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Carbon Footprint for Coffee Supply Chains



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Session: Addressing the Environmental Footprint of Coffee Production

MCS has developed **GHG calculators** for a large number of **agricultural products**, waste/residues and downstream supply chains



Corn



Coffee



Municipal solid waste



Palm



Coconut fibers



Used Cooking Oil



Rubber



Forest Residues

Selection

Increasing global demand for GHG emission calculations – Development of **GHG calculations** for producers in ten coffee producing countries completed




MCS is collaborating with market players, initiatives and consortiums to measure and reduce the coffee carbon footprint

Examples

Working towards climate friendly coffee production in Tanzania

4C partners with JDE Peet's and DEG to reduce GHG emissions and strengthen climate resilience of smallholder producers



4C Services and JDE Peet's are proud to announce the start of a joint project on "Reducing GHG emissions and increasing yields from Robusta coffee production by 7,000 smallholder farmers and processors in Tanzania", co-financed by DEG – Deutsche Investitions- und Entwicklungsgesellschaft mbH – with funds of the developPPP.de program of the German Federal Ministry for Economic Cooperation and Development (BMZ), together with funds of JDE Peet's and 4C Services GmbH.




USAID Green Invest Asia

3,106 Follower:innen
6 Tage

15 companies in the #coffee sector, 5 technical partners, 2 origins, 1 convener, and 1 goal: establish baseline of #carbonemissions from Robusta coffee production to standardize #ghgemissions measurements going forward. Final study led by **Enveritas**, annexes, technical insights here: <https://lnkd.in/gWskiJuT>. **JDE Peet's**, **Nestlé**, **Costa Coffee**, **Lavazza Group**, **ECOM Agroindustrial Corp. Ltd.**, **Hanns R. Neumann Stiftung - HRNS**, **Intimex Group**, **Louis Dreyfus Company**, **ofi**, **Neumann Kaffee Gruppe (NKG)**, **Sari Makmur**, **Simexco Daklak Ltd.**, **Sucafina**, **Sucden Coffee**, **Volcafe**, **CIRAD**, **Geotree Strategies**, **4C**, **Sphera**, **Yara International**.

GHG calculation for green coffee supply chain in Rwanda



GHG calculation for robusta coffee supply chain in Vietnam



Sources: <https://www.meo-carbon.com/references/>, <https://greeninvestasia.com/research/usaaid-green-invest-asia-reports/>, <https://www.4c-services.org/working-towards-climate-friendly-coffee-production-in-tanzania/>

4C Services, MEO, and the Center for Global Commons University of Tokyo partnership for Life Cycle Assessment (LCA) in the coffee sector

- Research project on interventions and solutions for transition to sustainable food system through value chain approach
- Countries: Brazil, Colombia, and Vietnam
- 4C Carbon Footprint Add-On methodology will be used to calculate GHG emissions at the farm level for LCA

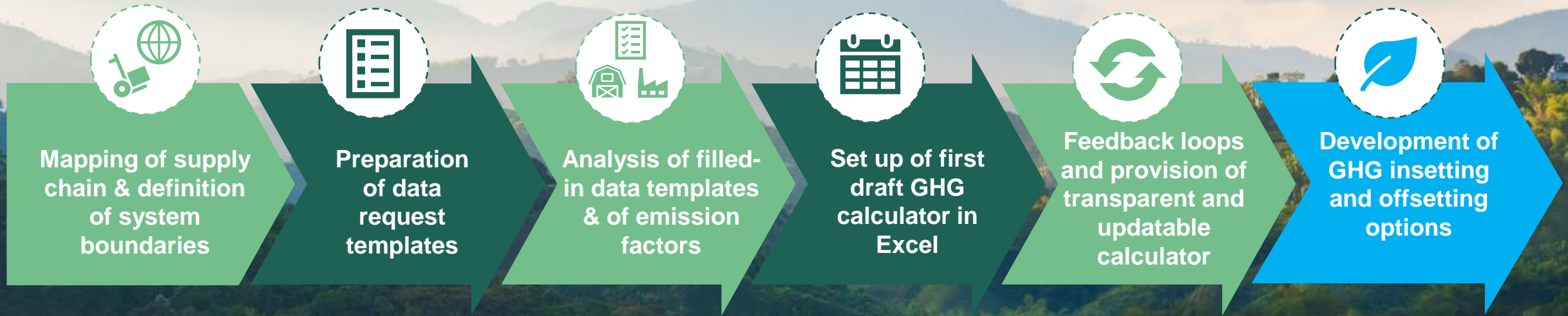
Technical Lead: 4C Services and Meo Carbon Solutions

