

Developing a low-carbon Coffee Value-Chain in Kericho, Kenya

Moyee Coffee, The Fairchain Foundation, Agriterra, Kipkelion District Cooperative Union and Kenya Agriculture Livestock and Research Organization (KALRO) have formed a consortium to develop a low-carbon coffee value-chain in Kericho, Kenya.

During coffee production, 40% of the GHC emissions come from the production and use of synthetic fertilizers and pesticides. Another 40% comes from the rotting of the cherry once the coffee bean is removed. The other 20% includes all other production activities, incl. transport to western markets(!).¹ Therefore, this project aims to develop bio-solutions as an alternative for synthetic inputs. Furthermore, the coffee cherry will be used to develop a high-value compost specifically optimized for coffee trees.

Food: greenhouse gas emissions across the supply chain

Our World in Data

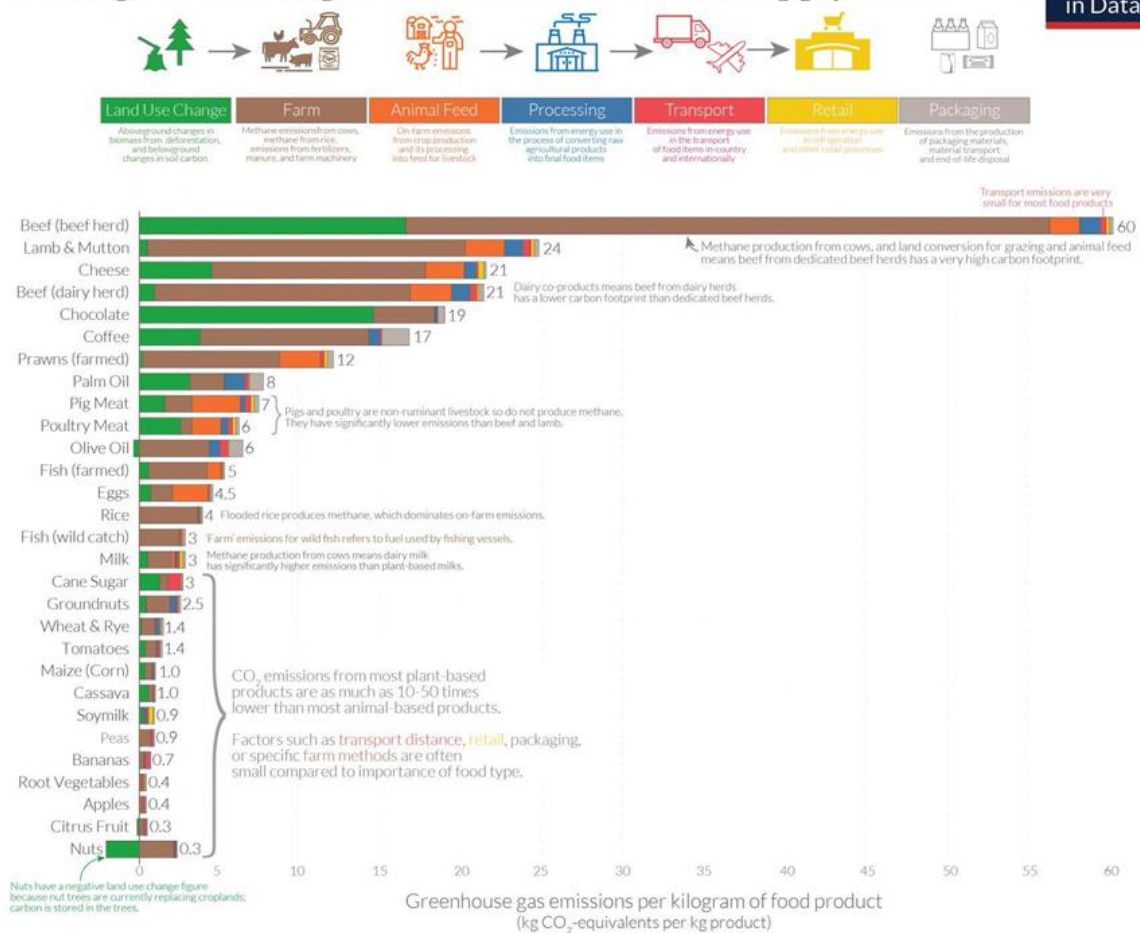


Figure 1: The GHC Emissions of Coffee in the supply chain, per KG.

This project consists of three four main elements to support 7,200 smallholder farmers to transition from a traditional coffee farming model, consisting of mainly mono-culture coffee and the application of synthetic fertilizers and pesticides, to a low-carbon farm model.

¹ Usva, K., Sinkko, T., Silvenius, F. *et al.* Carbon and water footprint of coffee consumed in Finland—life cycle assessment. *Int J Life Cycle Assess* **25**, 1976–1990 (2020). <https://doi.org/10.1007/s11367-020-01799-5>

- Developing a bio-solutions production facility at KDCU, producing bio-compost, bio-fertilizers and bio-pesticides produced from local waste materials, to be sold as an affordable alternative to synthetic fertilizers and pesticides.
- Implementing a Model Farm for a Regenerative Low-Carbon Coffee growing Strategy, developed by Renature
- Establishing a blockchain platform on which all coffee-related transactions (such as quantities of coffee bought, prices but also results from soil testing are made transparent and available, proving low-carbon practices and higher incomes and giving farmers access to financial services
- Developing a coffee roasting facility at origin in Nairobi.

