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Participant Handbook

Sector
AGRICULTURE AND ALLIED

Sub-Sector
Agriculture Allied Activities

Occupation
Dairy Farm Management

Reference ID: **AGR/Q4101, Version 1.0**
NSQF Level 4

Dairy Farmer

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> Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.

Shri Narendra Modi
Prime Minister of India

Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

AGRICULTURE SECTOR SKILL COUNCIL

for

SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**Dairy Farmer/Entrepreneur**' QP No. '**AGR/ Q4101 NSQF Level 4**'

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It is expected that this publication would meet the complete requirements of QP/NOS based training delivery, we welcome the suggestions from users, Industry experts and other stakeholders for any improvement in future.

About this book

A Dairy Farmer / Entrepreneur is a person who is responsible for various activities involved in dairy farm management. Various decisions pertaining to the viability and sustainability of the dairy farm is taken by the Dairy farmer. He / She ensures proper care of dairy animals, their health and productivity, milking and marketing of the produced milk. The job is to be performed in an efficient manner to allow the production of high quality milk and promote animal well being and comfort. The individual should also be able to demonstrate skills of using various tools and keep records as required. The trainee will enhance his/her knowledge under the guidance of the trainer in the following skills:

- **Knowledge and Understanding**: Adequate operational knowledge and understanding to perform the required task
- **Performance Criteria**: Gain the required skills through hands on training and perform the required operations within the specified standards
- **Professional Skills**: Ability to make operational decisions pertaining to the area of work.

The handbook incorporates well-defined roles of Dairy Farmer like preparation of accommodation for livestock, Feed and water for livestock, forage conservation, entrepreneurship, health & safety at the work place etc. The Dairy Farmer / Entrepreneur should work independently, and has the ability to make various strategic and operational decisions pertaining to his / her area of work. The individual should have clarity and should be result oriented. The individual should also be able to demonstrate skills to use various tools.

We wishes all the best for your future in the Dairy Farming Sector

Symbols Used


Key Learning Outcomes


Steps


Time


Tips


Notes


Unit Objectives


Exercise

Table of Contents

The book on New Employability Skills is available at the following location: https://eskillindia.org/Home/handbook/NewEmployability

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
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1.Introduction

Unit 1.1 – General Instructions
Unit 1.2 – Selection of cattle

Key Learning Outcomes

At the end of this module, you will be able to:

- Understand the roles and responsibilities of a Dairy Farmer
- Understand the breeds of cattles
- Select the Cattle for Dairy farming

UNIT 1.1: Introduction

Unit Objectives

At the end of this unit, you will be able to:

- Understand the roles and responsibilities of a Dairy Farmer
- Understand the breeds of cattles

1.1.1 General instructions to Participants

- Greet your instructors and the other participants when you enter the class
- Always be punctual for every class
- Be regular. Candidates who fall short of the required attendance will not be certified.
- Inform your instructor if, for any reason, you need to miss class.
- Pay attention to what your instructor is saying or showing.
- If you do not understand something, put up your hand and seek clarification.
- Make sure you do all the exercises at the end of each module in this book. It will help you understand the concepts better.
- Practice any new skills you have learnt as many times as possible. Seek the help of your Trainer or co-participant for practice.
- Take all necessary precautions, as instructed by your Trainer, while working with electricity, tools and animals.
- Make sure you are neatly attired and presentable at all times.
- Make sureyou wear canvas shoes or rubber boots.
- Participate actively in all the activities, discussions and games during training.
- Always take bath, wear clean clothes and comb your hair before you come to class.
- The three most important words you must always remember and use in your daily conversation are PLEASE, THANKYOU and SORRY.

1.1.2 Understand the role of dairy farmer

Dairy farming is much more complex and needs to be managed scientifically. Dairy farmer managing a such dairy farm requires broad knowledgeable, wide variety of multi tasking skills and keen business acumen.

Duties and responsibilities of Dairy Farmer (Manager)

- Spend 50 percent of time in Management of the Dairy Herd and remaining time in supervising employees,
    - Ration preparation and feeding
    - Raising of replacements
    - Milking
    - Upkeep of facilities, grounds and equipment
    - Pasture management
    - Herd management
- Spend 30 percent of time in Herd Health and Reproduction.
    - Treat and care for sick animals
    - Help with difficult births
    - Heat detection
    - Breeding
    - Fill in for sick and vacationing employees
- Spend 20 percent of time in General Office Work and Procurement
    - Record keeping (herd health, production, reproduction inventories)
    - Monthly inventories
    - Order supplies, repair parts, feed

- Knowledge, Skills and Abilities Required:
    - Trained in artificial insemination
    - Knowledgeable of disease and injury treatment and calf pulling
    - Knowledgeable in dairy nutrition
    - Ability to motivate employees
    - Ability to communicate
    - Knowledge of milking procedures
    - Knowledge of and use for Dairy Herd Improvement Records

- **Duties and responsibilities of Feeder**

- Spend 70 percent to 80 percent work time to perform the duties of feeding and caring for all livestock.
- Keep the animal areas, lots and barns clean and free from manure and extraneous objects.
- Allow the production of a highquality product and promote animal well-being and comfort.

- Feeding Responsibilities:
    - Check all animals on a timely basis (three to four times per day) to be certain they are receiving adequate feed. Be certain clean water is available at all times.
    - Feed cows and calves in a timely manner
    - Be certain lots and barns are cleaned daily Routinely check freshening area and assist in birthing process.
    - Check all lots at least five times per day (dry cow, heifer and calf areas) to be certain cattle are not under stress due to weather conditions.
    - Maintain all equipment as prescribed by manufacturer's suggestions. Be certain all machinery is in working order. Notify manager immediately if any malfunctions occur.
    - Take any necessary feed or forage samples for nutrient testing as required by manager.
    - All pastures and fencing shall be maintained & repaired from time to time. ○All the equipment and tools to be maintained in an orderly manner so that they are readily available for use.
    - Treat sick animals and administer appropriate prescription drugs only when told by the manager.
    - Perform routine vaccinations under supervision of the manager.
    - Assist in any special projects or routine maintenance of farmstead in coordination with the manager

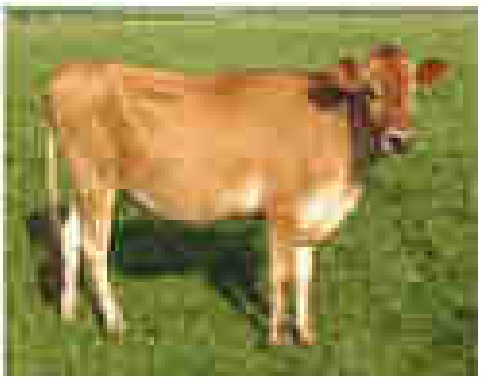
- **Duties and responsibilities of Milker**

- Spend 70 percent to 80 percent work time to perform the duties of milking and related activities for lactatingcows.
- Milking Responsibilities and Procedures:
    - Prepare milking equipment and bulk tank for milking.
    - Bring in cows for milking or help otheremployees bring in cows if needed or requested.
    - Wear gloves when milking to help prevent spread of mastitis-causing organisms.
    - Follow recommended pre-milking preparation of cattle before milking.
    - Milk all cows in an orderly, proper and consistent manner.
    - Be certain to look at treatment records so that milk from treated cows is not put into the bulk tank.
    - The treatment records should be checked to ensure that milk from treated cows is not put into the bulk tank.
    - The milking parlor, holding area and bulk tank room should be cleaned.
    - All milking equipment shall be operated as recommended by the manager and factory specifications.
    - After milking, be sure all machinery and sanitation procedures are followed according to manufacturer's specification and Grade A Standards of the Public Milk Ordinance.

- Milking Related Activities:
  - Help to get cattle in barn if necessary.
  - Maintain treatment records and identify treated cows with appropriate markers, such as leg bands, etc.
  - Assist in ordering supplies by making a list and bringing to the manager's attention any items in short supply.
  - If unable to be present at scheduled working hours, the manager must be given sufficient notice to arrange for a substitute milker.Clip udders, freeze brand and perform other procedures that promote accurate identification and animal well-being.
- Other Responsibilities (approximately 20 percent to 30 percent of daily work schedule) as Assigned by the Manager.
- These responsibilities may include, but are not limited to the following responsibilities:
  - Care of springers and cows at calving
  - Feeding and care of calves
  - Feeding, cleaning and care of milking herd
  - Maintenance of free-stalls
  - Heat detection, A.I.
  - Record keeping
  - Cleaning and maintenance of office building
  - Maintenance of grounds, pasture, fences
  - Maintenance of vacuum pumps

1.1.3 Cattle Crossbred

Female



Male

1.**Name**:Jersey Crossbred

2. Crossbred

3.**State**: All India

4.**Purpose**: Food – Milk:

5.**Milk yield per lactation(kg)**: 1749 - 2147

1.**Name**:Holstein Friesian Crossbred

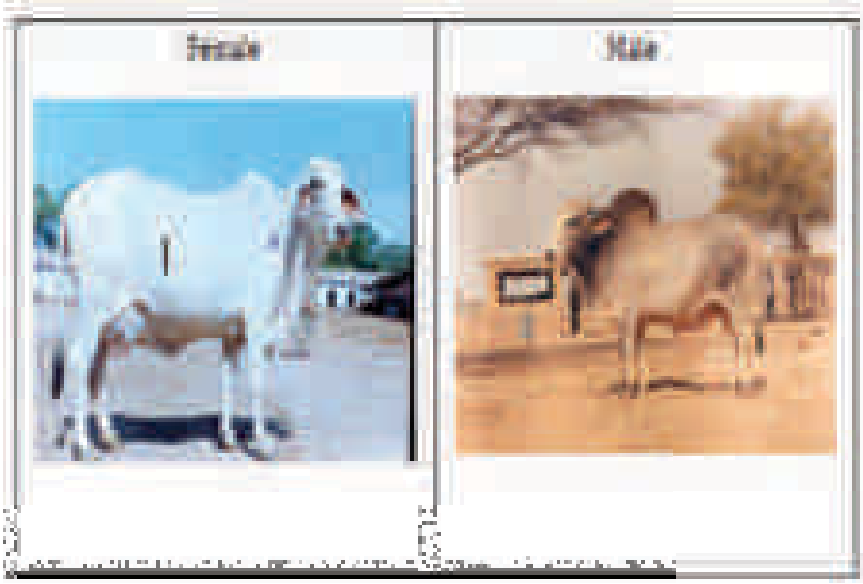
2. Crossbred

3.**State**: Hilly and Temperate regions (All India)

4.**Purpose**: Food – Milk:

5.**Milk yield per lactation(kg)**: 3000 - 3500

Cattle



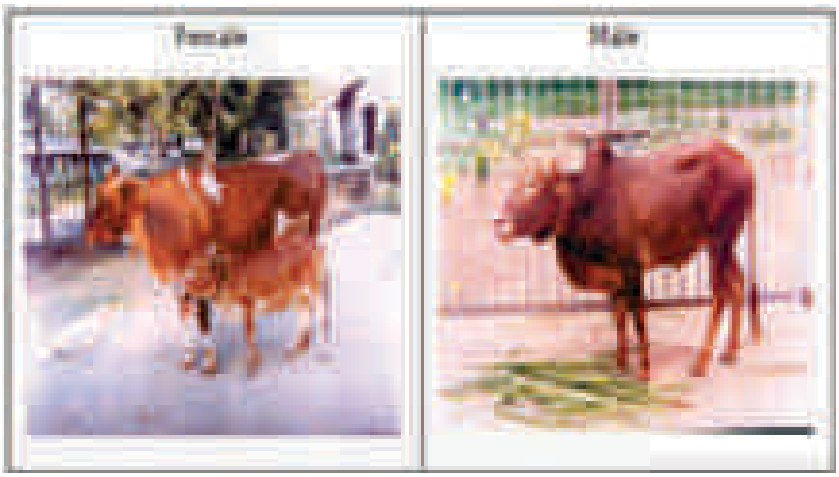
1.**Name**: Tharparkar (White Sindhi, Grey Sindhi, Thari)

2. **Indigenous bred**

3.**State**: Gujarat, Rajasthan (Tharparkar animals are found along the Indo-Pak border covering Western Rajasthan and uptoRann of Kutch in Gujarat.)

4.**Purpose**: Food – Milk:

5.**Milk yield per lactation(kg)**: 1749 - 2147



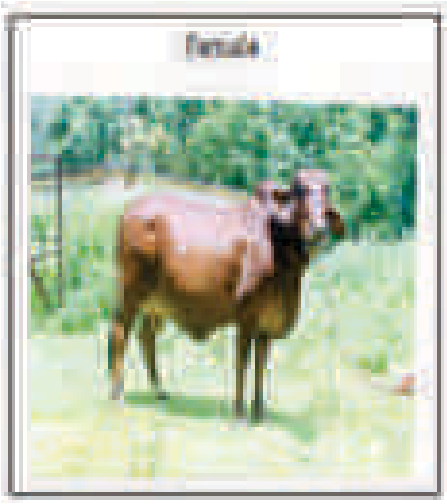
1.**Name**: Vechur (White Sindhi, Grey Sindhi, Thari)

2. **Indigenous bred**

3.**State**: Kerla(Kuttanad, a unique agricultural tract, which covers Alappuzha, Kottayam and Pathanamthitta; and Kasaragod districts of Kerala.)

4.**Purpose**: Food – Milk: Dung - Manure

5.**Milk yield per lactation(kg)**: 561



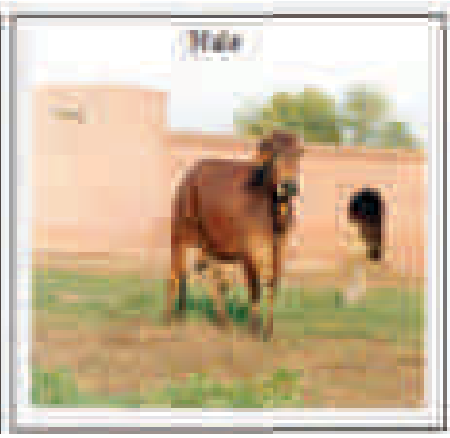
1.**Name**: Red Sindhi (Malir (Baluchistan), Red Karachi and Sindhi)

2. **Indigenous bred**

3.**State**: The original breeding tract is in Pakistan but some organised herds are available in Orissa, Tamil nadu, Bihar, Kerala and Assam states of India.

4.**Purpose**: Food – Milk:

5.**Milk yield per lactation(kg)**: 1840 - 2600



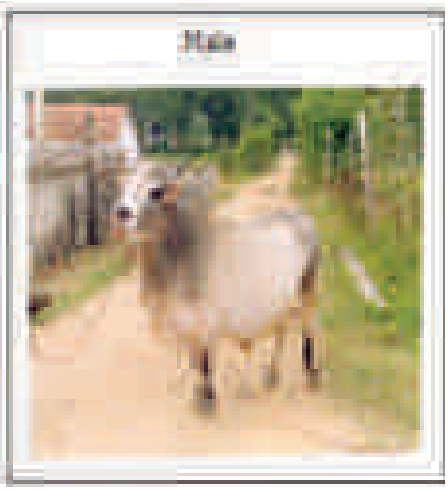
1.**Name**: Sahiwal (Lambi Bar, Lola, Montgomery, Multani and Teli)

2. **Indigenous bred**

3.**State**: Punjab,Rajasthan ()

4.**Purpose**: Food – Milk:

5.**Milk yield per lactation(kg)**: 2325 - 2750



1.**Name**: Punganur ()

2. **Indigenous bred**

3.**State**: AP (The breed tract is confined to the taluks of Punganur and adjacent taluks of Vayalpad, Madnapalli and Palamaner in Chittoor district of Andhra Pradesh..)

4.**Purpose**: Food – Milk: Work – Draught: Transportation

5.**Milk yield per lactation(kg)**: 546 - 1100

1.**Name**: Rathi

2. **Indigenous bred**

3.**State**: Rajasthan (Rathi animals are particularly concentarted in Loonkaransar tehsil of Bikaner district which is also known as Rathi tract.)

4.**Purpose**: Food – Milk:

5.**Milk yield per lactation(kg)**: 1560 - 2810

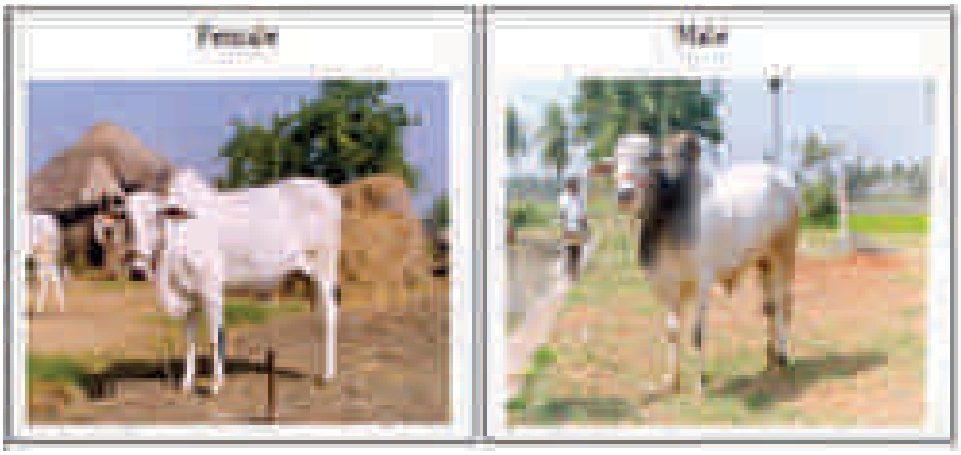
1.**Name**: Motu (Deshi)

2. **Indigenous bred**

3.**State**: Odisha (Southern part of Malkangiri district and adjoining area of Chhattisgarh and Andhra Pradesh. Heavy concentration is in Motu, Kalimela, Podia and Malkangiri area of Malkangiri district in Orissa. Sandy and clay type soil is predominant. Most of the area is covered with forest.)

