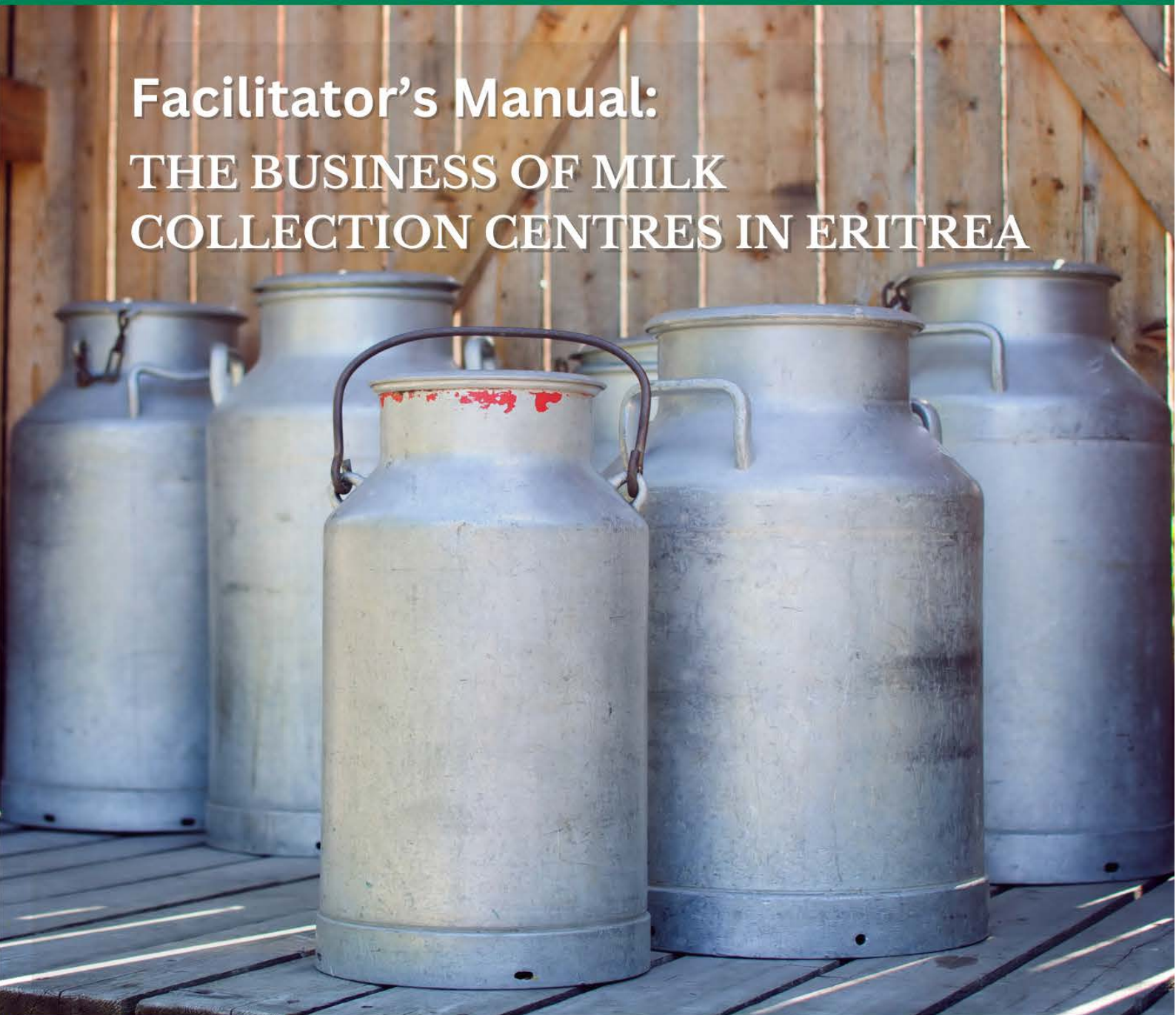


CSARIDE Dairy Value Chain Development Program - Eritrea June 2025

Facilitator's Manual: THE BUSINESS OF MILK COLLECTION CENTRES IN ERITREA



Climate Smart Agriculture Research and Innovation Support for Dairy Value Chains in Eritrea (CSARIDE)

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CSARIDE THE BUSINESS OF MILK COLLECTION CENTRES IN ERITREA – JUNE 2025

Accompanied by in-person training, this manual will introduce you to the business fundamentals of operating a sustainable milk collection centre as a cooperative, in Eritrea.

Kireshni Naiker



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Programme Overview: Why are we here?

Small-scale dairy farming in Eritrea is a largely untapped income opportunity. Your role in the dairy industry adds plenty of value, and being a part of this programme will provide you with insight, tools and knowledge on how to enhance your value – for the industry but most importantly, for your community, your family and for your professional potential. Your experience, your ideas and the knowledge you bring to this programme are the foundation of collective success.

As you are here to learn, you are also here to bring your unique insights into improving dairy business practices in your area.

By the end of this training, you will have a clear understanding of the role and operations of a milk collection centre (MCC) which operates as a cooperative in Eritrea. You will understand the basic business practices that will change the way you think about your operation. You will have established the steps needed for you to work with others in building a sustainable business.

**“There are no secrets to success. It is the result of preparation,
hard work and learning from failure.”
– Colin Powell**

How to use this manual

This manual is a resource for you as you work through a set of activities and engage in discussions with your colleagues. The training is dependent on you sharing your experiences with others, discussing not only your challenges and successes but continuously trying to identify better ways to produce quality milk for the consumers, be it from the perspective of a dairy farmer or a MCC processor.

The manual is divided into 2 parts:

- 1.) Understanding MCC Operations and Milk Quality;
- 2.) The Business Behind a Successful MCC.

A subject expert will lead and facilitate the training, guiding you in the process of developing better practices, skills and understanding the key elements in dairy processing.

You are welcome to make notes within this manual as this manual belongs to you. Use the manual and your experience to respond to the activities. Remember to use this opportunity to ask questions and network with other dairy farmers and dairy processors.

Facilitator’s Note: This manual is a resource for both you and the participants in the training. Firstly, this manual allows you to feel comfortable with all the elements of the chapter. Once you are familiar with the content of the chapter, identify the key objectives/ outcomes of the training. This will be the starting point to the design of the various activities to engage the participants in the learning process. In other words, what must the participants demonstrate in the activity to indicate that they have mastered the content or skill set to you? Use the learning design template ([Annexure A](#)) and fill in the objectives for the participants of your training. Secondly, the manual is a resource for the participants. How can they use the manual to assist them in completing the various activities and learning experience that you have created for them? **Your role is to facilitate the learning process.** Your role is not to cover all the content. Remember that they can use the manual as a resource for themselves. However, think carefully about how you can support them to discover the relevant information and to demonstrate understanding and skill in working through the activities that you have created for them.

Part 1: Understanding MCC Operations & Milk Quality

The first half of this manual, will take you through the basics of what milk collection centres, run as cooperatives, look like. Part 1 will also cover some important technical revision around milk safety, testing and what makes milk so good!

Chapter 1: Introduction to MCCs and their role in the dairy value chain

Chapter 2: Structure, Governance, and Functions of MCCs as a cooperative

Chapter 3: Milk Quality Standards & Testing

Chapter 4: The value of Record Keeping for MCCs

Chapter 1: Introduction to MCCs and their role in the dairy value chain

By the end of this session, you will be able to

- Explain the importance of MCCs to small-scale dairy farming in the dairy value chain.
- Describe how operating a MCC as a cooperative adds benefit to local farmers
- Discuss the economic and social impact of MCCs within a community.

Milk Collection Centres (MCC) play an important role in the dairy supply chain, ensuring that milk is collected, processed, and distributed efficiently. These centres provide a vital link between local dairy farmers and larger markets. They help in maintaining the quality of milk, providing farmers with necessary resources, and ultimately enhancing the livelihoods of many in rural areas.



([Dairy Association of Zambia \(DAZ\)](#), 2018)

Additionally, these centres often facilitate training and education for farmers on best practices in dairy farming, contributing to improved production techniques and better herd management. By establishing a reliable infrastructure for milk collection, these centres help to stabilize prices for farmers and ensure a consistent supply of dairy products for consumers.

1.1. The Dairy Industry as a System

Even though dairy industries may look different, they share a similar structure or **value chain**. Like a chain, each part is connected and equally important to the industry's success.



The dairy value chain represents the full range of activities involved in the production, processing, and distribution of milk and dairy products. It includes everything from the farm where cows are raised, to the collection, processing, and ultimately, the sale of dairy products to consumers.

We are going to examine the dairy value chain from the perspective of Milk Collection Centres that involve a cooperative of farmers. The purpose is to demonstrate the interconnectedness of these activities and how the collection centres address some of the sustainability challenges encountered by small-scale dairy farmers. We will, therefore, start in the middle of the value chain with milk collection.



Milk Collection

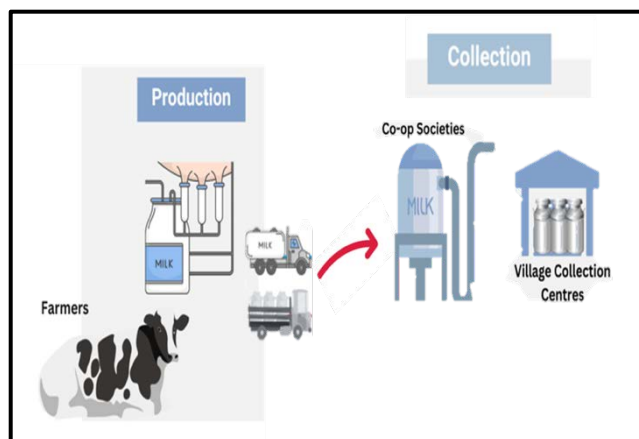
Milk collection centres (MCCs), whether run by cooperatives or not, act as an integral step between the production stage by the farmers and the processing stage by processors. They provide **centralised points** where local dairy farmers can bring their milk. In essence the collection step within the value chain acts like a distribution service. On the one hand, it offers the collection of milk to small-scale dairy farmers and on the other hand, it provides cold storage and wholesale to processing facilities.

MCCs also provide quality control measures to improve the quality of milk to consumers. This is a critical step in ensuring food safety.

The MCCs help to collect milk more efficiently from the farmers which reduces overall milk spoilage. MCCs were initially introduced as a solution to the lack of proper milk storage facilities for farmers. The close location of the MCCs generally reduces the travel time to drop off the milk before spoilage. Likewise, MCCs also offer the service of collecting the milk from certain farms. This collection of milk, therefore, follows the production stage.

Production (Milk Farming)

Milk production is the cornerstone to the dairy industry. It involves the raising of dairy cows, goats, or sheep, which are specifically bred for their ability to produce large quantities of milk.



Farmers are awake before sunrise to ensure the dairy value chain has its first point of product. Operating so early in the morning is a large part of their role in the value chain – to ensure milk is as fresh as possible before it enters MCCs, processors, packaging and eventually, the consumer's household. The produced milk must reach the collection centres within 4 hours, so that it can be chilled promptly to less than 4 °C. As production is the first point of the dairy process, **hygiene, expertise** and a solid **understanding of milk safety** is key at this stage.

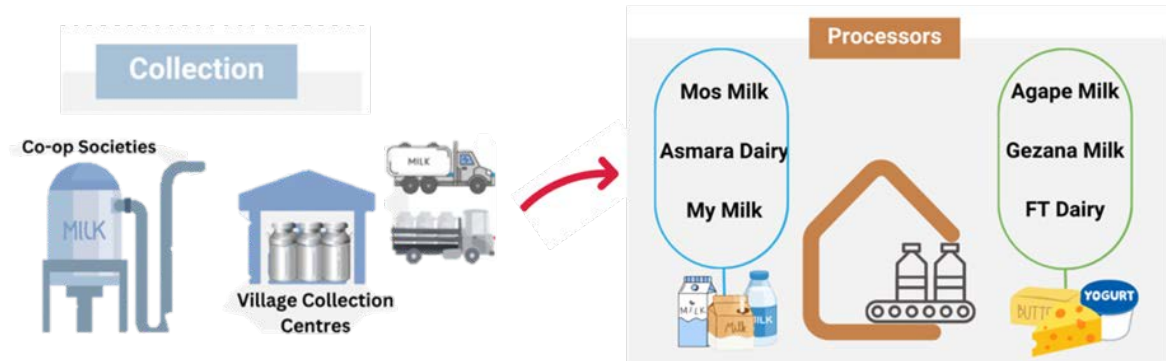
The art of dairy farming is to improve the health and productivity of their livestock to optimise the volume of produced milk. This includes proper nutrition, veterinary care, and breeding practices of their livestock. Farmers need to have access to a range of resources as indicated in the image below.



MCCs provide farmers with access to some of these essential services such as veterinary care, feed, financial services and training of best practices through the services of extensionists.

Let's examine the step after the collection stage of the value chain.

Milk Processing



Milk processing includes activities like pasteurization, packaging, and quality control. These processes ensure that the milk is safe for consumption and has a uniform texture. The processing facilities also produce a variety of dairy products, including cheese, yogurt, and butter.

Milk processors are often the most reliable income or buyer/customer for milk collection centres. Sometimes they are extensions of MCCs and members of the cooperative. However, the MCCs provide the farmers with a better opportunity to market access and better prices.

Processing facilities are responsible for distributing dairy products to consumers. This includes transportation logistics, storage facilities, and retail locations. Efficient distribution ensures that dairy products remain fresh and are delivered in a timely manner to meet consumer demand.

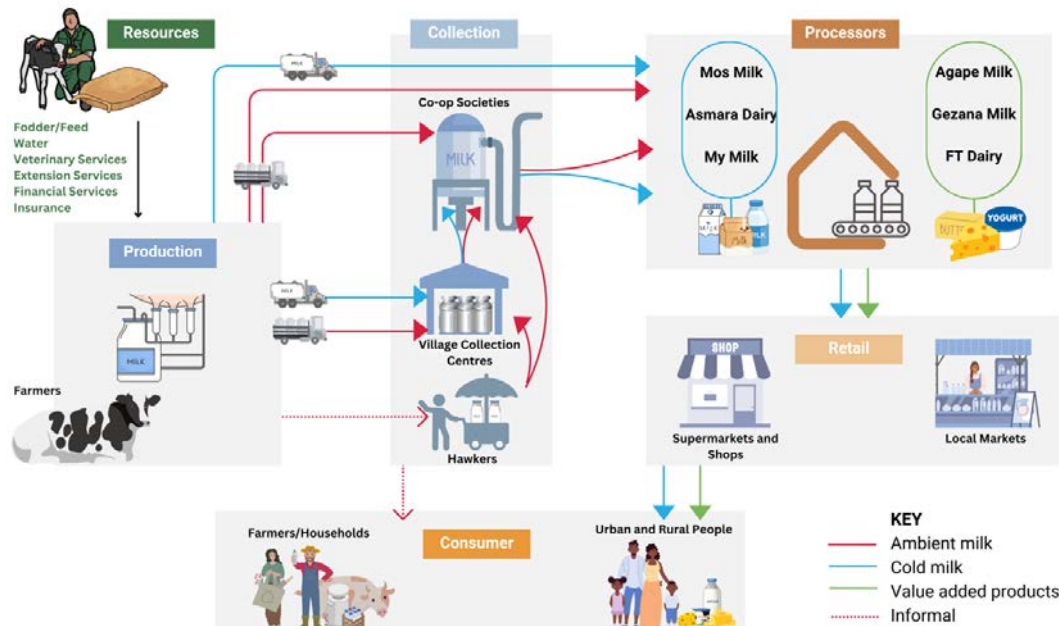
Retail & Consumers

Retailers are the link between processing companies and consumers, selling dairy products in stores and online. The packaged dairy products are delivered directly to stores or to hotels and restaurants.

Finally, consumers are vital as they drive the market through their purchasing decisions, preferences, and feedback. Their choices can influence trends and practices within the dairy industry, ultimately shaping the future of dairy production and sales.



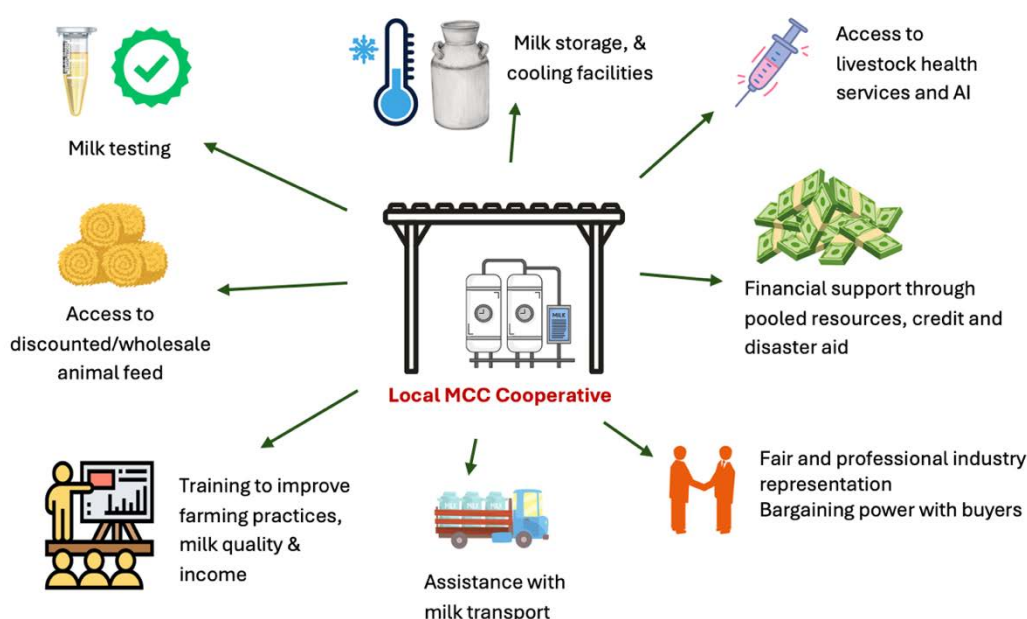
Each stakeholder's contribution is interconnected to ensure the health and viability of the value chain. Look at how the individual parts connect to represent the dairy value chain below:



1.2. Milk Collection Centres: the key to a successful dairy farming

Now that we have established the value milk collection centres add to the dairy value chain, we are going to zoom in and look at how they benefit small-scale dairy farmers in Eritrea.

MCCs often function as **cooperative enterprises**. This means that local individuals (or farms) come together to start and run a business in which they all have invested interest. By pooling their resources, these farmers can overcome individual limitations, resulting in increased milk production and improved quality standards. Examine the image below that summarises the benefits of MCC cooperatives to local farmers.



Trainers Note: Did you know that images are the simplest and most effective way to make sure that the information gets stored as a long-term memory. We also process images 60,000 times faster than words (Chappell, 2018). This means that we find it easier to remember an image. Including posters or visuals in your training, therefore, helps the learning process. In fact, one third (1/3) of the brain is dedicated to analysing images.

Besides from the already mentioned benefits of milk storage and quality control measures, cooperatives facilitate access to essential services such as training, veterinary care, and better farming practices, which enhance milk yield and overall herd health. Research (Balikowa, D et al., 2021) has indicated that MCCs that offer a diverse range of activities attract members to join the cooperative.

Additionally, cooperatives enhance bargaining power for farmers. By collectively marketing their milk, they can negotiate better prices with buyers, helping to ensure fair compensation. This collective approach also allows farmers to access larger markets, increasing their income potential and economic stability.

In summary, cooperatives play an important role in ensuring the sustainability of dairy farming in Africa. They promote best practices in milk production, and help maintain quality control, thereby contributing to the development of a more robust dairy sector.

IMPORTANT:

These benefits are only feasible when there is a committed and fully functional membership. Members are required to outsource these benefits by building partnerships. Members also need to pay their membership fees to cover the basic costs of implementing benefits.

**Cooperatives and memberships will be covered in more detail later in the manual.*

1.3. Social & Community Impact

Imagine a thriving dairy sector in Eritrea and in your district. The ripple effect of MCCs doing well brings ripples of positive impact to households, communities and to futures. The story below captures the personal impact of MCCs in Africa.

Case Study 1: Joseph the Dairy Farmer, Zambia



Joseph has lived in Magoye in Zambia all his life. Magoye is a fairly remote area where people rely on subsistence farming primarily of growing corn. The land is suitable for dairy farming which can be more lucrative, but it's so far from the local market that milk spoils during the journey. So, in the past, commercial dairy farming really wasn't possible.

But that changed when a local NGO worked with the local farmers, like Joseph, to create the Munjile Milk Collection Center. This is a cooperative owned by the local farmers that collects enough milk every day so that Parmalat, the large dairy product company, sends a big truck to collect it and take it to one of their major collection centers. The cooperative provides a reliable income from dairy farming that has tripled the income of many of the farmers and literally lifted them out of poverty.



Image: World Food Programme (WFP)

A steady stream of farmers bicycle their milk jugs to the collection facility, every day. It's clear that water is essential for this effort as the collection facilities have to be kept clean and each farmer washes his milk jugs before returning home. Water is essential for good milk production, particularly during the dry season, when the cattle feed is dry. The cattle can drink 5 gallons of water a day.



Joseph is 60 years old and worked 27 years as a schoolteacher. He saved enough money from his teaching career to buy the farm and since he didn't have a pension, he needs a source of income for his family. Joseph didn't really know if he'd have any luck with farming. He relied on local organisations as well as the local community to teach him how to be a dairy farmer.

He was afraid that he'd be the laughingstock of the community but now is proud that his single cow effort from 4 years ago has turned into a lucrative dairy farm with more than a dozen cows. Joseph has a 10-minute bike ride to bring the milk to the collection facility and thinks of his family during the bike ride and how much better off they are now because of their higher income.



