Happy Cow Dairy

African Centre for Technology Studies
ACTS
Knowledge for Better Livelihoods

FOOSTER DAIRY SOLUTIONS

Optimizing a Solar Milk Pre-Cooler Innovation to Improve Quality and Safety of Raw Milk at Smallholders' Chilling Centres in Kenya

Project Brief

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Co-funded by the European Union

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Agri-Business Facility for Africa

Project Overview

The Happy Cow Ltd–GIZ project aims to enhance the quality and safety of raw milk in Kenya's smallholder dairy sector by optimizing and scaling a solar-powered milk pre-cooling innovation at dairy cooperative chilling centres.

The project addresses a critical bottleneck in Kenya's dairy value chain—delayed cooling of raw milk, which leads to high bacterial growth, milk spoilage, and income losses for farmers and cooperatives.

Implemented over 24 months (April 2024–March 2026), the project targets high-potential dairy regions in Nakuru and surrounding counties, with a strong focus on climate resilience, inclusive business models, and capacity building.

Project Implementation and Partnerships

The project is led by Happy Cow Ltd in partnership with the African Centre for Technology Studies (ACTS) and Fooster Solutions Ltd. Happy Cow Ltd provides overall project leadership and technical direction in the optimization and deployment of the solar milk pre-cooling innovation.

ACTS supports policy engagement, evidence generation, documentation, and knowledge sharing to strengthen the enabling environment for sustainable dairy innovations. Fooster Solutions Ltd leads technical training and skills development for local SMEs, cooperatives, and technicians, ensuring effective fabrication, installation, operation, and maintenance of the technology.

The Challenge

Kenya's dairy sector contributes approximately 4% of national GDP and is dominated by smallholder farmers. However, an estimated 20% of marketed milk is lost due to inadequate cold-chain systems between farm collection and chilling centres. Existing chilling technologies at cooperatives are not designed for instant cooling, allowing bacterial multiplication in the first critical hours after milk delivery. This results in milk rejection, reduced processing efficiency, and lower farmer incomes.

The Innovation

Happy Cow Ltd has developed a solar-powered ice-bank milk pre-cooling prototype, inspired by European dairy systems and adapted for smallholder contexts. The innovation enables rapid pre-cooling of raw milk before it enters bulk chillers, significantly reducing bacterial growth, energy costs, and dependence on fossil fuels. The Matching Grant Fund supports the optimization, validation, and market readiness of this technology.

Overall Objective:

To improve milk safety and quality by strengthening the cold chain through optimized solar-powered pre-cooling at smallholder dairy chilling centres.

Specific Objectives:

- Optimize and validate the technical performance of the solar milk pre-cooler
- Develop inclusive, market-based business models integrating women- and youth-led enterprises
- Build technical and entrepreneurial capacity among dairy value chain actors
- Influence policy and investment decisions through evidence-based advocacy

Key Activities

- Design and technical validation and optimization of the pre-cooling prototype
- Training local SME technicians in fabrication, installation, and maintenance
- Capacity building for cooperatives, farmers, and MSMEs on milk quality and business skills
- Stakeholder engagement and policy dialogue at county and national levels

Expected Results and Impact

- 60% reduction in raw milk chilling time
- Up to 40% reduction in milk spoilage and rejection
- 10% increase in average farmer incomes
- Improved processor off-take and dairy sector efficiency
- Direct reach to 1,500 MSMEs, including 35% women and 25% youth
- Increased adoption of low-carbon, climate-resilient dairy technologies

Partnerships

The project is led by Happy Cow Ltd, in partnership with:

- African Centre for Technology Studies (ACTS) – policy engagement, documentation, and advocacy
- Fooster Solutions Ltd – technical training and skills development

It is supported by the EU, OACPS, BMZ, and implemented through GIZ's Agri-Business Facility (ABF).

Sustainability and Scalability

The project embeds sustainability through locally sourced components, capacity development of local enterprises, and integration into cooperative business models. Scalability is driven by market-led deployment through trained SMEs, alignment with national dairy policies, and partnerships with financial institutions to enable uptake beyond the project period.

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