4.**Purpose**: Food – Milk: Work – Draught: Manure

5.**Milk yield per lactation(kg)**: 0 - 140



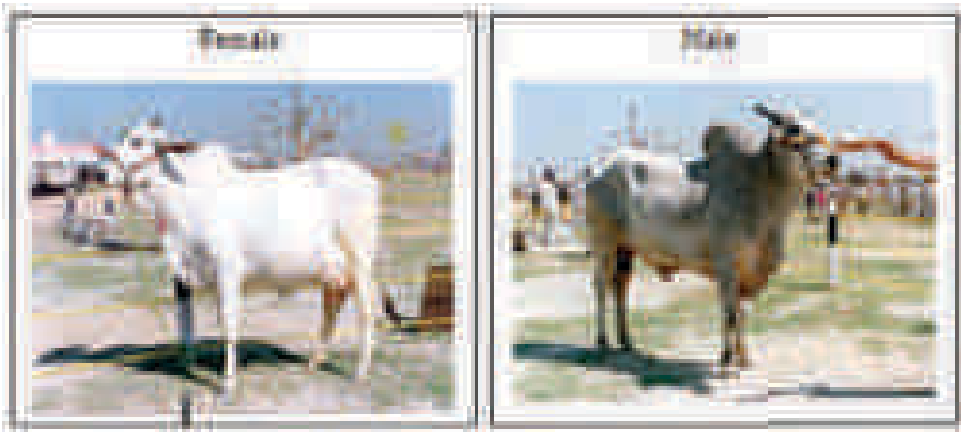
1.**Name**: Ongole (Nellore)

2. **Indigenous bred**

3.**State**: Andhra Pradesh (The breeding tract extends all along the coast from Nellore to Vizianagram.)

4.**Purpose**: Food – Milk: Work – Draught:

5.**Milk yield per lactation(kg)**: 798



1.**Name**: Khariar (Deshi)

2. **Indigenous bred**

3.**State**: Odisha (Nuapada district and adjoining area in Kalahandi and Balangir district. Heavy concentration is in Khariar, Komna, Sinapali and Boden blocks of Nuapada district)

4.**Purpose**: Food – Milk: Work – Draught: Manure and fuel

5.**Milk yield per lactation(kg)**: 0 - 450

1.**Name**: Kosali ()

2. **Indigenous bred**

3.**State**: Chhattisgarh (Soil type: light to medium light (red-yellow)-65%, Medium heavy to heavy (brown-black)-35%.)

4.**Purpose**: Food – Milk: Work – Draught: Manure

5.**Milk yield per lactation(kg)**: 210 - 250

1.**Name**: Hariana (Hansi)

2. **Indigenous bred**

3.**State**: Haryana

4.**Purpose**: Food - Milk Work - Draught and Transport

5.**Milk yield per lactation(kg)**: 997 - 1745

1.**Name**: Kankrej (Wadad or Waged, Vagadia, Talabda, Nagar, Bonnai)

2. **Indigenous bred**

3.**State**: Gujarat, Rajasthan

4.**Purpose**: Food - Milk Work - Draught and Transport

5.**Milk yield per lactation(kg)**: 1738 - 1800

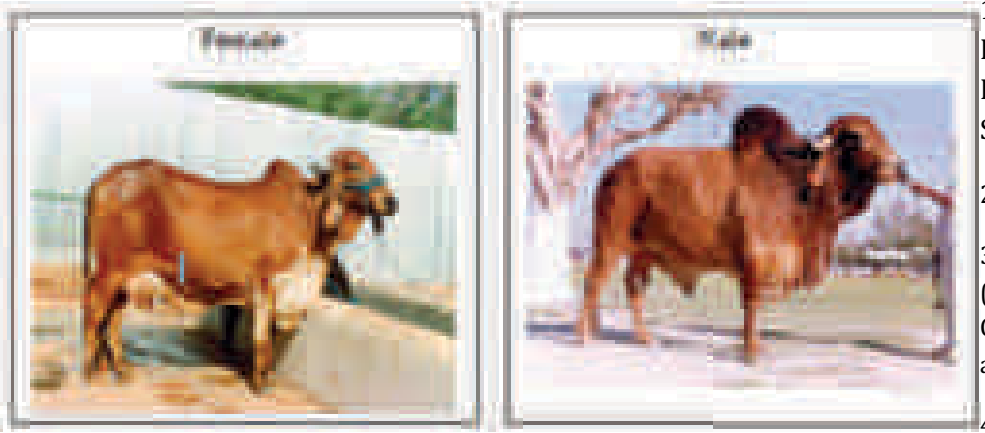
1.**Name**: Ghumusari (Deshi)

2. **Indigenous bred**

3.**State**: Odisha(Western part of Ganjam district and adjoining areas of Phulbani district. Heavy concentration is in Bhanjanagar, Sorada and Aska area of Ganjam district)

4.**Purpose**: Food - Milk Work –Draught , Manure , Fuel

5.**Milk yield per lactation(kg)**: 0 - 650



1.**Name**: Gir (Bhodali, Desan, Gujarati, Kathiawari, Sorthi, and Surati)

2. **Indigenous bred**

3.**State**: Gujarat (Saurashtra region of Gujarat specially area in and around Gir forest.)

4.**Purpose**: Food - Milk

5.**Milk yield per lactation(kg)**: 2110 - 3300

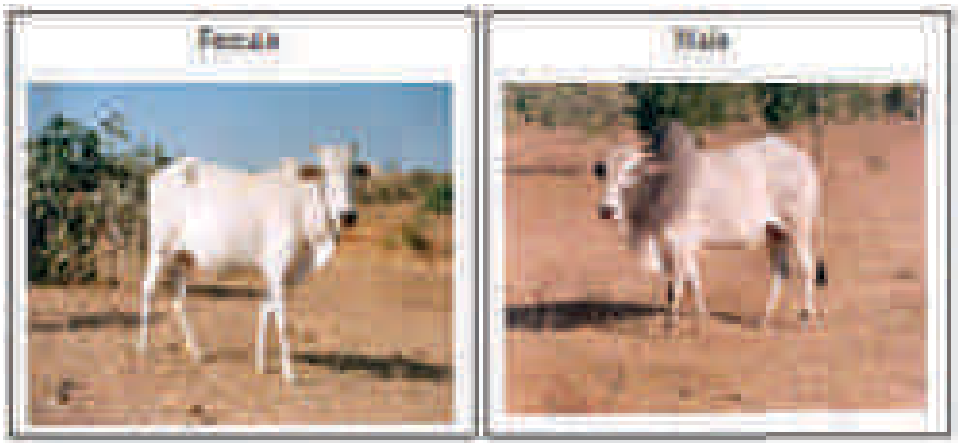
1.**Name**: Gangatiri (Eastern Hariana or Shahabadi)

2. **Indigenous bred**

3.**State**: Bihar, UP (Ghazipur, Ballia, Varanasi, Mau, Mirzapur and adjoining districts of Uttar Pradesh and Bhabhua, Buxar and Bhojpur districts of Bihar.)

4.**Purpose**: Food - Milk Work –Draught , Manure

5.**Milk yield per lactation(kg)**: 1049.24 - 1200



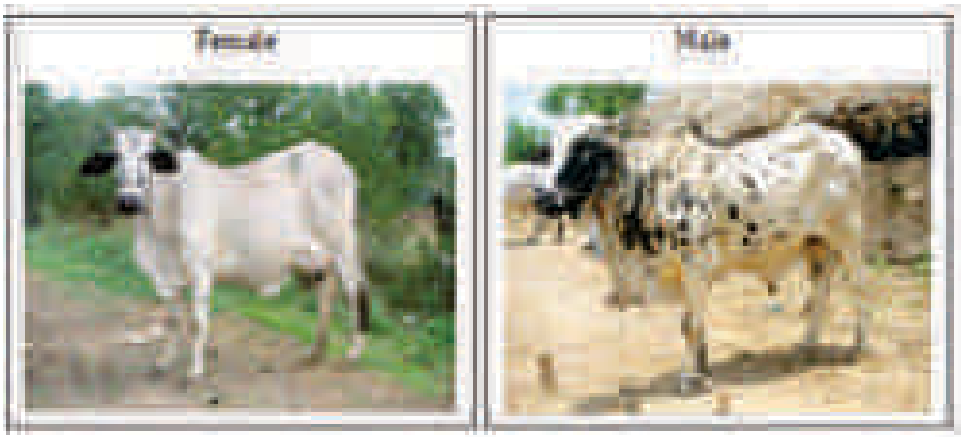
1.**Name**: Gaolao (Arvi, Gaulgani)

2. **Indigenous bred**

3.**State**: Madhya Pradesh, Maharashtra

4.**Purpose**: Food - Milk Work –Draught

5.**Milk yield per lactation(kg)**: 604 - 725



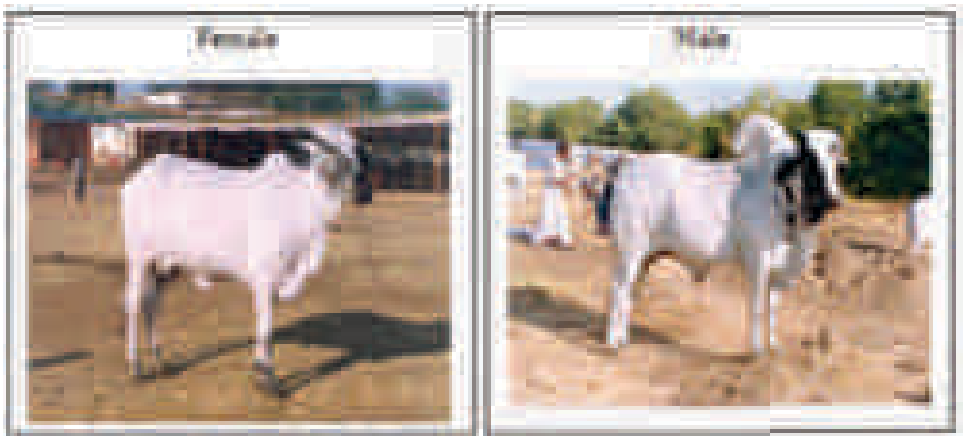
1.**Name**: Dangi (Kandadi)

2. **Indigenous bred**

3.**State**: Gujarat,Maharashtra (Mostly found in the Akola taluka of Ahmadnagar district, Sinner and Igatpuritaluka of Nashik districts of Maharashtra and Dangs district of Gujarat. It is also found nearby Thane district of Maharashtra. Generally these animals are found near the hilly tract where forest is available in the ranges of Sahyadri.)

4.**Purpose**: Food - Milk Work –Draught

5.**Milk yield per lactation(kg)**: 430 - 800



1.**Name**: Deoni (Surti, Dongarpati, Dongri, Wannera, Waghyd, Balankya and Shevera.)

2. **Indigenous bred**

3.**State**: Karnataka,Maharashtra (The breeding tract lies in the Balaghat range of Sahyadri hills extending from Kannadtaluk of Aurangabad to Deglurtaluk of Marathwada region of Maharashtra state.The actual place of origin is Deoni, Udgir and Ahmadpurtaluks of Latur district..)

4.**Purpose**: Food - Milk Work –Draught,Transport

5.**Milk yield per lactation(kg)**: 868 - 1229

Fig 1.1.3 Cattle Crossbred

1.**Name**: Belahi (Morni, Desi)

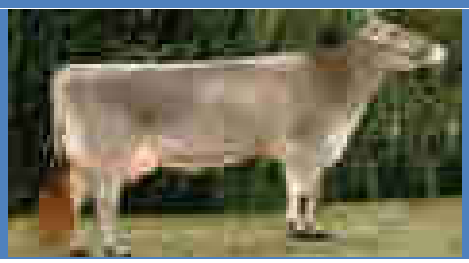
2. **Indigenous bred**

3.**State**: Haryana (Breeding tract lies in the foothills of Shivalik in Haryana.)

4.**Purpose**: Work – Milk, Draught and Manure

5.**Milk yield per lactation(kg)**: 1014 - 2092

1. 1.4 High milk yielding varieties

BREED IMAGE	EXOTIC BREEDS
	Ayrshires • Strong and rugged cattle: adaptable to all terrain • Low somatic cell count • Male weighs – 600 kg while female weighs - 500 • Lactation yield – 5000 lit • Moderate Butterfat & Relatively high in Protein Content
	Jersey • Reddish fawn color • Lactation yield – 5000 kg • Accustomed to indian conditions
	Brown Swiss • Known for ruggedness and milk production • Docile and easily manageable • Crossbred from India – Karan Swiss

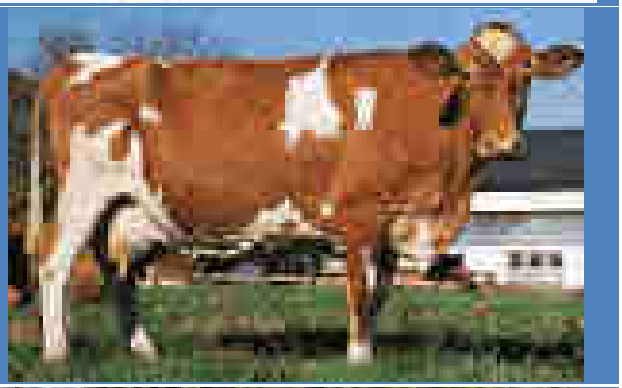
 z	**Brown Swiss** • **Known for ruggedness and milk production** • **Docile and easily manageable** • **Crossbred from India – Karan Swiss**
	Red Dane • Body color - is red, reddish brown or even dark brown. • It is also a heavy breed; mature males weighing up to 950 kg and mature female weigh 600 kg. • The lactation yield varies from 3000 to 4000 kg • fat content of 4 per cent and above.
	Guernsey • Golden coloured milk • Rich in beta carotene • Male weighs – 600 kg while female weighs - 500 • Lactation yield – 6000 lit • Butterfat – 5 % & Protein Content – 3.7 %
	Holstein– Friesian • Rugged and large udder • Large dairy breed – 700 kg • Lactation yield - 7000 kg

Fig 1. 1.4 High milk yielding varieties

Exercise

1. What is the need of Organic Farming in India?

Answer: .....

Notes

UNIT 1.2: Selection of cattle

Unit Objectives

At the end of this unit, you will be able to:

- Select the Cattle for Dairy farming

1.2.1 Selection of cattle

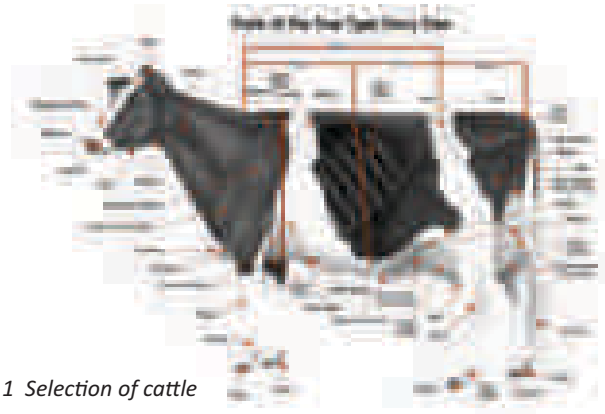


Fig 1.2.1 Selection of cattle

- For success in dairying, Proper selection of cows is the first and the most important step to be adopted.
- Records are the basis of selection and hence proper identification of animals and record keeping is essential.
- Maintain animals suitable to the local weather condition.
- Do not mix animals from different agro-climatic conditions as it causes problems due to non-adjustment in many cases.

Selection of dairy cows

- A dairy farmer should build up his own herd by breeding his own herd.
- Select animals based on breed characters and milk producing ability
- History sheet or pedigree sheet which are generally maintained in organized farms reveals the complete history of animal
- Select cows in first or second lactation. Cows give maximum yield in 5^{th} lactation.
- Select cows in second month of lactation. Maximum yield is noticed till 90 days after calving.
- Three successive complete milking has to be done and an average of it will give a fair idea regarding production by a particular animal.
- Select docile and approachable cow.
- Purchase the animals during the months of October and November.