He's proud that he's been able to send five of his children to college. One of the most satisfying parts of his day is when his family gathers for the evening meal and makes plans of how they're going to make the farm even better.

Joseph's wife Annie says that the farming work is difficult and she works harder than when she was a housewife when Joseph was a schoolteacher.

But, she says they are fulfilled. Annie says, "Yes, the work is hard but it helps give our life purpose and our family is happy and healthy".

This impact story has been amended from World Vision Organisation website. You can find the original blog here: <https://www.wvi.org/blogpost/joseph-dairy-farmer>.

Facilitator's Note: Each chapter contains activities. Most include a selection of questions at the end of the chapter while others are integrated throughout. It is important that the feedback to these activities is facilitated. Try to encourage participants to share their answers and to encourage discussions so that the responses are developed. You may need to ask probing questions, redirect questions to others to develop a scaffolded approach. Remember that your role is to engage the participants in the learning experience, and feedback is one such opportunity.

Complete the following activities

(The facilitator's manual contains suggested answers.
Not all the solutions may be listed.)



Facilitator's Note: Use this question to emphasize how MCCs solve the critical problems of transportation, cooling, and market access for remote dairy farmers. Discuss similar challenges in the participants' own communities.

Activity 1

Using what you've learnt in this chapter and from Joseph's story, work through the following questions.

1.1. How do MCCs add value to the dairy value chain? List at least three things.

MCCs provide centralized milk collection points for small-scale farmers

MCCs enable milk testing and quality control before processing

MCCs offer bulk cooling and storage facilities that individual farmers cannot afford

MCCs create bargaining power with processors through collective volumes

MCCs facilitate transport and logistics to reach larger markets

MCCs reduce milk wastage through proper storage and handling

1.2. You want to start a MCC cooperative in your village, but you need other local farmers to get onboard with you. Make a list of reasons as to why forming a MCC cooperative would be a good idea for their dairy practice.

Better prices through collective bargaining power with buyers

Reduced transportation costs through shared logistics

Access to cooling facilities for better milk preservation

Quality testing services to improve milk standards

Training opportunities to improve farming practices

Access to discounted animal feed through bulk purchasing

Potential for financial support through pooled resources

Fair representation in the industry

Access to livestock health services

- 1.3. Producing dairy makes more money than crops. Why could Joseph not farm dairy before an MCC was established in his village?

Joseph could not farm dairy commercially before the MCC was established because his village (Magoye) was too remote from markets. The milk would spoil during the journey to market due to lack of proper transportation and cooling facilities. The MCC provided the critical link between the remote farms and the commercial processor (Parmalat) by collecting enough milk to make it worthwhile for the processor to send a truck to collect it.

- 1.4. Since Joseph has been working with his local MCC, his life has improved in various ways. Capture how his life has improved in the following departments:

His knowledge on dairy farming	Joseph learned how to be a dairy farmer from local organizations and the community. He had no prior experience in dairy farming, having been a schoolteacher for 27 years.
His dairy production	Joseph's dairy farm grew from a single cow to more than a dozen cows over four years. His production increased enough to provide a sustainable income for his family.
His children	Joseph has been able to send five of his children to college thanks to the increased income from dairy farming.
His wife	Though Annie works harder than when Joseph was a schoolteacher, she feels their life has purpose and that their family is happy and healthy.

Discuss your responses with your colleagues.

Facilitator's Note: Use Joseph's story to illustrate the transformative potential of dairy farming when supported by effective MCCs. Invite participants to share any similar success stories they know from their own communities.

Did you discuss some of the social and economic benefits mentioned below?

One of the primary benefits of cooperatives is the collective bargaining power they provide to individual farmers. By pooling resources, farmers can negotiate better prices for their milk, reducing vulnerability to fluctuating market conditions. This leads to increased incomes, which can be reinvested back into the community, supporting local businesses and services.

Moreover, cooperatives often provide access to essential services such as training, veterinary care, and technology. By equipping farmers with knowledge and tools, cooperatives improve dairy farming practices, contributing to improved milk quality and yield. This educational aspect also fosters a culture of learning and cooperation among community members, strengthening social networks.

The establishment of milk collection centres through cooperatives helps to reduce the distance between producers and consumers, ensuring that local dairy products reach markets more efficiently. This not only boosts the local economy but also promotes food security within the community by making fresh, locally produced milk readily available.

Additionally, cooperatives cultivate a sense of ownership and accountability among their members. When farmers contribute to decision-making processes, they become more invested in the success of the cooperative, leading to sustainable practices and a commitment to community welfare.

In summary, there is a definite social impact because of cooperatives in milk collection centre operations. It encourages community involvement, improves the economic situation, and empowers individuals.

The closing of a training session:

This is an opportunity for the participants to reflect on key insights and to question for further clarification.

- What did they learn that they did not know before? Or session highlights.
- Where are they confused / uncertain? Or session lowlights.
- What questions do they still have on this topic?

These types of questions provide insight into how the training has gone. Remember that as a facilitator, you need to reflect on the training...what worked and what didn't. A facilitator needs to be a **reflective practitioner**, always looking at how to develop the training to make a bigger impact.

Chapter 2: Structure, Governance, and Functions of MCCs as a cooperative

By the end of this session, you will

- Outline a MCC organisational structure.
- Explain the key roles and responsibilities of its members.
- Discuss the core operations of an MCC.
- Explain the key steps of good governance for an MCC.
- Discuss how decision-making processes of MCC cooperatives impact operations
- Problem-solve some of the challenges of operating a MCC cooperative.

Facilitator's Notes: Once you have identified the intended objectives, think carefully about how you are going to plan the activities to allow the participants to master these objectives. Remember that you are now scaffolding the activities for learning to take place. You may need to create some resources (visuals, refer them to this booklet etc). In the design of the activities, think about how you would measure whether the farmers have understood or mastered that objective.

The focus of this chapter is on the organisational structure of a MCC run by a 'cooperative'. A reminder that a cooperative is a **partnership** where all parties (members) have a say in the business's operations, in important decisions, in finances and in the future of the business. MCCs are business enterprises that must be managed professionally to ensure profitability and sustainability.

In this chapter, we are going to cover the fundamentals of operating a MCC, as well as the basic governance processes for a cooperative. The governance structure of a milk collection centres influences the way decisions are made that impact the performance of the MCC.

2.1. The MCC organisational structure

The organisational structure varies dependent on the size of the MCC. Research indicates that most MCCs employ a manager and/ or Milk Assistant, an Accountant or Accounts Assistant, and a Laboratory Technician (or Quality Control Officer). Most organisational structures also include drivers, extensionists and temporary labour providers.

1. **Manager:** The manager oversees all operations at the milk collection centre. His/ her responsibilities include managing staff, ensuring compliance with health and safety regulations, maintaining quality standards, and coordinating with dairy processing units. The manager also handles logistics and communication with farmers and suppliers. In the event of a manager's absence, the Milk Assistant will assume the responsibilities of the manager.

2. **Milk Assistant:** The milk assistant works under the manager and is responsible for the daily collection of milk from farmers. He/ she coordinates collection schedules, manages collection staff, and ensures that the milk is collected following hygiene and quality protocols.
3. **Accountant:** This person manages the financial operations of the MCC. The responsibilities involve budgeting, accounting, financial reporting, and cash flow management. This person supports the manager in ensuring that the MCC operates efficiently, remains financially healthy, and meets regulatory requirements.
4. **Laboratory Technician:** This role is crucial for maintaining the standards of the milk collected. The Laboratory Technician conducts tests to check for purity, fat content, and any contaminants. They ensure that only milk meeting quality standards is accepted and processed.
5. **Transport Coordinator:** A larger MCC may appoint a Transport Coordinator. If not, this responsibility rests with the manager who arranges the logistics of transporting collected milk to processing units. He/ she schedules transport vehicles, manage routes, and ensures that milk is delivered in a timely manner while maintaining quality through proper handling.
6. **Storage Supervisor:** A larger MCC may appoint a Storage Supervisor. Otherwise, the milk assistant will assume some of the responsibilities. The storage supervisor oversees the milk cooling process. This includes ensuring that milk coolers are fully operational, at the correct temperature and maintaining general hygiene and maintenance of the storage area and cooling tanks.
7. **Extensionists:** this group of field staff often work directly with farmers, providing them with support and training on best practices in milk production and hygiene. They also serve as a link between the farmers and the collection centre.
8. **Data Entry Clerk:** This position may be available in the bigger MCC. Otherwise, each person above maintains their own record-keeping related to their role. The Data Entry Clerk is responsible for recording all transactions related to milk collection. This includes documenting the quantity of milk received, the farmers' details, and any quality testing results. Accurate data entry is essential for inventory management and financial reporting.

Each employee contributes to the overall success of a MCC. Refer to the table below for an overview of the roles and responsibilities of the above-mentioned positions.

Role	Responsibilities
Manager	- Oversees all MCC operations. - Manages the risks associated with MCCs. - Manages staff. - Manages the quality of record keeping across all roles.

	- Solves problems. - Oversees the implementation of the value-added services such as training, fodder sales, AI services etc. - Manages relationships and communication with farmers and processors/ or farmers and customers.
Accountant/ Assistant Accountant	- Determines the budget with the Manager and oversees the roll-out of this budget. - Manages payments due to farmers. - Ensure clients pay within agreed timelines. - Pays wages/salaries (for the staff at the MCC). - Records all expenses, sales and other income per month. - Keeps accurate financial records. - Manages the cash flow of the MCC. - Manages the MCC assets (cooling tanks, vehicles etc)
Milk Assistant	(Assumes the responsibilities of the manager if no manager is on site.) - Receives milk delivered by farmers. - Records the name of farmer and weighs the amount of milk received. - Ensures the milk has traveled safely – clean containers, well-sealed etc. - Stores the milk for testing. - Oversees Cleaning in Place (CIP) procedures for equipment and lines in terms of temperature, time and flow etc. - Ensures that all staff adhere to all codes of Personal Hygiene.
Laboratory Technician	- Carries out routine quality control checks and analyses on all milk supplied to confirm conformity with set standards. - Tests milk samples for components such as fat content, protein levels, and somatic cell counts. - Maintains accurate records of milk quality tests and inspections. - Monitors, documents and reports compliance with good lab practices on milk reception floor. - Implements corrective actions for any quality control issues identified during inspections or testing. - Maintains all work surfaces, equipment, trolleys, trays, test tubes and pipettes to ensure cleanliness before and after receiving or releasing milk. - Reports findings and provides feedback to management for decision-making.
Milk Storage Supervisor	- Ensure milk coolers are always fully operational. - Monitors storage conditions of milk samples in fridges/ cold rooms etc. and ensures conformity with all standards and procedures. - Maintains hygiene and maintenance of milk storage area and cooling tanks.
Milk Transport Coordinator	- Determines the best route for collection/ distribution and manages the roster of drivers (for the bigger MCC).

	- Manages the collection of milk twice a day from certain farmers. - Manages the preparation of milk to be dispatched to the processors. - Keeps a record of all collections and deliveries via MCC transport.
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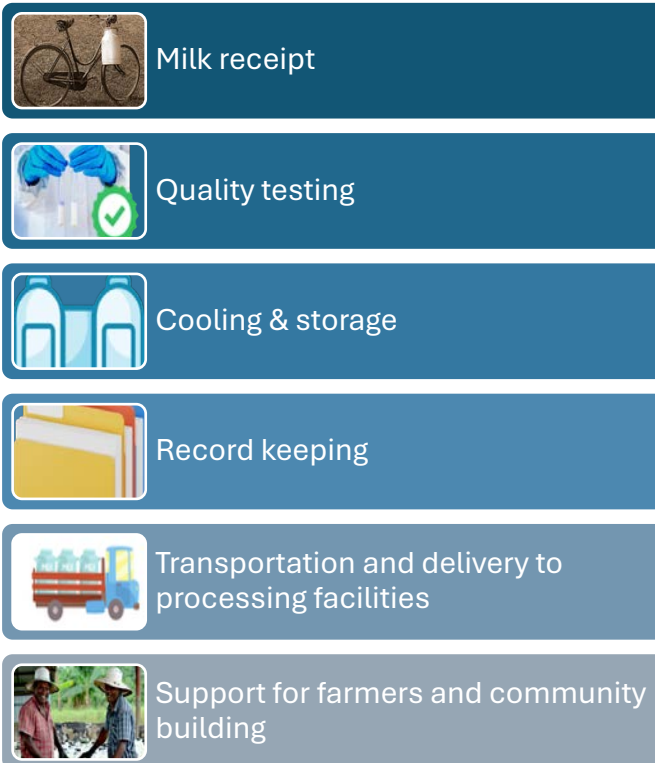
Facilitator's Notes: Using tables helps to extract the key responsibilities for the participants. Asking participants to provide a mind map or table is a good exercise if you want them to extract the most important concepts from a resource. These visuals are easier to recall than lots of text. Furthermore, it encourages the participants to work with the resource.

Despite the varying size of the MCCs, it is important to recruit the right candidate for the above-mentioned positions. One of the challenges in running an efficient MCC, as cited by Balikowa et al. (2021), is the inability of MCCs to hire qualified human resources, particularly in the more strategic positions (Centre Manager, Accountant and Lab Technician) due to the small-scale level of operations. It is challenging to attain economies of scale when there is a reduced supply of milk in the dry season and the low consumption of milk during the fasting months.

A cooperative-run MCC has the potential to strengthen the efficiency of the MCCs. All members (farmers and/ or processors of the area) co-own the MCC and therefore, bring with them experience and expertise in a range of activities. This means that those with a maintenance background could offer their services to repair failing machinery, those with a veterinarian background can assist other farmers with herd management. A cooperative brings an additional layer to the hierarchical structure of the MCC organisation. Considering that a cooperative consists of vested members, a board is elected, via a general assembly. This board provides the strategic direction of the MCC and develops policies that help govern the MCC. Read more about this later in this chapter.

2.2. The Core Operations of a MCC

Milk Collection Centres serve multiple functions crucial for dairy farming.



Receipt of milk

Receipt of milk is either through collection or delivery: Local farmers deliver their freshly produced milk to the collection centre, ensuring that the milk arrives in a timely manner to maintain its quality and freshness. The milk is weighed and recorded. Accurate measurement is crucial to ensure proper payment and maintain quality standards.



Quality Testing

Quality Testing: At the centre, collected milk undergoes rigorous quality testing. These tests check for freshness, fat content, and the presence of contaminants. The milk needs to meet the established health and safety standards before moving forward.



Cooling & Storage

Cooling & Storage: After testing, the milk is quickly cooled to preserve its freshness and prevent spoilage. Milk collection centres provide adequate storage facilities to keep the milk cool and fresh until it is transported to processing plants. Maintaining the correct temperature is essential for ensuring the milk remains safe for consumption.



Record Keeping

Record Keeping: Accurate record keeping is another critical operation. This includes tracking the quantity of milk received, results of quality tests, and details of payments to farmers. These records help in managing inventory and ensuring transparency in operations.



Transportation and Delivery

Transportation and Delivery: Finally, the MCC is responsible for arranging transportation to deliver the milk to processing plants. This involves scheduling trucks and ensuring that the milk remains at the required temperature during transit. Efficient logistics are key to maintaining the supply chain.



Support for farmers and community building

Support for farmers and community building: MCCs generally provide additional services to farmers. One additional support is to provide farmers with training on dairy farming techniques, milk hygiene practices and herd management. Likewise, the MCCs facilitate market access by connecting farmers with larger markets. This also helps to stabilize prices and provides a consistent customer base for dairy farmers. Likewise, by ensuring that farmers receive prompt compensation for their milk, collection centres help to improve their financial stability and encourage them to continue dairy farming. Overall, MCCs play a role in building a sense of community among dairy farmers. They foster collaboration and support through cooperative efforts, enhancing the overall dairy industry.

When designing the layout of the MCC, consideration must be given to the flow in the processing and storing of the milk. Reflect on the above-mentioned functions of the MCC and consider the movement of the received milk to the distribution to the retailers/ consumers.

Layout of a MCC



Receiving Area: Where farmers bring their milk, which is weighed and recorded.

Quality Control Station: Milk is sampled for testing (e.g., for fat content, temperature, and cleanliness).

Cooling Section: Milk is poured into bulk cooling tanks immediately after quality checks. The cooling tanks rapidly bring the milk temperature down to around 4°C, slowing bacterial growth.

Storage Room: Contains the bulk cooling tanks. These are insulated tanks designed to keep milk at a low temperature until transport.

Office Space: For administration, record-keeping, and training activities.

Ensuring an efficient workflow minimizes delays and maximizes productivity. This includes strategically placing collection points, storage facilities, and processing areas to facilitate easy movement of milk from collection to storage and processing. Proper equipment, such as cooling tanks and transportation vehicles, is essential for maintaining the quality of the milk. Regular maintenance of machinery and systematic training for staff can further enhance operational efficiency, reducing the risk of contamination and ensuring timely deliveries.

In conclusion, a well-designed layout is important for the success of a MCC. Likewise, MCCs play an integral role in supporting dairy farmers, enhancing milk quality, and ensuring that the dairy supply chain operates smoothly.

2.3. Good Governance

As a cooperative is governed very differently from a traditional business, it is important to understand the basic governance structure you will need to put in place. Governance of MMCs is often managed by the cooperative itself, with a board of directors elected by the members. This ensures that decisions reflect the interests of the farmers and that profits are reinvested into the cooperative or distributed among members. Additionally, these centres have staff responsible for day-to-day operations, compliance with health regulations, and coordination with processing plants.

2.3.1 The General Assembly / Members

The General Assembly consists of farmers or processors who have partnered to form a MCC cooperative. To be part of a cooperative, the person must apply to be a member. This results in the collective ownership of resources that enables communities to work together towards common goals, maximizing efficiency and sustainability.

In a traditional business, one person makes the important decisions and benefits greatly from company profits. In a cooperative, the General Assembly is the highest decision-making power. This means that decisions are made through voting and business profits or benefits are divided equally.



A startup MCC general assembly may consist of 8 – 10 members. Ideally, your membership will grow over time. The bigger the general assembly, the greater the inputs into the cooperative (milk, skills and membership fees).

All members meet once a year, or when specially requested or needed.

2.3.2 The Board of Directors (Elected by General Assembly/Members)



The MCC cooperative requires a smaller team to lead the operations, develop partnerships, secure sales and manage the finances. This team is the Board of Directors. The directors are also members and voted in by the general assembly based on their experience, skills and ability to lead the MCC to success.

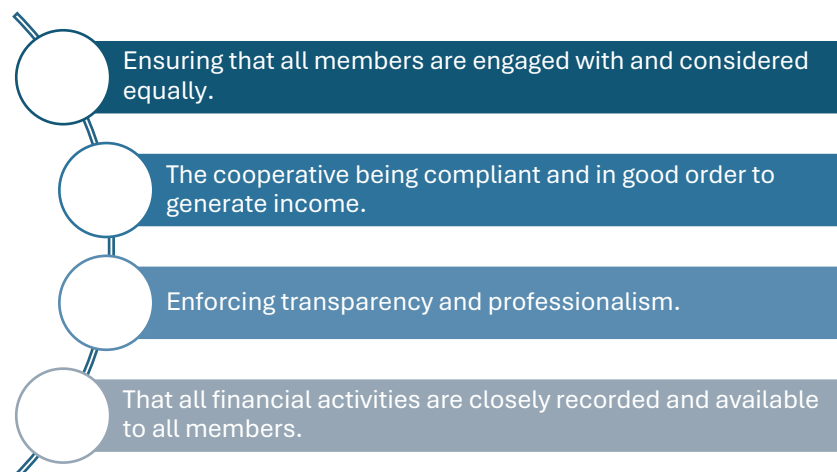
The board of directors consists of at **3 to 4 key roles**, plus any other important leadership roles.

A board of directors is made up these important roles:

Chairperson / President	Provides leadership and represents the cooperative in all official matters. Their duties include: • Governing board meetings and general assemblies. • Ensure policies and strategies align with cooperative goals. • Acts as a liaison between the board, management and external stakeholders (such as government, NGOs etc) • Signs official documents and contracts on behalf of the cooperative. • Leads dispute resolution among members.
Vice-Chairperson (if a bigger MCC)	Assists the Chairperson and takes over in their absence. Their duties include: • Supports running of MCC. • Acts as Chairperson if chairperson is not available.
Secretary	Manages documentation and communication within the cooperative. Their duties include: • Maintains records of meetings, minutes, and decisions. • Issues notices and invitations for board and member meetings. • Keeps legal and administrative documents organized. • Ensures proper communication between the board and cooperative members.

Treasurer	Oversees the cooperative's financial management. Their duties include: • Supervises financial transactions, budgets, and bookkeeping. • Ensures timely payment of members and suppliers. • Prepares financial reports for the board and general assembly. • Oversees fundraising and financial sustainability strategies.
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As a group, the **board of directors** is responsible for:



They are responsible for reporting back to the general assembly on all MCC operations. The board of directors only gets paid if there are profits or benefits from the business. They get paid equally – regardless of age, gender or education.

If a director on the board does not add value to the cooperative's stability, growth and overall success, they are voted out by the general assembly.

2.3.3 Decision Making and Accountability in a Cooperative

Each member has a say in the decision-making process, promoting transparency and trust within the cooperative. Governance structures may include a board of directors elected by the members, ensuring that the interests of the dairy farmers are represented in operational decisions.

All major strategic and policy decisions that impact the overall operation and future of the cooperative are made by the general assembly through a voting process. Below lists some of the required decision-making:

1. Governance & Leadership Decisions

- Electing the Board of Directors – Members vote for leaders who will manage the cooperative.
- Approving Bylaws & Policies – Setting or amending rules for how the cooperative operates.
- Dissolving or Merging the Cooperative – Deciding on the future of the MCC.

