SEI Stockholm Environment Institute

# Transforming Kenya's dairy industry through sustainable consumption and production practices

**SEI brief**
**September 2022**

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IMAGE (ABOVE): Dairy cattle, Kenya


## Key messages

- **The dairy sub-sector, which accounts for about 15% of Kenya's total agricultural sector's gross domestic product, contributes substantially to the national economy and aims to play a significant role in achieving the 10% economic growth stipulated in Kenya's Vision 2030 blueprint document.**
- **However, the dairy sub-sector's growth and development is hindered by low productivity; informal trading and marketing systems; limited skills and knowledge; and poor service delivery. Moreover, the sub-sector is a significant emitter of the greenhouse gases methane, nitrous oxide, and carbon monoxide.**
- **Integrating various sustainable consumption and production practices along the dairy value chain is a key pathway to overcoming some of the challenges mentioned above and supporting the sub-sector's growth and development.**
- **Sustainable consumption and production in the dairy sector involve everything from the production of nutritious feeds and artificial breeding to the creation and marketing of value-added products. It is also necessary to consider farmyard manure as a by-product and renewable energy as an input.**
- **The Kenyan government therefore needs to reduce the increasing complexity of sustainable consumption by standardizing livestock production and supports on imports, exports and prices. At the local level, the government support should be tailor-made to suit its own jurisdiction. This can be done by working with the private sector, civil society groups, farmers, NGOs and other stakeholders.**

## Introduction

Dairy in Kenya is facing several challenges, which are hampering the agricultural sector's growth and affecting the lives of 40% of the population (USAID, 2021). To address the challenges and fulfil Kenya's 2030 visions for the sector (*Economic & Macro Pillar | Kenya Vision 2030*, n.d.), integrating sustainable consumption and production (SCP) practices along the value chain could decouple economic growth from environmental degradation, promote more efficient utilization of resources, and foster sustainable lifestyles. This is in line with Sustainable Development Goal 12 as part of the United Nation's 2030 Agenda. This policy brief examines how various applications of SCP practices along the dairy production chain could increase productivity while promoting economic growth. The study outlines several policy recommendations such as providing extension services at the local level.

## What is at stake? Kenya's dairy value chain

Despite Kenya's long history of dairy farming, the dairy industry is stagnated in its formative stages, with some segments of its value chain being more advanced than others. An average per capita milk consumption is estimated at 110 litres annually, which is the highest among other countries in sub-Saharan Africa (Rademaker et al., 2016). An average annual increase in domestic production of about 5.8% is attributed to the rapid urbanization and growing middle-class population (Bebe et al., 2017). The value chain is currently worth over KSh 184 billion (USD 1.7 billion) which contributes to up to 6–8% of Kenya's GDP (USAID, 2015). Thus, to fulfill the growing demand, the Kenya National Dairy Master Plan aims to double the per capita milk consumption to 220 l by 2030 (Ministry of Agriculture, Livestock & Fisheries, 2019).

However, the dairy value chain currently experiences low productivity due to inadequate feeding resources, poor disease management, intermittent production, poor quality of milk produced and supplied, and an extensive informal marketing and trading system. Along the dairy value chain, which is frequently fragmented and challenging to manage and monitor, there are actors with limited skills and knowledge. Moreover, the delivery of services and input supplies is subpar, which further contributes to low productivity. The sub-sector lacks an organized infrastructure to help with skills and knowledge training, policy formulation, governance, and quality assurance in the supply of services and inputs.

The dairy cattle industry in Kenya is responsible for about 12.3 million tonnes of $CO_2$-eq. The sector's greenhouse gas emissions profile is dominated by methane at 96%, with nitrous oxide at 3% and carbon dioxide at 1% (FAO, 2017). The level of methane production in the dairy industry is influenced by the type of animals, the quality and quantity of feed, and environmental conditions (Pinto et al., 2020).