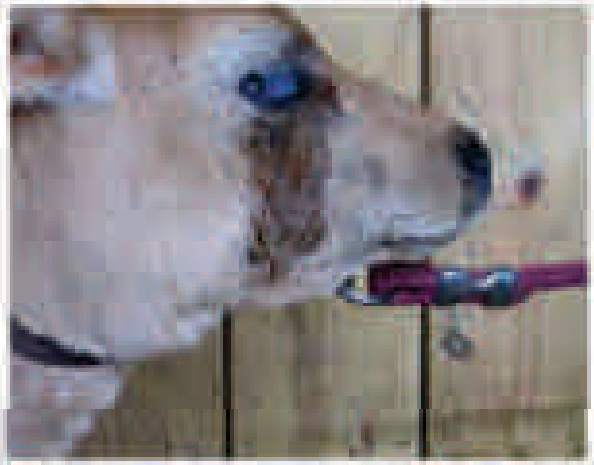
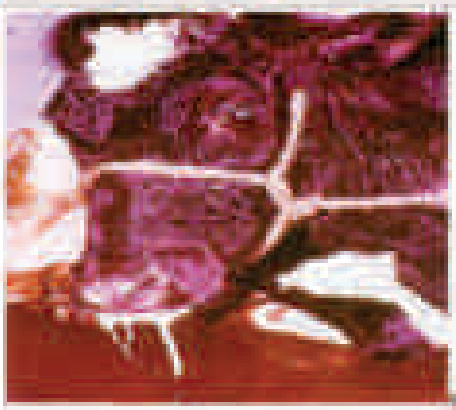
Breed characteristics of high yielding dairy cows

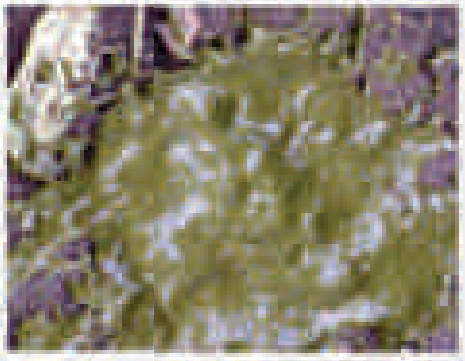
- Attractive individuality with feminity, vigour, harmonious blending of all parts, impressive style and carriage
- The appearance of the body should be wedge shaped.
- It should have bright eyes with lean neck
- The udder should be well attached to the abdomen
- There should be a good network of blood vessels in the skin of the udder
- All four quarters of the udder should be well demarcated with well placed teats.

Score card in selecting cattle

Area to be judged and score	Description
Frame - 15	• Frame - skeletal parts excluding feet and legs. • Broad muzzle and strong jaws - Better feed consuming ability • Strong shoulder - Ability to move around and set up and down in stanchion and stalls. • Straight topline - General strength and conformation; (proper development of digestive, reproductive and mammary system is related to strong topline) • Width of pelvic region - ease of calving, width and length of rump affects support and placement of udder
Dairy character - 20	• Excellent dairy character – converting feed with maximum efficiency. • Poor dairy character - Usually coarse and too fat (over condition) .Skin should be thin, loose and pliable.
Feet and Legs - 15	• Proper placement of legs indicates ability to move with ease. • Width in front legs provides room for a wider chest, width in rear legs provide room for a larger udder. • Too much sickle hock weakens the legs as age advances. Too straight legs cause much stress on the hock.
Body capacity - 10	• [Volumetric measurement of capacity of the cow (length x depth x width) evaluated with age] • Good body capacity helps in more feed and roughage consumption results in high milk yield.
Udder - 40	• It should be soft, pliable and elastic. If firm and large even after milking probably full of fibrous or scar tissue (meaty) . • Teat should be 1.5 – 2.5 inches long, when the udder is full they should hang the structure down. • Size of mammary vein indicates the amount of blood circulating to the udder.

1.2.2 How to differentiate between healthy cow and sick cow

S.No.	Parameter	Healthy sheep	Sick animal
1	Look of cow	Active and alert	 Dull and inactive
2	Head	Erect	Droop head
3	Eyes	Wide open, bright and without any discharge	
4	Nose	Moist and free	 Discharge

9	Movement	Active	Sluggish
10	Consistency of dung	Semi-solid	Hard, loose or mixed with mucus or blood 
7	Pulse / minute	70-90	More than 90
8	Respiration / minute	30-50	Above or below the range is seen in sick animals
9	Grazing	Active	Dull or absent

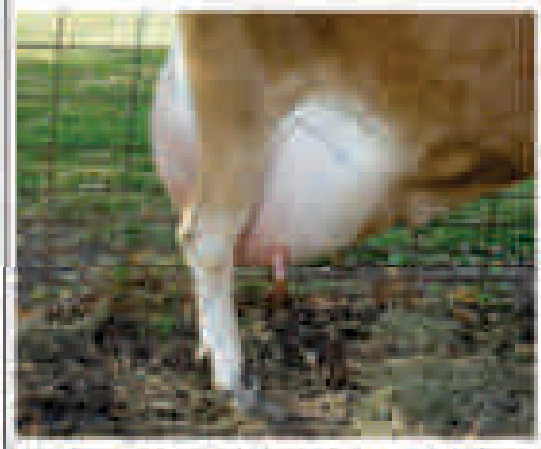
10	Rumination	Regular	Irregular
11	Feed and water intake	Normal	Reduced
12	Udder	Normal	Swelling or change in consistency 

Fig 1.2.2 How to differentiate between healthy cow and sick cow

1.2.3 Basic skills of communication

Do's	Don'ts
Listening	
Keep an open mind. Maintain eye contact and show interest. Listen for the central themes. Consider the speaker's nonverbal behaviors and tone of voice. Ask for clarification. Paraphrase the meaning and feelings being expressed.	Be judgmental. Fake attention. Interrupt the speaker. Begin formulating a rebuttal. Distort the message based on your own beliefs or thoughts.

Non Verbal Communication	
Eye Contact: Look at people's eyes. Continually scan the group with your eyes. Look at the whole group.	Eye Contact: Avoid eye contact. Scan the group too rapidly or infrequently. Only look at one or two people or at only one side of the room.
Body Movement: Position your body so you face the majority of the people. Vary your position in the room. Stand with good posture. Walk toward people when they speak.	Body Movement: Talk to your notes, easel, or board. Turn your back to part of the group. Stand in fixed positions. Slouch. Distance yourself from people.
Gestures and Facial Expressions: Use natural and spontaneous gestures. Smile and be animated. Convey emotion affirmatively	Gestures and Facial Expressions: Engage in distracting behavior such as looking at your watch, or jingling change. Look disinterested. Use gestures or expressions that could be seen as negative or judgmental.

Use your voice	
Speak loud enough to be heard. Vary the pace of your presentation. Slow down for important points. Use the pause.	Mumble. Use “fillers” such as “like” or “um.” Speak with a monotone voice. Be afraid of pauses.
Engaging your audience	
Ask clear, concise questions. Ask open-ended questions. Focus each question on a single issue. Acknowledge responses in a positive manner. Allow time for the audience to answer. Let your conviction and passion for the subject matter show.	Ask questions that require two distinct answers. Answer your own question! Rephrase your question if you don’t get an answer. Ignore comments or questions. Declare an answer is wrong. Be afraid to remain silent while waiting for responses

Fig 1.2.3 Basic skills of communication

1.**Name**: Binjharpuri (Deshi)

2. **Indigenous bred**

3.**State**: Odisha (Whole Jajpur district and adjoining areas of Kendrapara and Bhadrak. Heavy concentration is in Bari, Binjharpur and Dasrathapur area of Jajpur district)

4.**Purpose**: Food - Milk, Work –Draught and Manure

5.**Milk yield per lactation(kg)**: 0 - 1350

1.2.3 Basic skills of communication

READING THE COW SIGNS

- A cow gives signals all the time about her welfare and health. She does this with behaviour, attitude, body language and body condition. You can use these cow signs to optimise your herd health, comfort and milk production results. Train yourself to observe, evaluate, and find solutions for the benefit of your cows and business
- Ask yourself:
    - What do I see?
    - What is causing this?
    - What does this mean?
- How to judge cow signs
    - Judging an animal is not as easy as it may look. Please study the animal signs table closely and learn it by heart. Each time you walk among your cows, select one and check her in accordance with the key indicators for a healthy cow as outlined here. Once you have checked a few cows like this, you will start to gain an understanding of cow comfort and see possible issues that may need resolving. Please do not draw conclusions in this phase, as you still need to check the body condition score and the locomotion score.
- Learn to read the body language of cows. This will give us an indication of how they feel and how good the environment is
- Reading the signs better will help the farm manager in improving the productivity of the farm
- Cow OBSERVATION in its natural setting is first step towards reading the signs. Farmer need to stand back and observe the individual cow as well as the herd
- Housing enables greater control of the cow's environment and feeding. However, when housed, it's crucial that cows are able to express their natural behaviour.
- Cows are able to express six things thorough their behavior, that include feed, water, light, space and quality air, along with the right environment to rest.
- Upon observation, the farmer needs to act on areas that the cow signals
- Cows usually lie down 12 – 14 hrs a day and 90 percent of cows lie down in resting area at given time.
- A standing cow is the best indicator of what is wrong with her. If cows are standing, farmers should ask themselves: Is there enough feed space? Are cow cubicle beds comfortable and set up to the right dimensions for the size of the cows? Are there enough access points in the shed to enable less dominant cows to escape bully cows?
- Keep cows on deep bed straw yards in the run up to calving and then keeping cows in a “pamper pen”.

The newborn calf is then placed in front of the mother in a clean “cuddle box.” Hay or silage is put on top of the calf to encourage the mother to lick the calf and eat food straight away. “If you get the cow eating straight after calving, you get her off to the right start by maximising dry matter intakes at this critical time.

Exercise

1. List out the high milk yielding verities.

Answer: .....

2. What are the importance of score card in selecting a cattle.

Answer:.....

Notes

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

2. Prepare and maintain livestock accommodation

Unit 2.1 – General accommodation needs of Livestock
Unit 2.2 – Tools and equipments
Unit 2.3 - Waste handling/ management
Unit 2.4 - Routine cleaning of animal shed

AGR/N4101

Key Learning Outcomes

At the end of this module, you will be able to:

- Understand the accommodation needs of livestock
- Understand the different types of accommodation- Head to Head, Tail to tail
- Understand the best balance between animal health and well-being and available resources
- Use and recognize tools/equipment used for preparation of accommodation
- Understand the different methods of waste handling/ management
- Plan and follow the routine cleaning of animal shed

UNIT 2.1: General accommodation needs of Livestock

Unit Objectives

At the end of this unit, you will be able to:

- Establish housing for Dairy animals
- Plan, Layout and design the shed

2.1.1 General accommodation needs of Livestock

- Cow Comfort - Diary animals need to be comfortable, healthy and achieve optimum protection through good housing design and animal welfare practices.
- Animals need to be protected from extreme heat and direct sunlight. India has wide geographic, climatic region with varing temperature. Hence it is impossible to provide a uniform housing design for dairy cows.
- The facility need to provide basic comfort to the diary animals with regards to ventilation, drainage and manure removal.
- The flooring should have a slight gradient for effective drainage, non-slippery and all the flooring surfaces should be easily washable.
- The sheds and the facilities should be kept clean and free from metal objects, pieces of wire and plastic bags and all fittings and internal surfaces including entrances must be designed constructed and maintained to ensure there are no injury to the animals.
- Diary animals must lie down and rest comfortably for sufficient periods in a day without any difficulty.

HOUSING OF ANIMALS

Animal housing is also very important in harnessing the maximum potential of the animal. Stressful conditions significantly reduce productivity and it is therefore important to protect the animal from inclement weather. Improper housing also predisposes the animal to hoof conditions and heat stress.

Some high cost cattle shed options

Fig 2.1.1 Housing of Animals

Some low cost cattle shed options

Fig 2.1.1 Housing of Animals

It is important to provide clean and comfortable housing facilities to the dairy animals for their proper growth and optimum productivity. The milch animals should be provided proper sheds to protect them from extreme weather conditions of summer, winter, scorching direct sunrays and winds. During summer, the animals suffer from heat stress and they become restless. Sweating and panting, to some extent helps them cool their bodies. Reduced feed intake of the animals results into decreased milk production. Therefore, we must have a suitable housing for the animals.

Fig 2.1.1 Housing of Animals

Animal cooling systems are very important especially in high yielding crossbreds and exotic animals.

Animals welfare needs

Provide proper and sufficient food and water
Provide adequate shelter
Provide opportunity to display normal patterns of behavior
Unreasonable or unnecessary pain or distress shall be avoided while physical handling

Cow Comfort factors

COW TRAFFIC - Cows need to move freely without any injury or hindrance from one area to other, turn around and back in and out of stalls.

LYING - Cows need to be able to lie in dry, clean and comfortable conditions.

FEED & WATER -Cows need the correct feed and trough space at the right height.

SOCIAL INTERACTION - Herds or groups of cows have a social pecking order with higher and lower rankings. Cows will be most settled if there is minimal competition for space, feed and water.

LIGHTING - Cows need uniform distribution of light to make best use of lying areas and cow traffic. Good lighting also makes it easier for staff to observe heat detection or health problems.

LOAFING AREAS - Cows must be given the correct space and environment to be able to pass each other, socialize and groom.

FLOORING - Cows need to walk confidently on non-slip reasonably clean flooring.

AIR QUALITY - Cows need good quality air supplied through an effective ventilation system.

BEDDING - Cows need dry and comfortable bedding that offers stability to get up and out of, and to spend long periods of time lying on.

SHADE - Cows require shade to reduce the impact of heat stress.

Understanding Dairy housing system

Ultimately design and management of a housing system is influenced by how long the cows will use it e.g. all winter or summer or for twelve hours a day. Irrespective of how the building is integrated within your farm system, it must provide a clean, dry and comfortable environment that does not compromise cow health, welfare, comfort or production.

The longer the building is expected to house cows, the greater the consideration for key factors like structuralrobustness, effluent management and cost. The level of design detail required when housing cows for long periodsshould not be underestimated.

Loose housed:

Cows are kept loose in an open paddock throughout the day and night except at the time of milking and treatment.In this system, shelter is provided along one side of open paddock under which animals can retire when it is very hot or cold or during rains.
Common feed manger and water tank is provided and concentrates are fed at the milking time which is done in a separate milking barn or parlour in which cows are secured at milking time and are milked. The open paddock is enclosed by means of half walls or plain wire fences of convenient height.

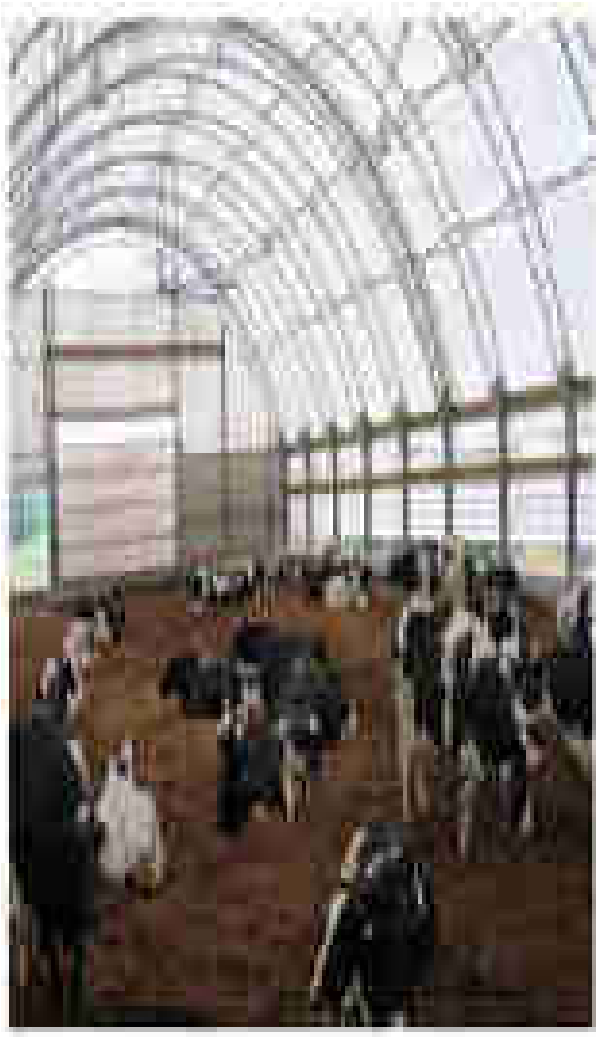


Fig 2.1.1 Housing of Animals

Fig 2.1.1 Housing of Animals

Fig 2.1.1 Housing of Animals

- Feeding passage – Feed bags are kept in the feeding passage in the above picture.
- Feed Manger – Animal feed from the manger
- Standing space -

Fig 2.1.1 Housing of Animals

- Water trough – Water trough is outside the shed.

- Gutter or drainage channel
- Milking passage

Depending on the animal type and purpose following building units are needed

Fig 2.1.1 Housing of Animals

-Milking barn or parlour

Fig 2.1.1 Housing of Animals

- Down calver shed / calving pen

Fig 2.1.1 Housing of Animals

- Calf pen/ Young stock or heifer shed
- Dry animal shed
- Isolation shed
- Quarantine shed

Accessory buildings

- Store room
- Milk room
- Hay or straw shed

Notes

2.1.2 Layout and Design

The housing layout of dairy farm is the most important document in the design process. The objective of this layout is to make the design functional, flexible, expandable and cost-effective.

A conventional design with a central feed passage is likely to contain multiple rows of stalls on each side of the lane.Layout should be matched to herd size, building use and feed space per cow. Keeping cows clean and passagewaysfree of effluent build up is critical to achieving best performance.