2. Financial Decisions

- Approving Annual Budgets – Reviewing and endorsing financial plans.
- Setting Membership Fees & Capital Contributions – Determining how much members contribute.
- Distributing Profits or Surpluses – Deciding how revenue is shared among members.
- Approving Loans & Major Investments – Authorizing large expenses like equipment purchases.

3. Milk Pricing & Sales

- Setting the Base Milk Price – Establishing how much members are paid per litre of milk.
- Negotiating with Buyers & Processors – Making decisions about contracts with milk processors.

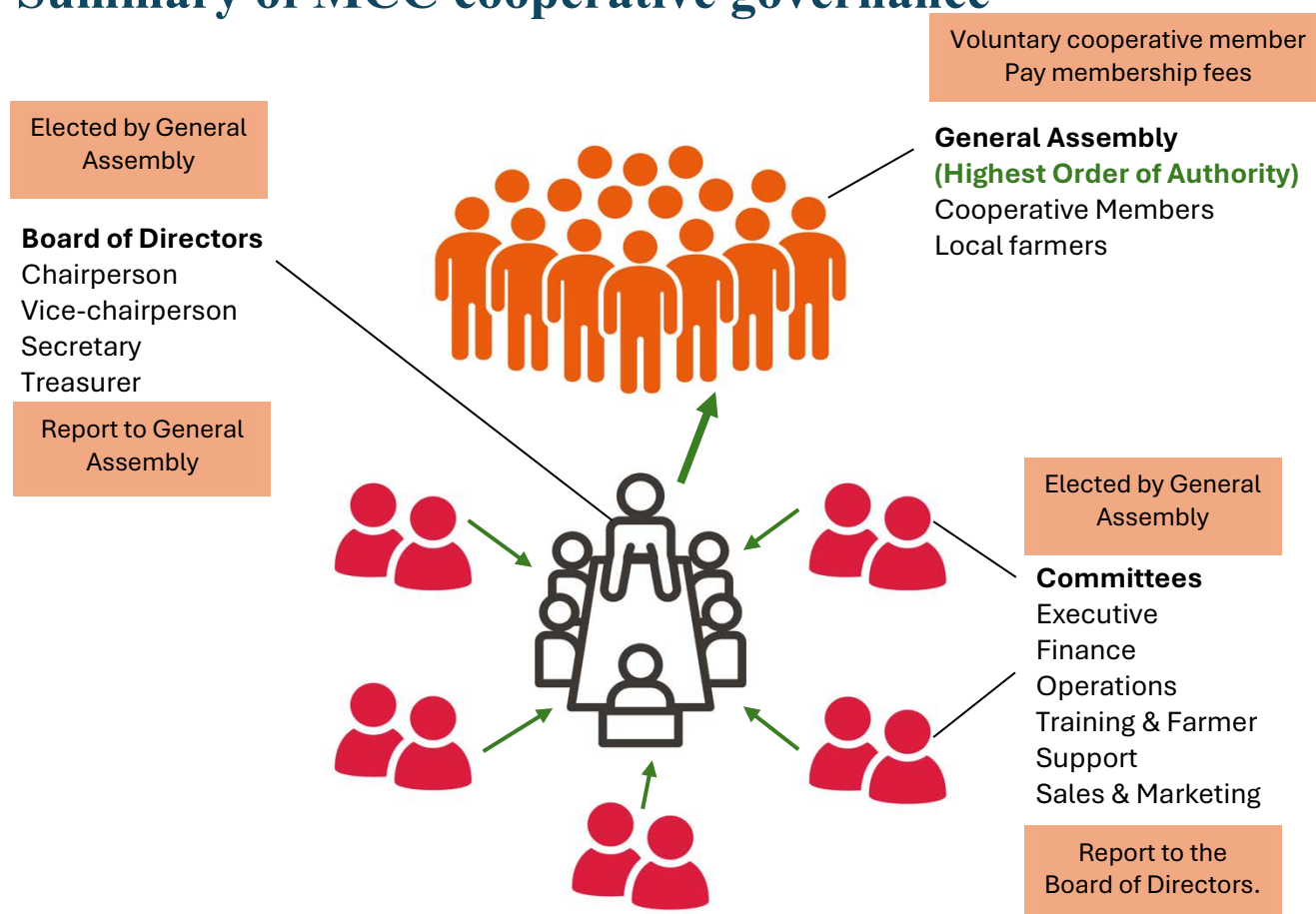
4. Operational & Service Improvements

- Expanding Services – Deciding on adding new services (e.g., veterinary support, training programs).
- Quality Control Measures – Setting standards for milk hygiene and safety.
- Infrastructure Development – Approving facility upgrades like new cooling systems.

5. Conflict Resolution & Member Discipline

- Handling Disputes – Making decisions on conflicts between members.
- Setting Disciplinary Actions – Determining consequences for rule violations.

Summary of MCC cooperative governance





Governance Values:

- General Assembly as the Highest Authority
- Board of Directors for Strategic Oversight
- Management Team for Daily Operations
- Transparency & Accountability
- Shared Economic Participation
- Commitment to Education & Training
- Long-Term Sustainability & Community Focus

Complete the following activities



Activity 2.1

Now that you have a better idea of what you need to start and run an MCC in your village, answer following questions:

2.1.1) Who are the local dairy farmers in your area that you would like to form a cooperative with? List them here. The more you can list the easier it will be to get started.

Facilitator's Note: After participants complete their lists, facilitate a brief discussion where they can share some names and why they think these individuals would be good cooperative members. This helps participants start thinking strategically about building their membership.

2.1.2) How do the farmers reduce milk spoilage when delivering to the MCC?

2.1.3) Look at the MCC setup below and answer the following questions.



a.) Explain why it is important to consider the layout of an MCC?

b) What is the importance of this person's role?

c) Why is it important that milk is weighed and tested when arriving at the MCC?

2.1.4) Choose the correct answer.

What are the primary challenges faced by milk collection centres in adhering to governance best practices?

a) Ensuring consistent milk quality and maintaining traceability across the supply chain.

b) Finding qualified personnel to oversee milk quality checking.

c) Implementing sustainable transportation methods for milk distribution.

d) Negotiating competitive prices for milk with farmers.

Activity 2.2.

Divide into groups. Each group will represent an important MCC department.

Group 1 – Finance

Group 4 – Cooling and Storing

Group 2 – Receiving

Group 5 – Transport Logistics

Group 3 – Milk Quality Assurance

Your trainer will provide you with a scenario. Discuss the scenario in your groups and come up with a solution. Your solution will be presented to the general assembly (the rest of the group) and voted in or out.

Facilitator's Note:

Print these out on slips of paper or write them up on flipchart paper. Distribute them to the groups. Allow them time to strategize and then additional time to plan their presentation to the GA. Keeping it simple is key. The participants should have fun with this. Encourage them to be creative and use the Chapter to help them.

Group 1 (Finance): "The MCC has just discovered that milk payments to three farmers were calculated incorrectly last month, resulting in overpayment. How should this situation be handled?"

Group 2 (Farmer Training): "Several farmers are consistently delivering milk that fails quality tests. What training interventions would you recommend?"

Group 3 (Milk Quality Assurance): "During a random inspection, health officials found traces of antibiotics in a batch of milk. What immediate and long-term actions should be taken?"

Group 4 (Sales): "A major buyer has suddenly reduced their purchase volume by 40%. How would you address this situation?"

Group 5 (Partnerships): "A local NGO has offered to provide equipment but wants to place several conditions on the MCC's operations. How would you approach this partnership?"

This chapter has allowed you to establish a foundational understanding of the operations responsible for a MCCs success, how a MCC cooperative is structured and what is required to implement good governance.

As your MCC cooperative is established, and your operations, policies, roles and responsibilities start to formalise, you will be faced with challenges. Work together to continue to develop your leadership and communication skills, your knowledge on MCC operations, finance and managing a growing membership.



The closing of a training session:

This is an opportunity for the participants to reflect on key insights and to question for further clarification.

- What did they learn that they did not know before? Or session highlights.
- Where are they confused / uncertain? Or session lowlights.
- What questions do they still have on this topic?

These types of questions provide insight into how the training has gone. Remember that as a facilitator, you need to reflect on the training...what worked and what didn't. A facilitator needs to be a **reflective practitioner**, always looking at how to develop the training to make a bigger impact.

Chapter 3: Producing milk of a high quality

By the end of this session, you will

- Describe the importance of quality milk and market access.
- Explain how to implement milk quality control methods
- Demonstrate basic milk testing procedures.
- Assess milk test results.
- Practice milk production and collection hygiene



Milk is a valuable and highly perishable product that requires careful handling from the farm to the market. Poor hygiene practices, inadequate equipment sanitation, and improper storage can significantly affect milk quality, leading to spoilage, economic losses, and potential health risks for consumers. To ensure high-quality milk production, it is essential that both small-scale farmers and MCCs adopt best practices in milking, milk handling, and storage.

3.1. The Importance of quality milk and market access

Maintaining high milk quality requires implementing proper hygiene practices during milking, transportation, and storage. Regular testing and monitoring of milk for various quality parameters, including somatic cell counts and bacteria levels, are crucial. Training farmers and staff on best practices can also enhance overall milk quality. By establishing a reputation for excellence, a Milk Collection Centre can differentiate itself in a crowded market, building loyalty among consumers and fostering long-term partnerships within the dairy supply chain. Ultimately, a commitment to quality not only protects public health but also bolsters the economic viability of the entire enterprise. Market access for MCCs depends on numerous factors including adherence to regulations, logistics, and relationships with buyers. Centres that can assure consistent quality and safety are more likely to secure contracts with larger processors or retail chains. They may also gain access to export markets, expanding their reach. Finally, having a reputation for high-quality produce can lead to partnerships with health-conscious brands and organic labels, further diversifying market access.

What is milk quality?

Milk quality means the milk is **clean, safe to drink, and good for selling or making dairy products**. Good milk comes from healthy cows and clean handling.

Group discussion



Discuss how you would assess the milk to determine it was good quality. Think of the various senses that you could use

Facilitator's Note: It is so important to draw in your participants' experiences to encourage active engagement. This group discussion provides the participant's an opportunity to share their experiences of identifying "quality".

How to know if milk is good quality?

- **Appearance**
(How it Looks): White or creamy; no dirt, blood, clots, or added water
- **Taste:**
Mild and slightly sweet; no sour, salty, or bitter taste.
- **Smell:**
Fresh and clean; no sour smell.
- **Texture:**
Smooth, not lumpy; clots mean spoilage.
- **Temperature:**
Cool milk quickly; warm milk spoils fast.
- **Cleanliness:**
Milk should be free from dung, hair, or other dirt

Factors Affecting Milk Quality

The quality of milk a cow gives directly affects how much a farmer is paid for it. That's why farmers go to such great lengths to assure quality of milk. Factors impacting the quality of milk

Cow Health

A cow's health has the biggest impact on milk quality. They are vulnerable to udder irritation or inflammation, especially if stall conditions are poor. Exposure to mud, manure, and runoff increases the risk of infection, especially during rainy seasons, leading to higher somatic cell counts (SCC).



Somatic Cell Counts, Sub Clinical Mastitis (SCC)

SCC is one of the best indicators of cow health. High SCC in milk means there are more white blood cells signalling the cow is fighting an illness. Other somatic cells can reduce the milk's fat and protein content, affecting quality and shelf life. The CMT (California Mastitis Test) is a quick way to estimate SCC levels in milk.



Milk Handling and Poor Hygiene

Milk is a perfect environment for bacteria to grow. Bacteria counts taken during processing can reveal whether the milk was collected using clean equipment and cooled quickly. Cleaner equipment and faster cooling result in lower bacteria levels.



Diet

Just as diet affects how much milk a cow produces, it also influences the quality. In times of feed scarcity, both quantity and quality drop. When feed is abundant, farmers can fine-tune the diet to improve milk composition.



3.2. Strategies to implement milk quality control measures

MCCs need to implement various quality control measures to ensure that the milk collected meets health and safety standards. This includes testing for bacteria levels, fat content, and other parameters, which helps maintain the overall quality of the milk throughout the supply chain. Not only is regular testing for bacteria and contaminants essential within the MCC but also regular training sessions for farmers on proper hygiene and milking practices is needed at the production stage. This education is crucial for maintaining high standards of milk quality and preventing contamination before even receiving the milk at the MCC. Below is a step-by-step guide on milking hygiene.

3.2.1 Milking hygiene: step by step guide

Ensuring high-quality milk production begins with proper milking hygiene. This guide outlines each crucial step involved in maintaining the cleanliness of the milking process to optimize milk yield, minimize health risks, and prolong the shelf-life of milk

STEP 1: Preparing for Milking - Maintaining a Clean Milking Area

Clean Before Every Milking

Remove manure, feed residues, and dirt from the milking area before each session. This helps to create a clean and hygienic environment for both cows and milk.

Disinfection

Disinfect the floors, walls, and any surfaces that come into contact with cows or milk regularly. Use a mild, safe disinfectant to reduce the risk of bacterial contamination.

Proper Ventilation

Ensure the milking area has good ventilation to reduce moisture and humidity, which can encourage bacterial growth. A well-ventilated area also helps to keep the cows comfortable during milking.

Drainage

Maintain proper drainage in the milking area to prevent the buildup of water, urine, or spilled milk, which can be breeding grounds for bacteria and attract flies.

Use Clean Bedding

If using bedding for the cows during milking, ensure it is clean, dry, and regularly changed. Clean bedding reduces the chance of bacteria spreading from the cow's udder to the milk.

Keep Equipment Separate

Store milking equipment, such as buckets, containers, and cloths, in a clean and designated area to prevent contamination from dirt or manure.

Personal Hygiene

Wear clean clothing and wash hands before handling the cows or milking equipment to prevent the transfer of dirt and germs to the milk.



STEP 2: Prepare the Milking Equipment

Use Disinfectants

After each use, clean your equipment with a chlorine-based disinfectant or other suitable sanitizer to kill bacteria and remove residues.

Rinse Thoroughly

Rinse the equipment with clean water to remove any traces of the disinfectant.

Air-Dry in the Sun

Place cleaned buckets and tools upside down on a rack in a sunny area. Sunlight not only dries the equipment but also helps to kill any remaining germs.

Regular Maintenance

Inspect equipment regularly for cracks or damage.

Hand hygiene and use of protective clothing (aprons, gloves)

Before starting the milking process, wash your hands with soap and clean water. Dry hands with a clean towel or let them air-dry. During milking, keep a clean towel handy to wipe off any dirt that might accumulate on your hands

Wear clean aprons and use disposable or washable gloves to prevent contamination of milk. Gloves should be changed regularly, especially if they become soiled during milking.

STEP 3: Cow Preparation

Pre-milking udder washing and drying techniques

Clean the udder and teats before milking using a clean cloth soaked in warm water. This helps remove dirt, manure, and bacteria that might otherwise enter the milk. Gently wipe each teat with individual cloths to avoid cross-contamination.

Dry the udder thoroughly with a separate, clean towel for each cow to prevent bacteria from multiplying in the moisture.

Pre- and Post-Milking: Use of Teat Disinfectants

Pre-Milking

Apply a pre-milking teat disinfectant (teat dip) to each teat, ensuring full coverage. Allow the disinfectant to remain on the teats for at least 30 seconds before wiping it off with a clean cloth.



Post-Milking

Immediately after milking, apply a post-milking teat dip. This helps close the teat canal, preventing bacteria from entering and causing infections.



Farmers can use a mild iodine-based solution to disinfect teats before and after milking. This simple routine can greatly reduce udder infections.

Fore stripping to check for mastitis

Before attaching the milking equipment or beginning hand milking, strip a few streams of milk from each teat into a strip cup. Check for abnormalities such as clots, blood, or a watery appearance, which can indicate mastitis. If mastitis is suspected, separate the cow for treatment and avoid mixing its milk with the healthy supply.

3.3. Basic milk testing procedures

Establish a consistent schedule for testing milk quality, ensuring that the milk meets industry standards. Regular testing helps identify any issues early and ensures the safety and quality of the milk collected. Testing can include assessing milk composition, somatic cell counts, bacterial counts, and presence of antibiotics or other contaminants. By conducting routine tests, dairy farmers and the MCC laboratory technician can identify and address any issues that may affect milk quality promptly. This ensures that only high-quality milk is received at the MCC to be distributed to the market, maintaining consumer trust and satisfaction.

To ensure milk quality assurance, the following 3 criteria are needed:

1. Guidelines for basic milk quality testing (e.g., lactometer, pH tests).
2. Good handling of milk to prevent contamination: proper containers, avoiding exposure of milk to sunlight and heat.
3. Accurate record-keeping for milk production, quality testing, and storage conditions.
- 4.

Key Factors for High-Quality Milk

Fat Content:



The creaminess and taste of milk depend on its fat content. Good milk usually has 3.5% to 4.5% fat. Some cow breeds, like Jerseys, can give milk with over 5% fat.

Example: In the European Union, whole milk must have at least 3.5% fat.

Protein Content:



Protein in milk is important for nutrition and making products like cheese and yogurt. Good milk has 3.2% to 3.4% protein.

Example: The international standard (Codex) suggests that whole milk should have a protein content of at least 2.9% to 3.4%.

Somatic Cell Count (SCC):



SCC measures the health of a cow's udder. A high SCC means there could be an infection.

Good milk should have an SCC below 400,000 cells per mL.

Example: Milk with an SCC under 200,000 is considered healthy and fetches better prices.

Bacterial Load:



Fewer bacteria in milk mean it was collected and stored cleanly. Good milk has a bacterial count below 100,000 bacteria per mL.

Example: In the EU, raw milk should have less than 100,000 bacteria per mL.

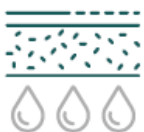
Absence of Antibiotics:



Milk should not contain antibiotics. If cows are treated with antibiotics, wait until the medicine is out of their system before milking them for sale.

Example: Europe and the U.S. do not allow milk with antibiotic residues.

No Foreign Materials:



Milk should be free from dirt, hair, or insects. Use milk filters or strainers and keep equipment clean to avoid contamination.

Milk should always be put through a filter to remove any foreign material.

Proper pH:



Fresh milk has a pH between 6.6 and 6.8. A different pH might mean the milk is starting to spoil.

Regular pH testing can help keep track of milk quality

Milk testing takes place at the dairy farm, at the MCC, and again at the processing site.

3.3.1 On farm testing: Testing for mastitis

Testing milk on the farm is an important step in ensuring good milk quality before it reaches the MCC. Simple tests can help farmers quickly check for signs of infection, spoilage, or contamination. These tests are especially useful for detecting issues like mastitis (through somatic cell count), checking milk cleanliness, and making sure milk is cooled and handled properly. Regular testing helps farmers improve milk quality, reduce losses, and maintain the health of their herd.

How do we test our milk on the farm?

One of the simplest and most effective ways to check milk quality on the farm is by using the California Mastitis Test (CMT). This test helps detect subclinical mastitis, an early stage of udder inflammation that may not show visible signs. It works by measuring the somatic cell count (SCC) in the milk. A high SCC usually indicates that the cow is fighting an infection.

The CMT is affordable and easy to use. You can either purchase a CMT kit or make your own version using common dishwashing liquid. It's a practical tool for farmers to monitor udder health and improve milk quality right at the farm level.

Materials Needed:

CMT paddle (a plastic paddle with four cups) or any type of cup to hold a milk sample

CMT reagent or a at home mastitis testing solution (below is a guide on how to make your own mastitis testing reagent)

Milk sample from each quarter of the udder



Testing Procedure:

Sample Collection: Strip a small amount of milk from each of the cow's four quarters into the corresponding cups of the CMT paddle. Discard the initial stream of milk to clear out any contaminants.



Add CMT Reagent:

Add an equal amount of CMT reagent or locally made mastitis solution to the milk in each cup on the paddle. The mastitis reagent contains a detergent that reacts with the DNA in somatic cells.



Swirl the Paddle: Gently swirl the paddle for about 10 seconds to mix the milk and the reagent.

Observation and Interpretation:

The reagent causes a gel-like reaction in the milk if there is a high somatic cell count.

Scale 1: Clear/No Gel: Indicates a low somatic cell count (normal).

Scale 2: Slight Gel Formation: Indicates a slightly elevated SCC, suggesting mild subclinical mastitis.

Scale 3: Thicker Gel Formation: Indicates a high SCC, suggesting a more significant infection.

Scale 4: Thick, Viscous Gel: Indicates a very high SCC, suggesting severe mastitis.



How It Works

The CMT reagent disrupts the cell membranes of somatic cells in the milk, releasing the cell contents, including DNA. The released DNA interacts with the CMT reagent, forming a gel. The thickness of the gel correlates with the number of somatic cells, allowing an estimation of the severity of mastitis. The mastitis test is a rapid, cost-effective test widely used on farms for routine monitoring of udder health and for deciding when to send milk samples to a laboratory for further testing.

Here's how you can make a basic mastitis test using dishwashing liquid as a simple, homemade alternative to the California Mastitis Test (CMT).

Materials Needed:
A small cup or container
Liquid dishwashing soap (lily)
Water

3 Parts Water

1 Part Dishwashing Liquid

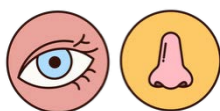
3.3.2 Testing procedures at the MCC

Milk quality testing at the collection centre is a crucial step to ensure that only clean, fresh, and safe milk enters the value chain. These tests help detect spoilage, contamination, or adulteration before milk is accepted for processing. By assessing indicators like temperature, smell, appearance, and simple chemical properties, collection centres can protect consumers, ensure farmers are paid fairly, and maintain the overall quality of dairy products.