Local Project Partners



Measurement of carbon footprint based on recognized methodologies in line with science-based target initiative

- Greenhouse gas (GHG) emissions calculation for coffee cultivation and whole supply chain
- Introduction of mitigation measures and monitoring of GHG reduction



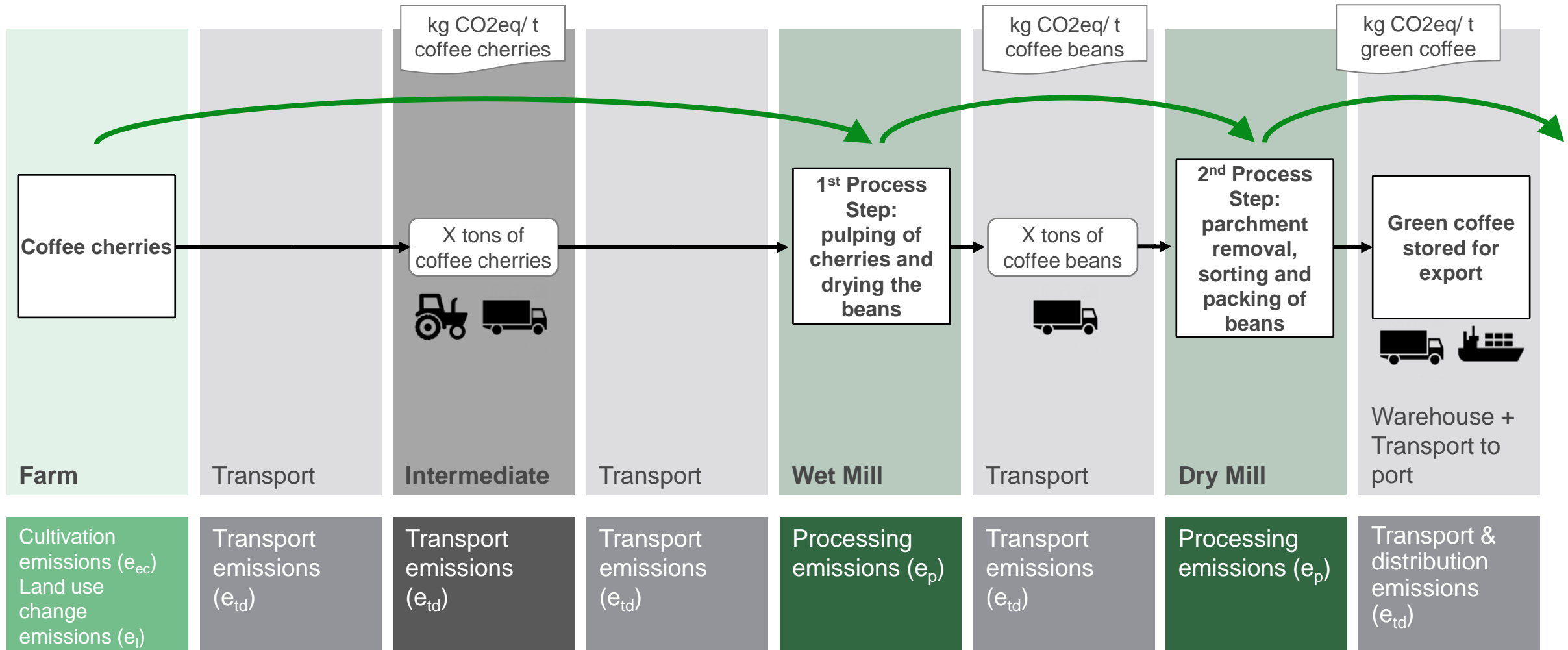
The quantification of GHG emissions from the coffee supply chain steps shall contain the following elements:

$$E = e_c + e_l + e_p + e_{td} - e_{s_{soc}}$$

Where:

