

MILK COLLECTION, TRANSPORTATION AND MARKETING BUSINESS

TRAINING COURSE FOR YOUTH AGRI-ENTREPRENEURS

Ethiopian Agricultural Transformation Institute



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OVERVIEW OF THE MODULE

This training module is prepared for organized youth groups that are expected to be engaged in milk collection and transport service businesses. Milk collection is one of the first activities of milk collector's groups. Milk should be collected within two hours of milking. Once the milk from different areas is collected in a central location, the milk can be processed or transported to processing centers or markets. Cooling milk immediately after milking keeps bacteria from multiplying rapidly. Therefore, holding milk at temperatures below 4 °C and above freezing maintains its excellent quality until it is processed for milk or manufactured into dairy products. Each degree in temperature above 4 °C elevates bacteria counts and decreases the shelf life of finished products. Temperature control and proper milk transportation are necessary for clean milk production and high-quality dairy products. Each section in this training module has its own overview of the section, learning outcomes, time required and learning questions, post assessment questions and key messages. The methodology to deliver this training will be in the form of a lecture, PowerPoint, pictorial presentation, and practical demonstration. To complete this module, a total of three days (one day for the theoretical part and two days for the practical part) are required. In addition to the soft skills, the youth will be introduced and familiarized with materials and methods used to start and run the milk collection and transportation business and how to handle and operate equipment during the production process. The technical skill sections of this module cover site selection for milk collection center establishment, factors affecting milk quality, hygienic milk handling, milk collection, storage, cooling, and transportation procedures, the different milk testing methods and record keeping. Lastly, the module also incorporates the marketing and feasibility study, potential risks and mitigation strategies that might arise during implementation of the business.

The Agriculture-focused Dignified Employment for Youth (ADEY) program is implemented by the Ethiopian Agricultural Transformation Institute in partnership with the Mastercard Foundation to enable 611,343 inclusive and dignified work opportunities for young women and men and support youth entrepreneurship, employability, and sustainable livelihoods in the agribusiness sector.

INTRODUCTION

Milk collection is one of the first activities of milk producers and/or collector's groups. Milk should be collected within two hours of milking. Once the milk from several areas is collected in a central location, the milk can be processed or transported to processing centers or markets. Cooling milk immediately after milking keeps bacteria from multiplying rapidly. Holding milk at temperatures below 4 °C and above freezing maintains its excellent quality until it is processed for milk or manufactured into dairy products. Each degree in temperature above 4 °C elevates bacteria counts and decreases the shelf life of finished products. Temperature control and clean milk are necessary to produce high-quality dairy products.

Milk can be transported in a variety of methods, such as by truck, bicycle, animal, or foot. To minimize the expense of transportation, the collector must choose the best method for delivering milk. One benefit of using small containers for milk transportation is that poor milk does not get combined with good quality milk. Milk should always be transported as quickly as possible from the farm to the factory, collection center, or processing center to avoid spoiling. Therefore, this training module is prepared to teach the youth group/s (male and female) organized in the collection, cooling, and transportation of milk as microenterprises business to enhance their technical capacity. Once the youth group/enterprise is capacitated with theoretical and practical skills, the physical capacity (inputs required and materials needed) needs special consideration to start the intended business venture.

Training Methodology

Target approach: This training module will be delivered to the youth group/s in the form of lecture, power point, pictorial presentation, practical demonstration and self-education.

Training materials: Marker, notebook, pen, flipcharts, laptop, LCD

Total time required: 3 days

Training Participants

Any interested youth group, MSME, farmer with minimum literacy level who can read and write can take this training and get engaged in the business.

SECTION 1: SITE SELECTION FOR MILK COLLECTION CENTER ESTABLISHMENT

Section Overview

This section provides an understanding about the site selection process for milk Collection centers establishment. Each important point to be considered in selecting the proper milk collection center is incorporated in this section.



Learning Outcomes

At the end of this training section the trainees:

- Understand points to be considered in selecting the ideal site for milk collection center establishment.



Time required

To cover this section of the training module 30 minutes is required.



Learning question

- What are the basic requirements for milk collection center establishment?
- What is the importance of reliable supply of clean water for milk collection center establishment?

1.1 SITE SELECTION

In selecting the ideal site for milk collection center, one must consider the following points:

- Ensure the reliable supply of clean water
- The collection site should be close to the road
- Accessible for all milk transport vehicles/facilities
- • Good drainage

- Easy to construct a building or a shade if needed
- The area should not be dusty
- Preferably, there should be electricity.
- If the youth plan to process the milk in the future, you might want to select a site that can also be used as a site for a processing center. In this case it is essential that electricity/solar power source are available.