To achieve this, farmer groups and collection point operators must establish strong quality control systems. This allows for the segregation of poor-quality milk and ensures that only acceptable milk is sent for processing.

Best Practices for Milk Handling at MCCs

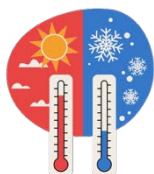
Initial Inspection



Inspect the milk container for cleanliness and ensure it is sealed.

Observe the colour and odour of the milk for any abnormalities. Milk should have a consistent white colour with a pleasant, fresh smell. Any deviation may indicate spoilage or contamination.

Check Milk Temperature



Use a thermometer to check the milk's temperature upon arrival. Milk should ideally be received at a temperature of 4°C to 6°C to maintain quality. If the milk is warm (above 10°C), it should be rejected as it is more prone to bacterial growth.

However, in rural areas where farmers do not have refrigeration, the acceptable temperature to receive milk would depend on the climate and the time it takes to transport the milk to collection centres. However, as a general guideline, milk should be kept as cool as possible to maintain its quality. Typically, the acceptable temperature for milk at the point of collection without refrigeration is below 10°C (50°F) if it is expected to be consumed or processed within a few hours.

Cleanliness and Hygiene



Ensure that all personnel handling milk follow proper hygiene practices, including clean hands, wearing protective clothing, and using sanitized equipment.

Containers used for milk transport must be thoroughly cleaned and sterilized before each use.

3.4. Milk sampling tests and the assessment of results

A few simple tests—when done thoroughly and consistently—can make a big difference in maintaining milk quality at both the collection centre and dairy factory level. Milk samples are collected at different points in the production process, including raw milk from farms, pasteurized milk from processing plants, and packaged milk before distribution.

The assessment of results from milk sampling tests involves several key factors. First, microbial testing measures the presence of bacteria, yeast, and molds, which can indicate spoilage or contamination. Common tests include total bacterial count, somatic cell count, and tests for specific pathogens like *E. coli* or *Listeria*.

The following tests are suitable for small-scale MCCs as they are cost-effective. These tests are essential for ensuring the milk meets safety standards set by regulatory bodies and does not pose health risks to consumers.

It is important to take representative samples of the milk from each delivery. These samples are carefully collected in sterile containers and labeled with relevant information like date, time, and source for accurate tracking.

To get a sample of milk:

Stir the milk container thoroughly to ensure uniform distribution of milk components before sampling.

Use a sterile sampling dipper to take a small sample (approximately 50 ml) from each milk can. Avoid using hands or non-sterile utensils to prevent contamination

Rapid Testing Methods for Milk Quality

Organoleptic Test

This test should be performed first. This is a basic sensory test to quickly assess milk quality using smell, appearance, and taste. It is easy and straightforward, allowing you to segregate poor-quality milk before you receive it.

Procedure

Open a cannister of milk.

Immediately smell the milk and establish the nature and intensity of smell, if any. The milk may smell non-fresh or foreign odours may be detected.

Observe the appearance of the milk. Look at the colour of milk, any marked separation of fat, colour and physical state of the fat, foreign bodies or physical dirt.

Touch the milk container to feel whether it is warm or cold. This may indicate to you how long milk has taken since milking (if not chilled thereafter) will influence the lactometer test adulteration.



Interpretation

Any unusual odours, tastes, or colours **suggest spoilage or contamination**, and the milk should be **rejected**.

Lactometer Test (Density Check)

This test checks for milk adulteration, particularly dilution with water. The test is based on the fact that milk has a heavier weight or density (1.026 - 1.032 g/ ml) compared to water (1.000 g/ml). When milk is adulterated with water or other solids are added, the density either decreases (if water is added) or increases (if solids are added). If milk fat (cream) is added to milk, the density becomes lower. The equipment used to determine milk density is called a lactometer. Most lactometers are usually marked from “0” (representing density of 1.000 g/ml) to “40” (representing density of 1.040 g/ml).

What you will need

Milk sample

Lactometer and lactometer cylindrical tube

Thermometer



Procedure

Measure the milk's temperature.

Take the lactometer reading at that temperature.

Use the table above to find the correction factor for the measured temperature.

Adjust the lactometer reading by adding or subtracting the correction factor.

For example, if the milk temperature is 23°C and the lactometer reading is 30, apply the correction factor of -1:

Corrected lactometer reading = 30 - 1 = 29
which represents 1.029

Milk Temperature (°C)	Correction Factor (CF) to Add/Subtract from Lactometer Reading
15	+2
16	+1.5
17	+1
18	+0.5
19	0
20	0
21	0
22	-0.5
23	-1
24	-1.5
25	-2

Interpretation:

The lactometer reading indicates the milk's density. The standard lactometer reading for milk ranges from 1.028 to 1.034 at 20°C.

Values outside this range may indicate adulteration or poor milk quality. Remember to record the milk sample test on the record sheet.

Milk Sample Testing

Sample No.	Smell	Appearance (Sight)	Clot on Boiling	Alcohol Test	Lactometer Reading	Results (Pass/Fail)
1	Sour	Watery	Yes	Positive	1.020 (below normal range)	Fail
2	Fresh	Creamy	No	Negative	1.032	Pass
3	Sour	Thick	Yes	Positive	1.038	Fail
4						

*lactometer normal range **1.026 to 1.032 g/ml**

Record Sheet

Alcohol Test

This is a simple test to check the stability of milk proteins. It helps detect any acidity or bacterial spoilage in the milk. The specific type of alcohol used is known as 'ethanol'. This test is more sensitive than Clot-on Boiling (COB) test.

Milk with high developed acidity or having calcium and magnesium compounds in greater than normal amounts, will coagulate when alcohol is added. Increased levels of albumen (colostrum milk) and salt concentrates (mastitis) may also result in a positive test

What you will need

Syringe to draw milk with (5ml>)

Milk sample

Clear Test tube

Ethanol solution (68%)



Procedure

Use a syringe to draw 5 ml of milk and mix it with 5 ml of ethanol solution (68%) alcohol in a test tube. Observe the mixture for any curdling or coagulation.

Interpretation

If the tested milk is of good quality, there will be no coagulation, clotting or precipitation

If the milk curdles, it indicates high acidity, poor hygiene, or bacterial contamination, suggesting the milk is of poor quality

Clot-on-Boiling Test

This is an easy and quick test to check for milk acidity. It allows you to detect milk that has been kept for too long without cooling and used is used for checking if the cholesterol or microorganism contamination is higher than usual. If the milk fails in testing, then it is declared that milk has a high amount of protein and cannot withstand regular use. Such milk cannot bear heat treatment process and has developed high acidity

You will need

Test tube or spoon

Milk sample

Lighter or open flame



Procedure

Heat a small sample of milk in a spoon over a flame until it boils



(Zanela & Ribeiro, 2018)

Interpretation

If the milk curdles or clots during boiling, it indicates high acidity or the presence of bacteria, suggesting poor milk quality.

pH Test (Using pH Strips or pH meters)

pH testing provides a quick assessment of milk's acidity level.

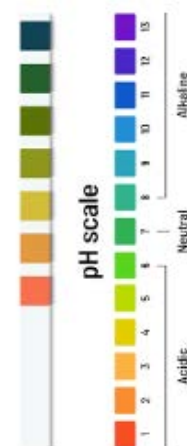
Procedure 1:

Use a pH strip

Dip the pH test strip for two seconds in the fluid that you want to measure.
Wait for ten seconds.

Because the strip contacts an acidic or alkaline substance, the strip discolours. The more acidic the fabric, the redder the strip becomes, and the more alkaline the fabric, the more blue the strip becomes.

Use the indicator scale with the different colours on the box of the pH strip purchased to Determine how acidic or alkaline the liquid you measured



or

Procedure 2:

Use a pH meter

Rinse the electrode with distilled water between calibration solutions and before testing the milk sample.

Pour a small amount of milk (around 100 ml) into a clean beaker or container.

Allow the milk to come to room temperature if it is refrigerated, as temperature variations can affect pH readings

Immerse the pH meter's electrode into the milk sample, making sure it is fully submerged but not touching the sides or bottom of the container.

Stir gently to ensure uniformity in the sample.

Wait for the pH meter to stabilize, which may take a few seconds or minutes depending on the meter.

Once the reading stabilizes, note the pH value displayed on the meter.

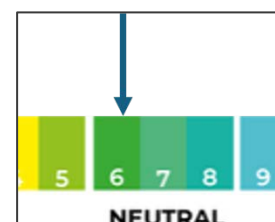


Interpretation

Normal pH range for fresh milk:

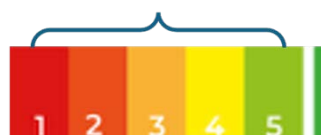
Fresh, unspoiled cow's milk typically has a pH between 6.6 and 6.8.

The pH of milk is slightly acidic, primarily due to dissolved carbon dioxide and lactic acid naturally present in milk.



Interpretation of Deviations

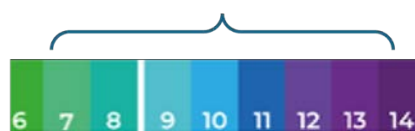
pH below 6.6:



This may indicate the beginning of souring or bacterial fermentation. Milk becomes more acidic due to lactic acid produced by bacteria such as *Lactobacillus*.

Spoiled or sour milk may have a pH as low as 4.0 to 5.0.

pH above 6.8:



This could indicate mastitis in dairy animals or adulteration, such as adding alkaline substances.

Alkaline pH in milk can also be a sign of contamination or improper storage conditions.

Summary of pH Ranges in Milk:

pH Range	Milk Condition
6.6 - 6.8	Fresh, unspoiled milk
< 6.6	Possible souring, bacterial activity
< 5.0	Spoiled, sour milk
> 6.8	Potential mastitis or adulteration

Important Notes for Small-Scale MCCs

- These tests are simple, low-cost, and effective for small-scale MCCs without advanced testing equipment.
- Staff should be trained in these testing procedures and hygiene practices to ensure consistent milk quality.
- Proper documentation of test results for each batch of milk received should be maintained for quality control and traceability.

By implementing these rapid and straightforward milk testing methods, small-scale MCCs in Eritrea can ensure they maintain high milk quality standards and provide safe, nutritious milk to consumers.

Overall, milk sampling tests and their results play an integral role in the dairy industry, supporting quality control, ensuring consumer safety, and promoting best practices in milk production and processing.

Facilitator's Note: Use the principle of modelling to show the farmers how to conduct these tests correctly. Allow them to demonstrate to each other as they master the correct techniques.

Complete the following activities



Activity 3.1.

Read the following case study below and complete the required task.

Case Study: Milk Contamination Incident in Fort Portal City, Uganda

Fort Portal City, Uganda, is a major dairy hub where small-scale farmers supply milk to local markets and collection centers. Dairy farming is a key source of income for many households, but challenges in hygiene and milk handling pose serious risks.



Image: RACHEL MABALA, Monitor

In a recent laboratory investigation, milk samples from local markets in Fort Portal City tested positive for coliform bacteria, including E. coli, indicating contamination from human waste. This contamination was linked to poor handling practices at different stages, including:

- Unsanitary milking conditions on farms
- Use of unclean containers for milk storage
- Contaminated water sources used for cleaning
- Improper transport methods exposing milk to dirt and bacteria

The impact of these poor handling practices results in

- **Health Risks:** Consumers who drank the contaminated milk faced risks of foodborne illnesses such as diarrhea, vomiting, and stomach infections.
- **Economic Losses:** Due to quality concerns, some vendors lost customers, and small-scale milk traders faced declining sales.
- **Damage to Reputation:** Trust in local dairy products declined, affecting both farmers and MCCs that rely on steady milk sales.

This incident highlights the importance of **strict hygiene** and **quality control** in small-scale dairy operations. By improving milk handling standards, small MCCs in Africa can protect public health, maintain market trust, and enhance their business sustainability.

You can read more about the research here: <https://krcuganda.org/a-taste-of-safety-uncovering-the-food-safety-concerns-in-fort-portal-city-food-markets/>.

Using the information from this chapter, and from the case study, create an educational video for local dairy farmers, MCCs and processors.

Your video should be no longer than 3 minutes. Your video needs to include:

1. Why milk quality is important to the dairy sector
2. Best practice with demonstration
3. The risk of not handling milk properly (like in the case study)
4. The positive impact of best practice (why).

Each group will address a certain focus topic.



Group 1: Cow and Farm Hygiene
Group 2: MCC Milking Process and Hygiene
Group 3: Milk testing on the farm
Group 4: What good quality milk looks like vs bad quality milk
Group 5: Some key take-aways from this case study about the quality of milk.

Facilitator's Note: This is a creative group activity to develop educational videos about milk quality. Before the activity:

- Divide participants into 5 groups with assigned topics
- Provide basic materials for them to plan script and story board
- The evaluation is on the presentation of their video concept (no actual filming required)

After all presentations, facilitate a discussion about how these educational concepts could be implemented in their sector.

Guidance for evaluating presentations:

- Clear explanation of the importance of milk quality
- Participation/ contribution from all the participants
- Insightful and developed responses to the identified focus areas
- The presentation needs to be engaging

Activity 3.2.

In pairs, select one rapid test method to practice. Capture your results on the record sheet below.

Facilitator's Note: Demonstration encourages best practice and allows the participants to model the correct techniques. The following activity requires you to guide the participants through the different test procedures to model the proper technique and to explain how to interpret the results. It is important for the groups to practice these techniques. After all pairs have completed at least three different tests, facilitate a group discussion about their findings and any challenges they encountered.

When complete, practice another rapid test. Capture the results. Do this until each pair has practiced at least THREE rapid test procedures.

Example of test results:

Sample No.	Smell	Appearance (Sight)	Clot on Boiling	Alcohol Test	Lactometer Reading	Results (Pass/Fail)
1	Sour	Watery	Yes	Positive	1.020 (below normal range)	Fail
2	Fresh	Creamy	No	Negative	1.032	Pass
3	Sour	Thick	Yes	Positive	1.038	Fail
4						

*lactometer normal range **1.026 to 1.032 g/ml**

Your test results:

Sample No	Smell	Appearance	Clot on Boiling	Alcohol Test	Lactometer Reading	pH Level	Result (Pass /Fail)

Facilitator's Note: A reminder to use the opportunity at the end of the training session to gauge how effective the training session was so that you are able to reflect on how you are creating engaging learning experiences.

Chapter 4: The value of Record Keeping for MCCs

By the end of this session, you will be able to

- Describe the importance of maintaining accurate records for a MCC.
- Explain the different types of record-keeping required.
- Demonstrate how to record information using some basic templates.
- Analyse data to support decision-making for the MCC.



Facilitator's Note: Perhaps start this session with a discussion on the importance of keeping accurate records. Draw on the experiences of the dairy farmers. This will provide a hook to cover the relevant information in this chapter and to evaluate their existing knowledge on the topic.

Records are the foundation of all successful businesses. Accurate records help in tracking the quantity and quality of milk collected, ensuring that standards are met and maintained. This data is crucial for managing inventory, facilitating timely payments to farmers, and predicting supply needs based on historical trends.

To ensure quality control, all test results must be documented, noting any deviations from standards. This information is crucial for traceability and helps identify any trends or recurring issues. Moreover, effective record keeping supports regulatory compliance, allowing centres to demonstrate adherence to health and safety standards.

Furthermore, detailed records can enhance communication with stakeholders, such as farmers and distributors, by providing them with relevant information regarding milk production and pricing. This can foster trust and improve relationships within the dairy community.

4.1 How to maintain records for your MCC

Refer to the Operations Team in Chapter 2. Record keeping responsibilities are allocated to almost all the roles as each function within the MCC needs to be tracked. These are the records your MCC cooperative will need to keep:

Record	Details required for record	Person(s) responsible for this record
Milk Collection Records	Date, Time, farmer details, milk quantity, quality results and payment due.	Milk Assistant/ Milk Collection Manager
Milk Quality Testing Records	Date of record, sample ID, test results and actions if issues arise.	Quality Control Manager/ Lab Technician
Farmer Payment Records	Farmers Name, Milk Quantity, rate per litre, total payment, payment	(Assistant) Finance Manager

	method and payment date.	
Milk Dispatch Records	Logs date, milk quantity, destination, transporter and transport conditions.	Milk Transport Manager and drivers
Inventory Records	Date of purchase, item description, quantity received, quantity used, quantity balance and supplier.	Centre Manager & Administrator
Expenses & Maintenance Records	Expense description, amount paid, payment method & maintenance activities.	Finance Manager & Maintenance person
Customer Orders and Sales Records	Customer name, order date, milk quantity requested, price per liter, total amount and delivery date.	Centre Manager
Staff Records	Member/staff name, date worked, department allocated to (eg. Cleaning, testing, receiving deliveries etc.), training received.	Centre Manager
Cooperative Membership Records	Members Name, Address, Contact Details, Membership Category (eg. Farmer, Treasurer, Sales), Date of membership Payment, Method of Payment, Profit/Benefit Share (Quarterly or Annually)	Administrator/ Milk Assistant & (Assistant) Finance Manager
Training and Development	Register of attendance, Details of training. Evaluation of training & facilitator's report	Extensionists & Centre Manager/ Milk Assistant

Below is an example of a record sheet used by the Quality Control Manager at an MCC.

DATE	DAY	KG MILK	DENSITY READING	FAT%	RATE PER KG	TOTAL AMOUNT
	Sunday morning					
	Sunday evening					
	Monday morning					
	Monday evening					
	Tuesday morning					
	Tuesday evening					
	Wednesday morning					
	Wednesday evening					
	Thursday morning					
	Thursday evening					
	Friday morning					
	Friday evening					
	Saturday morning					
	Saturday evening					
	WEEK TOTAL:					
PAYMENTS MADE ON:						
REMARKS:						

Image: FAO.org, Chapter 4

Below is an example of Milk Sample Testing Record Sheet:

Sample No.	Smell	Appearance (Sight)	Clot on Boiling	Alcohol Test	Lactometer Reading	Results (Pass/Fail)
1	Sour	Watery	Yes	Positive	1.020 (below normal range)	Fail
2	Fresh	Creamy	No	Negative	1.032	Pass
3	Sour	Thick	Yes	Positive	1.038	Fail
4						

*lactometer normal range **1.026 to 1.032 g/ml**

Record-keeping tips for your cooperative:

- Keep the record keeping process and documents as simple as possible.
- Back-up records are a good idea if you can manage it. In case of water damage, loss, or destruction.
- Train record keepers on accuracy, regularity and processes.
- Ensure records are signed off by the Centre Manager to ensure transparency.



4.2. Keeping track of resources and their value

Along with keeping a record of daily activities of your cooperative, it is important to keep a close eye on your equipment, your resources and your finances. Remember, everything your cooperative owns, has a nakfa value to it. It's nakfa value covers

1. What it is worth if sold

2. The value of its role in your cooperative.

Imagine running a MCC without record books. The book itself may not cost that much, but the value of what you're keeping IN the book is where the value really is. This means, we need to look after everything, big and small, as if it is worth a lot.



The MCC Finance Manager is responsible for these records. The essential equipment your MCC should be keeping a record of includes the following:

1. Milk Collection & Handling

Equipment	Average Units per MCC	Estimated Replacement Frequency
Milk Cans & Buckets	30 – 100	Every 1 – 3 years (based on wear and tear)
Weighing Scales	1 – 3	Every 3 – 5 years (if properly maintained)
Milk Pumps	1 – 2	Every 5 – 7 years (depending on maintenance)

2. Milk Testing & Quality Control

Equipment	Average Units per MCC	Estimated Replacement Frequency
Lactometer	2 – 5	Every 1 – 2 years (prone to breakage)
Alcohol Test Kit	10 – 20 kits	Monthly (used frequently)
pH Meter	1 – 3	Every 2 – 4 years
Antibiotic Residue Test Kit	Varies by demand	Ordered as needed
Bacteria Count Test Kit	10 – 50 tests	Monthly (used frequently)

3. Storage & Cooling Equipment

Equipment	Average Units per MCC	Estimated Replacement Frequency
Milk Cooling Tanks	1 – 3	Every 7 – 10 years (high investment item)
Refrigerators/Chillers	1 – 2	Every 5 – 8 years
Insulated Transport Containers	5 – 10	Every 3 – 5 years

4. Cleaning & Hygiene Equipment

Equipment	Average Units per MCC	Estimated Replacement Frequency
Cleaning Brushes & Detergents	100+ brushes & liters of detergent	Replenished monthly
Sanitizing Sprayers	2 – 5	Every 3 – 5 years
Wastewater Management System	1 per MCC	Every 10 – 15 years (if properly maintained)

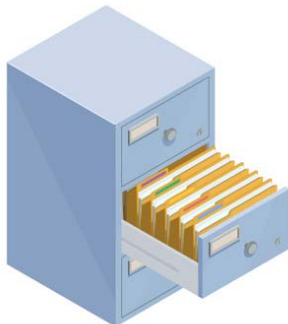
5. Transport & Logistics

Equipment	Average Units per MCC	Estimated Replacement Frequency
Milk Transport Vehicles (Motorbikes, Small Trucks)	1 – 3	Every 5 – 10 years
Milk Transport Cans	50 – 100	Every 3 – 5 years

Each of these resources have a financial value. This value will depend on:

- Whether they were purchased new or pre-owned (pre-owned is often a financially lean way for small cooperative to get started).
- How old the equipment is.
- What material it is made of (eg. plastic vs steel).
- How affordable it is to repair (if it is difficult to repair – the value will be lower)

4.3. Record Safety & Organisation



The Centre Manager of your MCC will need to ensure that there is a strict record safety process in place.