- E total emissions from the coffee supply chain in the final unit **kg CO₂eq/t of green coffee beans**
- e_c emissions from the **cultivation** of coffee
- e_l annualized emissions from carbon stock changes caused **by land-use change**
- e_p emissions from **processing** (dry milling, wet milling, roasting, etc)
- e_{td} emissions from **transport and distribution**
- $e_{s_{soc}}$ emission **savings** from **soil carbon accumulation** via improved agricultural management

Simplified coffee supply chain, GHG emission categories and forwarding of GHG emissions





High quality dataset is crucial for a realistic GHG emission calculation

Take aways from past assessments:

- Data collection process most critical and time consuming
 - Intensive feedback loops required between company and 4C/MCS to finalize dataset
 - Willingness of coffee farmers to participate
 - Simplified data collection template with explanatory comments per entry available in local language
 - Selected company experts needed as responsible for data collection and exchange with farmers
 - Training of local company responsible staff in advance of the process for good data quality (non-farmers)
- Complete and verified data is key for GHG calculation and realistic results

Potential improvement measures to reduce GHG emissions along the coffee supply chain from farm to roastery



Increasing the yield of coffee per farm



Improving treatment of wastewater



Improving treatment of waste, residues and pulp



Reduction of fertilizer application



Reducing use of plastic packaging material



Switching to renewable energy sources



More efficient ways of transportation



Local capacity building, e.g., farmer education

Improved agricultural management practices leading to soil carbon accumulation



- Improved cropping systems including cover crops, intercropping with perennials and agroforestry



- Improved fertilizer or manure management



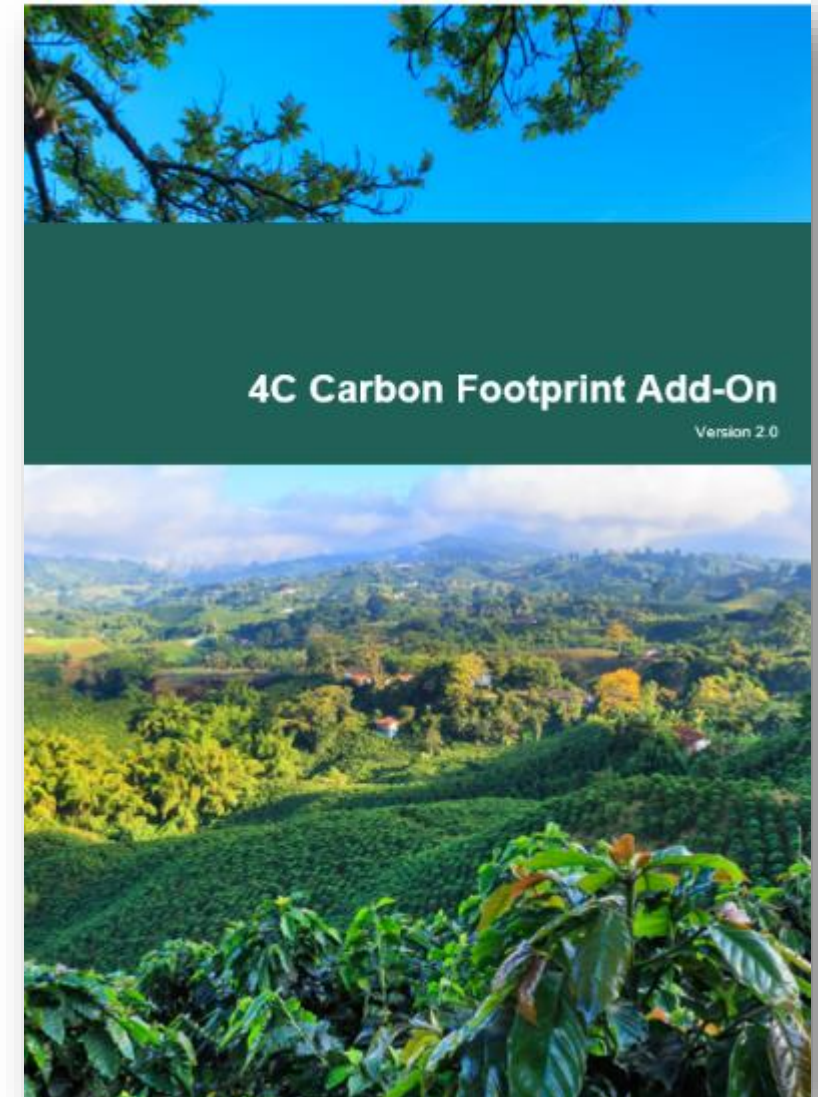
- Improved crop residues management



- Use of soil improver (e.g., compost)

