

Improving Kenya's coffee value chain

Integration of sustainable consumption
and production practices



SEI brief

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Key policy messages

- Coffee is one of the most economically important crops of Kenya, employing 30% of the country's agricultural workers.
- Climate change poses an existential risk to the coffee sector socially, economically and environmentally by reducing yields.
- In addressing said challenges, integrating Sustainable Consumption and Production Practices (SCPs) can improve development in the coffee value chain in six ways: farming, factory production, milling, marketing, consumption and a combination of all of the above.

Introduction

Coffee is an essential player in Kenya's agricultural sector, yet it has suffered a steady decline in production in the past 40 years.

Addressing the sector's challenges can also advance the UN 2030 Agenda's 12th Sustainable Development Goal, which is to "ensure sustainable consumption and production patterns," by incorporating Sustainable Consumption and Production Practices (SCPs) in the coffee value chain.

This policy brief explores the potential integration of SCPs across the coffee production chain. We present SCPs that emerged from a series of focus group discussions, stakeholder consultations and surveys, which will minimize environmental impacts and maximize productivity and worker welfare. We also summarize capacity-building measures and financial support required to implement the SCPs at scale. Adopting the recommended solutions can both boost Kenya's coffee industry and put the sector on a path toward greater environmental sustainability.

What is at stake? Kenya's coffee value chain

Kenya's coffee sector employs about 30% of Kenya's agricultural labour force – roughly 5 million people – directly affecting the livelihoods and economic status of more than 800,000 rural households (ICO, 2019). Coffee is also a crucial contributor to the country's agricultural GDP; the sector accounts for about 10% of the total agricultural

IMAGE (ABOVE): Collecting coffee cherries,
Kenya © BARTOSZ HADYNIAK / GETTY

export earnings. In 2020 alone, Kenya's total coffee production was at 39 000 tons, though it has fluctuated in recent years and decreased overall from 1971 to 2020 (USDA, 2020). Despite being an essential commodity, coffee growing, production and marketing is declining. Production has slipped by 40% since the 1980s to just 1 million bags per year (ICO, 2019). The effects of climate change also exacerbate the situation, as unreliable and erratic rains and shorter growing seasons pose unpredictable challenges in producing quality yield (Jaramillo et al., 2011). Combined with poor living conditions, lack of access to updated technologies and a vulnerable market, these factors have prompted coffee producers to switch to less risky commodities.

Our study

To address the challenges of Kenya's coffee industry, SCPs emerged as an inclusive solution that tackles all social, economic and environmental issues. Here, we introduce 17 SCPs for coffee production to improve resource efficiency and livelihoods across the value chain. The SCPs were selected as a result of fieldwork consisting of focus group discussions, oral interviews and questionnaires administered by the Stockholm Environment Institute's Africa Centre in partnership with Jomo Kenyatta University of Agriculture and Technology, Kenya National Chamber of Commerce and Industry (KNCCI), Etimos Foundation and E4Impact. We consulted with regional stakeholders including smallholder coffee farmers, processing factories, farmer cooperatives and agricultural supply businesses in seven Kenyan counties (Kiambu, Kirinyaga, Meru, Kisii, Trans-Nzoia, Embu and Murang'a), as well as unions and millers. In an interactive session, the stakeholders identified their roles, the gaps, the challenges and opportunities within the value chain. Their input informed the policy recommendations we propose here.

Summary of the key SCPs

We apply SCP as defined by UN Environment Programme as "a holistic approach to minimizing the negative environmental impacts from consumption and production systems while promoting quality of life for all" (UNEP, 2015). We adopted the 21 SCP indicators for sustainable production within the categories of energy and material use, natural environment, economic performance, community development, and social justice and workers. The recommended SCPs, a series of established techniques and methods, were selected according to their scalability, tackling both short- and long-term problems. Scalability in this context refers to the capacity to scale out and up by replicating the solutions across counties and, potentially, nations. This scalability is possible, as each solution is more economical and suitable for the target users, while resolving the shortcomings of the current practices. These practices are divided and categorized across the coffee value chain, including farm level, processing/factory level, milling level, marketing, consumption and potential cross-cutting practices. Meanwhile, the scalability may exclude smallholder farmers and Small Medium Enterprises (SMEs) that cannot meet the mass production standard, so these value chain actors need to be supported to increase their production.

