped and categorized from existing resources listed in section 1.3.
- **2030 Targets**: Targets were projected based on a mix of proxy indicators.
- **Assumptions**: Where data was incomplete, conservative assumptions were applied to avoid overestimations. Specific assumptions are documented alongside each investment category in following sections.

1.3 SOURCES

The estimates in this annex draw from a combination of publicly available datasets, technical reports, and prior studies:

- UNEP State of Finance for Nature (2023)
- REDD+ Funds Progress Reports
- Global Forest Finance Pledge (2021)
- Forest 500 Reports
- Forest Finance Theme 3 Assessment 2023
- CPI Policy Brief – Brazil knows what to do to fight deforestation
- AgFunder Global AgriFoodTech Investment Report 2024
- Emerging insights from satellite monitoring and traceability investment platforms

Wherever available, actual financing data from 2022–23 has been used as a baseline.

1.4 ATTRIBUTION TO AGRICULTURAL DEFORESTATION

Not all forest finance targets agricultural drivers. This annex estimates the share relevant to agriculture by analyzing the scope of funding and investment categories, along with their exposure to forest-risk commodities. Attribution is detailed for each category in the sections that follow.

2. FINANCE FLOWS AND NEEDS BREAKDOWN

This section provides a breakdown of the estimated investment requirements across the three core components critical to achieve deforestation-free agricultural supply chains by 2030. Each category draws on recent financing data (2022–23) and scales forward to 2030 based on sector-specific proxies.

2.1 2022-23 FINANCE FLOWS

Investment Area	2022-23 ($B)	Proxy Used/Assumptions	References
Production System Transformation	34	Current flows categorized under Sustainable Agriculture, Sustainable Supply Chains, Impact Investing, Carbon Markets, PES, Farmers' Investments, and ODA, as per UNEP SFN 2023 report (aligned with Sustainable Land Management NbS category – Figure 3.7 in UNEP SFN 2023). In addition to above, we reference sustainable intensification as part of the broader sustainable agriculture and sustainable land management categories tracked by UNEP SFN 2023	UNEP SFN 2023
Midstream accountability infrastructure	2	Finance for certification of deforestation-free commodities (e.g., certified coffee, palm oil, soy, and cocoa), as illustrated in Fig. 3.5 of UNEP SFN 2023. Finance for certified forestry products—primarily pulp and paper—accounting for approximately 30–40% of total certified forestry trade, also illustrated in Fig. 3.5 of UNEP SFN 2023.	UNEP SFN 2023
Enabling Environment	1	REDD+ Funds averaged over past 5 years (~$0.36M), Forest finance pledges for Deforestation-free Supply Chains & Deforestation-free financial markets/investments (~$0.35B), and Jurisdictional programs (long-term projects with a horizon of 5-10 years of fund disbursement).	REDD+ Funds Progress Reports; Global Forest Finance Pledge (2021)
Total	**37**		

2.2 2030 ESTIMATIONS

Investment Area	2022-23 ($B)	Proxy Used/Assumptions	References
Production System Transformation	181	The target reflects the cost of transitioning to Sustainable Land Management (SLM) and regenerative practices as identified in Figure 4.1 UNEP SFN 2023 Report. Total SLM needs estimated as 1/3 of (~$542B).	UNEP SFN 2023
Midstream accountability infrastructure	22.3	The target was calculated by estimating the per-unit cost of traceability and certification and applying it across expected market volumes in 2030 for five commodities: - Cocoa - Coffee - Soybean - Beef - Palm Oil	Reference Section 3 *'Estimation of Midstream Accountability Infrastructure Finance Needs'*
Enabling Environment	5.5	Estimates reflect the investment required in legal and regulatory reform, institutional capacity & governance, public finance in monitoring and data infrastructure, and multilateral and international platforms commitments.	Reference Section 4 *'Estimation of Enabling Environment Finance Needs'*
Total	**208.8**		

3. ESTIMATED ANNUAL INVESTMENT NEEDS IN MIDSTREAM ACCOUNTABILITY INFRASTRUCTURE (2030)

This section details the methodology used to estimate the cost of meeting traceability and certification needs across five key forest-risk commodities — cocoa, coffee, palm oil, beef, and soy — through to 2030. Due to lack of data, estimations on commodity 'Timber' is currently excluded.