MCS supports the **development of 4C climate-friendly solutions** for coffee supply chains globally - I

- Development of 4C Carbon Footprint Add-On
- Two-level certification approach for climate friendly and climate neutral coffee
- Carbon footprint calculation, reduction and optional offsetting of emissions and external communication
- 4C Carbon Footprint Add-On provides tools for data gathering, GHG calculation and audit preparation
- MCS experts available to consult 4C system users and conduct GHG emission calculations



MCS supports the development of 4C climate-friendly solutions for coffee supply chains globally - II

FREQUENTLY USED EMISSION FACTORS AND THEIR RESPECTIVE SOURCES			
Input	Unit	Standard factor	Source, description
A) Emission factors for cultivation			
Fertilizers			
CaO-fertilizer	kg CO ₂ eq/kg CaO	0.13	European Commission: Standard values for emission factors , v 1.0. 2015
Calcium ammonium nitrate	kg CO ₂ eq/kg CaN	3.67	European Commission: Standard values for emission factors, v 1.0. 2015

Specific fertilizer production emissions for Southeast Asia Region

Ammonium nitrate - 33.5% N (granulated)	Kg CO ₂ eq/kg of product	2,39	Brenttrup et al., 2018, pg 4.
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³⁷ For all N-fertilizers the emission factor refers to the amount of nitrogen in the fertilizer.



4C Carbon Footprint Add-On relies on the most relevant standards and initiatives

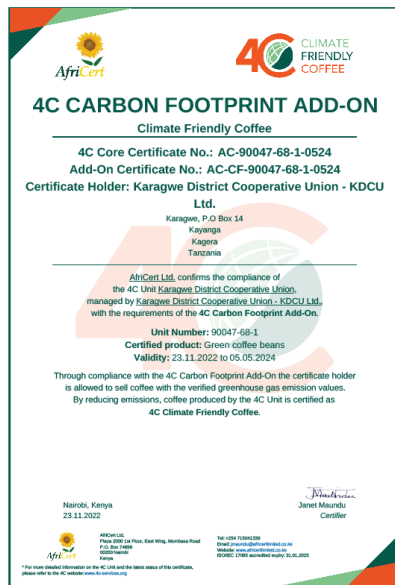
The 4C Add-On is aligned with:

- **ISO 14067:2018** → provides guidance for the quantification of GHG for the development of the carbon footprint of a product
- **GHG Protocol Product Standard** → Product Life Cycle Accounting and Reporting Standard is the guideline document stating the requirements for a LCA of a product
- **PAS 2050:2011** → Publicly Available Specification for the calculation of the GHG emissions produced during a product's life cycle (BSi)
- **IPCC (2006) Guidelines for National GHG Inventories** and **2019 Refinement**
- The guide from the **Science Based Target Initiative (SBTi)** and the **Paris Agreement** target to limit global warming to 1.5°C

Current 4C CF Add-on Certification

First Certificates issued in 2022 and 2023

3 Climate Friendly certificate has been issued to Managing Entities (ME) who are able to sell coffee with verified GHG emissions



Karagwe District Cooperative Union,
Tanzania



Vinh Hiep Co. Ltd., Vietnam



Greenco S.U., Burundi



Let's get started – Your company could be next

- 1 Contact 4C for core certificate as prerequisite or directly start with CF-Add On preparation
- 2 Prepare your GHG emission calculation & set plan for improvement measures following CF-Add On
- 3 Conduct on-site audit and receive approval by 4C auditor and 4C
- 4 4C Climate Friendly Coffee certification and on-product logo use



Optional: Insetting/ Offsetting to become “Climate Neutral”





Thank you for your attention!

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