Figure 1. Coffee Value Chain

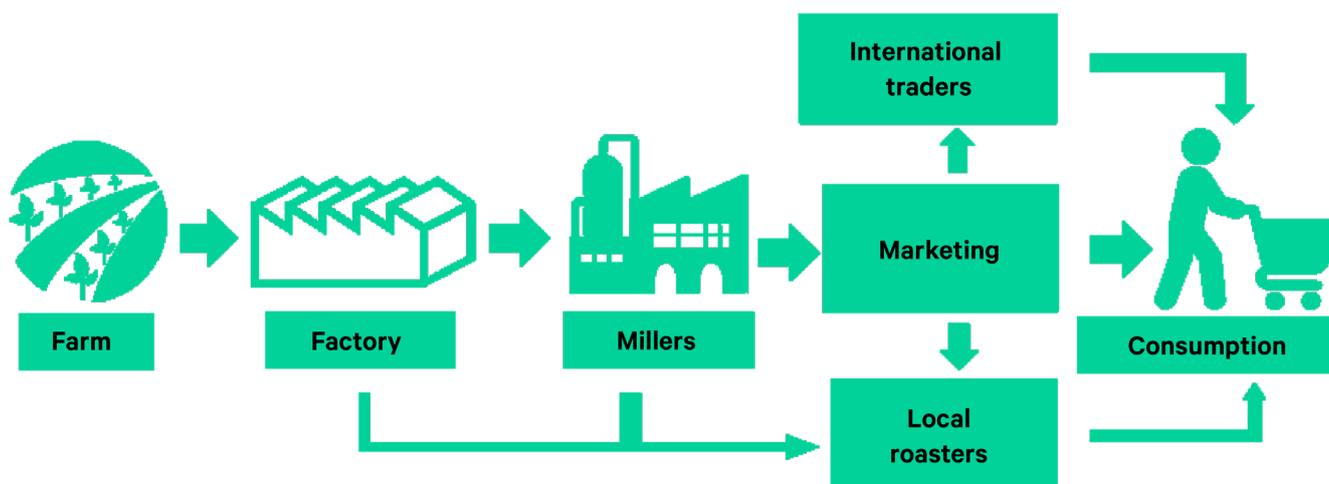


Table 1.17 SCPs and their position across the coffee value chain

Level	SCP	Benefit
Farm	Integrated coffee and livestock farming	Provides natural fertilizer source for crops
	Composting	Reduces waste and generates fertilizer
	Shade trees	Regulates soil temperature and water levels
	Single-stem farming	Increases yield up to four times from average while producing a higher quality
	Block and labelling	Improves traceability by keeping track of information (e.g. growth, fertilizer application)
	Pest management	Uses natural methods such as intercropping and plant-based pest repellents as safer alternatives to chemical pesticides
	Precision farming	Enhances productivity by protecting farms from pest using Internet of Things (IoT) systems
Factory	Eco-pulping	Nearly eliminates water consumption in coffee bean processing
	Natural processed specialty coffee	Uses no water and fetches higher prices in the market
	Solid waste management	Prevents waste contamination in facilities
	Coffee labelling and recording	Increases traceability of coffee product for better market prices
Millers	Solar photovoltaic	Conserves energy and promotes renewable energy
	Wind pumps	Enhances productivity by pumping water without fuel required
	Biomass (briquettes, pellets and husks)	Promotes circularity by turning coffee byproduct waste into energy
	Biogas	Generates renewable energy from manure and reduces farm emissions
Marketing and Consumption	Coffee Roasting and Packaging	Fetches higher market prices by roasting the coffee before selling
	Certification	Improves marketability of product

At the farm level, we identified seven methods to improve coffee production for Kenyan farmers. Kenya faces high water stress with few efficient irrigation systems (2030 WRG, 2015). Kenyan coffee production emits an estimated 4 kilograms (kg) carbon dioxide equivalent (CO₂e) per kilogram of coffee, one-third of which is due to synthetic fertilizer application (Maina et al., 2015). Incorporating SCP practices such as integrated coffee and livestock farming and animal manure composting generates organic fertilizers and encourages circularity within the farm. Replacing synthetic fertilizers with organic fertilizers essentially reduces the agriculture sector's emissions while also producing healthier crops with lower costs.

Meanwhile, adverse weather conditions attributed to climate change and a decline in the number of farmers due to low income leads to a decrease in coffee production (Gitonga, 2019). Using SCP methods such as shade trees, single-stem farming, block and labelling, or precision farming will help farmers control the micro-climate temperature and stability of the soil moisture. Shade trees provide an ideal microclimate for the growth and production of coffee, especially in poor soil (Alemu, 2015). Leguminous plants such as silk trees, weeping fig, bishopwood and orange trees are some of the most ideal shade trees for Arabica coffee, the most common type of coffee grown in Kenya (Alemu, 2015). These methods will also produce significantly higher yield while strengthening the traceability of yield improvement, which is fundamental for continuous compliance with sustainability commitments. The single-stem technique is a deliberate thinning technique leaving only one or two coffee stems per plant with single-sided branches to maximize yield. The pruning should always ensure optimum primary branches with few secondary and no tertiary branches.

In addition, another SCP that can be implemented at the farm level is locally sourced and organic pest management practices. Planting lemongrass between crops or natural plant pesticides (using dried leaves of pest-resistant plants diluted in water) serve as natural pest repellents that replace synthetic ones. This practice will enhance yield and quality by protecting soil and water quality, improving farmers' health by reducing direct contact with synthetic pesticidal poisons, and lowering carbon emissions. Implementing any of these farming methods individually or in combination will help build resilience through the dry season, reduce carbon footprints and increase qualifications for sustainability certifications, which could lead to higher and competitive coffee prices in national and international markets.