This should lead to: Improving farmer income, improved food security and improved resilience against climate-change related shocks for 7,200 smallholder farmers in Kericho, Kenya.

Who?

The consortium consists of:

Moyee Coffee: Moyee Coffee will invest in developing a low-carbon specialty coffee, roasted and packaged in Kenya, providing a market linkage for smallholder farmers.

Agriterra: Agriterra will select and support high-potential Primary Cooperatives (PCs) to produce this sustainable coffee and support the PCs in governance, financial management and women and youth participation. Furthermore, Agriterra will train the extension officers and lead-farmers on low-carbon farming practices, setting up bio-compost production facilities at the Union and support the implementation of an intercropping strategy.

Fairchain Foundation: The Fairchain Foundation will provide traceability and transactions marketplaces using blockchain technology. Fairchain will survey the smallholders farmers. Fairchain Limited will build a roasting facility in Kenya.

Kipkelion District Cooperative Union (KDCU): A farmer-led and farmer-owned coffee mill in Kenya, will provide local value-addition of the low-carbon specialty coffee and set up an organic demo farm and nursery for intercropping trees to support the project.

Kenya Agriculture and Livestock Research Institute (KALRO): Strategies for climate-smart and low-carbon agricultural practices such as intercropping, to ensure food security, will be provided by KALRO (Coffee Research Institute), and implemented by partners and beneficiary PCs and farmers.

Renature: An external partner to the consortium that joined thanks to the “Impact Accelerator” instrument of RVO. Renature will develop a regenerative model farm suitable for the lower and higher regions in Kericho. Renature utilizes the vast potential of Regenerative Agriculture in fighting climate change, poverty, biodiversity loss, and food insecurity. Renature brings together knowledge about regenerative agriculture, impact monitoring, stakeholder engagement and more to make the business case for regenerative agriculture around the world.

How?

How will this consortium improve the livelihoods of smallholder farmers in the Kericho region?

- Ban the use of fertilizers, limit the use of pesticides, farmers will get a premium based on soil samples

- Support the cooperatives by improving their governance and financial management structures
- Set up local bio-solutions production facility to increase the use of affordable bio-compost, bio-fertilizer and bio-pesticides to improve the soil-health and increase productivity
- Support the implementation and roll-out of a comprehensive intercropping strategy for farmers
- Support the hiring of Youth Extension Officers dedicated to sustainable agriculture and low-carbon farming
- Buy Coffee at a premium and decrease delivery-payment term from 6 months to 4 weeks
- Roasting at Origin: Set up a local roasting facility in Kenya to create local job-opportunities and support structural transformation of Kenya.
- Create a transparent value-chain through Fairchain's blockchain application
- Actively involve women and youth in the development of this low-carbon coffee value chain

In this project, we work together with the Sustainable Development Goals Partnership (SDGP), a programme from the Netherlands Enterprise Agency. The Netherlands Enterprise Agency uses SDGP to contribute to achieving food security and private sector development on behalf of the Dutch Ministry of Foreign Affairs.



Figure 2 Fairchain Roasting Facility in Nairobi



Figure 3 Modern Roaster with 120KG/Batch capacity



Figure 4 Bio-Solutions Production Training



Figure 5 Bio-solutions Facility



Figure 6: Bio-compost Manual developed during training

Field: Compost With Pulps

History (Last 3 analysis)

Parameter	Unit	Result	Grade Low	Grade High	Low	Optimum	High	Symbol	Content	Method
pH		8.28	6.00	8.50				pH	8.28	Photometric
EC (Salts)	mS/cm	1.01	0.75	1.50				EC(S)	1.01	Photometric
Dry matter	%	49.5		< 60.0				DM	49.5	Gravimetric
Carbon	%	24.1	13.0	60.0				C	24.1	Ignition
Total Nitrogen	%	1.40	0.80	1.50				N	1.40	Colorimetric
Phosphorus	%	0.35	0.20	0.75				P	0.35	Spectroscopy
Potassium	%	1.32	0.40	2.00				K	1.32	Spectroscopy
Calcium	%	1.81	0.60	1.50				Ca	1.81	Spectroscopy
Magnesium	%	0.47	0.20	0.80				Mg	0.47	Spectroscopy
Sulphur	%	0.14	0.20	0.50				S	0.14	Spectroscopy
Manganese	ppm	1280	200	800				Mn	1280	Spectroscopy
Iron	ppm	42600						Fe	42600	Spectroscopy
Zinc	ppm	159	40.0	1000				Zn	159	Spectroscopy
Copper	ppm	52.1	8.00	400				Cu	52.1	Spectroscopy
Boron	ppm	62.1	20.0	140				B	62.1	Spectroscopy
Sodium	ppm	1950		< 3000				Na	1950	Spectroscopy
C/N ratio		17.2	10.0	20.0				C:N	17.2	Calorimetric
Arsenic	mg/kg	4.68		< 15.0				As	4.68	Spectroscopy
Cadmium	mg/kg	< 0.01		< 10.0				Cd	< 0.01	Spectroscopy
Cobalt	mg/kg	15.0						Co	15.0	Spectroscopy
Chromium	mg/kg	18.6		< 1000				Cr	18.6	Spectroscopy
Nickel	mg/kg	33.8		< 100				Ni	33.8	Spectroscopy
Lead	mg/kg	9.67		< 250				Pb	9.67	Spectroscopy

Figure 7: Lab-results of bio-compost by Cropnuts Lab