1.2 CONSTRUCTING A COLLECTION CENTER

Whether you are going to construct a building, or a shade depends on the funds available. An open shade is often sufficient for collecting the milk, simple testing and transporting to the processing center. If you want to construct a building, it is best if the floor is a hard washable surface. If one plans to expand its activities in the future and wants to include milk processing, it might want to construct a building that can also be used for this purpose.

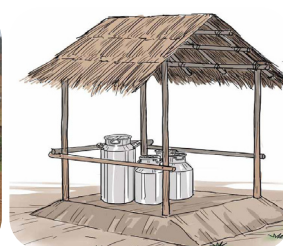


Figure 1. Different types of houses for milk collection made of locally available construction materials



Post assessment questions

1. What are the factors to be considered in selecting the site for milk collection center establishment?
2. What is the importance of drainage in selecting the site for milk collection?



Key message

- Proper site selection for milk collection center establishment is necessary to maintain milk quality.

SECTION 2: MILK QUALITY AND HYGIENIC MILK HANDLING

Overview of the section

This section provides a brief understanding about the different factors that affect milk quality, hygienic milk handling, the different milk testing methods, the steps to follow in cleaning and disinfection of milk equipment.



Learning outcome

At the end of this training section the trainees:

- Understand the different factors that affect milk quality.
- Understand how to handle milk hygienically.
- Know how to perform the different milk quality tests.

Time required

To cover this section of the training module a total of 3 hr. (1 hr. theoretical and 2 hr. practical) is required.



Learning question

1. What are the major factors that affect milk quality?
2. Explain the different milk quality test methods?
3. What are the procedures to follow in cleaning and disinfecting milk equipment?

2.1 MILK QUALITY

Milk quality is influenced by various factors beyond temperature management alone. Maintaining the right temperature is crucial though other factors play significant roles in determining the freshness and

nutritional value of milk. These factors include:

- **Hygiene Practices:** The cleanliness of milking equipment, storage tanks, and milking transport equipment directly impacts milk quality. Poor hygiene can introduce contaminants and bacteria, compromising the safety and purity of the milk.
- **Cow Health and Nutrition:** The health and diet of dairy cows greatly affect the composition and quality of milk. Proper nutrition ensures the production of milk with optimal fat, protein, and vitamin content, enhancing its nutritional value.
- **Milking Techniques:** The method and frequency of milking can influence milk quality. Improper milking techniques or prolonged intervals between milkings can lead to udder infections, which can contaminate the milk and affect its quality.
- **Storage Conditions:** Apart from temperature, the conditions in which milk is stored, such as light exposure and ventilation, can impact its quality. Properly insulated storage tanks and facilities help maintain the freshness and flavor of milk.
- **Water Quality:** The quality of water used for cleaning equipment milk influences milk quality. Contaminated water can introduce harmful bacteria and impurities into the milk, affecting its safety and taste.

2.2 HYGIENIC MILK HANDLING

What causes milk spoilage?

- Milk is very rich in nutrients. Because of this, the bacteria that cause spoilage can grow very quickly in milk.
- If milk is stored at high temperatures for a long time then the bacteria will grow and divide very fast and soon the milk will have a very high number of bacteria and thus get spoilt quickly.
- If the milk had a high number of bacteria to begin with then it will get spoilt in a very short time.

2.3 MILK TESTING METHODS

- During testing, only a small amount i.e. 5 ml (sample) of milk from each container is collected.
- If the sample doesn't pass the test, the milk from that container should not be accepted.
- Thus, you should advise the farmer to always handle milk in accordance with good hygienic practice.

- You can check whether the milk you collect is of good quality by carrying out one or more of the following tests:

2.3.1 ORGANOLEPTIC TEST

This test is performed first and involves using the senses to assess the milk with regard to its smell, appearance and color. This test is quick and cheap to carry out, allowing for segregation of poor-quality milk. No equipment is required, but you should have a good sense of sight and smell, in addition to experience. Milk that cannot be adequately judged in this way is subjected to tests that are more objective. But doesn't mean that this test is the only and adequate testing method.

Procedures

- Open a can of milk to inspect
- Immediately smell the milk and establish the nature and intensity of smell, if any.
- Do not accept the milk if it smells slightly sour or has foreign odors like paint or paraffin.
- Observe the color of milk.
- Deviation from the normal yellowish-white color indicates damage to the udder (reddish-blood, or yellow- pus).
- Check for any foreign bodies or physical dirt which may indicate that the milking and handling were not done hygienically.
- Touch the milk container to feel whether it is warm or cold. This indicates how long milk has taken since milking (if not chilled thereafter) and will influence the lactometer test for adulteration.