At the processing and factory level, the current traditional pulping method commonly used in Kenya requires a large amount of water – up to 20 litres of water per kilogram of coffee cherries, the fruit that encases the seeds or beans. SCP recommends either using eco-pulper machine technology that mechanically separates the beans from the cherry without the need for water or sun-drying the coffee cherries, allowing natural separation of beans from the dried fruit husk. Both methods can reduce water usage from 90–100% compared to the current wet processing method (Golinucci et al., 2020). Additionally, using eco-pulpers is less labour-intensive, which in turn increases the efficiency of pulping. Next to that, plastic waste generated from packaging is another problem in current coffee production practices. Plastic waste creates a hazardous environment, putting the health of humans and livestock at risk. Waste can be reduced by creating a systematic process of collecting plastic containers for recycling and re-use. Therefore, implementing these recommended SCP practices will increase resource efficiency and create a safer and cleaner environment at the factory level.

SCPs will increase revenue and employment at all levels of the value chain. In the milling process, careful labelling and recording make it easier for the coffee farmer to control quality and use traceability for the coffee quality and characteristics in marketing. Along with certification, coffees roasted and labelled with specific qualities and features obtain

better prices and sales compared to selling raw green beans. The use of sustainable energy and materials in the roasting and packaging process can also increase the product's attractiveness and ensure that the coffee retains product value for a longer time. Better control and resource use under SCP, in turn, improves farmers' livelihoods and creates incentives to produce a more sustainable product.

Coffee in Kenya is generally an export product with relatively low local consumption. The coffee industry in Kenya also lacks interest from youth as a vocation. Thus, an SCP recommendation at the consumer level is to create a stronger domestic market for coffee by, for example, promoting a coffee-drinking culture in Kenya, especially among the youth. The promotion could be done through local channels such as cooperative members and networks, posters and local vending. Indeed, it is not common to find locally roasted coffee from small scale producers in mainstream super- and hypermarkets, but rather in locally owned shops. Creating direct local sales that foster engagement between the grower-marketer and consumers would benefit coffee producers economically and help them to hedge against risks inherent in the global market.

Finally, two more recommended SCP practices could be implemented across the coffee value chain. First, sustainable coffee certifications such as UTZ Kapeh, FLO, Rain Forest Alliance, Nestle AAA, and C.A.F.E. Practices increase the purchase and consumption of Kenyan coffee both locally and globally. Whereas coffee farmers and cooperatives are becoming more aware of the certifying bodies, their main challenge is the accessibility and costly processes of certification and high fees levied by certification bodies.

Second, Kenya is endowed with abundant renewable energy resources, yet access to grid electricity is limited in rural areas. Implementing renewable energy such as biogas, solar and wind across the coffee value chain could help build resiliency within the industry. Moreover, renewable energy could help mitigate greenhouse gas (GHG) emissions and help the coffee industry contribute to achieving Kenya's voluntary emission reduction commitments articulated in the country's Nationally Determined Contribution as part of the Paris Agreement (Ministry of Environment and Forestry, 2020).

Policy recommendations

For the above SCP practices to be adopted and scaled up by the various actors along the coffee value chain, technical, institutional, financial and knowledge barriers must be overcome. Thus, appropriate strategies targeting each actor need to be enacted. This can be achieved through support from policy-makers at both the national and sub-national and county levels, especially in county-integrated development plans and national master plans for the agricultural sector. Below are some of the policy changes we recommend based on our study:

- At the national level, the Ministry of Agriculture should incorporate SCP in the current Government of Kenya (GOK) coffee sector reforms. SCP could boost results for the 2017–2022 strategy for Kenya's coffee sub-sector focused on the revival, strengthening and adequate funding of the coffee sector.
- Ministries of agriculture at national and county levels should allocate resources to support capacity-building activities for all actors along the coffee value chain. The availability and quality of the extension officers to provide knowledge and training on the SCP practices to coffee producers is essential for implementing the practices. Some of the critical knowledge includes information on the best SCP practices and their benefits for specific land conditions and how farmers can maintain the sustainable practices. SCP training is also required in order to create more skilled

labourers. Thus, it is important for the county-level minister to ensure the effectiveness of these extension officers.

- Ministries of agriculture at national and county levels should allocate financial resources to support coffee producers by providing subsidy programs for sustainable technology improvements and incentive programs for SCP integration. This will encourage more farmers to improve their current practices and switch to sustainable practices. In addition, this will motivate more farmers and youth to stick with coffee production.
- The ministry of agriculture at the county level should consider creating institutional platforms for farmers to explore both local and international coffee markets, allowing them to gain access to information on the market conditions and bargaining powers on the pricing and product marketing. This will help farmers better understand market demands and produce quality coffee that fits the market with the potential to sell at a higher price.



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