3.1 METHODOLOGY

The analysis estimates the total cost of traceability by:

- Projecting production volumes for each commodity from 2024 to 2030 using volume CAGRs (Compound Annual Growth Rates), adjusted for inflation via price CAGRs.
- Applying a per-tonne traceability cost, based on market studies and expert estimates, to each year's projected volume.
- Aggregating annual costs to determine the average investment need per year.
- All estimates assume a global average price CAGR of 1.5%. Volume CAGR = Value CAGR – Price CAGR.

All amounts are expressed in the value of today's dollars to remove the effects of inflation over time. This helps reflect the true cost of investment needs year by year. The estimates cover global traceability needs to meet new rules like the EU Deforestation Regulation (EUDR).

3.2 ESTIMATION BY COMMODITY

Commodity	2023 Volume (Mt)	Volume CAGR	Traceability Cost ($/Tonne)	Key Assumptions/Note	References
Cocoa	4.4	3.3%	78	Derived from cocoa price range (0.5%–2% of value) plus $50 GPS mapping fee.	Volume Computation Cost of Traceability
Coffee	11	3.2%	62.4	Assumed at 80% of cocoa's cost due to simpler supply chains.	Volume Computation
Palm Oil	76	2.7%	65	Direct reference from existing report – Chain Reaction Research.	Volume Computation Cost of Traceability
Beef	60	2.9%	30	Direct reference from existing report – Chain Reaction Research.	Volume Computation: Source 1, Source 2 Cost of Traceability
Soy	396	2.9%	30	Direct reference from existing report – Chain Reaction Research.	Volume Computation Cost of Traceability

3.3 INVESTMENT NEEDS (2024-2030)

Year	Total Investment Need ($B)
2024	20.2
2025	20.75
2026	21.3
2027	22.0
2028	22.6
2029	23.2
2030	24.0
Average	~22.3

The average annual investment need for meeting traceability needs through 2030 is estimated at $22.3 billion.

3.4 SOURCES

- Volume growth projections: Statista, FAS USDA, Mordor Intelligence, Grand View Research
- Cost assumptions: Transparency Pathway, Chain Reaction Research
- Regulatory context: EU Deforestation Regulation (EUDR), industry estimates on certification and geolocation costs

Note: The average annual investment need for traceability infrastructure through 2030 is estimated at $22.3 billion. While unit costs are expected to decline over time due to economies of scale and maturing technologies, this estimate also factors in potential increases in compliance requirements, platform integration costs, and verification complexity. **As such, the projected investment need ranges between $20–25 billion annually to build and maintain credible, commodity-wide traceability systems.**

4. ESTIMATED ANNUAL INVSTMENT NEEDS IN ENABLING ENVIRONMENT (2030)

4.1 INVESTMENT NEEDS BY SUB-CATEGORIES

Category	Definition	Estimation Proxy	Attribution to Agri-Deforestation	Annual Need ($B)	References
Legal and Regulatory Reform	Funding for land tenure reform, environmental law enforcement, and legal capacity to uphold forest rules.	Indonesia's One Map Project ($40M/year) used as a proxy.	**~70%.** Land tenure and forest law reforms are closely linked to agricultural land use change. Estimate assumes replication across ~10 high-risk tropical countries.	0.28	Indonesia One Map Program
Forest Monitoring & Data Infrastructure	Investments in MRV systems, satellite monitoring, land registries, and geospatial platforms.	Brazil's IBAMA and INPE enforcement budget (~$685M/year) used as upper-bound proxy.	**~50%.** A significant share of forest monitoring targets agriculture-driven deforestation. Estimate assumes similar investments in ~10 tropical countries. May overlap with midstream costs.	3.43	Brazil's IBAMA and INPE Budget
Multilateral and International Platforms	Global programs such as REDD+, GFFP, and jurisdictional deals (e.g. LEAF) supporting governance and capacity.	Based on pledges and reported annual flows: - GFFP ($3-4B/year) - REDD+ Finance expected to flow by 2030[1] - Large-scale Coalitions like LEAF ($2–3Bn/year)	**~40–50%.** While agri-deforestation is a major focus, some finance supports biodiversity, restoration, and broader conservation outcomes.	2.1-3.75	GFFP Report 2021, REDD+ Finance Updates, LEAF Coalition update
Total				5.8-7.5	

4.2 ATTRIBUTION LIMITATIONS AND UNDERREPORTING

A significant share of deforestation-relevant investment is not disaggregated by commodity or region, leading to uncertainty in attribution to agriculture-driven forest loss. REDD+ and public enforcement flows may also address broader conservation goals. In this annex, only the portion targeting agricultural land use change was considered.