Figure 2. Organoleptic test

2.3.2 CLOT-ON-BOILING TEST

- This test is quick and simple.
- It allows for detection of milk that has been kept for too long without cooling and has developed high acidity, or colostrum milk that has a very high percentage of protein.
- Such milk does not withstand heat treatment hence this test could be positive at a much lower acidity.

Procedures

- Boil a small amount of milk for a few seconds in a spoon or other suitable container.
- Observe immediately for clotting.
- The milk will be rejected if there is visible clotting, coagulation or precipitation.

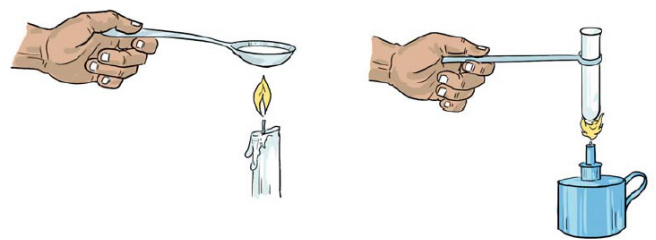


Figure 3. Clot on boiling test

2.3.3 ALCOHOL TEST

- The test is quick and simple.
- The specific type of alcohol used is known as "ethanol".
- This test is more sensitive to lower levels of acidity and can therefore detect bad milk that may have passed the previous tests.
- It also detects milk that has kept for long without cooling, colostrum or milk from a cow with mastitis.
- Because this test is quite sensitive, milk that passes this test can keep for some hours (at least two hours) before it goes bad.

Procedures

- Use a syringe to draw equal amounts of milk and 70% alcohol solution into a small tube or glass cup.
- Mix 2 ml milk with 2 ml 70% alcohol and observe for clotting or coagulation.
- If the tested milk sample coagulates, clots or precipitates, the milk will be rejected.

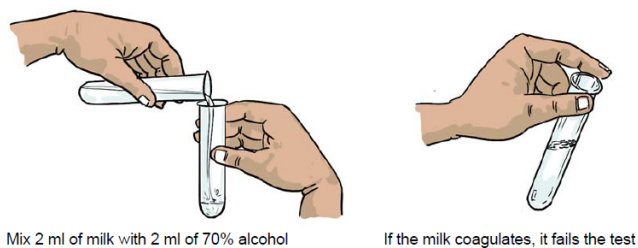


Figure 4. Alcohol Test

2.3.4 LACTOMETER TEST

- Some unscrupulous milk suppliers adulterate milk with added water to increase the volume or added solids to make it look thicker.
- Addition of anything to milk can introduce bacteria that will make it spoil quickly.
- Adulteration of milk is cheating from the buyer of that milk and is therefore illegal.
- The lactometer test is used to determine if the milk has been adulterated with added water or solids.
- This 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 decreases.
- The equipment used to measure 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).

Procedures

- Leave the milk to cool at room temperature for at least 30 minutes and ensure its temperature is about 20°C.
- Stir the milk sample and pour it gently into a 200 ml measuring cylinder or any container deeper than the length of the lactometer.
- Let the lactometer sink slowly into the milk.
- Take the lactometer reading just above the surface of the milk.

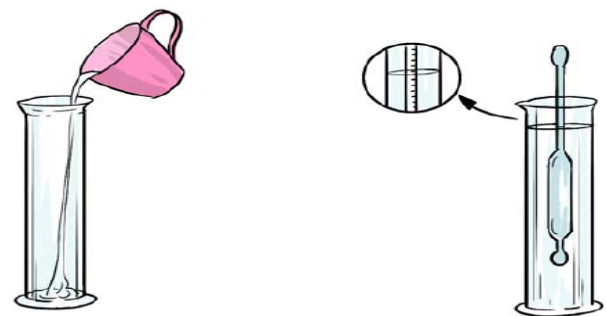


Figure 5. Lactometer test

If the temperature of the milk is different from the lactometer calibration temperature (20°C), then use this correction factor:

- For each °C above the calibration temperature, add 0.2 lactometer “degrees” (°L) to the observed lactometer reading.
- For each °C below calibration temperature, subtract 0.2 lactometer “degrees” (°L) from the observed lactometer reading.
- Note: These calculations are done on the lactometer readings (e.g. 29 instead of the true density of 1.029 g/ml)
- Examples of how to calculate the true lactometer readings when the milk temperature differs from the calibration temperature of 20°C

MILK TEMP °C	OBSERVED LACTOMETER READING °L	CORRECTION °L	TRUE LACTOMETER READING °L	TRUE DENSITY G/ML
17	30.6	-0.6	30.0	1.030
20	30.0	Nil	30.0	1.030
23	29.4	+0.6	30.0	1.030

If the milk is normal, its lactometer reading will be between 26 and 32. If the lactometer reading is below 26 or above 32, the milk will be rejected because it means that it has been adulterated with added water or solids.