Records need to be well organised and easy to find. Invest in proper filing space to keep records per department, per month and per year. A business needs to keep its records for at least three years before discarding them. If you are unable to keep records on a computer, ensure you have suitable filing storage. If your records are kept on a computer, ensure to back it up on a hard drive or on the cloud. Your MCC cannot afford to lose records if your computer gets stolen or damaged.



Complete the following activities

Activity 4.2

Here's a practical record-keeping exercise tailored for a MCC. It aims to simulate day-to-day operations while helping staff learn how to maintain accurate and organized records. Use a piece of paper or the Excel Spreadsheet to complete the exercise below:

Part 1: Daily Milk Collection Log

Instructions:

Each staff member should fill out the log for a simulated day, recording milk deliveries from local farmers.

Date	Supplier ID	Supplier Name	Quantity (Litres)	Time Received	Quality Status (Pass/Fail)	Remarks
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Activity: Using the information below, record the entries using the above criteria.

On the morning of June 13, 2025, eight farmers delivered milk to the local milk collection centre. The first delivery was made by John Mwangi (Supplier ID F001), who brought in 50 litres of milk at 6:15 AM. The milk was inspected and found to be of good quality. Shortly after, at 6:35 AM, Mary Njeri (F002) delivered 30 litres. However, her milk had a sour smell and was classified as spoiled. At 6:45 AM, Peter Kamau (F003) arrived with 40 litres, which passed all quality checks and was accepted without issue.

By 7:00 AM, Grace Wambui (F004) had delivered 35 litres. Upon testing, the milk showed a high water content, failing the lactometer test, and was recorded with a quality issue. Samuel Otieno (F005) came in at 7:10 AM with 60 litres, all of which was in good condition. Ten minutes later, Lucy Achieng (F006) brought 25 litres, but her milk had curdled and was deemed spoiled upon inspection.

Daniel Kiprono (F007) followed at 7:35 AM, delivering 45 litres of good quality milk. Lastly, at 7:50 AM, Agnes Cherop (F008) arrived with 38 litres. Although her milk was generally acceptable, a slight trace of water was detected. It remained within the acceptable dilution threshold and was therefore recorded as good with a note on the slight water content.

These records are essential for tracking milk quality and ensuring transparency in the collection process.

Answer:

Milk Delivery Records

Supplier ID	Farmer Name	Volume Delivered (Litres)	Delivery Time	Quality Status	Notes
F001	John Mwangi	50	2025-06-13 06:15 AM	Good	—
F002	Mary Njeri	30	2025-06-13 06:35 AM	Spoiled	Sour smell detected
F003	Peter Kamau	40	2025-06-13 06:45 AM	Good	—
F004	Grace Wambui	35	2025-06-13 07:00 AM	High Water Content	Failed lactometer test
F005	Samuel Otieno	60	2025-06-13 07:10 AM	Good	—
F006	Lucy Achieng	25	2025-06-13 07:20 AM	Spoiled	Milk curdled; rejected
F007	Daniel Kiprono	45	2025-06-13 07:35 AM	Good	—
F008	Agnes Cherop	38	2025-06-13 07:50 AM	Good (Slight Water Trace)	Accepted after dilution threshold test

Discuss how the MCC should handle rejections or returns.

1) If milk fails any test:

- Inform the farmer respectfully and explain the reason for rejection.
- Show the test result if possible, especially if the farmer disputes it.

Keep communication professional and supportive to avoid discouragement or conflict.

2) Maintain a milk rejection log, including:

- Date and time
- Supplier ID and name
- Volume rejected
- Reason for rejection (e.g., sour smell, high water content)
- Test results
- Staff member responsible

This ensures transparency, traceability, and accountability.

3) If the farmer is present and willing, the milk can be returned to them.

If not:

- Clearly mark and separate rejected milk to avoid contamination.
- Dispose of it safely according to environmental and public health guidelines (e.g., burying, converting to compost).

A milk collection centre should treat rejections as opportunities to maintain quality, protect consumers, and support farmers in improving their practices. Handling returns with consistency and respect ensures a strong, trust-based relationship in the dairy value chain.

Facilitator's Note: Remember to draw on the responses from the participants. A feedback session is not about giving the answers. It is about supporting and guiding the participants to a better understanding.

Part 2: Supplier Payment Record

Instructions:

Calculate payments based on accepted quantity and agreed-upon rate (e.g., 50 Nakfa per litre).

Date	Supplier ID	Supplier Name	Quantity Accepted (Litres)	Rate per Litre	Total Payment	Paid (Yes/No)
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Activity:

- Using the above information about the 8 farmers, record the payment details.
- Track pending and completed payments. "Pending payments" are all those farmers who had late deliveries of milk.

Answer:

Date	Supplier ID	Supplier Name	Quantity Accepted (Litres)	Rate per Litre (Nakfa)	Total Payment (Nakfa)	Paid
2025-06-13	F001	John Mwangi	50	50	2,500	Yes

Date	Supplier ID	Supplier Name	Quantity Accepted (Litres)	Rate per Litre (Nakfa)	Total Payment (Nakfa)	Paid
2025-06-13	F002	Mary Njeri	0	50	0	No
2025-06-13	F003	Peter Kamau	40	50	2,000	Yes
2025-06-13	F004	Grace Wambui	0	50	0	No
2025-06-13	F005	Samuel Otieno	60	50	3,000	Yes
2025-06-13	F006	Lucy Achieng	0	50	0	No
2025-06-13	F007	Daniel Kiprono	45	50	2,250	Pending
2025-06-13	F008	Agnes Cherop	38	50	1,900	Pending

Part 3: Milk Storage and Dispatch Log

Instructions:

Log milk stored in the cooling tank and track daily dispatch to processors or market.

Date	Milk Collected (L)	Milk Dispatched (L)	Balance in Storage (L)	Dispatch Destination	Transport Method
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Activity: Using the information below, record the entries using the above criteria and complete the calculation below.

Scenario: Milk Collection and Dispatch with Transport Delay and Spoilage

On **June 13, 2025**, the milk collection centre received milk deliveries from several farmers, amounting to **280 litres of milk collected**. However, **15 litres were found to be spoiled during quality testing** and had to be discarded. This left **265 litres** of acceptable milk.

The dispatch vehicle scheduled for 11:00 AM was delayed due to mechanical issues. As a result, **no milk was dispatched on June 13**, and all acceptable milk was stored in the cooling tank overnight.

On the next day, **June 14, 2025**, **265 litres** were in storage. The transport issue was resolved, and **200 litres were dispatched to Sunrise Dairy Processors** using a **refrigerated truck**. The remaining **65 litres** stayed in the cooling tank.

On **June 15, 2025**, **additional 120 litres** were collected from farmers. From the stored and newly collected milk ($65 + 120 = 185$ litres), **180 litres were dispatched to the local market** using **motorbikes**, while **5 litres remained in storage**.

Answer:

Milk Storage and Dispatch Log

Date	Milk Collected (L)	Milk Dispatched (L)	Balance in Storage (L)	Dispatch Destination	Transport Method
2025-06-13	280 (15L spoiled)	0	265	—	—
2025-06-14	0	200	65	Sunrise Dairy Processors	Refrigerated Truck
2025-06-15	120	180	5	Local Market	Motorbikes

Calculate spoilage loss if cooling fails.

If **cooling fails** in the above scenario, spoilage would likely affect all milk stored overnight, since raw milk must be kept at low temperatures (ideally 4°C or lower) to prevent bacterial growth.

Let's break it down by each date:

June 13, 2025

- **Milk stored overnight:** 265 litres (15 litres already discarded as spoiled)
- **Cooling failure scenario:** Entire **265 litres** would likely spoil by the next day.
- **Spoilage Loss: 265 litres**

June 14, 2025

- If cooling is not restored and **no dispatch occurs**, the remaining **65 litres** stored from the previous day (after dispatch of 200 L) would also spoil.
- **Spoilage Loss: Additional 65 litres**

June 15, 2025

- If the cooling issue continues and **120 new litres are collected**, those too could spoil within hours unless dispatched quickly or cooled.
- **Spoilage Loss: Up to 120 litres**

Total Potential Spoilage Loss Due to Cooling Failure:

June 13 spoilage: 265 L

June 14 spoilage: 65 L

June 15 spoilage: 120 L

Total: 450 litres

Facilitator's Note: In real operations, how quickly milk spoils depends on ambient temperature, time without cooling, and exposure. Without refrigeration, spoilage may occur within **6–8 hours** in warm climates.

Part 4: Quality Testing Report

Instructions: Refer to the data where 3 batches of milk were tested.

Date	Supplier ID	Temperature (°C)	Lactometer Reading	Smell Check (Pass/Fail)	Final Verdict
2025-06-13	F003	6.5	1.030	Pass	Accepted
2025-06-13	F004	9.2	1.018	Pass	Rejected (High Water Content)
2025-06-13	F006	7.8	1.032	Fail	Rejected (Sour Smell)

Answer the following questions

1. Why is it important to reject low-quality milk at a MCC?

Based on the tabulated results provided earlier, rejecting low-quality milk at a milk collection centre is important for several specific and practical reasons:

1. Prevent Contamination of Good Milk (e.g., F006 – Sour Smell)

- In the case of Supplier F006, the milk **failed the smell check**, indicating spoilage. Accepting this milk could contaminate the entire storage tank or batch during processing.
- Spoiled milk introduces bacteria that can spread quickly, even in cooled environments.

2. Detect and Deter Adulteration (e.g., F004 – Low Lactometer Reading)

- Supplier F004's milk had a **lactometer reading of 1.018**, below the acceptable threshold, suggesting **possible water adulteration**.
- Accepting such milk lowers the quality of the final product and **encourages unethical practices** if not consistently rejected.

3. Ensure Product Quality and Consumer Safety (e.g., Only F003 Passed All Checks)

- Only Supplier F003's milk met all quality criteria: correct temperature, lactometer reading, and passed the smell check.
- Accepting only such high-quality milk helps ensure **safe, nutritious, and long-lasting dairy products** for consumers.

4. Avoid Economic Losses

- Using low-quality milk can lead to **product spoilage, returns, or recalls**, resulting in financial losses for processors and cooperatives.

- Early rejection at the collection centre saves **processing, transport, and storage costs.**

5. Maintain Standards and Farmer Accountability

- Routine checks and clear rejection of poor-quality milk **educate and encourage farmers** to improve handling, hygiene, and cooling practices.
- This builds a culture of **accountability and continuous quality improvement.**

Conclusion:

Rejecting low-quality milk at the collection point—as shown in the cases of F004 and F006—is a critical control step that ensures only safe, uncontaminated, and undiluted milk enters the processing chain. It protects public health, reduces losses, and strengthens trust in the dairy value chain.

Facilitator’s Note: This is a good discussion point to evaluate how effectively the participants have understood the importance of quality milk.

2. What problems might arise if records are inaccurate?

Accurate recordkeeping is the backbone of trust, safety, and efficiency in milk collection operations. Inaccurate records can lead to several issues (See issues on the next page)

Facilitator's Note: Below are 7 issues that the participants could discuss:

1. Payment Disputes with Farmers

- **Overpayment or underpayment** may occur if delivery volumes or quality assessments are incorrectly recorded.
- This can lead to **loss of trust**, complaints, and even legal conflicts between farmers and the collection centre.

2. Compromised Milk Quality and Safety

- If **spoiled or adulterated milk** is mistakenly recorded as acceptable, it may be mixed with good milk, **contaminating the entire batch**.
- This could pose **serious health risks to consumers** and trigger product recalls or regulatory action.

3. Inaccurate Inventory and Dispatch Management

- Errors in recording **milk collected, stored, or dispatched** can result in:
 - Overstocking or understocking,
 - Missed deliveries,
 - Spoilage due to delayed dispatch,
 - Inability to trace which milk went where in case of contamination.

4. Regulatory Non-Compliance

- Inaccurate records violate food safety and traceability requirements from regulatory bodies.
- This could result in **fines, license suspension, or business closure** during audits or inspections.

5. Loss of Processor or Market Confidence

- Dairy processors and buyers rely on accurate records for **supply planning and quality control**.
- Inaccuracies can damage business relationships and **cause loss of contracts or market access**.

6. Poor Decision-Making

- Management uses records to analyse trends in **milk production, quality, and logistics**.
- Faulty data leads to **poor planning, misallocation of resources, and wrong investment decisions**.

7. Inability to Track Farmer Performance

- Records help monitor individual supplier consistency in **volume and milk quality**.
- Inaccuracy makes it difficult to reward good performance or support those needing improvement.

Activity 4.3

Analyse the following milk receipt records and answer the following questions:

Date	Supplier ID	Supplier Name	Milk Received (L)	Quality Status	Time Received	Remarks
2025-06-01	S001	Amanuel	25.0	Pass	07:30 AM	
2025-06-01	S003	Dawit	18.0	Pass	07:45 AM	
2025-06-01	S002	Selam	15.5	Fail	08:10 AM	Sour smell
2025-06-02	S001	Amanuel	26.0	Pass	07:25 AM	
2025-06-02	S003	Dawit	0.0	Fail	—	Did not deliver
2025-06-02	S002	Selam	16.0	Pass	08:05 AM	Slightly late
2025-06-03	S001	Amanuel	24.0	Pass	07:20 AM	
2025-06-03	S003	Dawit	19.5	Pass	07:40 AM	
2025-06-03	S002	Selam	15.0	Pass	07:55 AM	
2025-06-04	S001	Amanuel	25.0	Pass	07:30 AM	
2025-06-04	S003	Dawit	18.0	Pass	07:50 AM	
2025-06-04	S002	Selam	14.5	Pass	08:00 AM	
2025-06-05	S001	Amanuel	23.5	Pass	07:35 AM	
2025-06-05	S003	Dawit	20.0	Pass	07:40 AM	
2025-06-05	S002	Selam	0.0	Fail	—	No delivery
2025-06-06	S001	Amanuel	26.0	Pass	07:25 AM	
2025-06-06	S003	Dawit	19.0	Pass	07:45 AM	
2025-06-06	S002	Selam	16.0	Pass	07:50 AM	
2025-06-07	S001	Amanuel	27.0	Pass	07:20 AM	
2025-06-07	S003	Dawit	17.5	Pass	07:35 AM	

4.3.1. Supplier Performance

a. Which supplier delivered the most milk in total during the week?

Amanuel: 176.5 litres

b. Which supplier had the highest rejection rate?

Selam

c. Which supplier delivered milk on time consistently?

Amanuel: 7 on-time deliveries (out of 7)

4.3.2. Quality Control

a. How many litres of milk were rejected in total?

15,5 litres

b. What percentage of the total received milk failed the quality test?

4.07%

c. Is there a correlation between late delivery and failed quality status?

100% of rejected samples were delivered late

4.3.3. Operational Insights

a. What is the average daily milk collection?

54,36 litres

b. Identify any peak or low collection days. What might be the cause?

Peak Day: 6 June 2025- 61 litres

Lowest Day: 2 June 2025 -42 litres

c. Suggest two ways to reduce quality failures in the future.

1. Train suppliers (especially Selam) on proper milk hygiene and cooling practices.
2. Enforce stricter time windows for delivery (before 08:00 AM) to maintain quality.
3. Install or upgrade cooling infrastructure to preserve quality if delays occur.

Facilitator's Note: A reminder to use the opportunity at the end of the training session to gauge how effective the training session was so that you are able to reflect on how you are creating engaging learning experiences.

Part 2: The Business behind a successful MCC

“To succeed in business, to reach the top, an individual must know all it is possible to know about the business.”

– J. Paul Getty

Now that you have a better understanding of how a cooperative milk collection centre adds value to local farmers, the surrounding community and the dairy industry at large, the second half of the manual will take a closer look at the business elements that are crucial to a MCC’s sustainability and success.



by Banda, 2018 from www.pressreader.com

Remember, you do not need to go to business school to run a business. You just need to be open to learning and disciplined enough to implement good business practices.

Luckily, being a part of a cooperative, all members have the support of each other, to learn, share resources and experiment with improving your business operations.

Chapter 5: Financial and Cost Management for MCCs

Chapter 6: Business Sustainability for MCCs

Chapter 7: Milk Collection Logistics and Cold Chain Management

Chapter 8: Compliance, Regulation and Risk Management

Chapter 5: Financial & Cost Management for MCCs

By the end of this session, you will be able to

- Explain the difference between operational costs and revenue streams.
- Discuss the importance of managing cash flow.
- Identify the various inputs to create a budget.
- Create a budget with current milk prices.
- Set prices.

Facilitator’s Notes: Remember that one of the principles of teaching and learning is the concept of modelling. This is showing others best practice (or how to complete all the necessary steps to arrive at a conclusion). Modelling is an effective technique with a numeracy module. The participants can see the sequential steps needed to complete a financial calculation. Modelling also encourages practice and application. The participants need to practice the skill in completing various calculations. Modelling provides the time and space for participants to work through calculations on their own to consolidate understanding by applying best practice.

There is one thing cooperatives and traditional businesses have in common, and that is the importance of financial planning and financial management. Too many businesses fail due to a lack of financing or managing their finances.

In this chapter, we are going to cover the basics of business financial management and how to plan with current milk prices.

5.1. The fundamentals of business finance

Facilitator's Notes: This is an opportunity to draw on the participants' understanding of the fundamentals. Think carefully of an appropriate activity where the discussion addresses the fundamentals in a developed and real manner. Use probing questions, re-direction to ensure that superficial answers become more developed and address the key fundamentals.

Financial management is crucial to ensure profitability and sustainability of a MCC. From operational costs to pricing strategies, effective budgeting plays a key role. By closely monitoring expenses such as labour, transportation, and equipment maintenance, managers can identify areas for cost reduction. Meanwhile, setting competitive yet profitable prices for milk can attract suppliers while ensuring adequate margins. Implementing strong financial controls and regular analysis of cash flow will also help in making informed decisions. Overall, comprehensive financial planning is essential for the continued success and growth of the milk collection centre.

These are the fundamentals of business finances:

5.1.1 Budget

Budgeting is essential for planning and allocating resources effectively. The centre must estimate costs related to milk procurement, transportation, storage, and processing. This helps in setting financial targets and managing expenses. Businesses set a budget for the year ahead.



A budget for a MCC must consider various components to ensure sustainable operations and profitability. Below is an example of a potential budget for such a centre, focusing on initial setup and ongoing operational costs.

Initial Setup Costs:

1. Land acquisition: Costs for purchasing or leasing land in a strategic location.
2. Construction: Building a facility for milk collection, storage, and processing.
3. Equipment: Purchasing milking machines, storage tanks, refrigeration units, and transport vehicles.
4. Licensing and permits: Fees associated with obtaining necessary registrations and health certifications.

Ongoing Operational Costs:

1. Staff salaries: Wages for workers including managers, collection agents, and administrative staff.
2. Utilities: Monthly expenses for electricity, water, and internet services.
3. Maintenance: Regular upkeep and repairs for equipment and facility to ensure smooth operations.

4. Transportation: Fuel and maintenance for vehicles used in milk collection and distribution.
5. Marketing: Costs for promoting the collection centre to farmers and consumers, including advertising and community outreach.
6. Supplies: Purchasing packaging materials and other necessary items for processing milk.

Revenue Streams:

1. Milk sales: Income generated from selling processed milk to distributors and retailers.
2. Value-added products: Potential revenue from producing yogurt, cheese, or other dairy products.
3. Grants and financial assistance: Funds from governmental or non-governmental organizations aimed at supporting agricultural initiatives.

Budgets help to estimate spending and revenue and identify capital. They help leadership understand how the company is performing, because each month the actual revenue and expenditure can be compared to the budget. Deviations should be discussed, so that everyone understands why the actual performance is different, and what can be done to improve performance.

Budgets are also essential to delegate tasks and responsibilities to other staff. Without a budget, people cannot make important decisions. And this means that the centre manager needs to make all decisions in the MCC, which is not sustainable. If someone has a budget, they can compare the expenditure with the budget, and this tells them if they can go ahead with a purchase.

Refer to the example budget of a small-scale MCC. You will see there is a **monthly budget** and an **annual budget**:

Category	Monthly Amount (ERN)	Annual Amount (ERN)
Income		
Milk Sales Revenue	75,000	900,000
Membership Fees	7,500	90,000
Value-Added Product Sales (Yogurt, Cheese)	30,000	360,000
Grants & Subsidies	15,000	180,000
Other Income (Training, Consultancy)	4,500	54,000
Total Income	132,000	1,584,000
Expenses		
Milk Purchase from Farmers	60,000	720,000
Staff Salaries (Manager, Collectors, Security)	22,500	270,000
Transport Costs (Milk Collection & Delivery)	12,000	144,000
Utilities (Electricity, Water)	4,500	54,000
Equipment Maintenance & Repairs	7,500	90,000
Rent & Facility Costs	10,500	126,000
Packaging Materials	9,000	108,000

Licensing & Certification	1,500	18,000
Loan Repayment	7,500	90,000
Training & Farmer Support	4,500	54,000
Miscellaneous Costs	3,000	36,000
Total Expenses	142,500	1,710,000
Net Profit/Loss	-10,500	-126,000

A budget has two main components: **income** and **expenses**.

5.1.1.1 Income (Revenue)

Income, also known as revenue, represents the money that your cooperative plans to make through sales and other activities. Project revenue based on expected milk volumes collected and potential selling prices. Analyse historical data and market trends to create realistic revenue estimates, considering seasonal fluctuations in milk production and consumer demand.

Businesses should have more than one income stream to ensure it remains viable and sustainable.

Activity 5.1.

Using the budget above, list the common income streams for a small-scale MCC in Eritrea:

	Income stream (with answers)
1.	Milk Sales Revenue
2.	Membership Fees
3.	Value-Added Product Sales (Yogurt, Cheese)
4.	Grants & Subsidies
5.	Other Income (Training, Consultancy)

Facilitator's Notes: Discuss which of these income streams would be most feasible for a start-up MCC in the participants' communities. Emphasize the importance of diversifying income sources for financial stability.