SEI research team visits the Holstein calf breeding centre in Kajiado County, Kenya © MBEO OGEYA / SEI

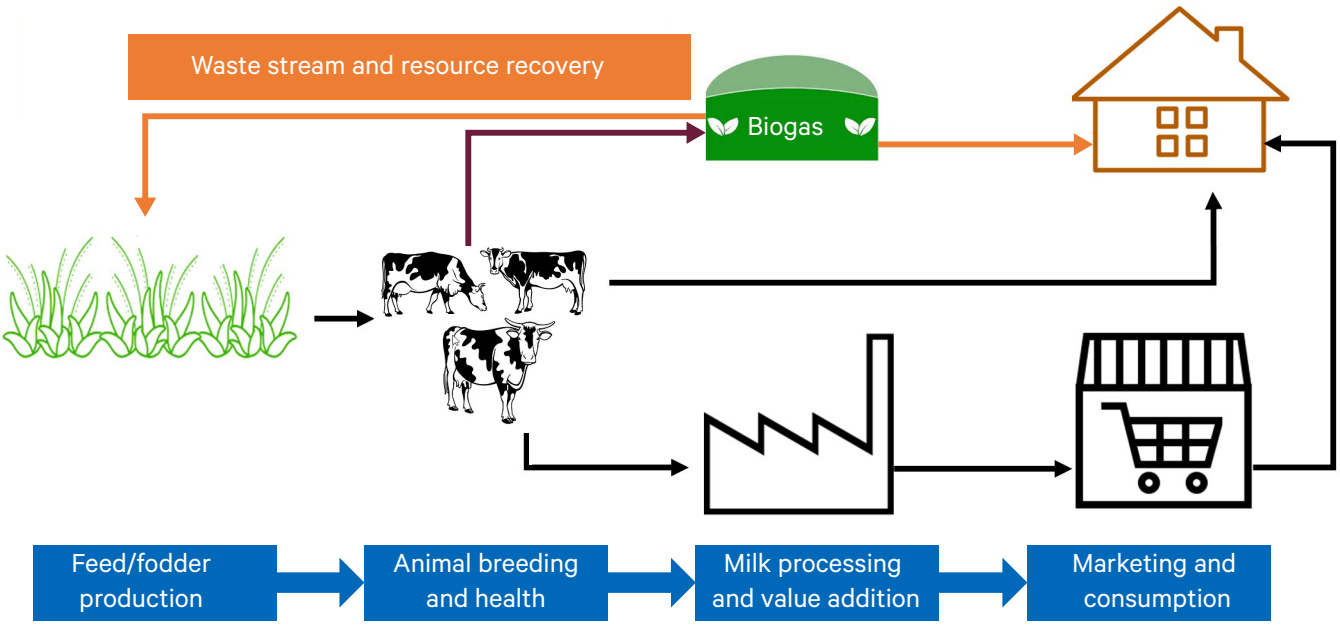
Holstein heifers in Kiambu County © MBEO OGEYA / SEI

## Our study

To understand how the dairy sub-sector could integrate various SCP practices throughout different segments of the dairy value chain, the Africa Centre of the Stockholm Environment Institute in collaboration with Jomo Kenyatta University of Agriculture and Technology, Kenya National Chamber of Commerce and Industry (KNCCI), the Etimos Foundation and E4Impact analyzed the various SCP practices along the dairy value chain in Kenya. The research team identified more than 20 SCP practices after visiting individual dairy farms, cottage industries, large industries, farmers cooperatives and agricultural supply businesses in Kiambu, Kajiado, Uasin Gishu, Kericho and Nandi counties in Kenya. Data collection involved interviews and focus group discussions with different actors along the dairy value chain. These segments included feed/fodder production, dairy production, milk processing and marketing. However, only 20 SCP practices were highlighted as they were considered useful, impactful and replicable.

The list below summarizes 20 identified SCP practices that are categorized based on the different stages in the dairy value chain. For our research, we used a systematic approach of focus group discussion and used the Lowell Center for Sustainable Production framework to identify and list the SCP practices. These practices were further validated by a team of experts based on three criteria (most useful, most impactful and most replicable) followed by a second round of expert reviews and shortlisting. Some of these practices can be adopted and scaled up by different actors along the dairy value chain.

Figure 1: The dairy value chain with resource recovery stream




## Summary of key SCPs

**Feed/fodder production |** First comes **silage preparation**, which involves fermentation of pasture mixed with molasses under anaerobic conditions. Thus, high-quality feed is available which contains sufficient nutrients. Another SCP practice is feed formulation, which depends on the type of animal, feed, and region. A dairy farmer can mix different feed ratios to ensure that the animal gets all the essential nutrients in appropriate quantities, thus preventing over-or under-feeding. These SCP practices will address the feeding and low milk production challenges that smallholder farmers currently face.