2.4 CLEANING AND DISINFECTION OF MILK EQUIPMENT

Immediately cans are emptied of milk, and they should be cleaned as follows:

- Rinse with cold water.
- Scrubbing with brush and warm detergent (any unperfumed liquid soap will do).
- Sterilize (sanitize) with boiling water or steam if available or use dairy sanitizing solution such as hypochlorite or commercial brand preparations in accordance with manufacturer's instructions.
- Dry the cans on a drying rack.
- Exposure to sunlight will enhance killing off bacteria during drip drying of cans.

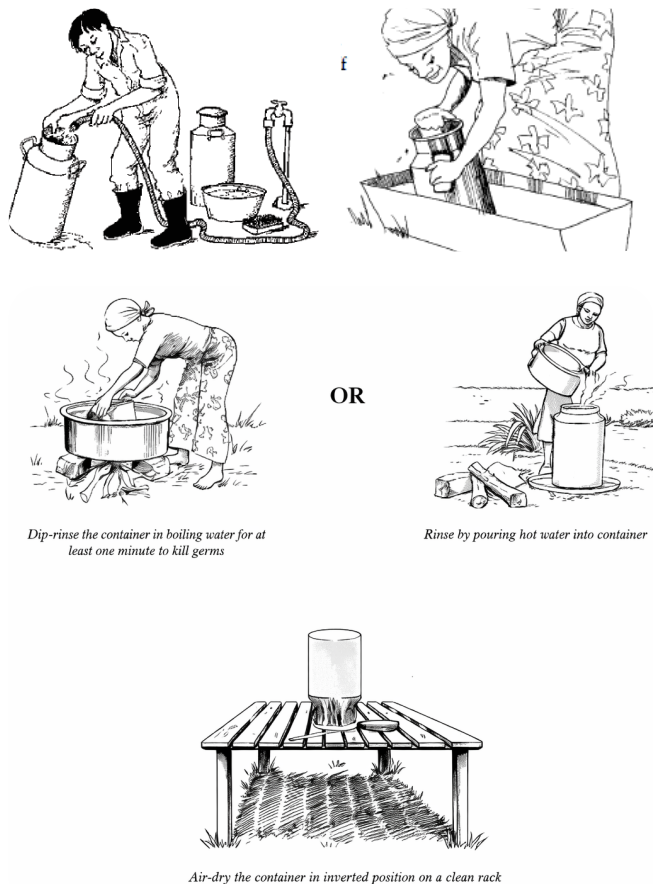


Figure 6. Cleaning and disinfecting milk equipment



Post assessment questions

1. Explain the different factors affecting milk quality?
2. Explain step by step procedure of clot-on-boiling test method?
3. Explain how to perform the lactometer test?
4. Explain the procedures to follow in cleaning and disinfecting milk equipment?



Key message

As milk is a perishable product, performing milk quality test is necessary to have good quality dairy products.

SECTION 3: MILK COLLECTION, STORAGE, COOLING AND TRANSPORTATION PROCEDURES

Overview of the section

This section highlights about the general guideline to follow during milk collection, storage, cooling and transportation. It also gives insight on the milk cooling mechanisms, the different type and factors to be considered in selecting milk transport types.



Learning Outcomes

At the end of this training section the trainees:

- Understand the basic procedures and routine activities implemented during milk collection time
- Apply the basic principles and procedures of milk cooling
- Apply the basic practices during milk transportation
- Able to handle the materials used for milk collection, cooling and transportation purpose

Time required

This section of the training module requires a total of 3 hours (1 hour for theoretical session and 2 hours for practical session)



Learning question

- What are the general guidelines to follow during milk collection, cooling and transportation?
- What are the different ways to transport the milk from production site and collection center to the processing units?

3.1 GENERAL GUIDELINES DURING COLLECTION, COOLING AND TRANSPORTATION

- Always handle milk in clean metal containers. (aluminum, stainless steel or food grade plastic)
- When transferring milk between containers, pour the milk instead of scooping.
- Scooping may introduce spoilage bacteria.
- Do not store milk at high temperatures.
- Avoid keeping milk for a long time before it is delivered to the milk collection point or processing factory.
- Do not handle milk if you are sick. Seek medical treatment and resume your work only when the doctor says you are fit to do so.



Scooping milk



Pouring milk

Figure 7. Wrong (left) and right (right) milk collection procedures

3.2 MILK COLLECTION

- Always use certified food grade containers, e.g. aluminum, stainless steel or food grade plastic jerry cans designed for single use only.
- Metal containers are preferable because they are easy to clean and sterilize.
- Do not store milk in plastic jerry cans that previously contained paint, herbicides and other

chemicals because traces of these substances can taint your milk.