Revenue streams for MCCs primarily come from the sale of raw milk to processors, but they can also include value-added services such as pasteurization, packaging, and distribution. By diversifying these revenue streams, centres can minimise the risks associated with fluctuating milk prices.

5.1.1.2 NET Income

Net income is different to income as it is the amount of money that remains after **all expenses, taxes, and deductions have been subtracted from the total income**. It provides a clearer picture of the actual profitability or financial health of the MCC. In essence, while income is a broad measure of earnings, net income is a more refined figure that reflects true earnings after all costs are accounted for.

BUSINESS TIP:

Your income (revenue) also works as a business target. If you budget on bringing in 75,000 ERN per month with raw milk sales, your team needs to plan to make this happen. This is often the responsibility of the members who are in charge of sales and partnerships. You can measure if sales are going well by comparing monthly income to the monthly NET income.

For a cooperative, when an MCC hosts its annual general meetings (AGMs), the Treasurer/ Accountant is responsible for presenting the businesses NET income to the general assembly.

Identify the monthly NET income from the above example:

5.1.1.3 Expenses (Costs)

On your business budget, expenses, also known as costs, represents the money that the cooperative needs to spend to operate efficiently.

Using the budget example above, list the 3 largest expenses budgeted to run this MCC.



	Expense (with answers)	Amount
1.	Milk Purchase from Farmers	60,000 ERN
2.	Staff Salaries (Manager, Collectors, Security)	22,500 ERN
3.	Rent & Facility Costs	10,500 ERN

A major challenge in budgeting and price setting for milk is the volatility of feed costs. Feed prices can fluctuate significantly due to factors such as weather conditions, crop yields, and changing global demand. These variations directly impact the cost of producing milk, making it difficult for dairy farmers to predict their expenses accurately.

When feed prices rise, the cost of production increases, which can pressure profit margins. Additionally, if farmers are unable to raise milk prices in response to higher production costs due to market competition or consumer price sensitivity, profitability can suffer. This fluctuation in prices can complicate financial planning, making it challenging for dairy producers to maintain consistent budgets and setting prices that cover costs while remaining competitive in the market.

TRAINER NOTES: Explain that understanding major cost drivers helps in financial planning and cost control. Discuss strategies for managing these major expenses effectively.

In essence, business expenses (costs) fall under two main categories:

Fixed Expenses/Costs	Variable Expenses/Costs
These costs are recurring and remain the same throughout the year. They are easier to budget for.	These business costs fluctuate throughout the year. Variable costs change from month-to-month based on seasons, buyer demands, the availability of resources or services etc. Budget for these based on industry trends or demand (which months people are buying milk).
Examples of Fixed Costs • Rent of MCC building • Rent or loan payment on equipment <i>*Both these examples should be signed into agreements with the landlord or equipment service provider to ensure the costs stay the same.</i>	Examples of Variable Costs • Electricity used by MCC (per Watt used that month) • Water used by MCC (per kilo litre used that month) • Petrol or other transport costs • Stationary used by MCC (record books etc) • Payments made to farmers • Maintenance of equipment

Let's identify the fixed and variable costs. Examine the above budget example, and classify the expenses into fixed or variable costs:

	Fixed Costs	Variable Costs
1.		
2.		
3.		
4.		

5.		
6.		
7.		

When creating the budget, identify all the fixed costs such as rent, utilities, and salaries, alongside variable costs like transportation and packaging. This comprehensive assessment provides a clear view of the total expenses involved in running the MCC.

5.1.1.4 NET Expenditure

Net expenditure refers to the total amount spent by a MCC after accounting for income received from various sources. This includes expenses but also takes into account any income that can offset those expenses, such as grants or reimbursements. Net expenditure gives a clearer picture of the overall financial position, showing how much money has been spent net of any financial inflows.

In summary, while expenses focus solely on the costs incurred, net expenditure provides a broader view **by considering both expenses and any incoming funds**, leading to a more comprehensive understanding of financial performance.

BUSINESS TIP:

Keep your expenses as low as possible. Purchase pre-owned equipment rather than new. Or you can hire instead of purchase. No money from the cooperative should be spent on any of the members, unless it is a bonus, salary or milk purchase. Expenses are strictly for the MCC operations only.

5.1.1.5 Determine the operating margin

After the capturing the projected income streams and expected costs, determine the operating margin.

To determine the operating margin, you need to calculate the operating income and then divide it by the total revenue, both of which are essential components of financial performance. The operating income is derived from the revenues generated by the company minus the operating expenses, which include costs such as wages, rent, utilities, and raw materials.

To illustrate this with an example of a small-scale MCC, let's say the centre collects milk from local farmers and sells it to distributors.

Assume the total revenue from selling milk in a month amounts to 20,000 ERN. The operating expenses for the MCC, including salaries for workers, rent for the facility, utilities, transportation costs, and maintenance of equipment, total to 15,000 ERN.

First, you calculate the operating income:

Operating Income = Total Revenue - Operating Expenses

Operating Income = 20,000 - 15,000

Operating Income = 5,000 ERN

Next, you calculate the operating margin:

Operating Margin = Operating Income / Total Revenue

Operating Margin = 5,000 / 20,000

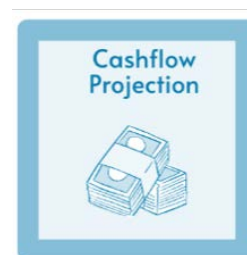
Operating Margin = 0.25 or 25%

In this example, the operating margin of the small-scale MCC is 25%, indicating that for every ERN of revenue earned, 25% is retained as operating income after covering operating costs. This metric helps the manager and Accountant assess the efficiency of the business operations and can guide future financial decisions.

Before we examine pricing strategy associated with budgets, we are going to explore cash flow and why this is important.

5.2. Cash Flow Management

Cash flow management for a MCC involves the process of monitoring and analysing the inflow and outflow of cash generated from various activities related to milk collection and distribution. This management is crucial for ensuring the centre can sustain its operations, process payments to farmers, and meet other financial obligations.



In a MCC, cash inflow primarily comes from the sale of milk and dairy products to wholesalers, retailers, and processors. The centre must accurately forecast revenue based on expected sales volume and pricing trends. For example, if a buyer owes you 15,000 ERN which is due in a month's time but only actually pays 90 days later, this late payment will impact the MCC. For 90 days, the business will need to operate without the 15,000 ERN. It is, therefore, important to manage this cash inflow and is even more important to establish good relationships with buyers to ensure steady demand and timely payments.

On the other hand, cash outflow includes expenses such as payments for raw milk purchased from farmers, operational costs like labour, transportation, maintenance of equipment, and utilities. Additionally, there may be costs associated with compliance to health and safety regulations, as well as investments in facility improvements or technology upgrades.

Effective cash flow management requires careful planning and budgeting to balance these inflows and outflows. Implementing a system to track cash transactions and manage accounts receivable and payable helps prevent cash shortages, which can disrupt operations. By maintaining a cash reserve or line of credit, the MCC can better navigate periods of fluctuation in income.

Overall, strong cash flow management ensures that the MCC operates efficiently,

maintains good relationships with suppliers and buyers, and ultimately contributes to its long-term financial health and sustainability.

5.3. Calculating profit, loss and breaking even for your MCC

Businesses measure financial success by measuring whether they have made a **profit** or a **loss**.

We do this through a simple calculation:

$$\text{Total income} - \text{total expenses} = \text{NET income (PROFIT or LOSS)}$$

5.3.1 Profit

Profit is when a business (or cooperative) has made **MORE** money than it has spent. It is financial surplus or extra money made for the budget period.

Profit is what businesses aim for. Only when there is profit, do the board of directors and members get paid. Look at the example below:

September 2025 Total Income	September 2025 Total Expenses	NET Income	Profit / Loss
45 000	(-) 32 500	(=) 12 500	PROFIT

It's important to remember that when a business makes profit, they owe the government income tax.

BUSINESS TIP:

If your cooperative has surplus income, rather than claiming a profit, it is a good idea to invest it back into the business for improvements, new equipment, a vehicle or anything else that will benefit the operations and growth of your MCC.



5.3.2 Loss

When the result to the above calculation is a negative amount, that means your business (cooperative) made a loss that budget period. An example of loss is below:

September 2025 Total Income	September 2025 Total Expenses	NET Income	Profit / Loss
36 000	(-) 41 000	(=) -5000	LOSS



You can see the business spent more (41 000) than it made (36 000) for this month. It is normal for businesses to run at a loss for some months and for the first 2 or 3 years of operation, as new businesses are often in debt to loans. The treasurer and other finance members need to ensure that the long-term viability of the cooperative has been carefully thought out – business success is a long road.

Refer back to the budget example. Explain whether the MCC is making a profit or loss for that year.

5.3.3 Breaking Even

When the income a business has generated, exactly covers its expenses, the business **breaks even**. It doesn't make a profit or a loss.



Breaking even should be the goal for your cooperative before profit. A business that breaks even means that it is moving closer to financial stability. For example:

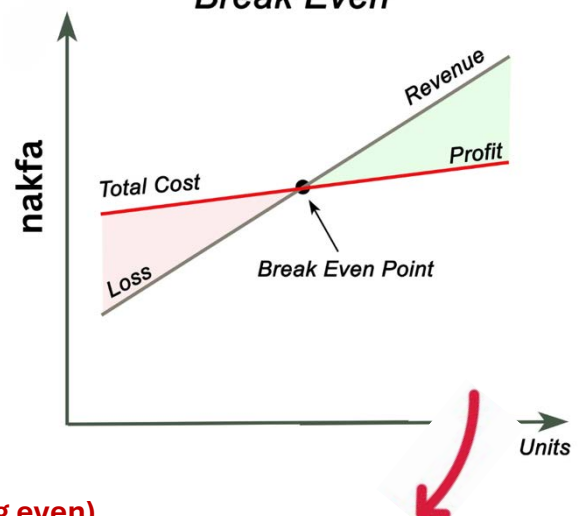
September 2025 Total Income	September 2025 Total Expenses	NET Income	Profit / Loss
39 500	(-) 39 500	(=) 0	Break Even

You can see that there is zero difference. The business spent more money than it made. Let's look at break even in more detail: MCC expenses are:

Expenses	
Transport	7 500
Staff Salaries	12 000
Cooling Storage	4 000
Electricity	2 500
Total Expenses	26 000

There is no surplus, nor has the

Break Even



Examples of Income (from milk sales):

- If you sell the milk at 5 ERN per litre, income = 5,000 liters × 5 = 25,000 ERN → **You lose 1,000 ERN (you are not breaking even).**
- If you sell at 5.2 ERN per liter → Income = 26,000 ERN → **You break even (you are not losing, but not gaining either).**
- If you sell at 6 ERN per liter → Income = 30,000 ERN → **You make a profit (you're above break-even).**

5.4. Financial tracking, recording and bookkeeping



The treasurer and Accountant (this may be the same person for a startup cooperative) is responsible for tracking every cent that moves in and out of the cooperative. This is called **bookkeeping**.

Up-to-date records should be available for every month. Financial activities cooperative will need to track carefully include:

- **Sales** – all the money that comes into the business in exchange for product or services.
- **Other income** – money coming into the business from funders or partners.
- **Expenses** – accurately recording how much money is spend on every business operation.
- **Evidence** – payment receipts or invoice. These need to be well organised and filed safely.



Below is an example of weekly bookkeeping practice for an MCC:

1. Daily Income Records

Date	Income Source	Description	Amount (ERN)
Jan 1 (Mon)	Milk Sales	150 L @ ERN 25	3,750
Jan 2 (Tue)	Milk Sales	140 L @ ERN 25	3,500
Jan 3 (Wed)	Cheese Sales	10 kg @ ERN 150	1,500
Jan 4 (Thu)	Membership Fee	1 new member	300
Jan 5 (Fri)	Milk Sales	160 L @ ERN 25	4,000
Jan 6 (Sat)	Yogurt Sales	30 cups @ ERN 20	600
Jan 7 (Sun)	No sales (Rest day)		0
Total Weekly Income		13,650	

2. Daily Expense Records

Date	Expense Category	Description	Amount (ERN)
Jan 1 (Mon)	Farmer Payments	150 L @ ERN 20	3,000
Jan 2 (Tue)	Fuel	Transport to processor	600
Jan 3 (Wed)	Staff Salary Advance	1 worker	1,000
Jan 4 (Thu)	Cleaning Supplies	Detergents & gloves	300
Jan 5 (Fri)	Farmer Payments	160 L @ ERN 20	3,200
Jan 6 (Sat)	Packaging	Yogurt cups	200
Jan 7 (Sun)	Utilities	Water & electricity	400
Total Weekly Expenses		8,700	

5.5. Payment Models

Implementing a suitable payment model for small-scale MCCs in Eritrea is essential to ensure fairness, to incentivise quality milk production, and maintain the financial sustainability of the MCC. The following are potential payment models that can be adapted to the Eritrean context, taking into account the local economic conditions, infrastructure, and production systems.

5.5.1 Volume-Based Payment Model

In the volume-based payment model, farmers are paid solely based on the total **quantity of milk they deliver** to the MCC. This model is straightforward and easy to administer, especially in areas where monitoring milk quality is not feasible due to limited infrastructure or resources.



This model does **not consider milk quality**; farmers may prioritize increasing quantity over maintaining or improving quality. This can lead to issues such as delivering milk with high bacterial counts or adulteration, reducing the overall market value of the milk.

BUSINESS TIP:

MCCs could introduce small bonuses for basic quality improvements. For example, an additional ERN 0,5 per litre could be awarded to farmers whose milk meets basic cleanliness and storage standards. This is what The Sabatia and Mumberes Dairy Cooperatives in Kenya did (Chapter 4).



5.5.2 Input-based Payment Model

In the input-based payment model, farmers receive essential farming inputs (such as feed, veterinary services, or equipment) instead of cash payments for the milk they deliver to the MCC. This model is particularly beneficial in areas where farmers face challenges accessing these inputs due to financial or logistical constraints. The MCC acts as both a buyer of milk and a supplier of essential inputs, creating a mutually beneficial relationship.



Be fair



Be aware that, determining a value for the inputs and ensuring that

farmers receive the correct amount for their milk can be complex. Prices for inputs and milk may fluctuate, making it challenging to maintain a balanced exchange rate.

This model might not meet the immediate cash needs of farmers. They may require flexibility to choose between cash and input-based compensation depending on their current financial situation.

BUSINESS TIP:



MCCs can work with local or regional suppliers to secure bounties on feed and veterinary services, ensuring that farmers receive consistent, high-quality inputs. Training programs could be introduced alongside this model to educate farmers on best practices for using the inputs provided, ensuring they derive maximum benefit.

5.5.3 Selling value-add services and products

Some MCCs may offer **value-added services** to other MCCs or processors such as:

- milk testing (quality checks for fat content, somatic cell count, etc.)
- training
- deliveries



And as we learnt from The Sabatia and Mumberes Dairy Cooperatives in Kenya, your MCC could also offer other products such as cheese, yogurt or butter.

Most successful businesses have more than one stream of income/revenue. This helps with income stability, especially during tough months.

Activity 5.2.

Take a look at how another MCC cooperative in Kenya managed to find more than one way to make money and complete the task that follows.



Case Study: The Bondo Dairy Cooperative (Kenya)

The cooperative is located in the Bondo region, an area known for dairy farming, and has implemented several creative strategies to enhance its income generation. Here's how it works:

The Bondo Dairy Cooperative Society was established to help smallholder farmers in the region access better markets for their milk and dairy products. The cooperative serves as a MCC, where milk from local farmers is collected, processed, and distributed to local markets. The cooperative has grown from a small group of farmers to a significant player in the local dairy industry.

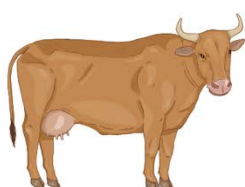
1. Milk Collection and Value Addition

Milk Collection: The cooperative collects milk from its members and sells it to local processors or directly to the market. The cooperative charges a small membership fee to farmers, which grants them access to milk collection and cooling services.

Value-added Products: In addition to selling raw milk, the cooperative has ventured into producing value-added dairy products such as yogurt, butter, and cheese. This allows them to capture higher margins compared to selling raw milk alone. The cooperative has also explored branding these products, which allows them to command a premium price in the local market.



2. Livestock and Feed Sales

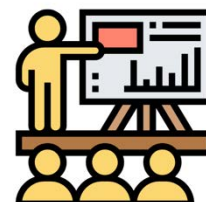


Improved Dairy Cattle: The cooperative provides farmers with access to improved dairy cattle through partnerships with livestock breeders and government programs. Farmers can purchase high-yielding cows at subsidized rates, increasing milk production and quality. The cows will pay themselves off over time.

Animal Feed Production: The cooperative has started producing and selling animal feed to its members. This provides farmers with an affordable and sustainable source of high-quality feed, improving milk yields and farm profitability. The sale of animal feed is a key revenue stream for the cooperative.

3. Training and Extension Services

The cooperative offers training and extension services to its members, providing guidance on best practices for dairy farming, including breeding, feeding, milk hygiene, and disease management. The cooperative charges a small fee for these services, which generates an additional revenue stream. The training also helps farmers improve milk quality, which benefits the cooperative by ensuring higher-quality milk for processing.



4. Milk Processing Equipment Leasing

The Bondo Dairy Cooperative has invested in milk processing equipment, which it leases to its members. This allows small-scale farmers who cannot afford processing equipment to make dairy products like yogurt or cheese on-site, thus adding value to their milk before selling it to the cooperative or the market. The cooperative charges a leasing fee for the use of the equipment, generating extra income while empowering farmers.

5. Renewable Energy Projects

The cooperative has also embraced renewable energy solutions by installing solar panels to power its cooling systems and processing equipment. This reduces electricity costs, which are a significant operational expense. The energy savings are passed on to members



in the form of lower fees for milk cooling and processing services, while the cooperative itself enjoys reduced energy costs, improving overall profitability.

6. Partnerships with NGOs and Government

The cooperative has established strong relationships with local NGOs and government agencies, which provide funding for infrastructure improvements, capacity building, and market access. These partnerships have enabled the cooperative to enhance its services and reach more farmers, generating additional revenue from increased milk collection volumes and product sales.

The benefits of several income streams for any MCC includes:



Increased Income for Farmers: Through the value-added products and training, farmers have increased their income by selling higher-quality milk and processed products.

Sustainability: The use of solar energy and sustainable practices helps the cooperative remain financially viable despite fluctuating energy prices and market conditions.

Market Access: By processing milk into branded products, the cooperative has expanded its market reach and improved its brand recognition in local and regional markets.

Improved Milk Quality: The provision of training and high-quality animal feed has led to better milk production practices, resulting in higher-quality milk that commands better prices.



The Bondo Dairy Cooperative Society demonstrates how an MCC can innovate beyond traditional milk collection and sales. This case highlights the importance of innovation, diversification, and community-driven strategies for MCCs in Africa.

**The Bondo Dairy Cooperative Society is a fictionalized entity based on real-life stories of several milk collection centre cooperatives in Kenya. This story was created by AI using several sources such as Kenya Dairy Board Reports, International Fund for Agricultural Development, Kenya Agricultural and Livestock Research Organization (KALRO) and others.*

Task

In groups of 3 or four, brainstorm and capture how your MCC cooperative can generate income, save money and benefit farmers.

TIP: Think specifically about your local market demands when you're brainstorming here. Your area and the economy in your area is different from Kenya or any other place in Africa. Is there something unique your cooperative could offer your unique market?

After participants read the Bondo Dairy Cooperative case study, divide them into groups of 3-4 people. Give each group large sheets of paper and markers to brainstorm income generation ideas specific to their local context.

Encourage them to think creatively but realistically about:

- What products or services their MCC could offer
- What unique advantages exist in their local area
- What local market demands they could meet
- How they could save money through innovative approaches

After the brainstorming session, have each group present their ideas to everyone. Facilitate a discussion about the feasibility of different ideas and how they might be implemented.

5.6. Setting prices for sustainability

In Eritrea, milk prices are determined by a combination of government regulations, production costs, and market forces. The government may regulate the prices to ensure affordability and stability, while supply-demand dynamics and the cost of production influence the final price for consumers.

Processors currently (April 2025) buy milk from farmers at **20 ERN per litre** (average).



Key elements to consider when putting a price on your milk include

Base Price Set by Market & Government	
Cost of Production	
Quality-Based Pricing	
Seasonal Variations	
Competition & Alternative Buyers	
Transport & Distance Costs	
Processor & Retailer Agreements	

Facilitator's Notes:

In Eritrea, the pricing of milk at small-scale Milk Collection Centers (MCCs) is influenced by several factors, including production costs, market dynamics, and government policies. However, the dairy sector in Eritrea remains relatively small, and the mechanisms for determining milk prices are still developing.

1. Government Regulation & Market Influence

- The **Eritrean government** plays a role in regulating agricultural sectors, including dairy. While specific milk price regulations may not be extensively formalized, there may be **guidelines** or recommendations for pricing in local markets.
- In more urban areas or larger towns, **market forces** come into play, with MCCs competing with private dairy processors and informal milk traders. This can lead to fluctuations in the price based on supply and demand.

2. Cost of Production

- **Farm gate prices** for milk are directly influenced by the costs that **small-scale farmers** face, including **feed, labor, veterinary care**, and general animal husbandry.
- MCCs must consider their **transportation** and **operational costs** (such as cooling, storage, and quality testing) when determining the price they are willing to pay for milk.
For example: If fuel prices rise or transportation becomes difficult in rural areas, the MCC may lower the price offered to farmers or adjust payments accordingly to account for higher operational costs.