[1] Based on an average approval volume of $362 million in 2023, and assuming REDD+ finance either holds steady, grows at 5% annually, or declines slightly depending on global policy support, annual REDD+ approvals between 2024 and 2030 could plausibly range between $300-450 Mn.

5. ESTIMATED ANNUAL INVESTMENT POTENTIAL IN TRACEABILITY SOLUTIONS (2030)

This section estimates the investable market potential across traceability-related technologies that support deforestation-free supply chains, focusing on agricultural supply chain management services, geospatial solutions, and blockchain applications.

5.1 METHODOLOGY

We identified relevant markets based on sectoral forecasts and applied filters to determine the share attributable to DCF[2]-specific use cases. For each category, we calculated the 2030 market size and the share aligned with traceability needs in forest-risk commodity supply chains. The total market scope by 2030 is estimated at $28 billion, distributed across the three categories below.

Category	2030 Market Size ($B)	Deforestation-free aligned Estimate ($B)	Key Assumptions
Agricultural Supply Chain Management (SCM)	1.6	0.75	We have considered five SCM functions: Inventory & Logistics (I&L), Procurement Planning, Traceability, Certification, Compliance. High alignment assumed for traceability and certification; medium for planning; low for logistics. Equal weighting across all five functions suggests ~62.5% alignment. 25% discount applied for overlap with geospatial/blockchain tools. Final share: **47% of total market**
Geospatial Solutions	873	25	Agriculture accounts for 7–10% of the total market. Within agri-uses, six key areas are considered: Traceability, MRV/Carbon, Logistics, Precision Agriculture, Irrigation, and Pest Monitoring. Only traceability, MRV, carbon certification, and logistics considered relevant to DCF (~30% of agri-use). Final share: **~3% of total market**
Blockchain in Agri & Food Systems	5.6	2.8	Blockchain use cases in agriculture split across four main areas: Payments, Procurement, Food Safety, Certification/Sourcing. We have considered only two (Certification & Sourcing) as relevant. Assuming equal share across use cases, 50% of market aligns with the scope. Final share: **50% of total market**
Total	—	28.3	

[2] DCF: Deforestation- and Conversion-Free

5.2 ATTRIBUTION

- SCM attribution was built by scoring each component (e.g., traceability tools = high; I&L = low) and weighting their alignment with DCF needs.
- Geospatial attribution applies an Agri-sector filter, followed by a second filter for relevant use cases.
- Blockchain use cases were filtered to include only those enabling verifiability, such as digital certifications.

5.3 SOURCES

- Agricultural SCM Market Size: GlobeNewswire, 2024
- Geospatial Market Size: Grand View Research
- Blockchain in Agriculture: InsightAce Analytic

6. LIMITATIONS AND ASSUMPTIONS

The investment estimates provided in this annex reflect the best available data as of 2023–24. However, several limitations and assumptions underpin the analysis. These are critical to interpreting the numbers with appropriate caution.

6.1 DATA GAPS

- **Private Sector Flows:** Corporate and investor contributions—especially in traceability, certification, and regenerative agriculture—are not systematically disclosed. This results in likely underreporting of actual investments.
- **Geographic Gaps:** Public finance datasets often lack disaggregation by geography or commodity, limiting the ability to align funding flows with specific deforestation fronts.

6.2 ATTRIBUTION

- **Overlapping Objectives:** Some programs (e.g., REDD+, jurisdictional initiatives) target a mix of environmental goals. Attribution to agriculture-driven deforestation was estimated using qualitative assessments and may not capture full nuance.
- **Downstream Costs Excluded:** Costs linked to downstream compliance, such as product relabelling or consumer-facing traceability, are excluded but may be material.