**Animal breeding and health |** For animal breeding, **artificial insemination** can be used as an SCP practice. It involves introducing living sperm into the reproductive tract of female cattle to speed up the reproduction process. Another SCP practice is **embryo transplant**. An embryo from an often genetically superior animal is transferred to a female animal to complete the gestation period, thus allowing farmers to produce high-quality livestock using poor quality livestock. For the animal's health, attaching **dairy track monitors** to the animal will enable farmers to keep records of different aspects of the animal, thus any anomalies can be identified and addressed immediately. **Automated milk hygiene** is another SCP practice where a machine does the milking. This process ensures the milk is highly hygienic, protects the animal's teats and is time efficient. Using a **soothing brush** on the cow can also help relax the animal, leading to increased milk production.

**Milk processing and value addition |** Aside from unprocessed milk, farmers can produce value-added products categorized as **fermented**, **unfermented**, and **by-products**. These include cheese, ghee, fermented milk, yoghurt, ice cream and pasteurized milk, which have longer shelf lives and can also be sold for premium prices.

**Waste management, resource conservation and recovery |** The by-product of biogas is **bioslurry** from organic waste, which acts as an SCP practice. It can help reduce the prevalence of infectious diseases and reduce methane production. This SCP practice is also a source of fertilizer for farming, thus reducing the use of synthetic fertilizer.

A seven-month-old Ayrshire calf in Nandi County © MBEO OGEYA / SEI

The biogas produced is a source of energy for cooking and water heating. Farmers can use **automated watering bowls** to minimize water wastage and contamination, thereby supporting sustainable water utilization as the water is exposed and flows on demand.

**Renewable energy use |** Renewable energy technologies can be substitutes for fossil fuel use. For instance, **solar appliances** for the water heaters and lighting, **briquette** boilers, and **biogas** appliances for the dairy value chain. These SCP practices help reduce the dairy sub-sector's carbon footprints.

**Dairy products marketing and certification | Automated milk machines** (vending machines) enable consumers to purchase a quantity that they can afford and eliminate packaging, which reduces environmental pollution from packaging waste and lowers the cost of packaging disposal. Moreover, the machines eliminate middlemen which allows farmers to get higher returns. **Social entrepreneurship** has also been used as an SCP practice to develop farmers' capacity to access formal markets and create information asymmetries that ultimately lead to good bargaining power and the selling of dairy products at valued prices. Social enterprises streamline linkages along the value chain facilitating business transactions and information flows, particularly to small scale dairy farmers.

## Policy recommendations

For the SCP practices mentioned in the briefing to be adopted and scaled up, the systemic problems hindering overall progress in the dairy sub-sector and the agricultural sector need to be addressed. Listed below are some of the critical recommendations for policymakers at the national and sub-national level.

- The Kenyan government both at the national and sub-national levels should allocate financial and human resources to enable the expansion of extension services. These new services will create knowledge and awareness of the various available SCP practices, the associated benefits and how they can be adopted and scaled up. Furthermore, collaboration with other stakeholders such as private sector actors and NGOs at the forefront of research and development would accelerate knowledge delivery and thus the adoption of SCP practices.

- The government at the county level should work closely with the Kenya Agriculture and Livestock Research Organization to support research and development on the SCP practices along the dairy value chain and establish demonstration farms to showcase new dairy farming techniques and serve as venues to research and test new SCPs. Also, social enterprises should be created to negotiate better contracts with milk buyers and bridge the entrepreneurial gaps.

- The Department of Livestock at the county level should mainstream the proposed activities in the Kenya National Dairy Master Plan into their County Integrated Development Plan. The proposed activities can also be supported by the various SCP practices identified in this study. This initiative will ensure collective resource allocation and coordinated actions between the county and the national government, limiting duplication of efforts in the dairy sub-sector.

- Both the national and sub-national level governments should support the implementation of the Dairy Industry Regulations of 2020. The regulations aim to streamline activities within the sub-sector, such as milk standards, inspection, pricing, imports and exports. The regulations will directly address the challenges of milk quality, which affect milk standards and its suitability for both domestic and export markets.

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SEI Stockholm Environment Institute

**Published by**
Stockholm Environment Institute
Linnégatan 87D, Box 24218
104 51 Stockholm, Sweden
Tel: +46 8 30 80 44

**DOI**:
https://doi.org/10.51414/sei2022.028



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