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Terms of Reference

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Title: Feasibility Assessment for the Adoption of a Solar-Powered Instant Milk Chilling System

Client(s): Sosiot Dairy Farmers Cooperative Society Ltd

Country: Kenya

Project number: 26SODF-10404

Assignment number: ADV.24200

Period: 20 September 2026 – 27 September 2026

Cooperative advisor(s): Hillary Maket

Agripool involvement: ☐ Local ☒ Dutch

1. Background & Context of the Assignment

Sosiot Dairy Farmers Cooperative Society Ltd is a farmer-owned dairy cooperative established in 1965 and located in Kericho County. The cooperative currently serves 2,026 registered members, approximately 25% of whom are active milk suppliers, and collects approximately 5,000 litres of milk per day through five satellite milk collection centres. It has established milk aggregation, cooling, transportation and marketing systems and provides members with milk marketing, input supply, transportation, access to financial services and farmer support services. The cooperative has invested in a 5,000-litre milk cooler, a 10,000-litre milk tanker, power backup systems and a digital Management Information System, while also undertaking small-scale value addition through fermented milk (Mursik).

The cooperative's current business model is centred on milk aggregation, cooling, transportation and marketing to processors, with a small proportion of milk processed into fermented products. It has ambitions to increase milk volumes, strengthen milk quality, expand value addition and improve the efficiency and sustainability of its operations. The assessment identified milk quality improvement, farmer productivity, extension services, climate-smart dairy farming, value addition and operational efficiency as important areas for future support.

The cooperative's current cooling system and associated energy requirements form an important part of its operating cost structure. The assessment identified high operational costs, including costs associated with energy, milk collection, transportation and farmer support services, as factors affecting profitability. At the same time, the cooperative is seeking to expand its milk volumes and strengthen its value-addition capacity, which will increase the importance of reliable, cost-effective and efficient milk cooling systems.

The Climate Clever Check (CCC) conducted as part Agriterra's Farmers-Focused Transformation (FFT II) Programme onboarding identified climate-related challenges affecting dairy production and cooperative operations, including climate variability and its effects on production, water availability and farm productivity. The assessment recommended stronger climate-smart dairy practices and improved operational systems as part of the cooperative's transformation pathway.

Against this background, the adoption of solar-powered instant milk chilling technology has been identified as a potential climate-smart solution for improving the efficiency and resilience of the cooperative's milk cooling system. However, before any investment is made, there is a need to establish whether such a system is technically suitable, financially viable, operationally practical and compatible with the cooperative's existing infrastructure and future milk-volume requirements.

Agriterra will therefore facilitate a feasibility assessment by a Dutch Agripool expert and a Local consultant with relevant expertise in dairy technology, milk cooling systems, renewable energy and/or cooperative dairy operations. The assignment will assess the suitability of solar-powered instant chilling for Sosiot's current and projected milk volumes, existing cooling infrastructure, energy requirements and operational context. The assessment will also consider the technical configuration, solar generation requirements, storage requirements where applicable, installation requirements, maintenance needs, investment costs, operating costs, potential energy savings, risks and financing options.

The assessment is intended to provide the cooperative with an evidence-based basis for determining whether and how solar-powered instant chilling should be adopted. Where the technology is found to be feasible, the assignment should provide a practical investment roadmap, including indicative system specifications, implementation requirements, cost estimates and recommended next steps. Where significant constraints are identified, the assessment should clearly state these and propose alternative options or conditions that would need to be addressed before investment.

The assignment will contribute directly to the cooperative's FFT II climate-resilience and commercial transformation agenda and will complement other interventions aimed at strengthening milk quality, value addition, operational efficiency and long-term business sustainability.

2. Assignment Objective

The main objective of the assignment is to determine the technical, financial, operational and environmental feasibility of adopting a solar-powered instant milk chilling system at Sosiot Dairy Farmers Cooperative Society and provide a practical basis for investment decision-making and implementation.

2.1 Specific objectives

i. Assess the technical suitability of solar-powered instant milk chilling technology for Sosiot's current and projected milk volumes, existing cooling infrastructure, energy supply and milk collection system.
ii. Determine the financial and operational viability of the proposed system, including investment requirements, operating and maintenance costs, potential energy savings, payback considerations and financing requirements.
iii. Develop an evidence-based recommendation and investment roadmap outlining the most appropriate system configuration, implementation requirements, risks and next steps for Sosiot Dairy Farmers Cooperative Society.

3. Expected Results

By the end of the assignment:

- A comprehensive feasibility assessment of solar-powered instant milk chilling for Sosiot Dairy Farmers Cooperative Society is completed.
- The cooperative's current milk cooling capacity, energy consumption, milk volumes, cooling processes and infrastructure requirements are assessed and documented.
- Appropriate solar-powered instant chilling technology options and system configurations suitable for the cooperative's operational context are identified and assessed.
- The estimated capital investment, operating and maintenance costs, energy requirements, potential savings and financial viability of the proposed system are established.
- The technical requirements for integrating the proposed system with existing milk collection, cooling, power backup and future value-addition infrastructure are identified.
- Key operational, technical, financial, environmental and maintenance risks associated with adoption of the technology are identified, with appropriate mitigation measures proposed.
- A clear investment recommendation and implementation roadmap is developed, indicating whether the cooperative should proceed with the investment and, where appropriate, the preferred system configuration and sequencing.
- The cooperative Board and management are provided with sufficient technical and financial information to make an informed decision on adoption of solar-powered instant milk chilling.