If the number of cows is less than 10, then they can be housed in a single row. If the number of cows is larger then they can be housed in double row.
In double row arrangement, the cows can be placed in head to head (face in) or tail to tail (face out) arrangement.

Head to head stall

Advantages

There should be no dead ends in the building with cow traffic and access to feed and water a design priority. Ultimately the feed space per cow drives the length of the building e.g. 70cm per cow with 100 stalls on each side will equate to a 70-metre barn in length (70cm per cow x 100 cows = 70m). The total width of the barn is driven by the number of rows of stalls and the width of the passageways.

Fig 2.1.2 Layout and design

Layout	Advantages	Disadvantages
• 4- row head-to-head	• excellent cow comfort • Pleasing for the eyes of the visitor when heads are together • Cows get in to their stalls easily • Sun rays dry gutter easily • Feeding of cows is easier from the middle alley • It is better for narrow barns. • one stall width of feed space for every two stalls • more feed space than other free stall layout • no stalls against the outside wall • 11.1 m2/cow (120 ft2/cow)	• cannot block animals away from free stalls • lose two stalls at the crossover

Table 2.1.2 Advantages of Head to Head

Tail to tail stall

Fig 2.1.2 Layout and design

Tail to tail stall

Advantages

Layout	Advantages	Disadvantages
• 4-row tail-to-tail	• one stall width of feed space for every two stalls • can block animals away from free stalls after milking or for bedding • lose only one stall at crossover • outside row of stalls extend the length of pen • Cleaning and milking operations will be easy with the presence of middle alley • Spread of diseases among animals is less • Cows get outside fresh air in plenty • Supervisor can effectively look over milk men will milking from the center alley • Any ailments in the hindquarter can be detected easily • 10.2 m2/cow (110 ft2/cow)	• stalls against the outside wall • rain and sun on the outside row of stalls • difficult to keep bedding on outside row of stalls • less feed space than head-to-head

Table 2.1.2 Advantages of Tail to Tail System

2.1.3 Cow uniformity

The dilemma for any farmer moving from an open lying area i.e. loose housed system, to a freestall design, is the issue of herd size uniformity. Cows in a herd will not be uniform. Twenty percent of herd will be heifers in a herd. The practicalities of housing non-uniform cows

	Correct size cows	Small Cows (Heifers)	Large Cows
Correct Stall Design	Comfortable	- Lies diagonally - Lies forward (soil the bed area) - Lies backward (not feeding properly, standing in passage way)	- Fill the lunge space - Tails in the passageway - Rub their backs on divider - Difficulty in lying and getting up
Incorrect Stall Design	- Lie in wrong way - Sunlight in head space/hind quarter -	- Not comfortable	- Not comfortable

Table 2.1.3 Practicalities of housing non-uniform cows

Passageway widths and layouts

Passages and crossover passages provide escape routes for submissive cows, turning spaces, areas of social interaction and improve cow traffic flow:

- All passageways and crossovers should be scraped or washed regularly.
- Adequate turning room to reduce risk of falling or pushing.
- Head to head – 5 – 6 feet width, Tail to tail – 4 – 5 feet width
- Central alley should have slope toward the gutters forming a crown at center

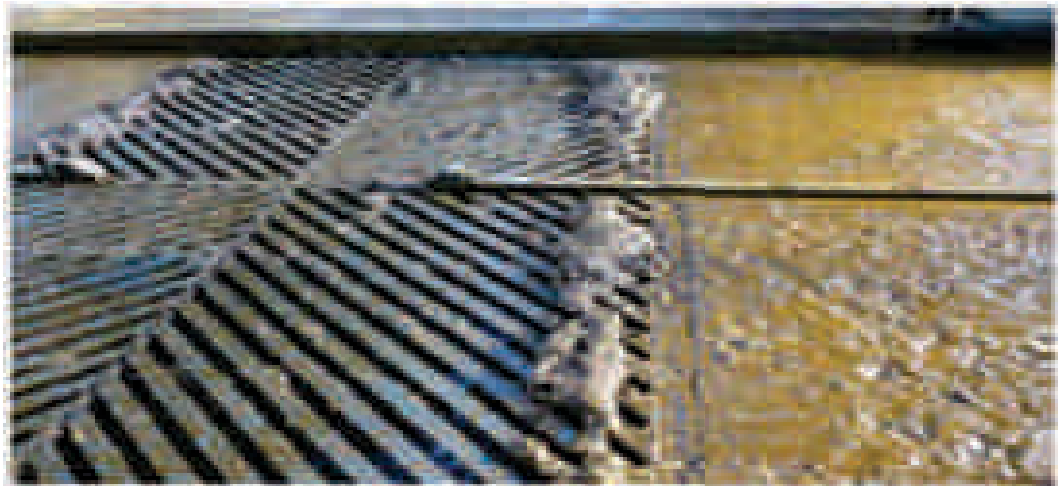


Fig 2.1.3 Passageway widths and layouts

Consider placing slatted cross channels or grates in longer scraped passages. If manually scraping, a cross passage drain will speed up the process and limit the risk of overflow of effluent onto beds during scraping.

Central passage:

Feed lane passages facilitate machinery movement. The machinery used is likely to be a mixer feeder wagon.
Areas to consider for a central passage:

- Machinery must be able to enter the building easily.
- Machinery should be able to operate effectively inside.
- There must be adequate space outside at either end of the feed passage for a turning area.
- There must be enough height clearance to deal with downer cows and remove dead stock.
- Ensure floor strength matches machinery weights.
- Take into account the width of the feed table when deciding on the central passage width

Stall design factors

The dimensions of a freestall depend on the size of the cow. It is important to understand the space requirements of acow when she lies down, rises and rests.

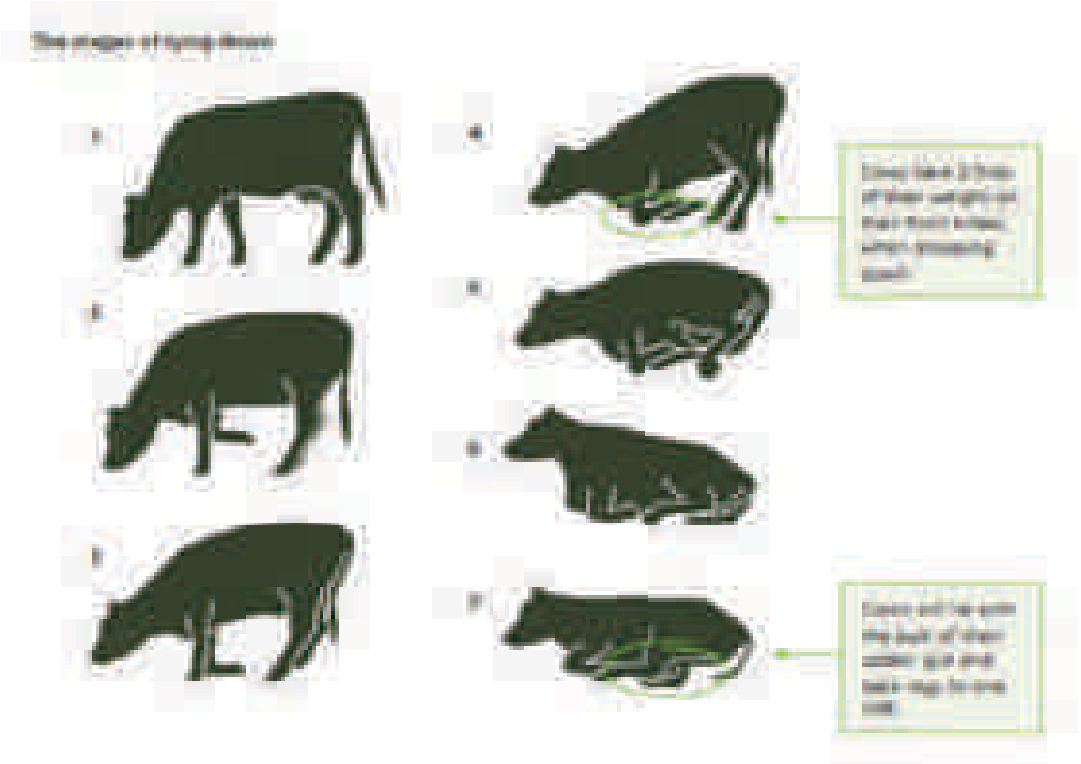


Fig 2.1.3 Stages of rising

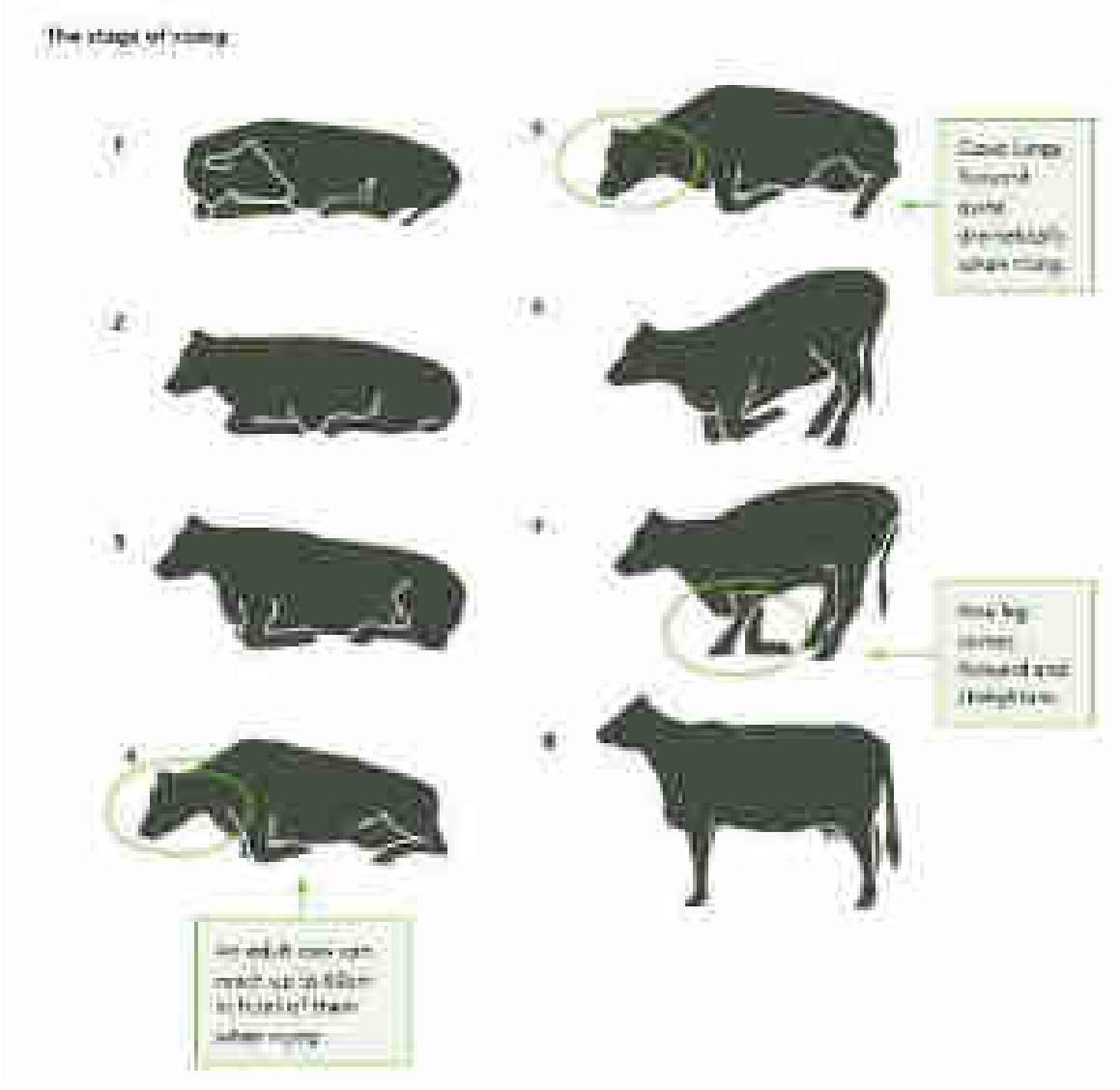


Fig 2.1.3 Stages of rising

Stall design factors have an effect on use and cow comfort.

Bed Length – The area the cow has to place most of her body. This does not include the lunging space.

Lunge space – The space the cow has to lunge forward into **when getting up**. Stalls that are located too close to awall have little or no lunging space, making it difficult for cows to stand up, compromising the lunging space, reducingstall use and lying time, and forcing cows to lie diagonally.

Head space– The space at the front of the cow when she is **lying down**. (Also referred to as the lunge space). Cowsdo not normally sit head to head. Cows need room before head when in rest. Cows do not intrude into each other's “threat” or personalspace. Cows do not like a wall blocking. If blocked, cows will lie diagonally.

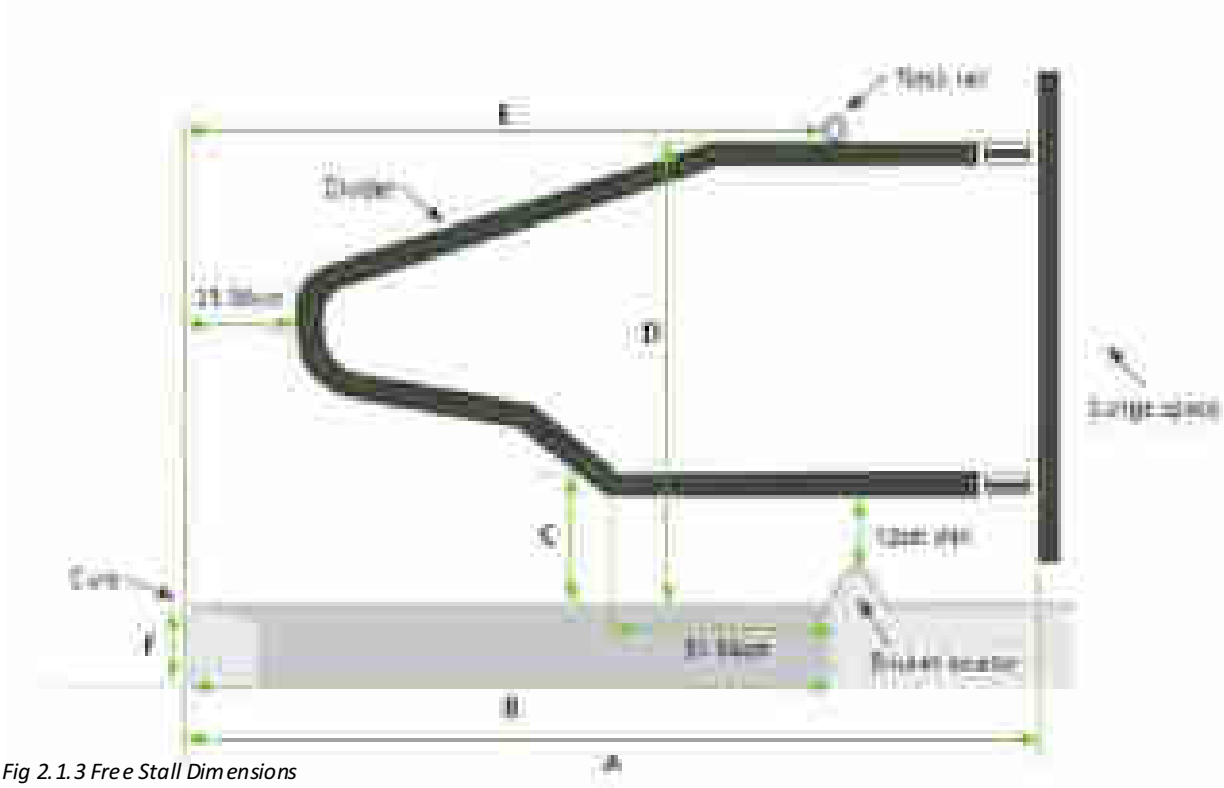


Fig 2.1.3 Free Stall Dimensions

Stall Dimensions for Mattress Stalls	Body Weight Intervals (kg)			
	455	545	636	727
Total rail length facing a wall (A)	244	244	274	305
Full length of head to head rail	409	409	518	518
Rear kerb to rear of brisket locator (B)	160	168	173	178
Stall width (centre to centre)	112	117	122	127
Height of upper edge of bottom stall divider rail from bed (C)	28	28	30	30
Height of neck rail above mattress surface (D)	112	117	122	127
Horizontal distance between rear edge of neck rail and rear kerb (mattress stall) (E)	163	168	173	178
Rear kerb height (F) Not including mattress thickness.	20	20	20	20

Fig 2.1.3 Free Stall Dimensions

There should be 23–30cm from the back of the divider to the kerb. Longer than 30cm, cows may walk or lie along theback of the bed.

Freestall width

The stall should be wide enough to allow the cow to recline and rise easily without banging her hip bones on the dividers.

Stall width is determined by the width of the gut of a fully fed cow lying down, with extra allowance for late pregnancy.

It is possible to calculate the correct width of the stall by taking hip measurements. Hip Measurement x 1.8 = hook bone to hook bone measurement.