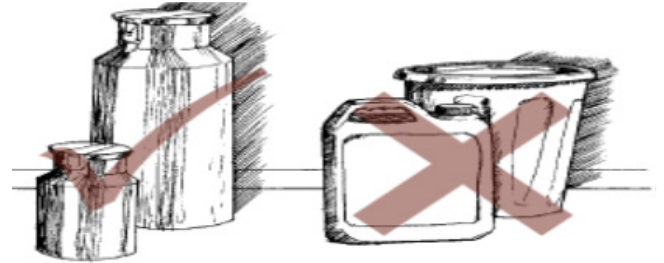


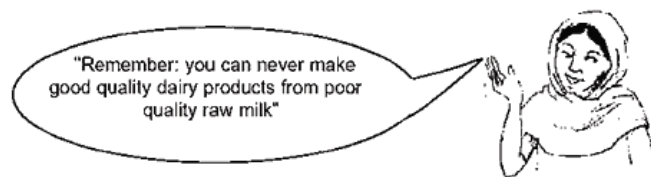
Figure 8. Demonstration of procedures in milk collection

3.3 MILK STORAGE AND COOLING PROCEDURES

3.3.1 MILK STORAGE

Proper milk storage and cooling can be obtained by following the 3C principles; cool, clean and covered. Some of the points that the youth should know to maintain good quality of milk during storage and transportation and avoid losses due to spoilage are:

- All containers used for storing milk should be clean and made of food-grade material like stainless steel or aluminum.
- These are also easy to clean and disinfect.
- The houses used for storing milk should be clean, pest-free, well-ventilated with adequate lighting, and protected from dust, rain and direct sunlight.
- Milk should not be stored in the same room with agricultural produce (e.g. onions) or chemicals like paint or paraffin, which can taint the milk with off odours.
- Transport milk as quickly as possible.
- Delays in transporting milk to a cooling center or processing factory can cause even good quality milk to spoil.
- Milk should reach a milk cooling center or processing factory within four hours after milking.



- Store the milk without chemicals in a lockable cool and clean place.
- Do not mix warm milk with cool milk; deliver the milk to the collection center separately or cool the warm milk before mixing.

3.3.2 MILK COOLING

Cooling the milk slows down the growth and activity of germs and hence prevents spoilage. Milk can be cooled through:

- Keeping under a shade
- Dipping the containers with milk in a cold water bath
- Keeping the milk in a refrigerator
- Using a charcoal cooler
- Using cooling rings: if cool (10°C or less) running water is available, you can pass it through a perforated ring so that it flows over the cans
- Using an electrical cooling tank. When cooling milk, loosen the lids of the cans to allow the air to escape, and make sure no water gets into the milk.
- Cover the cooling tank with a lid to protect the milk from insects and dust.

3.4 MILK TRANSPORTATION

- There are different ways to transport the milk from production site and collection center to the processing units; this could be by truck, bicycle, animal or foot according to the local standards if any.
- The youth has to decide on the most appropriate way to transport milk in order to keep the transport costs as low as possible.
- The advantage of transporting milk in small containers is that poor quality milk is not mixed with good.
- Milk transport from the farm to the collection center, processing unit or factory should always be as quick as possible to prevent spoilage of the milk.
- Hygienic milk transport is also important.
- Clean the containers used for transporting every time

3.4.1 SELECTION OF TRANSPORTATION TYPES

The following factors are considered in selection of a suitable, efficient and economic transportation types:

- **Location:** In hilly areas where roads are not developed, small quantity of milk can be carried out on head for short distance and on shoulder sling for comparatively longer distance and larger quantity.
- **Volume of milk:** For small quantity and short distance head load, shoulder sling, cycle, etc.; for moderate quantities and longer distance motorcycle, cart, etc. can be used. If the quantity of milk is large, milk in cans on truck can be used.
- **Cost of transportation:** Cost of transportation should be kept at minimum level by selecting a suitable transport of optimum size and capacity taking into consideration the quantity of milk to be transported, type of vehicles available, road condition and time involved.
- **Distance of transport:** Depending upon the distance of transport and quantity of milk, most economic type of transport system is selected.
- **Condition of road:** Condition of road such as dusty, narrow, broken, having sharp turnings, congestion etc. are also taken into account in selecting a suitable transportation mechanism for milk transportation.
- **Own vs. hired:** Having own transportation system is too expensive and highly cumbersome. Hired transport facilities are very effective and relieve the management from several problems. It is economical because of no or low investment and maintenance expenses of the vehicle. The youth can make an agreement with the owner of the vehicle regarding rate, mode and interval of payment, spoilage of milk, accidents, and change in the quality due to any fault on his part.
- **Keep full containers:** to avoid agitation and formation of butter grains. Etc.