3. Quality-Based Pricing

- While Eritrea's dairy market may not yet be as sophisticated as in some other regions, **quality-based pricing** could still be used in more developed MCCs.
- **Milk quality** in Eritrea is typically evaluated by factors such as:
 - **Fat content** and **bacterial count**
 - **Contamination (e.g., presence of antibiotics or foreign substances)**
- Farmers who deliver **high-quality milk** could receive a **premium price**, while **lower-quality milk** (e.g., with higher bacterial counts) could be priced lower.

4. Seasonality & Weather Factors

- Similar to many other African countries, **milk production in Eritrea** is influenced by **seasonal variations**.
- During the **dry season**, when feed and water for cows become scarce, the milk supply may be reduced, causing prices to rise.
- In the **wet season**, milk production typically increases due to better pasture availability, which can lead to lower prices.

5. Distance from Market & Transport Costs

- The **geography of Eritrea** plays a crucial role in milk pricing. In more **remote or rural areas**, transport to MCCs or urban centers may be more costly due to **poor road infrastructure** and **longer distances**.
- MCCs located in urban centers like **Asmara** may be able to pay **slightly higher prices** due to better access to transportation networks and larger markets.
- **MCCs in remote areas** might struggle to provide fair prices if transportation costs outweigh the milk's value. Farmers in these areas may face lower farm gate prices due to additional transport costs.

6. Processors & Retailers

- Some larger MCCs or cooperatives might strike deals with **local dairy processors**, who set agreed-upon prices for milk collected. These agreements can lead to more stable pricing structures, with processors paying a set price per liter.
- MCCs may also sell **directly to retailers or consumers**, which may allow them to set a **higher price**, but they must account for packaging and logistics.

7. Informal Market and Alternative Buyers

- In rural areas, **informal milk traders** might buy milk from farmers directly, often at slightly **lower prices** than those offered by MCCs. MCCs in these areas might need to offer better pricing or more reliable services to attract farmers.

Activity 5.3.

From the elements above, which ones do you and your MCC have control over and which ones are out of your control?

In our control (with answers)	Out of our control
• Cost of Production - MCCs can implement efficient processes and technologies to reduce costs • Quality-Based Pricing - MCCs can establish quality standards and payment structures • Transport & Distance Costs - MCCs can optimize collection routes and transport methods • Processor & Retailer Agreements - MCCs can negotiate favorable terms with buyers	- Base Price Set by Market & Government - External price regulations and market forces • Seasonal Variations - Weather patterns and natural cycles of production • Competition & Alternative Buyers - Actions of competitors and market dynamics

Facilitator's Notes: Discuss how MCCs can focus on the elements they can control while developing strategies to mitigate the impact of factors outside their control. Emphasize that understanding this distinction helps in effective business planning.

When you are setting a price for a service or product, it is important to consider the things that influence the price. Especially the elements that are outside of our control like government base prices – make sure you do not price below this.

Calculating a product or service price



To set a price you must first **calculate the total cost** of producing one unit (e.g., 1 litre of milk, 1 kg of cheese, or 1 cup of yogurt).

1. Consider all your once-off, fixed and variable expenses that goes into your product. For example:

Total milk processed
is your MCCs



Total monthly costs = ERN 90,000

Total milk processed = 4,500 liters

Cost per litre: $\text{ERN } 90,000 \div 4,500 = \text{ERN } 20 \text{ per litre.}$

2. Next, you need add a profit margin. You normally 10% - 30% of your cost per litre.





Example (with 25% profit margin):

ERN 20 + (25% × ERN 20) = ERN 25 per litre.

3. Then you need to consider current market prices and the process your competitors are selling their product for.

If most sellers price milk at **ERN 27 per litre**, your price should be competitive but profitable (e.g., **ERN 25-27**).

4. Be sure to consider the local demand for your product and how much your customer can afford.
5. If your MCC is making value-added dairy products, remember that not all your products will be priced the same, especially if you think about the different packaging they require. For example:



Product	Cost Price (ERN)	Profit Margin (20%)	Selling Price (ERN)
Raw Milk (1L)	20	4	24
Pasteurized Milk (1L)	22	4.40	26.40
Yogurt (500ml)	18	3.60	21.60
Butter (1kg)	150	30	180
Cheese (1kg)	200	40	240

Activity 5.4.

- a.) In groups, follow the steps you have learnt and use the below finances to set a price for a litre of their raw milk for this MCC:

Expense	Amount (ERN)
Raw Milk Purchase (4,500 litres)	90,000
Transport Costs	10,000
Electricity & Water	5,000
Packaging Materials	4,500
Labor Wages	20,000
Miscellaneous Costs	3,500
Total Cost	133,000

b.) Below is a budget sheet example for an MCC. It is missing the milk price which impacts the total net income. Let's practice budgeting with our milk price.

Description	Quantity	Unit Cost (ERN)	Total (ERN)
INCOME			
Milk Sold to Processor (litres)	5,000 L	1.)	2.)
Other Dairy Products (e.g., yogurt)	500 units	30	15,000
TOTAL INCOME	Auto-calc	3.)	
EXPENSES			
Milk Collection (transport, staff)	5,000 L	1.5	7,500
Storage and Cooling Costs	Flat rate	—	4,000
Salaries (3 staff)	Per month	—	12,000
Feed/Animal Maintenance (if needed)	—	—	3,000
Packaging for Products	—	—	2,500
Miscellaneous	—	—	2,000
TOTAL EXPENSES			4.)
NET PROFIT (Income – Expenses)			5.)

b.1) What was your milk price?

35.47 ERN per litre (may vary slightly based on chosen profit margin)

b.2) What would be the total income for milk sold?

5,000 L × 35.47 ERN = 177,350 ERN

b.3) What are the total expenses of this budget sheet?

7,500 + 4,000 + 12,000 + 3,000 + 2,500 + 2,000 = 31,000 ERN

b.4) Calculate the NET income and state whether this MCC made a profit or a loss this month.

Total Income = 177,350 + 15,000 = 192,350 ERN

NET income = 192,350 - 31,000 = 161,350 ERN

The MCC made a significant profit this month.

Facilitator's Notes: Discuss the importance of accurate budgeting and monitoring actual performance against budget. Point out that this example shows a very healthy profit, but in reality, there may be additional costs to consider. Ask participants what other costs might need to be included in a comprehensive budget.

5.7. Negotiating milk prices with buyers

MCCs in Africa negotiate prices with buyers using several strategies to ensure they get a **fair price** while maintaining **strong business relationships**. The negotiation process depends on factors such as market conditions, milk quality, supply volumes, and contractual agreements.

1. Understanding Market Trends



MCCs analyse market conditions to understand seasonal price fluctuations, supply-demand dynamics, and pricing trends in the dairy industry.

They track competitor pricing to ensure they negotiate competitive rates with processors. Research government-regulated milk price guidelines (if available) and use these to influence your negotiations too.

2. Quality-Based Pricing Strategy

Many processors pay premium prices for high-quality milk that meets safety and hygiene standards.

MCCs negotiate higher rates if they can consistently provide milk with:

- High fat content
- Low bacterial count
- Free from antibiotics and contaminants



MCCs with proper milk testing facilities can leverage quality-based pricing to maximize revenue.

3. Bulk Supply Agreements & Contract Negotiations



Long-term contracts: Some MCCs enter into fixed-price agreements with processors for stability.

Volume-based pricing: MCCs negotiate discounts or premiums based on the quantity of milk they can consistently supply.

Flexible pricing terms: Some agreements include seasonal adjustments, where higher prices are paid during low-supply periods (dry season).

4. Cooperative Bargaining Power

Many MCCs operate as cooperatives, where multiple farmers pool their milk. A cooperative MCC has stronger bargaining power than an individual farmer.

If multiple MCCs unite, they can collectively negotiate better prices from processors.



5. Alternative Buyers & Diversification

MCCs increase negotiation leverage by having multiple buyers (e.g., retailers, local dairy shops). Having diverse products or service also adds to MCC bargaining power.

6. Cost Transparency & Justification



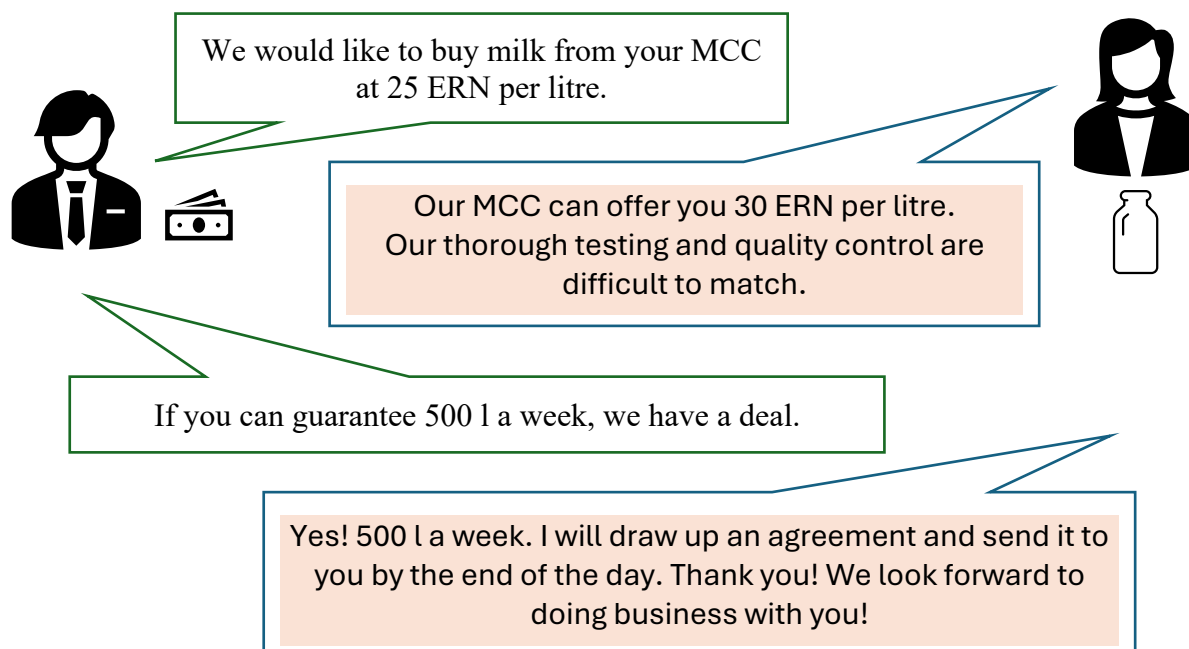
MCCs calculate operational costs (transport, cooling, testing, storage) and use these as negotiation points.

Processors are more likely to agree to price adjustments if MCCs provide cost breakdowns to justify higher prices.

7. Building Strong Relationships

MCCs maintain long-term partnerships with processors to ensure reliability and stability. Open and regular communication helps MCCs and processors adapt to market changes together.

Loyalty incentives—some processors offer MCCs higher prices for consistent supply over time.



Activity 5.5

In pairs, take some time to strategize on some strong negotiation techniques. You will need to be extra creative as your MCC is a startup which means it is new and not many customers will know about you yet. Do your best to get their business!

Then you're going to connect with another group and take turns to role-play the negotiation. Each pair having a turn to be the MCC with a product to sell and a turn to be the processor or another customer.

Negotiation strategy notes can go here:

Facilitator's Notes: This is a role-playing activity for practicing negotiation skills.

Before the activity:

- Review key negotiation principles with participants
- Pair up participants and explain that they will take turns being MCC representatives and buyers
- Provide some context for each negotiation scenario (e.g., new buyer, long-term customer seeking better terms, etc.)

During the activity, circulate among pairs to observe and provide guidance. After all pairs have completed both roles, facilitate a group discussion about:

- What negotiation strategies were most effective
- What challenges they encountered
- How they might apply these skills in real-world negotiations

Emphasize that successful negotiation creates value for both parties and builds long-term relationships.

SAMPLE NEGOTIATION STRATEGIES TO HIGHLIGHT:

- Know your bottom line before negotiating
- Emphasize quality and reliability as value propositions
- Bundle services or offer volume discounts
- Propose longer-term contracts for price stability
- Listen carefully to buyer needs and constraints
- Be prepared to walk away if terms are unsustainable
- Focus on creating win-win solutions

This chapter will be particularly helpful when you've started your MCC and you need to put these things in place.

All cooperative members should be empowered through financial education like this. Know that you understand the fundamentals of business finance, how to price your milk and how to negotiate, you have taken the first step to starting your own MCC. If you enjoyed this chapter, and working with finances is something you enjoy, you may want to put yourself forward for treasurer!



Complete the revision activities:

Activity 5.6.

Take a few minutes to orientate yourself to this MCC cash flow sheet example. Answer the questions below.

Item	Jan 2025	Feb 2025	March 2025	Total of 1 st Quarter
EXPENSES				
Milk cooling tank	12 000	0	0	12 000
Milk Transport Cans	3 000	0	0	3 000
Solar Panels	1 550	1 550	1550	4 650
Payments to farmers	1 400	3 500	3 002.22	7 902.22
Cleaning Detergents	130.00	110.30	95.50	335.80
Expenses Total	18 080	5 160.30	4 647.72	27 888.02
INCOME				
Raw milk sale	1 800	4 500	3 860	10 160
Memberships	1000	1000	1 050	3050
Income Total	2 800	5 500	4 910	13 210
NET Income				

a) Why is managing the cash flow so important in a MCC?

(This is a good opportunity to assess their understanding of cash flow management)

b) Calculate the NET income for the 1st quarter of 2025 (blue box)?

Total Income (13,210) - Total Expenses (27,888.02) = -14,678.02 ERN

c) Did this MCC make profit, a loss, or break even for the 1st quarter of 2025?

The MCC made a loss of 14,678.02 ERN.

(Discuss that initial losses are common for new businesses due to start-up investments. Explain how this loss might be addressed in future quarters.)

d) Which items were once-off costs?

Milk cooling tank (12,000 ERN) and Milk Transport Cans (3,000 ERN)

(Explain that these are capital investments that will benefit the business over many years. Discuss how these investments might be financed (loans, grants, member contributions).)

e) Which item is a fixed cost for this MCC?

Solar Panels payments (1,550 ERN per month)

(Point out that the MCC is making regular monthly payments for the solar panels, making this a fixed recurring cost until they are paid off.)

f) How much did this MCC pay the farmers for milk in the month of March 2025?

3,002.22 ERN

(Use this to discuss fair payment policies for farmers and the importance of timely payments.)

g) In January, this MCC sold 100l of raw milk at the price of 18.00 per litre. If they paid farmers 1 400 in January, how much is a farmer being paid per litre?

1,400 ERN ÷ 100 litres = 14.00 ERN per litre

(Discuss the margin between purchase price from farmers and selling price to customers. Explain how this margin covers MCC operating costs.)

h) Which month did this MCC spend the most money on cleaning detergents?

January (140.00 ERN)

i) What are the main income streams for this MCC?

Raw milk sales and membership fees

(Discuss the potential benefits of diversifying income streams as the MCC grows.)

j) Raw milk sales were the lowest in January. What are the things could have contributed to this? Below are some suggested answers:

- Seasonal factors affecting milk production (dry season)
- The MCC just starting operations with fewer farmers or customers
- Quality issues affecting saleable milk
- Transportation or logistics challenges
- Lower demand after holiday season
- Competition from other buyers
- Health issues affecting cattle production

(Discuss how these factors might be addressed.)

k) If each member of the cooperative pays 50 per month, how many members are there in the month of February?

1,000 ERN ÷ 50 ERN per member = 20 members

l) How many new members joined the cooperative in March 2025?

1,050 ERN ÷ 50 ERN per member = 21 members (1 new member compared to February)
(Discuss member recruitment strategies and the importance of demonstrating value to potential members.)

m) Cash flow has proven to be a challenge for this MCC for these months. What set them back?

The major once-off investments in equipment (milk cooling tank and transport cans) in January created a significant cash outflow. These investments, combined with relatively low income in the early months of operation, created cash flow challenges.

(Discuss the difference between profitability and cash flow. Discuss how businesses can be profitable in the long term but still face short-term cash flow challenges.)

n) List some ideas on how your MCC would manage its cash flow responsibly.

- Stagger large equipment purchases over time
- Seek financing options with favorable repayment terms
- Maintain an emergency cash reserve
- Establish clear payment terms with buyers
- Follow up promptly on late payments
- Forecast cash flow needs and plan accordingly
- Explore leasing equipment instead of purchasing
- Negotiate favorable payment terms with suppliers
- Develop multiple income streams
- Consider advance payments from regular customers

o) Based on what you have learnt from Part 1, what could this MCC do to improve its financial prospects?

- Increase milk collection volume by recruiting more farmers
- Improve milk quality to access premium markets
- Develop value-added products for higher margins
- Invest in efficient equipment to reduce operating costs
- Implement quality-based pricing to incentivize better milk quality
- Establish strong relationships with reliable buyers
- Offer additional services to members and non-members
- Seek partnerships with NGOs or government agencies for support
- Focus on proper record keeping for better decision-making

Facilitator's Note: A reminder to use the opportunity at the end of the training session to gauge how effective the training session was so that you are able to reflect on how you are creating engaging learning experiences.

Chapter 6: Business Sustainability for MCCs

By the end of this session, you'll be able to

- Identify and establish relationships with buyers.
- Assess and implement contracts/agreements.
- Discuss the activities required to sustain an MCC.

Facilitator's Note: Remember to identify the intended outcomes as your starting point to creating an engaging learning experience.

Once you have the intended objectives, think carefully about how you are going to plan the activities to allow the farmers to master these objectives. Remember that you are now scaffolding the activities for learning to take place. You may need to create some resources (visuals, refer them to this booklet etc). In the design of the activities, think about how you would measure whether the farmers have understood or mastered that objective.

Sustainability is the investment in additional services such as training, veterinary care, and better farming practices, which enhance milk yield and overall herd health. The study by Balikowa et al. (2021) indicated that a diverse range of activities attracts farmers to join the cooperative as they benefit from these shared resources. This increase in membership makes the MCC more economically viable.

Likewise, cooperative members are often more invested in the long-term health of both their industry and the environment. Through pooling resources, knowledge, and experiences, **dairy cooperatives can implement innovative strategies** that promote sustainability, improving not only their economic viability but also their social and environmental impacts.

Marketing is also essential to attract consumers. This can involve branding, advertising campaigns, and promotions. Understanding consumer preferences and trends is important for dairy businesses to effectively market their products and differentiate themselves in a competitive market. In fact, a community-oriented approach enhances transparency and accountability within cooperatives, building trust among members and consumers alike. This trust drives consumer loyalty and strengthens market positions, ultimately benefiting the entire cooperative. As a result, the integration of community values into dairy cooperatives not only supports their sustainability efforts but also contributes to the overall resilience and success of the cooperative model.

Lastly, building on proven cooperative dairy models from countries such as Kenya, India, Denmark, and Ireland can significantly enhance the efficiency and sustainability of dairy farming in various contexts.

6.1. MCC customers: the key to business success

“A satisfied customer is the best business strategy of all.”

- Michael LeBoeuf, US Businessman

Without customers, a business cannot exist. Think about all the businesses that exist because **you** are one of their customers.

Discussion point:

Think about a business you use regularly.

Why do you use this business regularly?

What do you like about them?

How much money, per month, do you think you spend with that business?

Does anyone else you know spend their money with the same business?

Why do you think others use this business as well?



If your cooperative has more than one revenue stream, you may have more than one type of customer.

Let us look at a bakery as an example.



This local bakery has THREE groups of customers:

1. Local restaurants / fast-food stalls
2. Walk-in customers
3. Local schools

Each of these customer groups may use the bakery in a different way.



Local restaurants/fast-food stalls	Pay on delivery or collection
Walk-in customers	Pay on collection at the counter
Local school	Pay per week

Just like milk, a bakery has a great responsibility to ensure their products are made in a clean and hygienic kitchen, that their products are fresh, they taste good and that the products are affordable for their customers.

How does this apply to your MCC cooperative as well?

Activity 6.1.

Who are the customers for your MCC cooperative? To clarify this, you need to list the services and products your MCC are offering first.

Then clarify the customer group with as much detail as possible for each service product. Complete the table.

Service/Product of your MCC	Customer Group
1. Raw milk	Eg. Milk Processor Companies

2.	
3.	

Each of these customer groups appreciate different elements of customer service to make them feel like the money they are spending with your MCC is better than spending it somewhere else. We need to respect our customers money and their choice to spend it with us – how can we do this?

Let's look at how the bakery does this:



Are cooperative members customers? What do **you** think?

Customer	Customer Service
Restaurants / fast-food stalls	Reliability: • Products always need to be delivered or available for collection, early. • Products need to be packaged to avoid damage. • New orders need to be responded to quickly. • Prices should not change without prior notice. • Provide a receipt or invoice.
Walk-in Customers	• Service should be quick and friendly. • Products need to be fresh. • The bakery needs to be clean. • Products to be stored safely (away from insects, heat or damp). • Accept the most common way of payment – and always have change if it is cash.
Local Schools	• Products need to be fresh. • Delivery needs to be early and reliable (don't want hungry children!) • Products need to be packaged to avoid damage. • Prices should not change without prior notice. • Provide a receipt of invoice/



Activity 6.2

For your MCC cooperative, how can you best serve your customer groups? What do your paying customers really need from you?

Customer	Customer Service
1. <i>Milk Processing Companies</i>	<i>Eg. High quality milk</i>
2.	
3.	

Facilitator's Notes: Use this exercise to emphasize the importance of identifying specific customer segments for each product or service. Discuss how different products might require different marketing approaches and distribution channels.