Divisions that allow horizontal adjustment help ensure appropriate stall widths

Freestall division

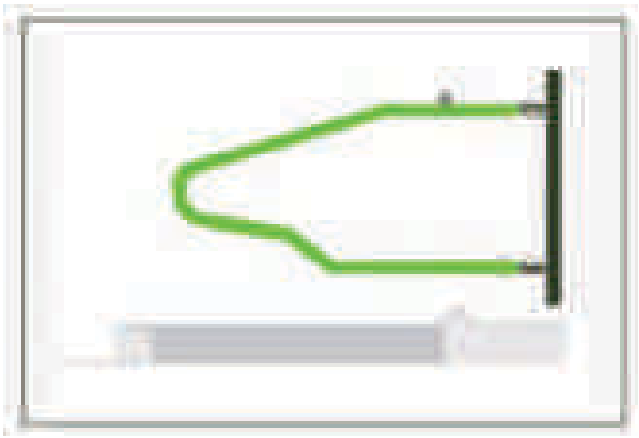


Fig 2.1.3 Free Stall Division

- Cow should be correctly positioned in the stall and not cause any discomfort or injury.
- Dividers must not catch the legs while manoeuvring in and out of the stall.
- Cows extend hind legs away from the body, so rear of the divider should not be attached to the ground to avoid obstructing rear legs, tail or udder

Brisket locator

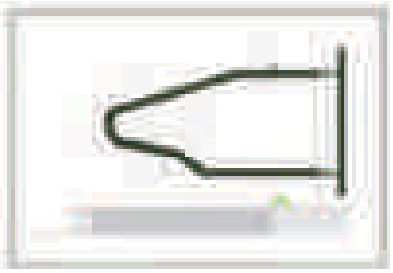


Fig 2.1.3 Brisket locator

- Brisket locator helps the cow to position itself when she lying down.
- Forward lying lead to bed soiling or interrupt with lunge space of opposite cows
- Brisket locator should be rounded, without sharp edges, 10 cms in height

Neck rail

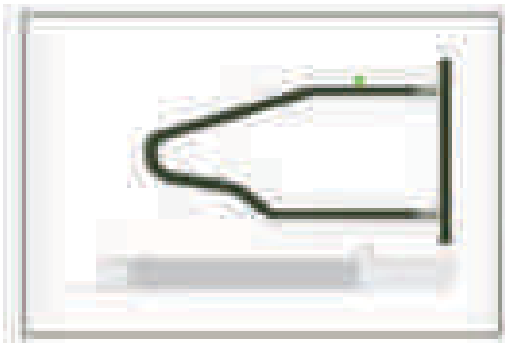


Fig 2.1.3 Neck rail

- Use - to position the cow when she enters the stall, before she lies down.
- The position of the neck rail needs to be correct both horizontally and vertically.
- Neck rails should be adjustable in herds with different sizes.

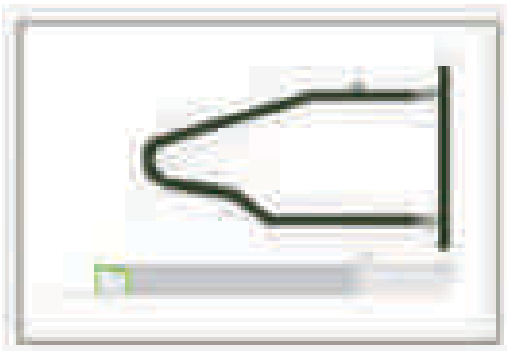


Fig 2.1.3 Kerb

-The kerb is the drop between the back of the bed and the cow passageway and keeps effluent off the stalls.
- Height will depend on the scraper type, floor type and length of passageway.
- It should not have sharp edges, be slippery or be too wide to prevent cows' hocks resting or rubbing on the kerb when lying down

Slope of bed

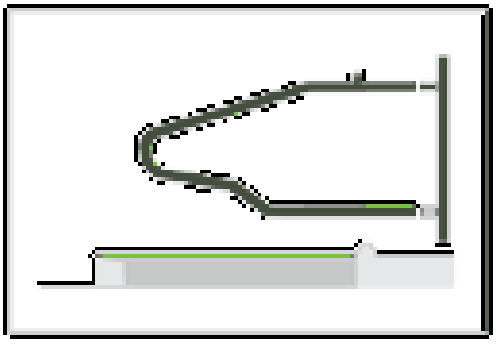


Fig 2.1.3 Slope of bed

- Stall beds should be installed with a slight fall of 1–2% from the front to the rear.
- The slope provides for drainage. Welldesigned mattresses incorporate slope and grooving to draw fluid away from the cow.
- More sloppy bed (3%) will not retain the bedding material

Freestall lying surface

- It must be clean, dry, comfortable, safe, provide sufficient grip and be made from resilient and durable material.
- There are several options
    - Mattresses – foam or rubber mattresses,
    - Waterbeds
    - Sand – offers the highest comfort and cleanliness for cows. It requires daily grooming and replacing. Sand can also be separated, washed, dried and reused.

Managing scraped passages

- The target is to keep the building and the cows as clean and as possible.
- Passages ways usually get dirty and it need to be cleaned periodically. Dirty passageways increase the prevalence of lameness, weakening of the hoof or digital dermatitis.
- A higher stocking rate will require more frequent scraping or washing.

Ensure scrapers run regularly enough to stop effluent pooling.

Fig 2.1.3 Managing Scraped passages

Ensure the scraper runs frequently enough to keep the volume of scraped slurry from overflowing onto the beds.

Flood washing

- An alternative to scraping is flood washing. The floor should be laid with a 2–3% fall and 10mm wide groves cut inthe floor in the direction of the water flow.
- Flood washes are not as common as scrapers and it is better if the barn is empty when the washing occurs. The volume of water required will depend on the slope of the floor and the width of the passage.

Fig 2.1.3 Flood Washing

Flooring

Floors must:

Anti-slippery
allow confident walking
allow standing on three legs and grooming with the fourth
allow expression of oestrus
prevent injury
be durable.

Concrete flooring

The durability, and particularly abrasion resistance, needs to be considered in the concrete specification for a feed passage floor. Cattle slats are typically spaced 40mm apart. The edges of the slats should be rounded to prevent hoof injuries.

- larger gaps create issues for cows when they walk,
- smaller gaps create issues with drainage.

Estimates of risk factor ratios for cows slipping on different concrete floor finishes and effluent conditions

Table 2.1.3 Risk factors

Rubber matting

- Reduces pressure on cows' feet in passage ways.
- Expensive but very slippery when wet and bacteria grows in cracked worn rubber.

Feeding system principles

- The principles applied to the feeding area are to:
- ensure easy and comfortable access to feed
- limit contamination from weather and pests
- limit feed wastage
- provide a non-injurious environment
- make feeding out easy for farm staff.

Standing and grazing stance:

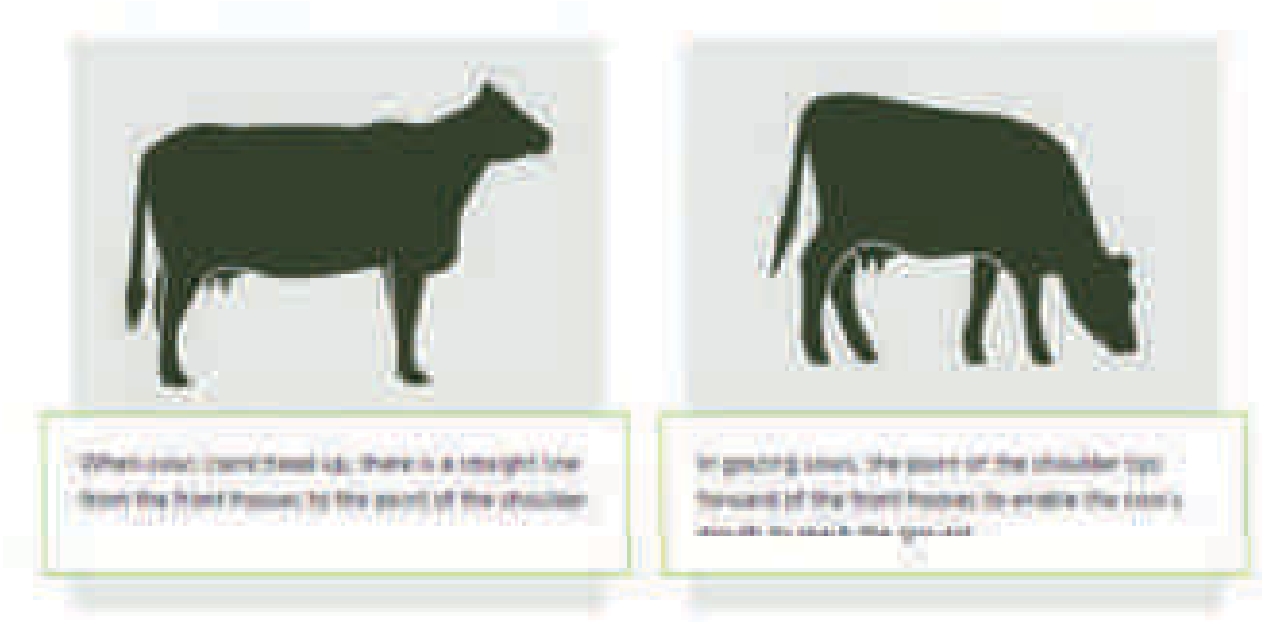


Fig 2.1.3 Standing and Grazing

The natural stance (grazing stance) can be hindered when cows feed from behind a barrier. Correct design of the barrier will help reduce this impact.

Feed barrier dimensions

Fig 2.1.3 Feed barrier

How the feed table height affects feed utilization

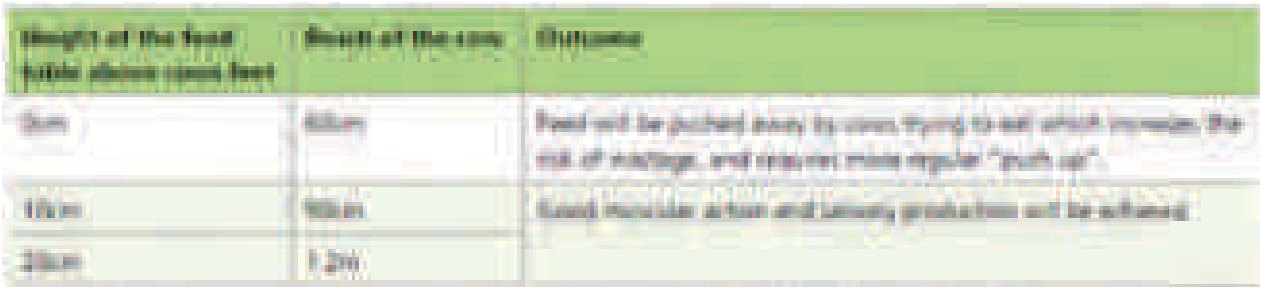


Fig 2.1.3 Feed Table height

Feed face per cow

These dimensions are a guide and you will need to measure your own herd to get the correct measurements.

Fig 2.1.3 Feed face per cow

The correct space per cow provides stress-free feeding, correct feed intakes and keeps cows on their feet for 30 minutes after milking.

Ventilation

- Ventilation will maximise cow comfort and health by:
  - removing excess heat
  - removing excess water vapour (respiration and sweat) and reducing effects of humidity
  - removing microorganisms, dust and gases, especially ammonia
  - providing a uniform distribution of air
  - minimising draughts at stock height.

Correct building design is critical to ensure adequate ventilation that will maintain air quality and temperature all yearround regardless of outside weather conditions.

Passive or natural ventilation relies on external wind speeds and the design of inlets and outlets. Active or forcedventilation uses internal and external fans, sometime in conjunction with natural ventilation.

Buildings will naturally ventilate best when they are sited at right angles to the prevailing wind direction; have no winddisruption from other obstacles such as buildings or tree lines; and have adequate eave height and roof design.

The chimney effect using a central ridge outlet

The chimney, or stack effect, occurs in a livestock building when warm air from the cows rises and escapes throughan outlet, and cool air from the sides is pulled in. For the chimney effect to work efficiently, there must be a suitablebalance between air inlet and air outlet and adequate roof pitch.

Fig 2.1.3 Ventilation

Basic cross-ventilation in an open-sided building

Passive ventilation systems usually have open sides, with no or minimal side walls, and utilisewind break curtains. When cows have access to a building with a central ridge outlet for short periods of time for feeding, it is most likely that only cross ventilation will be achieved.

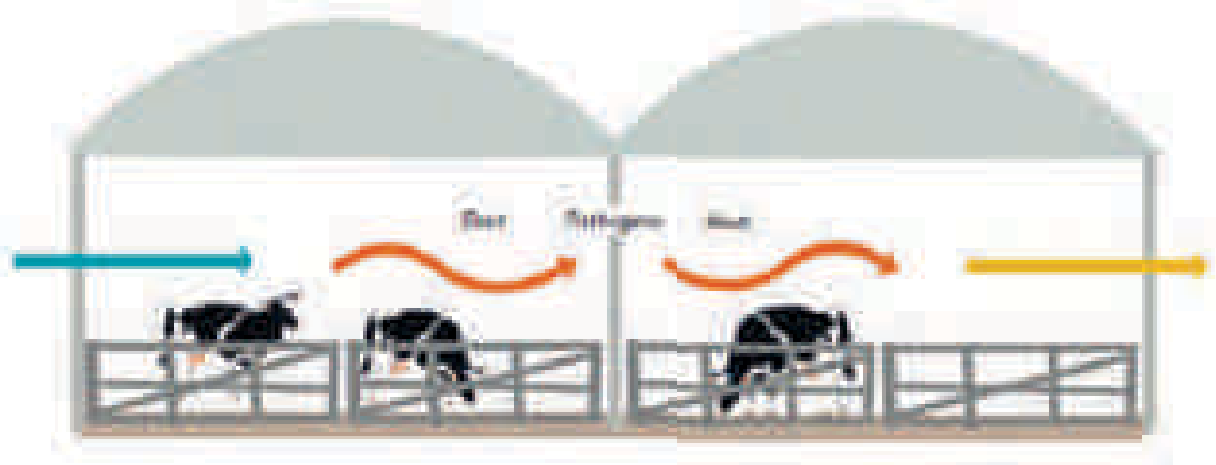


Fig 2.1.3 Ventilation

Condensation

Condensation forms when warm moist air rises and has no way of escaping, it collects under the cooler roof surface and forms droplets that fall down onto the bedding. If the droplets fall on lying areas it can increase the risk of pathogen growth and make some areas less appealing for cows to lie on. Good ventilation reduces the risk of condensation.

Fig 2.1.3 Condensation

Ensure housing environment is clean at all times

The housing area should:

- Be designed to provide good drainage and ventilation and to avoid animal injury
- Be of suitable size and designed to cater for the size of the animal and the herd; and
- Have adequate loose bedding which is maintained in a hygienic condition.
- All stalls and beds should be kept clean and dry (eg by replacing the bedding frequently). Regularly clean or scrape passageways to remove manure

Ensure milking area is kept clean

- The milking area should:
- Be easy to clean;
- have a clean water supply;
- have waste handling facilities; and
- have sufficient temperature regulation, ventilation and light. Construct holding yards to enable a high standard of cleanliness to be maintained.

Notes

UNIT 2.2: Tools and equipments

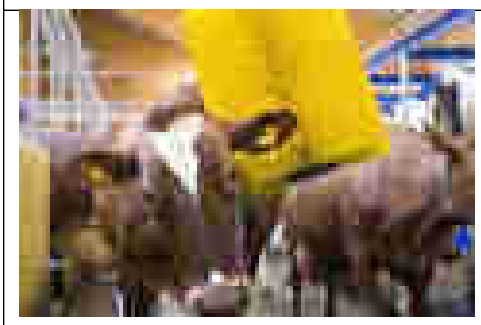
Unit Objectives

At the end of this unit, participants will be able to:

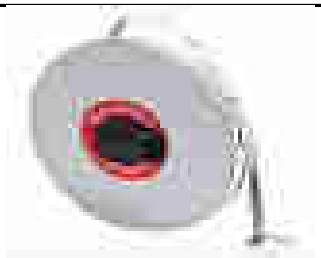
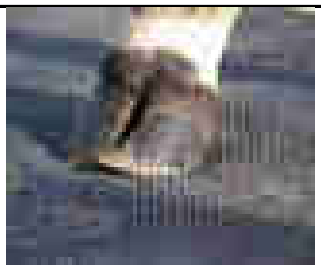
- Understand and procure the needy tools for Dairy farming
- Use the tools/equipments in Dairy Farming

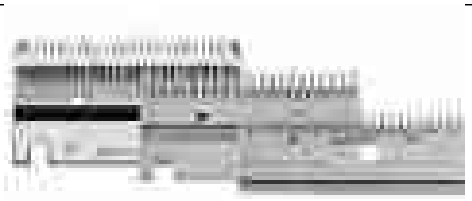
2.2.1 Tools and equipments

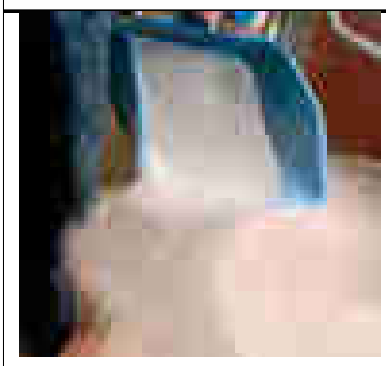
Use of tools and equipment used for preparation of accommodation

Equipments	Name
	Stiff Brushes To groom the cow manually
	Roller Automatic brush To groom the cow

Use of tools and eq 	Restraining ropes To restrain the cow
	Milk Strainer, Jar adaptor and storage jar To collect the milk
	Mouth gag To open the mouth and to administer oral medication
	Milking pails To collect milk

	Milk strip cup To strip milk
	Weighing machine To weigh feed and medicine
	Weighing scale To weight solutions, medications etc
	Measuring tape To measure the barn
	Rubber mats To protect the hoof of cow

	Exhaust Fans To improve ventilation
	Feed Troughs To hold feed
	Portable Hay feeders To distribute hay
	Water bowl To hold/water calf and cows
	Clipper blades To groom the cow
	Clipper To trim the hair

	Dip cup To dip teat with medication
	Bedding material To absorb excess moisture
	Hoof Equipment 1. Hoof clipper - hoof clipperfor shortening tips of toes, light hooves and grown hoof walls. 2. Hoof clipper pliers - for shortening tips of toes. 3. Hoof club- made of special plastic. 4. Hoof knife - with curved blade. 5. Hoof blade - for paring the underside of the hoof. 6. Hoof rasp - for rounding hoof wall.