3.4.2 TYPES OF MILK TRANSPORTATION FACILITIES

- **Head load:** Carry milk on head to nearby collection/ chilling/processing point. This is being practiced in villages to carry small quantity (3 to 25 liters) of milk for short distances (3-8 km) to the collection point, especially in hilly areas where there is no development of road.



- **Shoulder sling:** this is restricted to hilly areas or other areas where no other means of transport is easily available. When the milk is slightly more (20 to 40 liters) and conveniently cannot be carried on head, for little more distance (5 to 10 Km).



- **Pack animal:** horses and donkeys are usually employed to carry 40 to 80 Kg to a distance of 5 to 10 Km.



- **Horse/donkey cart:** It is faster than head load and shoulder sling, but it needs road to ply on and carries comparatively high load (200-250 Kg) for more distances (10-15 Km).



- **Bicycles:** bicycles are commonly and conveniently used to carry milk to the collection centers, and chilling/processing points. It is faster, more convenient and easily accessible to milk producers/consumers home. About 40 litres of milk for a distance of about 10- 15 Km can easily be transported.



- **Motorcycle:** Still heavier duty than bicycle and can be taken to cover more than 15 Km and carry more than 100Kg of milk in very short time.



- **Trucks:** trucks carry milk in cans and bulk tanks to a load of 0.5 to 3.5 tons for more than 100 Km. With the improvement in road facilities and construction of all season roads, motor trucks have been found most effective means of transportation.



3.5 INPUT REQUIRED

Materials Used for Milk Collection, Storage and Cooling Purposes

S.N	EQUIPMENT	DESCRIPTION
1.	Milk strainer 	The purpose of a strainer is to remove larger, unwanted suspended particles from a liquid, primarily to protect downstream equipment, like pumps, from damage. Milk filtration that is done on-farm may also use a mechanical filter to remove any solid particles from the raw milk
2.	Milk cans 	The purpose of a milk can is to provide a secure and hygienic container for storing and transporting milk, commonly used in the collection of milk from farms to dairy processing facilities
3.	Stainless steel milk collection tray 	Stainless steel milk collection tray is very useful for the collection of milk, during milk testing phase
4.	Milk Buckets 	Milk bucket is the right equipment for storing or transport during dairy processes.
5.	Milk Measures 	Used to measure the amount of milk produced or collected
6.	Milk sample bottle 	Used for proper milk sample collection for identification of mastitis and/ other pathogens.

7.	Sample bottle stand 	Sample bottle stand allows easy management of sample bottles.
8.	Milk Lactometer jar 	Used to determine purity of the milk.
9.	70 % alcohol 	To detects milk that has kept for long without cooling, colostrum or milk from a cow with mastitis
10.	Conventional refrigerator for small amounts of milk 	To keep milk cold. Cold temperatures help food stay fresh longer.
11.	Conventional refrigerator for small amounts of milk 	It is a storage chamber that is used to keep perishable commodities without the need of electricity. The chamber works on the principle of evaporative cooling.



Post assessment questions

1. Explain the general guidelines to follow during milk collection, storage, cooling and transportation?
2. What are the factors to be considered in selecting suitable transportation types?
3. What is the importance of milk cooling and explain the different milk cooling mechanisms?
4. What are the commonly used equipment to collect milk?



Key message

Hygienic and proper milk collection, storage, and transportation is crucial for maintaining milk quality & subsequent dairy products.

SECTION 4: RECORD KEEPING

- Milk recording is the process of making measurements of the milk yield collected every day for monitoring the profitability of the enterprise.
- Records during milk collection (amount of milk collected during morning and evening, transport cost (if any), fuel cost, labor cost, cost of milk (if on daily bases) etc.)
- Records during milk storage (amount of milk stored/cooled, labor cost, cost of milk (if on daily bases) etc.)
- Records during milk transportation (amount of milk transported, fuel cost, labor cost, cost of milk (if on daily bases) etc.)

The sample record keeping templates for milk collection and transport businesses is annexed in the annex part of this training module.

SECTION 5: FINANCIAL FEASIBILITY

Overview of this section

Financial feasibility describes whether agri-business is financially viable. It involves determining initial investment (resource) requirement to start the business, estimating production cost, operation expenses, and sales revenue. These are used to determine the initial investment requirement, profitability of the business, break-even point (minimum level of production) to attain the profit zone, and pay-back period (number of years required to recover initial investment). These series procedures are used to make wise decisions to accept or reject the agribusiness investment alternative. collection and transport businesses is annexed in the annex part of this training module.