4. Assignment Details

- **Composition of the assignment team**

Name	Role	Responsibility	Mode of Involvement
TBC	Dutch Agripooler	Technical assessment; solar chilling technology assessment; financial and operational analysis; preparation of feasibility report and recommendations	Field visit
Joyce Kinyanjui	Happy Cow Ltd, Project Manager. Local Consultant	Technical assessment; solar chilling technology assessment; financial and operational analysis; preparation of feasibility report and recommendations	Field visit
Hillary Maket	Cooperative Advisor	Assignment coordination, liaison with cooperative, contextual support, facilitation of meetings, quality assurance and reporting	Field visit

- **Duration of the assignment**
- The total duration of the assignment is **seven (7) days**, from **21 September to 27 September 2026**.
- This includes:
  - **1 day** - Preparation and review of existing documentation
  - **2 days** - Travel to and from Kenya
  - **3 days** - Field assessment and technical consultations
  - **1 day** - Analysis, reporting and presentation of preliminary findings
- The field component will be undertaken at Sosiot Dairy Farmers Cooperative Society and relevant milk collection/cooling facilities, with additional consultations with relevant technical and energy stakeholders where necessary.

4.1 Key Areas of Assessment

The feasibility assessment should cover, but not necessarily be limited to, the following areas:

A. Current Milk Cooling System

- Existing milk cooling capacity and equipment.
- Current daily and seasonal milk volumes.
- Milk inflows by collection centre and time of day.
- Existing cooling processes and milk handling procedures.
- Current cooling efficiency and operational bottlenecks.
- Existing power supply and backup systems.
- Current energy consumption and energy costs.
- Equipment age, condition and remaining useful life.

B. Future Milk Volume Requirements

The assessment should consider the cooperative's growth ambitions and projected milk volumes rather than assessing the solar system only against current milk intake.

The expert (s) should therefore assess:

- Current milk intake.
- Seasonal milk-volume variations.
- Expected milk-volume growth.
- Future value-addition requirements.
- Required chilling capacity under different growth scenarios.
- Potential integration with future processing infrastructure.

This is particularly important because Sosiot intends to increase milk volumes and expand value addition, while currently collecting approximately 5,000 litres per day.

C. Solar Resource and Energy Assessment

The assessment should determine:

- Suitability of the site for solar installation.
- Available roof/ground space.
- Solar resource potential.
- Required solar PV capacity.
- Battery/storage requirements, where applicable.
- Expected daily energy generation.
- Energy demand of the chilling system.
- Backup requirements during periods of low solar generation.
- Potential integration with the cooperative's existing backup power systems.

D. Technology Options

The experts should assess appropriate options for:

- Solar-powered instant milk chilling.
- Direct solar-powered chilling versus solar-plus-battery configurations.
- Integration with existing cooling infrastructure.
- Stand-alone versus grid-connected systems.
- Potential modular expansion as milk volumes increases.
- Equipment quality, availability and suitability for the Kenyan operating environment.

E. Financial Feasibility

The assessment should provide indicative estimates of:

- Capital expenditure.
- Installation costs.
- Civil/electrical works.
- Solar PV and storage costs.
- Chilling equipment costs.
- Operation and maintenance costs.
- Replacement costs for major components.
- Current versus projected energy costs.
- Total cost of ownership.
- Potential financing requirements and financing options.

Where sufficient data are available, the expert should compare the proposed system against the current grid/backup energy configuration.

F. Operational and Maintenance Requirements

The assessment should determine:

- Skills required to operate the system.
- Skills required for routine maintenance.
- Availability of local technical support.
- Availability of spare parts.
- Expected maintenance frequency.
- Equipment warranty considerations.
- Potential downtime risks.
- Staff training requirements.

G. Environmental and Climate Considerations

Where possible, the assessment should consider:

- Potential reduction in dependence on conventional electricity or diesel backup.
- Contribution to climate resilience.
- Long-term sustainability of the proposed system.

5. Detailed Programme

Date	Key Activities	Persons Involved
20/09/2026	Travel/arrival and briefing with Agriterra Kenya team/CA; review of Sosiot assessment, onboarding report, MBA and existing technical information.	Agripooler, Consultant, CA
21/09/2026	Introductory meeting with Sosiot Board and management; review of cooperative's milk volumes, cooling operations, energy consumption, existing infrastructure and future growth plans.	Agripooler, Consultant, CA, Board, Management
22/09/2026	Technical assessment of central milk cooling facility, power supply, backup systems, milk reception and cooling processes. Review of equipment specifications and energy requirements.	Agripooler, Consultant, CA, Sosiot Technical/Operations Staff
23/09/2026	Assessment of collection centre and milk collection arrangements; review of milk volumes, chilling requirements, potential solar installation sites and system scalability.	Agripooler, Consultant, CA, Sosiot Management
24/09/2026	Technical and financial analysis; consultations with relevant energy/solar and dairy equipment stakeholders as required; development of preliminary technology options and investment scenarios.	Agripooler, Consultant, CA
25/09/2026	Presentation and validation of preliminary findings with Sosiot Board and management; discussion of preferred options, risks, financing and implementation requirements.	Agripooler, Consultant, CA, Board, Management
26/09/2026	Finalization of key recommendations, reporting and travel to Nairobi.	Agripooler, Consultant, CA
27/09/2026	Flight back.	Agripooler

About Agriterra

Agriterra is an international agri-agency founded and governed by Dutch farmers' organisations, dedicated to strengthening farmer organisations in developing and emerging economies. Our approach centres on supporting ambitious farmer organisations to become member-responsive service delivery centres for smallholder farming households. With a project portfolio spanning Africa and Asia, Agriterra works to strengthen farmer organisations through advisory services, capacity building, peer-to-peer learning and business development support, contributing to long-term economic sustainability and resilience for their members.

Strengthening farmer organisations. Sowing the seeds of change together.