	Foot bath To disinfect the hoof of the visitors and cows entering the farm

Table 2.2.1 List of tools

Holding Chute

The holding chute is secured to the head gate and located immediately behind it. The holding chute should generally not be any wider than 26 inches but should be adjustable in order to compensate for different-size animals. The sides should be solid so that animals are not able to look out and be scared by their surroundings.

Working Chute

The working chute connects the holding chute with the holding pen. It should be long enough to hold five to six animals at a time.

Crowding Pen

The crowding pen is located at the back of the working chute. Size should be about 150 square feet. This area will hold five or six head of cattle.

Holding Pens

Holding pens should mesh conveniently with the rest of the facility. Each holding pen should provide approximately 20 square feet of space per animal.

Loading Chute

2.2.1 Loading chute

The loading chute may be optional if a trailer is used to transport animals. The loading chute should be located directly off the crowding pen.

Notes

UNIT 2.3:Understand the different methods of waste handling

Unit Objectives

At the end of this unit, participants will be able to:

- Disposal of waste
- Practice waste management

2.3.1Understand the different methods of waste handling

Understand the different methods of waste handling/ management

Best waste management practices that help dairy operators are that
Prevent direct discharge of manure or wastewater into surface waters or onto adjacent neighbors' property.
Prevent any nuisance conditions that interfere with normal use and enjoyment of neighbors' property.
Enhance the operational efficiency of the dairy unit.
Collect and use dairy manure and wastewater for beneficial purposes such as fertilizer, compost, or bedding.

Efficient handling or managing of waste in dairy farm

- Reduces disease incidence (hoof problems, ectoparasites etc)
- Reduce medicine or health care costs
- Reduces milking time (cleaning time of udders)
- Reduces ammonia emissions
- Improves cleaning in the farm
- Improves hygiene and animal welfare in farm
- Improves milk quality and value
- Improves overall profitability of the farm

Environment
Manure can be used as a farm resource reducing the environmental impact of phosphate, ammonia and methane emissions.

Social responsibility
Careful Manure handling at farm premises will reduce negative impact on human health in neighborhoods. This can achieved thorough pro-active solutions that ensure minimum impact from farm operations.

Other waste management in dairy farm

- Plastic
    - Plastics must be recycled or disposed of in a landfill.
    - Do not burn or bury plastic wastes in farm. Burning will release harmful chemicals in the atmosphere while burying will contaminate the soil and underground water of the farm. Waste Plastics include silage wraps, plastic disinfectant containers, drums, fertilizer bags, feed bags, bailing twins.
- Agrochemicals
    - Pesticides, weedicides or veterinary medicine are used in a dairy farm. They can betoxic, and may contain carcinogens, heavy metals and other compounds which can be dangerous to humans, animals andthe environment. They are often only used in small amounts, but can have a large environmental impact if used ordisposed of incorrectly.
- Dead stock
    - The primary purpose of safe disposal of carcass is to ensure the check and spread of disease either to other susceptible animals or humans.
    - Carcasses of animals may be disposed of by sending them to knackeries or by burial or burning.
- Run off management
    - Dairy liquid wastes (milking center), roof gutter and washing run off should be held in a pond.
- Composting
-
    - Composting is an effective way to dispose carcass while creating a useful product and minimising the potential for groundwater contamination.
    - If managed well, composting can be low cost and relatively odour free. In Composting, micro-organisms break down carcasses to form humus that can be spread over non-productive areas such as domestic gardens and shelter belts.
    - Bulking agents suchas sawdust or straw are to be added for composting. The process may take up to six months depending on the size of the animal.
- Solid/liquid separation for dairy waste
    - Solids and bedding waste should be collected separately in sedimentation pits so that it can be applied as fertilizers.
- Land application
    - it is the best end use of dairy manure and should match the fertilizer requirements of the target crop
- Waste storage pond

- A specially constructed pond used tocollect and store manure, flush water,and polluted runoff from a dairy facility for 3 to 6 months.
- At the end of storage period, the contents are used in land application
- Caution:
  - Impermeable liner to prevent leakage of stored water in to ground water
  - Away and downside of neighborhood, highways and public access area

- Dairy waste lagoon

  - Earthen structures used for biological treatment and long term storage of dairy waste
  - Biological treatment reduces nitrogen content upto 80 percent and can be used in sewer or irrigation lines

- Scrape and Haul

  - Remove solid manure from holding areas by scraping to a special manure holding area to await hauling for land application.
  - This special manure holding area should have an impervious base such as compacted clay, but concrete is preferable. This impervious base should be sloped to drain liquid manure away into a waste storage pond that also handles milking center liquid wastes. Storage areas may also be covered to reduce rainfall runoff into the system. This method of dairy waste management is very basic and is generally most applicable for dairy herds with less than 100 cows.

Fig 2.3.1 Run off Management

Fig 2.3.1 Land application

Fig 2.3.1 Waste storage pond

Fig 2.3.1 Dairy waste lagoon

Fig 2.3.1 Scrape and Haul

Notes

UNIT 2.4: Plan and follow the routine cleaning of animal shed

Unit Objectives

At the end of this unit, participants will be able to:

- Plan /schedule the cleaning of shed
- Clean and sanitize the shed

2.4.1 Plan and follow the routine cleaning of animal shed

Assessment of labour requirement

TYPE OF WORK	Cows per labour
Hand Milking operation including cleaning of animal, heat detection	10
Machine Milking operation including cleaning of animal, heat detection	15
Shed cleaning and grazing	25
Calf management inclusive of feeding, cleaning	25
Other works like cleaning the premises, fodder chaffing etc	50

Table 2.4.1 Assessment of labour requirement

- Train the labour on farm hygiene and biosecurity measure periodically and properly
- Person involved in cleaning operation should be trained covering infectious and non infectious diseases, waste disposal, inceneration and biosecurity measures, cleanliness, food and water safety, pest incidence etc.
- A person with patience, dedicated skill should be allotted to calf pen and calving pen.
- Modern facilities like close circuit cameras, intercom systems can be used to facilitate good monitoring.
- Safety of farm labour is very important. No compromise should be done in this regard, particularly equipment, electrical fittings and facilities should be monitored properly to avoid any untoward incidences.

Routine Daily Dairy Farm Operation

TIME (hours)	SI.NO	FARM OPERATION
03.00 - 03.30	1.	Cleaning/brushing of milch animals
03.30 - 05.00	1.	Feeding half of the daily concentrate ration just before milking
	2.	Milking cows
05.00 - 05.30	1.	Delivery of raw milk (in cans) to milk pick up van of dairy plants and receiving previous day's empty cans
	2.	Washing and disinfection of milking barns
05.30 - 08.00	1.	Cleaning of milk cow sheds
	2.	Feeding of dry/green fodder to milch stock
	3.	Cleaning of farm premises
	4.	Isolation of sick animals
	5.	Isolation of "in-heat" cows for artificial insemination

	Note: use milk man at the rate of one for every 12-14 cows, for all the above operations. Milk man go off duty by 8 am and farm labour come on duty
1.	Cleaning calf, maternity, dry stock, bullock and bull sheds
2.	Feeding half of the daily concentrate ration to calves, pregnant cows and bulls
3.	Exercising and grooming of bulls
4.	Treating sick animals.
5.	Breeding cows that are " in-heat"
6.	Harvesting, chaffing and feeding of green fodder to all the stock. Manger in all sheds should be filled with green fodder
	Note: animals should be taken for grazing (if practiced) between 9 a.m and 2 p.m. in winter and between 6 a.m and 10 a.m. and again between 5 p.m. and 7 p.m. in summer
1.	Lunch cum rest period for labourers
1.	Miscellaneous jobs of dairy farm like stock identification, periodical vaccination, preparation of concentrate mixture, repair of farm fences, fitting and repair of equipments, rope and halter making, weekly scrubbing and white washing of drinking water tank, manure disposal/conservation, hay and silage making, periodical spraying of animal houses with suitable pesticides, periodical deworming of stock, clipping of hair from sides and hind quarters of cows; grooming, toe trimming, dehorning of calves, attending to sale and purchase of livestock and their transportation, fitting and training of cows for show
	Note: the dairy manager should plan the jobs well in advance in such a way that they are evenly distributed over the week. Some jobs may require longer time and the labour have to work extra time on such occasions.

		Milkers come duty by 14.30 hours and remain up to 1730 hours whereas general farm labour go off duty by 1700 hours.
14.30 - 15.00	1.	Washing/brushing of milch cows by milkers
15.00 - 16.30	1.	Feeding the other half of daily concentrate ration to milch cows just before milking
	2.	Milking
	3.	Cleaning calf, maternity, dry stock and bull sheds and feeding the other half of concentrate ration to calves, pregnant cows and bulls
16.30 - 17.00	1.	Delivery of milk (in cans) to milk pick-up vans of milk plants and collection of morning's empty cans
	2.	Washing and disinfection of milking barns
	3.	Feeding dry and green fodder to calves, dry stock and bulls
17.00 - 18.30	1.	Cleaning of milk cow shed
	2.	Feeding green / dry fodder to milch stock
	3.	Cleaning of farm premises
18.30 - 03.00		Night watchman on duty

Fig 2.4.1 Routine Daily Dairy Farm Operation

Exercise

1. Write a note on Ventilation in Cattle shed.

Answer: .....

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Notes

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

3. Establish livestock with in accommodation

Unit 3.1 – Personal protective equipments
Unit 3.2 – Check the suitable environment condition
Unit 3.3 - Handling to minimize stress
Unit 3.4 - Understand and follow thesafety procedures
Unit 3.5 - Ensure cleanliness and follow proper method of waste disposal

AGR/N4102

Key Learning Outcomes

At the end of this module, you will be able to:

- Understand the required suitable personal protective equipment while establishing livestock in accommodation
- Check the suitable environment condition of the accommodation before establishing livestock within it
- Follow the proper handling to minimize stress
- Understand and follow the safety procedures
- Ensure cleanliness and follow proper method of waste disposal

UNIT 3.1: Personal protective equipments

Unit Objectives

At the end of this unit, participants will be able to:

- Understand the requirement of PPE in Farm
- Use the Personal protective equipments

3.1.1 Personal protective equipments

- This standard covers establishing, monitoring and maintaining livestock within indoor accommodation. The main emphasis will depend on the species of animal(s) you work with. Changes may occur in the behavior or physical condition of the livestock and you must be able to take the appropriate action when changes are identified.

- When working with livestock or machinery you need to be appropriately trained in line with current legislation, and hold a relevant award where appropriate.

- You must carry out your work in a way which will consider any impact on the natural environment.

- This standard is suitable for those involved in the establishment, monitoring and maintenance of livestock within indoor accommodation.

Ensure tools, equipment and machinery is fit for use and properly set up prior to undertaking the activity.

- Fencing for cows is a little easier and cheaper option to choose to restrict the movement of cows. Barbed wire fencing is the most common type of fencing.
- Solar Electric fencing is best for farms that interference with animals from outside.
- More rugged fencing such as stand-alone iron panels, wood board or iron rail is best for corrals, handling facilities and working or holding pens, and highly recommended for cull-cow pens.

Outside Lots & Fencing

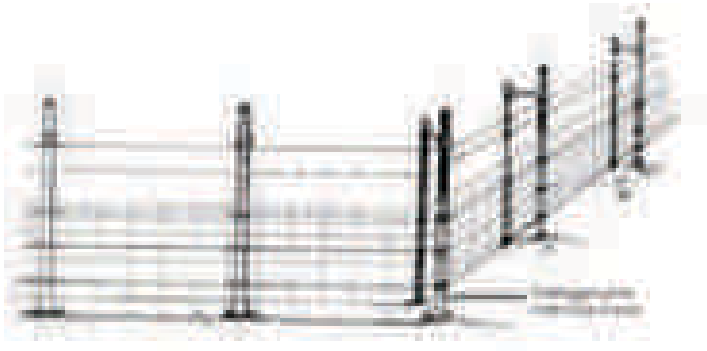

Fig 3.1.1 Fencing

Concrete Lot

Fig 3.1.1 Concrete Lot

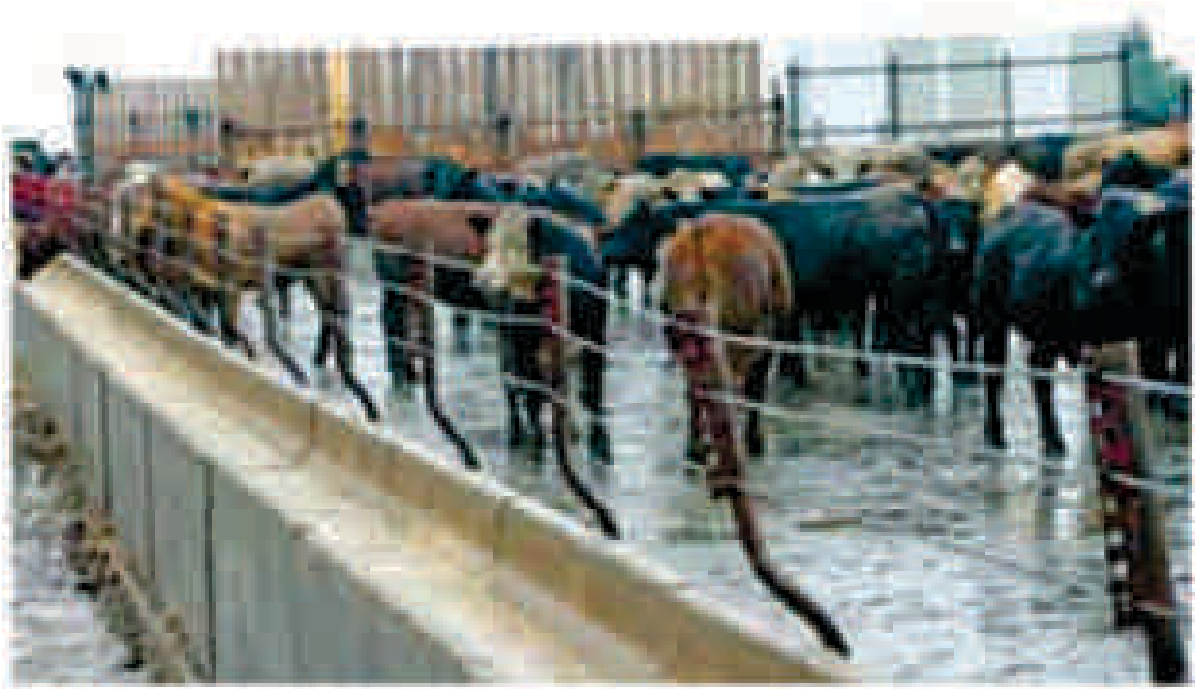

Fig 3.1.1 Concrete Lot

Aprons, Boots, Goggles and Gloves

Fig 3.1.1 Personal protective equipments

The above protective gear helps the farm labour protect from injuries, slipping, dust from feeds materials, contamination from milk or manure.
The materials should be durable, water resistant, easy to clean, non staining and comfortable to the user

Automatic feeding systems

- Automatic feeding makes it easier for you to deliver TMR (Total Mixed Ration). Specific feed rations needs to be delivered regularly and frequently in order to run a successful dairy farm.
- Besides being highly time consuming; measurement and mixing of feed requires attention to detail and precision.
- With automation you will save time and eliminate the guesswork.

Fig 3.1.1 Automatic Feeding system

Fig 3.1.1 Automatic Feeding system

Bedding chopper

- Bedding choppers used to spread bedding materials directly in the farm
- Bedding choppers finely chop large round or square bales.
- Advantage - Save you time, easy to clean and use less straw for bedding.
- Models – Skid loader mount and 4 wheel drive.

Calving pens (portable handling equipment)

Another critical criteria is the need for efficiency and reduced labor. The system was designed to get the most work done, with the least amount of labor. Cattle flow is improved when noise is reduced and this is accomplished with silicone sealant under the sheet metal and rubber bumpers between moving parts.