Learning Outcomes

At the end of this section the trainees equip on:

- How to determine initial investment requirement to start the business
- How to estimate periodical production costs, operating expenses, and sales revenue of the business
- How to determine profitability and cash flow of the business
- How to calculate break-even point (minimum level of production) to recover total cost and generate profit.
- How to calculate payback period (time requirement to recover initial investment and
- How to make decision to accept or reject the investment alternative



Time required: 4 hours



Learning question

- Do you know how to determine financial feasibility of the given specific agri-business to make wise investment decision?

5.1 INITIAL INVESTMENT

- Initial investment is the minimum capital requirement to start the business.
- Example of initial investment requirement to start milk collection, cold chain and transportation business includes tools and equipment, refrigerator, milk cans, milk collection room, transport vehicle, working capital, etc.

DESCRIPTION	TOTAL COST	REMARK
Tools and equipment		
Refrigerator		
Milk cans		
Lactometer		
Milk collection room		
Transport vehicle		
Working capital		
Etc.		
Total		

Table 1: Template to estimate initial investment requirement for milk collection, cold chain and transportation agri-business

5.1.1 LONG-TERM INVESTMENT

- Long-term investment in agri-business involves all asset requirements for the business which can serve for more than one year.
 - Example tools and equipment, vehicle, refrigerator, milk collection room, etc.

TYPES OF INVESTMENT	UNIT OF MEASUREMENT	QUANTITY	UNIT COST	TOTAL COST

Table 2: Template to calculate total cost for acquisition of long-term investment

5.1.2 WORKING CAPITAL



- Working capital for the planned agri-business includes all payments requirement for day-to-day operating activities such as production costs and operating expenses.

Example

- Production costs include cost of milk, fuel, packaging material, labor cost etc.
- Operating expenses includes administrative salary, sales commission, promotion, etc.
- Working capital excludes long term investments such as warehouse, tools and equipment, vehicle, and etc.

A. Production cost

- Production costs are a key component in agri-business.
- It includes all costs associated with production including value addition to make the product ready for sale.

TYPE OF COSTS	UNIT OF MEASUREMENT	QUANTITY	UNIT COST	TOTAL COST
Milk	Litter			
Chemical for milk quality test	Kilogram or liter			
detergents	Kg/ltr			
water	Lt			
Fuel cost	Liter			
Labor cost	Person			
Packaging	Kg			
Loading and unloading	kg			
Transporting	km			
Collection center if rental/month	Number			
Total				

Table 3: Template for estimating production cost

B. Operating expenses

- Operating expenses are all costs not directly associated with production.
- They are common costs incurred for administrative and selling activities

- Example administrative salary, promotion cost, sales commission, transport cost to sale, water and electricity charge, etc

TYPES OF COSTS	TOTAL COST
Administrative salary	
Utility (electric, water, telecom.)	
Interest	
Promotion	
Sales commission	
Tax	
Etc...	

Table 4: Template to estimate operating expenses for agri-business

5.2 ESTIMATED PRODUCTION AND SALE REVENUE

- Production volume is the main source of revenue for the agri-business to generate profit.
- Producers should determine the estimated average production volume from the planned production season.

Formula -1

Total production volume = Average production per hectare X Land size (ha)

- After determining the estimated volume of production, it is possible to determine the expected sales revenue for the planned production.

Formula -2

Total sales revenue = Total production volume X unit selling price



5.3 PROFIT AND LOSS STATEMENT

- The primary objective of any business is to generate profit.
- Profit and loss statement is the main tool to calculate profitability of the business.
- It is used to accept or reject the investment based on estimated profit.

Formula -3

- Gross profit = Total sales revenue – Cost of goods sold
- Net profit = Gross profit – Total operating expenses

DESCRIPTION		
Sales Revenue		
• Sale of milk		
Total Sales revenue		
Costs of goods sold		
• Milk collection cost		
• Milk packaging cost		
• Ending inventory		
Cost of goods sold		
Gross profit		
Operating Expenses		
Salary if any		
Utility (electric, water, telecom, sewage disposal.)		
Interest		
Promotion		
Depreciation		
Tax if any		
Total operating expense		
Net profit		

Table 5: Template for profit and loss statement preparation

5.4 BALANCE SHEET

Balance sheet used to know the total resource owned, amount of claim by creditors and amount of owners' equity

- Balance sheet contains asset, liability, and own capital
- Assets are all resources available for use or for sale
 - Example cash, inventory, warehouse, land, equipment etc
- Liabilities are all debts obtained from bank, microfinances, individuals or others
- Own equity/capital involves own/member contribution, grant/donation, etc