6.2. Protecting your customers and your business

We already mentioned that running a business, especially in the food industry, is a big responsibility. This is because we are not only responsible for keeping customers happy, we are also responsible for keeping them safe and healthy.

If you are receiving money in exchange for a service or product, it is advisable that your cooperative put some basic measures in place to ensure both your company and your customer are protected against any health and safety or legal trouble.

6.2.1 Health and Safety

Where possible, work towards getting your MCC compliance with health and safety regulations. In Eritrea, the Ministry of Agriculture through the Regulatory Services Department is primarily responsible for this.

This is the first step to protecting both your cooperative, and your customer.

The Regulatory Framework requirements for MCCs in Eritrea include the following:

1. Licensing and Registration

MCCs are required to obtain the necessary licenses and registrations from the relevant authorities to operate legally. This process ensures that the facilities meet the established standards for milk collection and processing.

Your MCC will struggle to secure bigger clients without these.

2. Facility Standards

The regulations specify the structural and sanitary requirements for MCC facilities. This includes guidelines on construction materials, layout, ventilation, lighting, and waste management systems to ensure a hygienic environment for milk collection and storage.

Without keeping to these standards, your MCC could face penalties which will prohibit your MCC from maintaining customers.

3. Equipment & Hygiene

MCCs must utilize appropriate equipment that meets the standards set forth in the regulations. Regular cleaning and maintenance protocols are mandated to prevent contamination and ensure the safety of the milk collected. Your records, from Chapter 4, will prove as evidence that your MCC is regulatory. Inspectors may ask for these records, as well as do a physical inspection of your equipment. If your MCC fails these inspections, you may be required to close business until it has been rectified. If this happens, your customers will need to take their business to another MCC.

4. Personnel Training

Staff involved in milk collection and handling are required to undergo training in hygienic practices and quality control measures. This ensures that personnel are knowledgeable about proper milk handling techniques and the importance of maintaining cleanliness throughout the collection process.

If an inspector discovers that your staff have not been trained adequately, they may request your operations to close down until staff are trained. Your staff records (Chapter 4) and certificates will be evidence of your trained personnel. Be sure to keep them safe.

5. Quality Control

The regulations emphasize the implementation of quality control measures to monitor the safety and quality of the milk collected. This includes regular testing for microbial contamination and adherence to established standards for milk composition. Remember the records and your MCC needs to keep for the all the milk testing? It is important you have these readily available for inspectors at any time.

In Chapters 2 and 3, we spoke about the team responsible for quality control. You can now see how all these elements of the business operations come together to ensure your cooperative is a success.

6.2.2 Customer Agreements / Contracts

Once your MCC has the required regulatory documentation, it is important to create an agreement that is signed by both your MCCs chairperson and your customer. These agreements need to be signed before any business transactions take place.

Why is this so important to your MCC's success? All businesses, big or small, for-profit or non-profit, use agreements/contracts to ensure that both parties have the same understanding of what is included (or not included) in the business transaction. These agreements/contracts can be referred to later, if there are any complaints, problems or non-payments.

IMPORTANT:

These agreements are only legally binding if both parties have signed it. Be sure your customer signs it before you transact.

You may need to find these agreements quickly and easily, if there are any issues with a customer. Be sure to keep them safe and organised.

Your agreement needs to be truthful. Do not claim anything false in your agreement.

6.2.3 Membership Agreement

As a cooperative, your members are often a large source of your income. It is important that your members know what their memberships cover (and what they do not cover) and what you, as a cooperative, are responsible for.

6.2.4 Service Provider Agreement

If your MCC requires another business to assist you with any services, or to provide you with necessary equipment or resources, they need to provide you with an agreement before any transactions are made.

The company you are purchasing from should provide you with this agreement, like you provide for your customers.

Make sure you get one! If you buy assets or resources, without an agreement, you could be putting your MCC and your own customers at risk.

Make sure you only sign contracts you understand and that you are comfortable with. If there is anything you do not understand, ask the service provider for clarity before signing.

You can ask for adjustments of the agreement before signing.



Things to look out for when you are about to sign an agreement/contract with another business:

1. Clear Pricing & Payment Terms – Understand all costs, payment schedules, and any penalties or discounts.
2. Services Provided – Make sure the contract clearly states what the provider will do and any limits.
3. Quality Standards – Ensure there are guarantees on service quality and what happens if it's not met.
4. Contract Length & Renewal – Check how long the contract lasts and if it renews automatically.

5. Ending the Contract – Look for fair exit options in case the provider doesn't meet expectations.
6. Liability & Insurance – Confirm who is responsible for damages or failures.
7. Dispute Resolution – Make sure there's a clear process for solving disagreements.
8. Data Protection – Ensure the MCC's business information stays private and secure.
9. Maintenance & Support – If equipment is involved, check for repair and service guarantees.
10. Legal & Regulatory Compliance – Ensure the provider follows Eritrean regulations, especially for milk safety and utilities.
- 11.

6.3. Mapping out your MCCs sustainability plan

Too many businesses think about growing before they think about becoming sustainable and stable. Think about the things your MCC needs to do, or put in place, to ensure it will run smoothly for the next 12 – 24 months.

Activity 6.3.1

Your trainer has given you an envelope with 10 cards in it.

Each card represents a step/or activity that you may need to do to formalise or improve your MCC cooperative operations. In pairs, place the activities your MCC needs to prioritise for the next 8 months, from left to right.

The most important activity first, followed by the next important activity as so on. Be sure that you are in agreement with the priority order of these activities. You have been given 5 blank cards. Think carefully about priorities you need to complete that are not listed on any of the cards. Add them into the order of importance.

Now that you have decided what activities you need to prioritise for your cooperative's stability, it is time to put these priorities into an action plan!

Activity 6.3.2

Put the priorities from above into an action plan including:

- By when you would like this activity completed by.
- What you need to get this activity completed.

Priority / Activity	Completion Date	Resources Required
1. <i>Eg. Confirm membership policy and agreement.</i>	30 Sept 2025	Templates.
2.		
3.		

4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

Next, swap your plan with another pair. Read their plan and add any resources they might have missed that you know of. Remember, as a cooperative, we are here to support each other and share our knowledge.

Business Tip: Your plans are allowed to change. We make plans with the knowledge and resources we currently have. As you learn and grow, it is normal for your plans to change as you gain more insight into what needs to be done. If your plans need to change, make sure the board/leadership/your fellow members, have agreed to it first.

Chapter 7: Milk Collection Logistics & Cold Chain Management

By the end of this session, you will be able to

- Explain the importance of coordinating the logistics.
- Demonstrate efficient milk transportation to avoid spoilage.
- Establish proper chilling and storage techniques.
- Discuss power supply challenges and alternative solutions.



The options your MCC has to transport milk will depend on how big your operation is. The priority while transporting milk is to avoid it getting spoilt or decrease in quality.

Discussion Point:

How are local farmers currently transporting milk to your local MCC?
What are the challenges or risks with these transport methods?



7.1. The importance of coordinating milk collection

Logistics coordination in a MCC is crucial for several reasons. Firstly, it ensures timely and efficient transportation of milk from producers to the collection point. This is vital because milk is a perishable commodity that requires prompt handling to maintain its quality and safety. A well-coordinated logistics system helps minimize the time between milking and collection, reducing the risk of spoilage.

Secondly, logistics coordination facilitates effective inventory management. By optimizing collection schedules and managing storage capacities, the centre can ensure that it has enough resources to handle fluctuations in milk supply. This balance is essential for preventing waste and ensuring that the centre can meet demand adequately.

Additionally, effective logistics coordination enhances communication among various stakeholders, including farmers, transporters, and dairy processors. This transparency allows for better decision-making and fosters stronger relationships, which are essential for the smooth operation of the supply chain.

Moreover, well-organized logistics can lead to cost savings. By streamlining routes and consolidating shipments, the MCC can reduce transportation costs and improve overall profitability. This financial efficiency is crucial for sustaining the operations of smaller producers who may have limited resources.

Finally, logistics coordination plays a role in compliance with health and safety regulations. Ensuring that milk is collected, stored, and transported under the appropriate conditions is necessary to adhere to quality standards. Effective logistics management helps maintain these standards, ensuring that the milk reaches consumers in optimal condition.

In summary, logistics coordination is integral to the successful operation of a MCC,

impacting quality, efficiency, communication, cost management, and regulatory compliance.

7.2. Transporting milk with efficiency & safety

Let's look at how small-scale MCC's in Eritrea transport their milk:

1. Delivered by the farmer

In plastic or metal milk cans; strapped to bicycles, motorbikes or donkey carts. Some are hand-carried, if the distance is not far at all.

Important: Ensure farmers are trained on sterilizing and cleaning their containers adequately.

2. Collection from the farms

Your MCC may have a vehicle or two to collect milk from local farmers. Some MCC's hire local vehicles to collect the milk from farms.

Important: If you are hiring someone to collect milk, make sure they sign a Service Provider Agreement to ensure they treat the milk under necessary requirements. Ensure that no liters of milk go missing between farm and MCC.

3. Keeping the milk cool and preserved

MCCs use insulated milk cans to slow down potential spoilage. Transport is arranged very early in the morning or in the evening when temperatures are cooler. Longer journeys need icepacks if cooling tanks are not available.



by Kramer, 2017 from <https://www.ifpri.org/>

4. Transporting milk from MCC to processors or other buyers

Whether the milk processing company/buyer collects milk from your MCC, or your MCC delivers it to them, will be stipulated in your agreement.

Processing companies normally have larger trucks with cooling facilities.

Large cooperatives use milk tankers.

Public transport is sometime used for small batches, in sealed containers.

Important: Ensure there are records and evidence of the milk quality before it leaves your MCC, especially if your buyer is collecting it from your location. If something happens during the transit, that is not your responsibility in your contract, you still need to get paid for the milk. Make sure you can support the quality of the milk as it left your MCC.

7.3. How to store milk at an MCC

The most important thing when it comes to storing milk, is keeping it both clean and cool. Milk needs to be stored at a temperature below 4°.

The MCC is responsible for checking and recording temperatures for cooling systems at least twice a day.

What you'll need:

- **Thermometers** (digital or mercury) that are placed in the coolers.
- **Temperature Logbook** to keep a detailed record (date, time, temperature and any other observations if necessary).
- **Bulk Milk Coolers:** Small-scale BMCs can range from 300 – 1000 litres.
- **Strict cleaning & maintenance** of bulk milk coolers and insulated milk cans. Training needs to be provided and hygiene measures recorded.



7.4. Milk storage challenges & solutions

In many parts of the world, electricity is unreliable, which is a challenge for any normal cooling system. Let's look at some ways your MCC can invest in more reliable cooling systems.



1. Solar panels

Solar energy can be used to power small-scale bulk milk coolers.

A solar panel is a great investment for a MCC. It will pay itself off in about 3 years.

Important: Ensure solar panels are safe from breakage or theft.

2. Insulated Milk Cans

Where bulk milk coolers and power is too costly or unavailable, you can use insulated milk cans with cooling packs.

Important: These keep milk cool for a short period of time only.



by Energypedia, 2016

3. Zero-Energy Cooling Chambers (ZECCs)



These are low-cost storage solutions that use evaporative cooling to maintain lower temperatures.

Important: ZECCs are for small volumes of milk, for short storage times. ZECCs require proper air circulation to maintain cool temperatures.

4. Wet Cloth or Blanket Wrap

Wrapping milk cans in wet cloths or blankets, and keeping them in shaded and ventilated areas, is also a low-cost, temporary cooling method.

Complete the activities



Activity 7.1

What measures will you put in place to ensure milk is safely delivered to and from your MCC?

This is an open-ended planning activity where participants identify specific measures for safe milk transportation in their context. Encourage participants to consider:

- Local transportation options and infrastructure
- Available resources and constraints
- Seasonal variations that might affect transport
- Distances between farms and the MCC
- Hygiene and temperature control measures
- Record keeping during transport

After participants develop their plans, facilitate a group discussion to share ideas and best practices. Highlight particularly practical or innovative solutions that emerge from the group.

POTENTIAL MEASURES TO HIGHLIGHT:

- Standardized, sealed milk containers for all farmers
- Early morning collection schedules to avoid heat
- Training for all transport personnel on milk handling
- Temperature checks at collection and delivery
- Cleaning protocols for transport equipment
- Insulated transport containers with ice packs if needed
- Detailed transport logs for traceability
- Backup transport arrangements for emergencies

Activity 7.2

In pairs, create a 5-minute skit or video that clearly demonstrates how small-scale dairy farmers without reliable electricity, can keep their milk cool. Use a method you have experience with if possible.

- Write a short and basic script.
- Be clear on materials needed and instructions.
- Provide benefits and disadvantages of your cooling system
- Stick within a 5-minute time limit.
- Find ways to be engaging for your audience!

Chapter 8: Compliance, Regulations & Risk Management

By the end of this session, you'll be able to

- Discuss industry regulations and quality assurance standards.
- Establish the basics of risk management in MCC operations.

We have touched on some of this in Chapter 3 and 6, however, this chapter will take a deeper dive into what compliance looks like for a small-scale MCC along with how your cooperative can remain resilience at the core of its strategy.

Resilience

The capacity to withstand or to recover quickly from difficulties.

- *Oxford Dictionary*

Businesses are not sustainable if they are not resilient. Starting and running a business involves taking all challenges into account and being prepared for them.

8.1. Industry regulations for top quality dairy

There are 4 main regulatory bodies overseeing the dairy industry in Eritrea.



1 Ministry of Agriculture (MoA)

Responsible for writing policies and regulations governing agricultural production, including dairy farming. The MoA oversees livestock production, ensures sustainable agricultural practices, and enhances food security.

Image source: [Development Aid](#)



2 Ministry of Health

Focuses on public health aspects related to food safety, including monitoring and managing foodborne diseases to ensure dairy products are safe for consumption.

Image source: [National Action Plan for Health Security 2017 - 2021](#)



3 Eritrean Standards Institution (ESI)

Develops and maintains food quality and safety standards, aligning with international norms. The ESI certifies food products, including dairy, ensuring they meet established quality benchmarks before reaching the market.

Image source: [Shabait.com](#)



4 Ministry of Trade and Industry

Regulates the commercial aspects of the food industry, including dairy, by overseeing imports and exports to ensure compliance with national and international standards.

The **Key Regulations and Standards** that you need be aware of are:

1. **Regulations to Determine the Requirements and Standards for Milk and Milk Products Processing Plants (Legal Notice No. 113/2006):** Issued on September 20, 2006, this regulation outlines the requirements and standards for milk processing facilities in Eritrea, aiming to ensure the safety and quality of dairy products.
2. **Environmental Protection and Management Regulations (Legal Notice No. 127/2017):** These regulations, issued on January 26, 2017, include provisions related to environmental standards that dairy processing plants must adhere to, ensuring that dairy operations do not negatively impact the environment.

These are the steps you'll need to take to ensure your MCC is compliant:

1. Register your cooperative with the Ministry of Trade and Industry or the Ministry of Agriculture.
IMPORTANT: For this process you will need to submit ownership details, location of MCC, operational plans and a basic business model.
2. Follow the Regulations for Milk and Milk Product Processing Plants (Legal Notice No. 113/2006), which outline hygiene, milk handling, and processing standards. Adhere to food safety laws enforced by the Ministry of Health to ensure milk is free from contaminants.
IMPORTANT: These can be found in the [Sense Farmers Milk Quality Booklet](#).
3. Always be prepared for health and sanitation inspections which are conducted by the Ministry of Health. Inspectors from the Ministry of Agriculture will also check your milk collection, testing and storage procedures.
4. The Eritrean Standards Institution (ESI) may do laboratory testing of your MCCs milk before granting you certification. Be sure to test thoroughly for:



- Bacterial contamination
- Adulteration
- Fat and protein content



5. Ensure the waste from your MCC is managed properly and does not cause damage to the environment (**Environmental Protection and Management Regulations (Legal Notice No. 127/2017)**)



6. Once your MCC has met regulatory requirements, it will receive a certificate of compliance which means it can legally collect and distribute milk.
7. Eritrean Standards Institution may also grant a quality certification for milk products intended for the formal market.

Complete activity 8.1 at the end of this chapter.

8.2. Managing risk in your MCC

Managing risk for your MCC is a full-time job, which is why it is important to ensure you have the right people in leadership positions (your Board of Directors), along with adequate training delivered to all dairy farmers and MCC staff.

Let's look at some of the common risks your MCC will need to consider – along with solutions to decrease the negative impact of such risks.

Facilitator's Note: Remember to draw on the experiences of the participants. Adult learning encourages the participants to be engaged in the learning experience...one technique is to ask them to share their experiences. As dairy farmers, they should be able to identify some real challenges or risks, as well as suggest potential solutions. They are able to share actual incidents that helps to provide tangible, concrete information. These shared stories help to recall the key concepts in learning.

RISK	SOLUTIONS
Milk Quality: Contaminated or spoiled milk due to poor handling, storage or transportation.	• Implement strict hygiene protocols for milk collection, storage, and transport. • Conduct regular milk quality testing for bacteria, adulteration, and composition.

	• Train farmers on best milking and storage practices to ensure high-quality raw milk
Financial Risk: Fluctuating milk process, high operational costs or unpaid deliveries.	• Develop a clear financial plan and budget to manage operational costs. • Diversify revenue streams (e.g., membership fees, selling by-products like yogurt, or renting equipment). • Use written contracts for buyers to ensure timely payments and stable pricing.
Supply Chain Disruptions: Farmers failing to deliver milk due to poor roads, weather or feed shortages.	• Establish alternative supply routes and local storage facilities to reduce reliance on a single delivery method. • Work with farmer groups to provide training on livestock feeding and health. • Pay farmers with feed and other resources rather than money. • Invest in basic cooling technology (e.g., solar cooling or insulated milk cans).
Equipment & Infrastructure Risks: Equipment breaks down leading to milk spoilage.	• Conduct regular maintenance of cooling tanks, generators, and testing kits. • Keep backup milk storage solutions (e.g., ice packs, shaded storage areas). • Create a repair fund for urgent equipment fixes.
Regulatory & Legal Risks: Non-compliance with dairy safety regulations leading to fines or shutdowns.	• Ensure proper registration and certification from the Ministry of Agriculture & Health. • Maintain accurate records for audits and inspections. • Stay updated with local dairy regulations to avoid violations.
Market & Competition Risks: Low demand for milk or competition from larger processors.	• Build direct relationships with buyers (hotels, schools, shops) to secure contracts.

	• Differentiate by branding and marketing milk as high-quality and fresh. • Explore value-added dairy products (cheese, butter, yogurt) to boost income.
Theft & Fraud Risks: Theft of milk, funds, or equipment by staff or suppliers.	• Implement transparent financial tracking and require multiple signatories for withdrawals. • Use digital payment systems to avoid cash handling risks. • Conduct regular inventory checks for milk and equipment.
Environmental Risks: Drought, heat waves, or other extreme weather.	• Work with farmers on drought-resistant feeding techniques for livestock. • Use eco-friendly milk cooling solutions (solar coolers, evaporative cooling). • Store excess milk as processed dairy products during high-production seasons.

Complete the activities:



Activity 8.1

Use the notes from above and match column A with its relevant statement in Column B.

Column A		Column B	
1	ESI	A	Regulations for Milk and Milk Product Processing Plants
2	Legal Notice No. 127/2017	B	Health & Sanitation Inspections
3	Ministry of Trade and Industry	C	Responsible Waste Management
4	Legal Notice No. 113/2006	D	Policies and regulations governing agricultural production
5	Ministry of Health	E	Eritrean Standards Institution
6	Ministry of Agriculture	F	Milk compliance certificate
7	Eritrean Standards Institution	G	Regulates the commercial aspects of the food industry.

Answers:

1.E 2.C 3.G 4.A 5.B 6.D 7.F

Activity 8.2

Conduct a risk assessment on a MCC and propose ways to either mitigate the risk or to avoid the risk.

The closing of a training session:

This is an opportunity for the participants to reflect on key insights and to question for further clarification.

- What did they learn that they did not know before? Or session highlights.
- Where are they confused / uncertain? Or session lowlights.
- What questions do they still have on this topic?

These types of questions provide insight into how the training has gone. Remember that as a facilitator, you need to reflect on the training...what worked and what didn't. A facilitator needs to be a **reflective practitioner**, always looking at how to develop the training to make a bigger impact.

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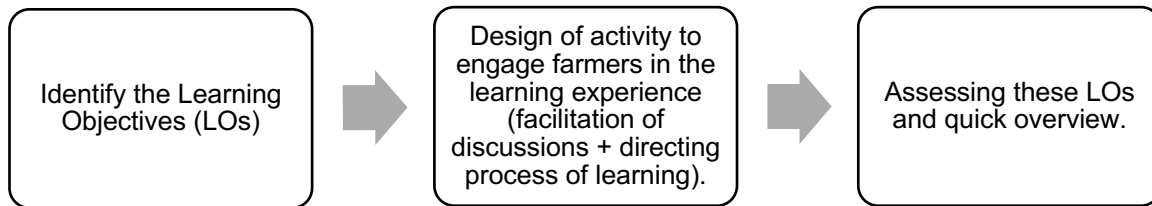
Annexure A

Use the following template to assist you when designing the learning experience of the participants.

Learning Design Template:

Topic to cover:

Date:



- 1) Identify the learning objectives (LOs): Describe or identify what the farmer is expected to achieve when performing.

- 2) Determine the activity/ task or set of activities that will allow the farmer to engage with the necessary learning.

3) How do you measure these LOs? And if these LOs have not been achieved, how do you close the gap?

It is important to understand the intended outcomes to the topic to design an effective learning experience. Remember to include the 4 principles of Adult Learning.



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