Cow mats

- Mat has given good comfort to cow, buffalos and bulls. Enabling them to recover from lameness and also increases the productivity of that animal. Each Solid Rubber Mat provides a firm grip to the hooves of the animal when it goes to sit or when it rises.

- The grooved on the underside of mat to allow for drainage and increase the softness. These mats also come with a diamond pattern to minimize slippage. They are available in straight edge orinterlocking.

Milking machines

The portable milking machines are mainly constituted by:-,Milking system: pulsator, claw, stainless steel teat cups,milking liners and tubes, stainless steel milk bucket, etc.

Milk unit washers

- For washing a milking unit, the teat cups are inserted in respective flexible receivers which seal around the enlarged end portions of the teat cups and communicate with a distributor having an inlet connected to a vacuum line for washing liquid.

- During washing, a high vacuum in the milk pipe line raises a valve in the distributor, while closing a drain opening therefrom, and draws washing liquid through the distributor, the receivers, the teat cups therein, the milk claw connected to the teat cups, and then into the milk pipe line for washing the latter.

Milk Bulk tank

- Milk Bulk Tank are made of Stainless steel cabinet with heavy duty polypropylene tank and is used to hold the milk in chilling temperature before it reaches milk processing plant.
- Floor standing, easy to install, requiring only a 13 amp supply.
- Built in water tank means they will work even in dairies with poor water pressure.
- Control has a variety of wash settings to suit individual situations.

Fig 3.1.1 Bedding Chopper

Fig 3.1.1 Bedding Chopper

Fig 3.1.1 Portable handling equipment

Fig 3.1.1 Portable handling equipment

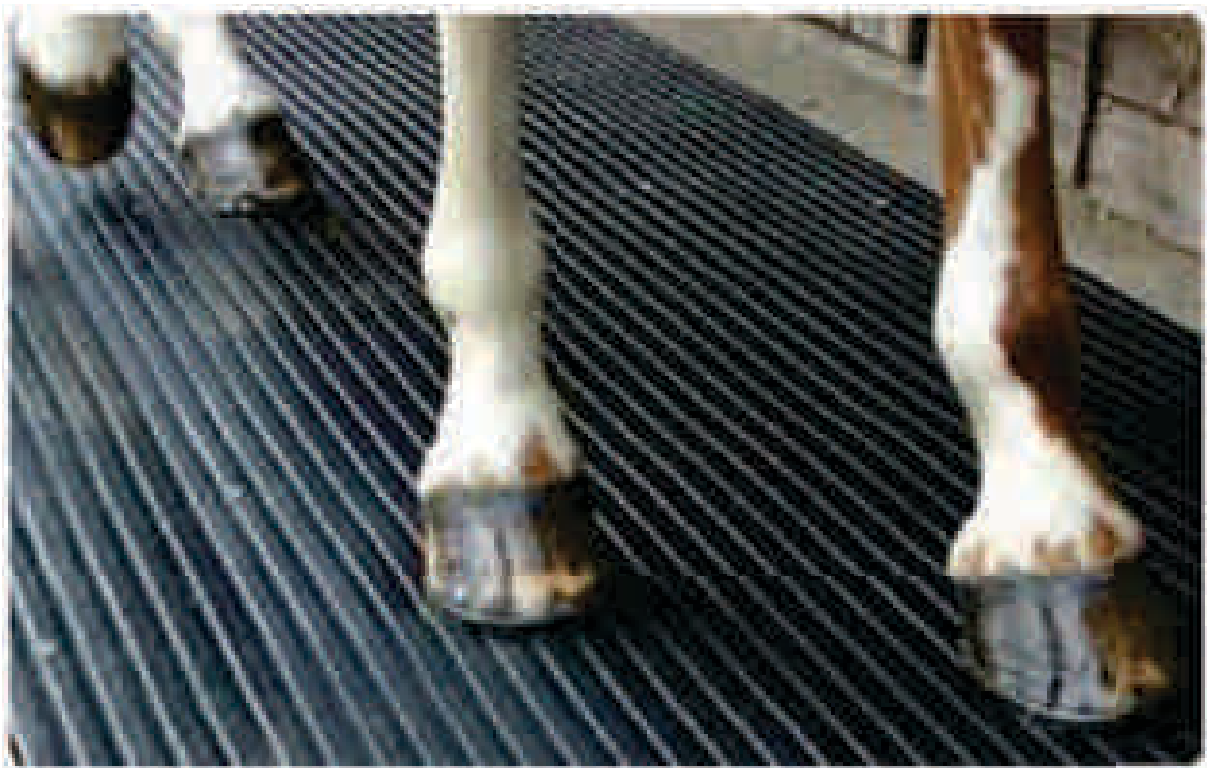

Fig 3.1.1 Cow mats

Fig 3.1.1 Cow mats

Fig 3.1.1 Milking Machine

Fig 3.1.1 Milk Unit washers

Fig 3.1.1 Milk bulk tank

Notes

UNIT 3.2: Check the suitable environment condition

Unit Objectives

At the end of this unit, participants will be able to:

- Confirm the suitability of indoor accommodation ready for the reception of the livestock
- Identify the location for dairy buildings

3.2.1 Check the suitable environment condition

Check the suitable environment condition of the accommodation before establishing livestock within it
Confirm the suitability of indoor accommodation ready for the reception of the livestock.

- Clean and disinfect the materials used for the construction of accommodation, and, in particular for the construction of pens, cages, stalls and equipment with which animals may come into contact,
- Ensure no harm or stress to animal while letting them in
- Ensure accommodation and fittings for securing animals do not have sharp edges or protrusions likely to cause injury.

An efficient management of cow will be incomplete without a well-planned and adequate housing. of cattle. Improper planning in the arrangement of animal housing may result in additional labour charges and that curtail the profit of the owner. During erection of a house for dairy cattle, care should be taken to provide comfortable' accommodation for an individual cattle. No less important is the
(1) proper sanitation
(2) durability,
(3) arrangements for the production of clean milk under convenient and economic conditions, etc.

Location of Dairy Buildings

The points which should be considered before the erection of dairy buildings are as follows.

2. Soil type

- Do not select fertile soil for dairy farm.
- Do not select dehydrated or dessicated soil as they will swell during rainy season and exhibit numerous cracks and fissures.

3. Exposure to the sun and protection from wind

- A dairy building should be located to a minimum exposure to the sun and protection from prevailing strong wind currents whether hot or cold.
- Buildings should be placed so that direct sunlight can reach the platforms, gutters and mangers in the cattle shed.
- As far as possible, the long axis of the dairy barns should be set in the east – west direction to have the minimum effect of tropical sun.

4. Accessibility

- Ensure the dairy farm is easilyaccessible from main road for transport of milk, feed and bedding materials.

5. Durability and attractiveness

- Ensure durability of the structure in addition to attractiveness of the dairy farm.

6. Water supply

- Ensure abundant supply of fresh, clean and soft water

7. Surroundings

- Avoid areas infested with wild animals and dacoits.
- Eliminate narrow gates, high manger curbs, loose hinges, protruding nails, smooth finished floor in the areas where the cows move and other such hazards.

8. Electricity

- Ensure continuous supply of Electricity, as it is the most important for several operations in modern dairy farm.

9. Facilities

- Construct cattle yards in relation to feed storages, hay stacks, silo and manure pits as to effect the most efficient utilization of labour.
- Sufficient space per cow and well-arranged feeding mangers and resting are contribute not only to greater milk yield of cows and make the work of the operator easier also minimizes feed expenses.
- The relative position of the feed stores should be quite adjacent to the cattle barn. Feed storages should be located at hand near the center of the cow barn.Milk-house should be located almost at the center of the barn.Centre cross-alley should be well designed with reference to feed storage, the stall area and the milk house.

Notes

UNIT 3.3: Handling To Minimize Stress

Unit Objectives

At the end of this unit, participants will be able to:

- Understand the behavior animals
- Understand how to minimize the stress in the animals and lead for good production

3.3.1 Follow the proper handling to minimize stress

- Cows need comfort and shelter, fresh water and a healthy balanced diet, freedom of movement, company of other animals, opportunities to exercise the most normal patterns of behavior, natural daylight, suitable flooring, veterinary care, avoidance of unnecessary mutilation and emergency arrangements.

Monitor and assess livestock health and welfare

- Conduct regular and periodic health and welfare checks in the farm
- Recognize and report symptoms of ill health and common diseases, disorders or parasite infestations
- Handle cows in calm and stress environment.

implement livestock health and welfare procedures

- Occupational Health and Safety (OHS) hazards in the workplace are recognized and safety issues reported according to enterprise requirements.
- Quarantine and bio security procedures are maintained as instructed to minimize the risks of disease introduction.
- Thorough personal hygiene practices are maintained in all activities associated with handling livestock, including reducing risks from diseases transmissible to humans.
- Sick or dead livestock are safely treated and humanely destroyed, if necessary.
- Environmental implications associated with livestock husbandry practices are identified, assessed and relevant measures implemented.

Maintain the indoor accommodation in accordance with livestock requirements.

Temperature:

- The overriding environmental factor affecting the physiological functions of domestic animals is temperature. For most farm animals, a mean daily temperature in the range 10–20 °C is referred to as the 'comfort zone'.
- In this range, the animal's heat exchange can be regulated solely by physical means, such as the constriction and dilation of blood vessels in the skin, ruffling up the fur or feathers and regulation of the evaporation from lungs and skin.
- At the upper and lower critical temperatures, physical regulation will not be sufficient to maintain a constant body temperature and the animal must, in addition, decrease or increase its metabolic heat production.
- A further decrease or increase in temperature will eventually bring the temperature to a point beyond which not even a change in heat production will be sufficient to maintain home other my.
- A very young animal, lacking fully developed temperature-regulating mechanisms, particularly the ability to increase heat production by increased metabolism, is much more sensitive to its thermal environment and requires higher temperatures.

Humidity

- Cows have varying abilities to sweat and, in descending order.
- In a hot, dry climate evaporation is rapid but, in a hot humid climate, the ability of the air to absorb additional moisture is limited and inadequate cooling may result in heat stress.
- Excessively low humidity in the air will cause irritation of the mucous membranes, while excessively
- high humidity may promote the growth of fungus infections. High humidity may also contribute to decay in structures.
- If possible, keep the relative humidity in the range of 40 percent to 80 percent.

Radiation

- The heat load on a grazing animal can be increased considerably by direct solar radiation and radiation reflected from clouds or the ground.
- A white hair coat will absorb less radiant energy than a dark one, but the heat penetrates deeper into a white, loose coat.
- Air movements will dispel the heat and reduce the differences. Solar radiation may also adversely affect the animal's skin, in particular breeds with unpigmented skin.

- Heat gain by radiation can be effectively reduced by the provision of a shaded area. It must, however, be
- sufficiently large to allow space between the animals to avoid reducing heat loss by other means. Grass-coveredground in the surroundings of the shade will reflect less radiation than bare soil.

Precipitation

- Avoid cows moving outdoor during monsoon. Heavy rain coupled with strong wind lead to excessive cooling and cause cold stress or lead to discomfort to cows.
- However, a naturally greasy hair coat will resist water penetration and with the provision of a shelter for the animals the problem may be avoided altogether.

3.3.2 Monitor livestock in their accommodation

Outdoor

- Prepare a plan for dealing with emergency situations such as adverse weather conditions or an outbreak of a serious disease.
- A good thing to have in your health and safety plan is an isolation system so that you can control a disease if there is an outbreak in your cattle.

Indoor

Ventilation

- The first and most important thing that you must consider when housing cattle indoors is ventilation.
- The main reason for this is because respiratory infection is undoubtedly the most common and the most financially damaging disease in housed calves and cattle.
- There are three different ways in which you can provide indoor livestock with ventilation; these are by wind effect, by outlet, or by inlet.
- You must remember that cows release a lot of heat and gas and therefore good ventilation also helps to control the air space/humidity and the gas concentrations.
- Good ventilation also allows cattle to have unlimited access to fresh air, so that it is as if they are outside.

Insulation

- This is done by providing them with bedding
- This provides the cows with all of the insulation they need as they do not need a lot because cows release their own heat.
- Insulation also links to temperature, it is important that cows are kept at a suitable temperature because otherwise it could cause illness.
- Cows release a lot of their own heat and therefore they do not need to be kept in very heated conditions.
- Flooring gives good insulation.
- This can link in with drainage because you must have to include this into your flooring plan. The most common flooring that is used is fully slatted flooring because cattle lie down regularly and bare slatted flooring would be uncomfortable

Lighting

- Ensure access to day light for cows. Do not place them in dark and damp corners.
- Keep Artificial lights that mimics natural light in the farm
- Avoid too bright or flashy lights in the farm.
- Lighting facilitates early identification of any abnormality in the farm.
- Good lighting stimulates feeding and result in high milk yield.
- Do not overcrowd cows in dairy farm as it leads to poor welfare and can increase the spread of disease. It can also cause the cattle to fight because they do not have enough space and it can also be caused by restricted access to food.
- With cattle it is especially important that you do not overstock when you have calves.

Overall, the main aim of the indoor accommodation is to provide shelter for the cattle; it should protect them from the extremes of rain and snow and protect them from the wind. This is really important because if cattle are not kept correctly and not kept in the correct conditions then it is not only seen as unfair to the animal but it can also cause the animals to become ill or die and therefore farmers end up losing lots of money because of it.

Fig 3.3.2 Outdoor livestock accommodation

Fig 3.3.2 Indoor Accommodation

Notes

UNIT 3.4: Understand and follow the safety procedures

Unit Objectives

At the end of this unit, participants will be able to:

- Maintain Safety at the workplace
- Prepare the checklist

3.4.1 Understand and follow the safety procedures

Maintain Safety at the workplace

Every year incidents involving livestock account for a large proportion of the injuries sustained by people working on farms. The effects can be severe.Many injuries caused by cattle result in the farmer being unable to work for months.

Before you start

Before working with Cows take a moment to Stop and Think!

- Follow safety procedures while working with cows. Ensure that the cows are restrained properly. Ensure you wear necessary protective gears.
- Ensure that the cows are not aggressive. Agitated or stressed animals are more likely to be dangerous. Certain tasks, such as veterinary work, may also increase the risk.
- Take care while approaching a recently calved cow, sick or stressed cow. The risk is increased if the animals have not been handled frequently.
- If cows are not restrained, always check that there is somewhere safe you can get to easily
- Work out an escape route or refuge before working with cattle.
- Attempting to carry out stock tasks on unrestrained cattle or with makeshift equipment is particularly hazardous.

Preventing disease

- Zoonoses are diseases passed from animals to humans. Reduce the risk of infection by vaccinating animals where appropriate and always wear suitable protective clothing when handling animals or potentially infected material such as the afterbirth or faeces.
- Ensure good personal hygiene at all times
- Wash and dry your hands before eating, drinking or smoking.

The Stop and think checklist The following helpful tips will help keep you safe on the farm.

Always

- make sure handlers are competent and agile
- work out an escape route or refuge before working with cattle
- be careful around cows and heifers with new-born calves
- remember that cows that are 'on heat' are unpredictable
- try to keep cows calm when handling them
- use a stick to assist in directing cow
- debud calves early to prevent horn growth
- watch for warning signs of animal aggression, especially in bulls and newly calved cows and heifers
- cull aggressive and difficult cows as soon as possible
- use well-designed facilities
- regularly check and maintain facilities such as the crush, gates and fences
- keep ground surfaces clean, as far as possible
- protect yourself against disease with proper personal hygiene

Never

- put an inexperienced handler or a child at risk with cows
- turn your back on a cow following calving
- stress or arouse cows unnecessarily
- keep dangerous cows
- beat or shout at cattle unnecessarily – they remember bad experiences

Principles of handling cows safely

- Keep cows calm
    - The following factors makes handling difficult
        - Hunger, Thirstyness
        - Loud noise – dog barking or motor traffic
        - Being hit or beaten
        - Being chased
        - People in personal space
        - Sickness
    - The following factors calms cow
        - Working in quiet and confident way
        - Familiarity
        - Gentle and low sounds
        - Rhythmic sounds and talking to cows
        - Stroking

- Recognising danger signs
    - Bellow loudly
    - Paw the ground with hooves
    - Head down facing the ground likely to butt
    - Lifted tail position
- Use gentle handling
- Learn the 'flight zone'
    - 5 mts or less
    - Cows will move when you enter this zone. It is proportional to speed and how close you move towards the cow
- Balance lines
    - Cattle have two balance lines.
    - One runs across the shoulders and the other runs along the backbone.
    - When you're working up close, whichever way you move through those lines, the animal will move the other way:
        - If you're alongside the animal and move forward, it will move backward.
        - If you go back, it will go forward.
        - If you're in front and move to the left, it will move to your right.
- Use your voice
    - Cows can not see the way we see
    - Good handlers use voice to calm the cows
    - Voice helps cows to assess your position or closeness

- Use a waddy
    - Use a long stick with a cloth like a flag
    - Helpful to handle difficult animals
- Be firm
    - Assert your position as dominant person needing respect
    - Do not threaten the cows frequently
- Avoid getting kicked
    - Stand away from cows
    - If need to stand close, watch yourself for safety or ensure the cow is restrained properly
- Wear the right gear
    - Gumboots or Leather boots with steel toe-caps are best.
    - A strong pair of trousers and leggings softens the severity of kick injuries.
    - Remove watch, jewellery
    - Roll your sleeves down

Render appropriate emergency procedures

- Inform the local authorities in case of disease outbreak.
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- An animal disease outbreak may occur through natural pathways or could be introduced as an act of terrorism.
- Response measures for an animal disease emergency may involve the mutual aid support from sister counties and municipalities as well as local private industry support.
- Animal disease emergencies may lead to prolonged economic impacts requiring long term federal and state assistance programs for recovery.
- Owners losing livestock in an animal disease emergency or persons responding to the situation may require psychological counseling and support.