Formula -4

Total Asset = Total liability + Total own capital

DESCRIPTION		
Asset		
Current asset		
Cash		
Inventory		
Total current asset		
Fixed asset		
Tools and equipment		
Warehouse		
Total fixed asset		
Total asset		
Liability and Capital		
Liability		
Bank loan		
Debt from relative		
Total liability		
Owners capital		
Own capital contribution		
Grant/donation		
Total owners' capital		
Total liability and capital		

Table 6: Template for balance sheet preparation

5.5 CASH FLOW STATEMENT

Cash flow is all cash inflow and outflow for any purpose in the business operation

Example:

- Cash inflows include sale of milk, debt obtained from banks, members' capital contribution, etc.
- Cash out flow includes purchase of input, payment

for construction, repayment of debt, payment for salary, etc.

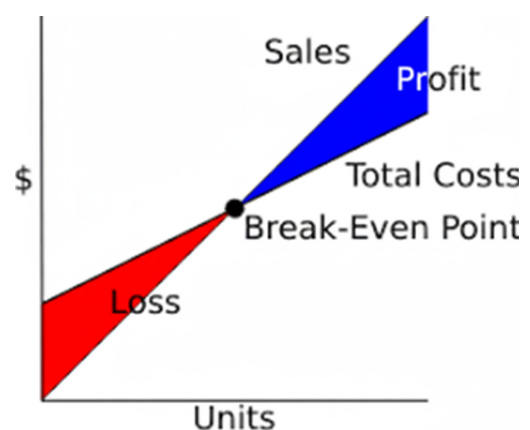
Formula -5

Beginning cash balance + total cash inflow = ending cash balance + total cash out flow

DESCRIPTION	AMOUNT OF OUTFLOW	AMOUNT OF INFLOW
Owners' investment		
Debt		
Grant		
Sale of milk		
Warehouse construction cost		
Purchase of equipment		
Purchase of input		
Milk collection room rent		
Labor cost		
Cash Operating costs		
Ending cash balance		
Total		

Table 7: Template for cash flow statement preparation

5.6 BREAK EVEN ANALYSIS



- Break even analysis is used to determine the minimum level of production to cover total cost
- At break-even point no profit no loss
- To make profit, level of production and sale should exceed/greater than breakeven point.
- Fixed costs are fixed in total amount regardless of increase/decrease in volume of production.
 - Example depreciation, warehouse rent,

administrative salary, promotion cost, etc

- Variable costs varied in total in response to increase/decrease in level of production
 - Example production costs, packaging cost, loading and unloading, etc

Formula -6

Break-even point = Fixed cost / (Unit selling price – unit Variable cost)

5.7 PAYBACK PERIOD



The payback period is used to determine number of years/periods it takes to recover initial investment.

Formula -7

- a. When the annual profit of the business is uniform/equal
Payback period = Initial investment / annual profit
- b. When the annual profit fluctuate/vary from year to year
Payback period = # of year before coverage + uncovered amount / profit of the next year



Post assessment questions

- Which of the following is part of working capital
 - Purchase of packaging material
 - Purchase of vehicle
 - Transportation cost
 - Purchase of chemical
- Which of the following should include in profit/loss statement
 - Purchase of tools and equipment
 - Sales revenue
 - Debt
 - Owner investment
- Which of the following is variable cost
 - Purchase of milk
 - Administrative salary
 - Depreciation
 - Rent of storage



Key message

- Analyzing financial feasibility of agribusiness enables to pre-determine the applicability of the business in terms of initial investment requirement, profitability, and sustainability.

Potential risks and Mitigation strategies

The following are some of but not limited the potential risks that may occur during implementation of milk collection, cold chain and transportation agri-business and its respective mitigation strategies.

S. NO.	POSSIBLE RISKS	RISK RESPONSE
1	Lack of experience of the youth group in this particular business management	Continues supervision and guidance from respective government/non-government offices is required until the youth can manage their business by themselves
2	Price fluctuation of inputs and outputs	Product/service diversification
3	Market computations from other groups	Minimize profit margin and focus on long term productivity and sustainability of their business
4	Security issue of the country	Subsidies in case of such risk happened

Annex

Record keeping format/sheet

DAY & DATE	TIME	KG MILK COLLECTED	TOTAL AMOUNT COLLECTED	DENSITY READING	FAT %	PRICE BUY/ LT	SALE/ LT	REMARK
Monday	AM							
	PM							
Tuesday	AM							
	PM							
Wednesday	AM							
	PM							
Thursday	AM							
	PM							
Friday	AM							
	PM							
Saturday	AM							
	PM							
Sunday	AM							