Notes

UNIT 3.5: Ensure Cleanliness and Follow Proper Method of Waste Disposal

Unit Objectives

At the end of this unit, participants will be able to:

- Understand the importance of cleanliness of shed
- Understand the disinfectants to be used

3.5.1 Ensure cleanliness and follow proper method of waste disposal

Washing of cattle

- Wash cows to remove the dirt and maintain health
- It also helps in regulating body temperature in summer.
- Wash cows twice daily, preferably before milking.
- Wash the regions of flank, udder and tail with antiseptic lotions and dry with a clean towel.

Clean, dry floors to prevent slips and falls:

- Maintain clean, dry floors in milking and bedding area
- Prevent slips and falls in the workplace. Different categories of floor cleaners serve different purposes.
- However, some products may contain chemicals that can be detrimental to flooring, so be sure to talk with a cleaning professional about what is best for your facility.
- In addition, keep your floors dry by using absorbent materials, such as floor mats.

Disinfectants prevent the spread of germs and illness, including the flu.

Germs can easily spread throughout a workplace, particularly during flu season—but disinfecting surfaces and objects with EPA-registered.

Disinfectants

- Disinfectants are germicide or antiseptic substances to kill organisms and their spores.Disinfection means destruction of pathogenic micro organisms from a place so that the place becomes free from infection.
- Disinfection can be brought about with the help of physical, chemical and gaseous agents. Most disinfectants are chemical agents.
- A good disinfectant neither stains nor damages materials and is free of undesirable odours.

Types of disinfection

- Physical disinfectant
- Flame gun
- Ticks are eradicated using flame guns in dairy barn
- Radiation
- Artificial UV lamps can be used for disinfection
- Filteration – Control microbial population
- Air filters in ventilation
- Water filters in drinking water or drainage
- Dessication – Removes moisture from microorganism
- Chemical disinfectant
- Most widely used in veterinary practice, as their aqueous solutions are easy to prepare.
- Gaseous disinfectants – Fumigation is done. Primarily in empty sheds one or two days before the animals are placed.
    - Formalin gas
    - Ozone gas
    - Cresol gas

Proper air filtration

- Install air filters to prevent hazardous dusts and vapors from feed and manure
- Accumulated dusts and vapoursare hazardous substances that can create an unsafe environment for employees.
- Maintain humidity around 30 to 50 percent through the use of a dehumidifier
- Eliminate air pollutants and promote clean air in the workplace.

Clean light fixtures improve lighting efficiency.

- Bright workspaces ensure cleanliness and highlight dirt
- Dirty light fixtures can reduce essential light levels, making it difficult and unsafe for employees to complete their daily tasks.
- Clean light fixtures significantly improve lighting efficiency in the place.
- Well-lit stairways and aisles are also important in preventing accidents and maintaining a safe work environment.

Proper disposal of waste and recyclable materials keeps work areas clutter-free.

- Do not allow trash to pile up and clutter the farm
- Use Disinfectants to eradicate pest in the farm. Untidy work environment allow pests to breed and pose a severe threat to health and well being of cows.
- Place “no-touch” wastebaskets in key locations and ensure materials are disposed of to reduce the spread of germs.
- Recycle materials and ensure a more sustainable environment.

Fig 3.5.1 Washing of cattle

Fig 3.5.1 Cleaning of accommodation

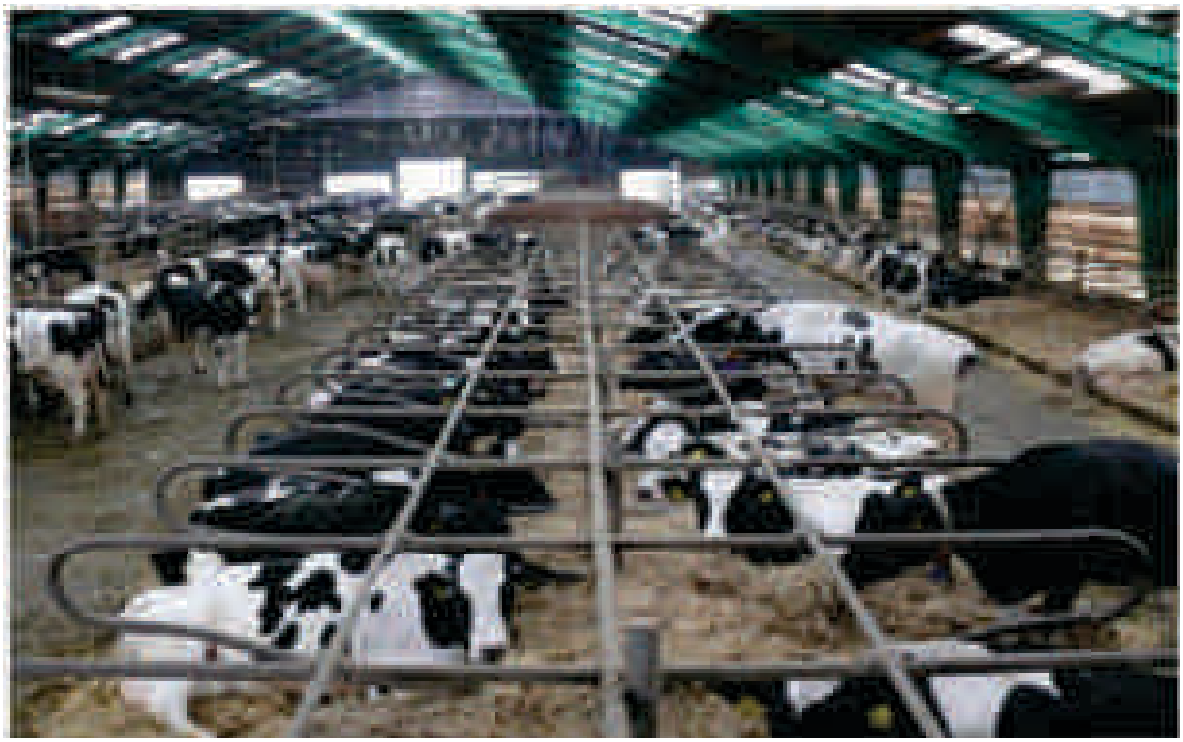

Fig 3.5.1 Cleanliness in accommodation

Fig 3.5.1 Cleanliness in accommodation

Exercise

1. Write a note on Minimizing the stress in Dairy animals..

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Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

4. Provide feed and water for livestock

Unit 4.1 - Feed Composition and Quality
Unit 4.2 - Understand the Nutrition requirements for animals
Unit 4.3 - Identify and procure the inputs required for the feed preparation
Unit 4.4 - Arrange for various feed and feed supplements essential for animal nutrition and growth
Unit 4.5 - Follow feeding chart and store feed
Unit 4.6 - Prepare Feed with the mixture of right components
Unit 4.7 - Provide the feed and water to cattle
Unit 4.8 - Understand the wastage minimization

AGR/N4103

Key Learning Outcomes

At the end of this module, you will be able to:

- Identify and procure the inputs required for the feed preparation
- Compose the Feed (Considering the nutrients requirement for animals)
- Maintain the quality of the feed
- Arrange for various feed and feed supplements essential for animal nutrition and growth
- Follow the Feeding Chart and store feed appropriately
- Provide the feed and water to cattle
- Minimize the wastage

UNIT 4.1: Feed Composition and Quality

Unit Objectives

At the end of this unit, you will be able to:

- Prepare balanced ration
- Identify the feed components
- Procure the ingredients
- Prepare feed and feed supplements for dairy animals

4.1.1 Animal Feed Composition and Types

Farmers keep livestock for obtaining milk. Food is the source for production for all such products as well for producing offspring. We call as 'food' of what ourselves eat. The same is known as 'ration' in the case of animals.

Nutritionally balanced ration is a must for keeping the animals healthy and strong.Without proper food, i.e. ration, animals cannot grow well, cannot keep good health, nor can they produce products and young ones properly. That is why we have to feed animals with nutritionally balanced and adequate quantity of rations.

Hence the need to feed livestock scientifically according to their body needs.

The feedstuffs used for feeding livestock can be classified into three major classes depending on the contents of fibre, moisture and nutrients as:,

Fig 4.1.1 Animal Feed Composition and Types

(a) Green or Succulent forages or fodders:

Forages are Edible parts of plants, other than separated grain, provide feed for grazing animals, or that can be harvested for feeding. Includes browse, herbage, and mast.

(b) Dry forages or fodders:

Hay has been the traditional forage provided for dairy cows during the barn feeding season. Cows fed excellent quality hay free-choice consume forage dry matter at a maximum rate.

(c) Concentrate Feeds.

Concentrates for dairy feeding come in a perplexing variety of different individual ingredients, descriptions and forms, each with their own advantages and limitations. Concentrates are good for: Providing highly concentrated sources of nutrients to supplement forages

Their classification is given in the below.

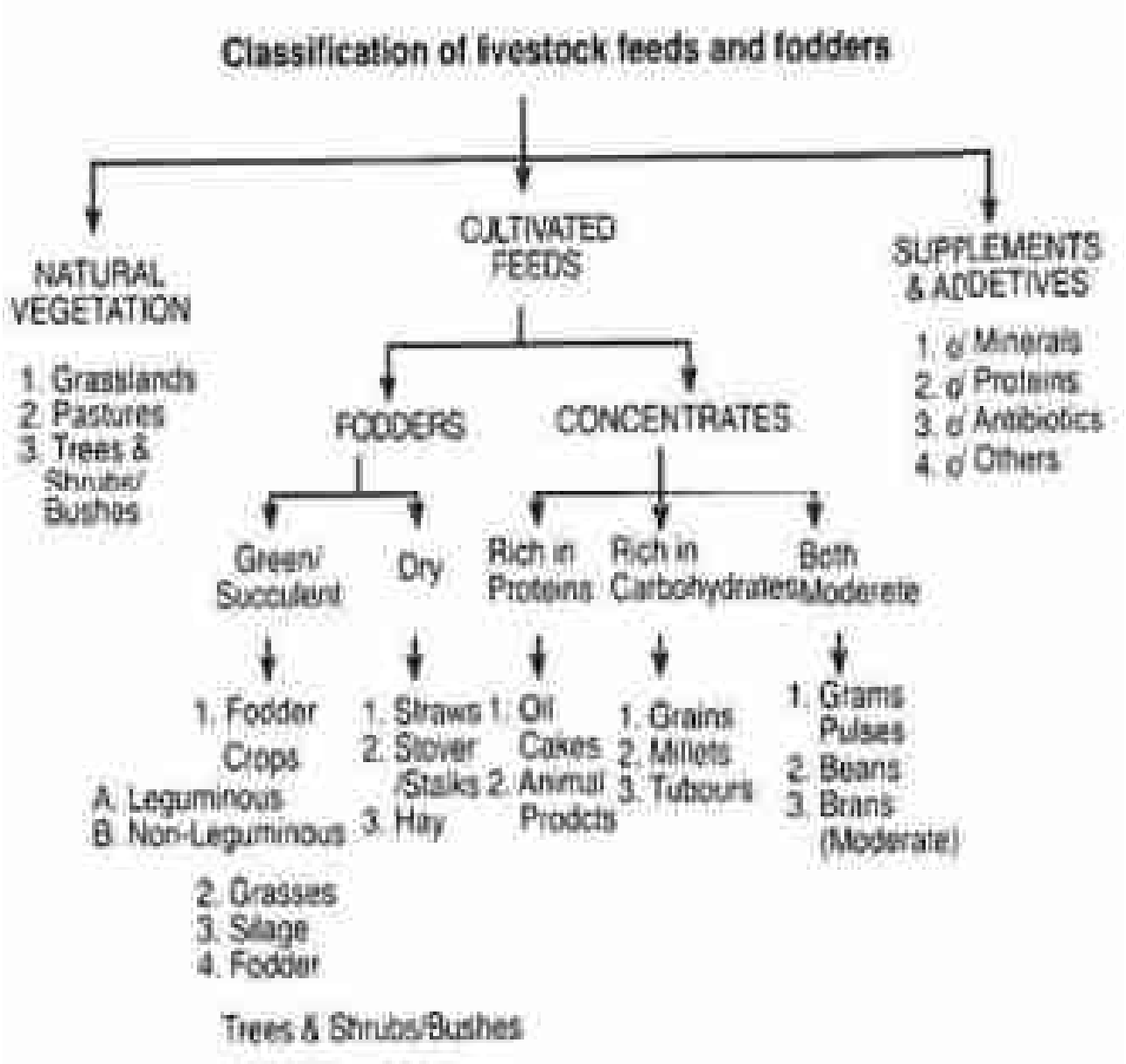

Fig 4.1.1 feed and Fodders

The forages – both green and dry are also known as bulk feeds or roughages, as they are voluminous due to high fibre content. They contain fewer nutrients per unit weight. By cultivated feeds and fodders we mean all those main and by products obtained via cultivation of crops by farmers, whatever may be their nutrient quality. The natural vegetation is that that occurs in nature even without human endeavour. On the other hand, there are some nutrients that are added to feeds or supplemented to the ration for providing some specific nutrient or group of nutrients.This is done to provide important high value nutrients in small quantities. Due to ever diminishing livestock feeds in the country, many unconventional feeds ranging from tree leaves to sea weeds were increasingly being recommended as animal feeds, especially during scarcity periods.

Feed Quality of Livestock:

The nutritive value of a feed is determined by analyzing the quantity of various nutrients present in it, which will be available to the animal for maintenance, growth and/or production.
This has to be determined with respect to energy, protein, minerals and vitamins.

Fig 4.1.1 Animal Feed Composition and Types

Feeding Standards or Requirements of Livestock:

Feeding standards are statements of the average daily nutrient requirements of different types of animals. Scientists have come to the help of farmers by providing certain guidelines in selecting properly balanced rations for meeting the nutrient requirements of various types and classes of livestock.
These recommendations have been collected, classified, tabulated and revised from time to time and have come to be known as feeding standards.
Thus, feeding standards are tables stating the amount of various nutrients that should be present in the daily ration of different classes of livestock for optimum results in growth, work and production.

Concentrate Feed of Livestock:

Concentrate feed means a mixture of milled grains, pulses, oil cakes etc. Given in Table below are set of formulae to make feed mixtures with ingredient available in different regions of the country. Farmers can use those ready-made formulae for preparing concentrate mixtures themselves.

Average dry matter content in feeds may be considered as follows:

All air-dry materials such as dry roughages, cakes and grain	90%
Succulent silage	30%
Green pasture, green maize, etc.	25%
Jowar young	30%
Jowar ripe	40%
Green legumes like berseem and lucerne	20%

Fodder Production:

The system of fodder production varies from region to region, place to place and farmer to farmer, depending upon the availability of water mainly and other inputs like fertilizers, insecticides, pesticides, etc. and the topography.

An ideal fodder system is that which gives the maximum out turn of digestible nutrients per hectare, or maximum livestock products from a unit area. It should also ensure the availability of succulent, palatable and nutritive fodder throughout the year.

One crop combinations sown in a season followed by the second crop combination after the preceding crop is harvested. Also one can choose from one of the 2 or 3 crop rotations recommended as it suits his/her farm conditions.

Fodder Crops of Livestock Feeding:

Leguminous Fodders	**Leguminous Fodders**	*Non-Leguminous Roughages*
Important true clovers useful as fodder crops are Berseem (Trifoliumalexandrinum), Shaftal (T. resupinatum), White clover (T. repens), Red clover (T. pratense) Crimson clover (T. incarnatum) and Subterranean clover (T. subterraneum).	Among medics, Lucerne (Medicago sativa) is the most popular fodder crop. Black medic (M. lupulina) and Bur clover (M. hispida) are other members of utility as fodder. Crotalaria group includes a large number of species useful for foraging like Sunhemp (Crotalaria junica), Cowpeas or Lobia (Vignasinensis) and Kudzu vine (Pueraristhunbergiana). Certain other legumes like soya beans (Glycene soya) are also important in livestock feeding.	The non-leguminous fodder generally consists of a lower percentage of nitrogen. Therefore, when livestock get non-leguminous fodder, special care has to be taken to add sufficient protein rich concentrates to balance the ration. They include many cereal fodder crops, perennial cultivated grasses, some indigenous grasses and introduced grasses.

Important cereal crops used as fodders:	Important perennial cultivated fodder grasses crops used as fodders:
Maize (Zea mays), Sorghum (Sorghum vulgare), Bajra (Pennisetumtyphoides), Oats (Avena sativa) and Teosinte (Euchlaenamexicana).	Para grass (.Brachianamutica), Guinea grass (Panicum maximum), Napier grass (Pennisetumpurpureum), Hybrid {giant) Napier (an interspecies cross between Napier and Bajra), Rhodes grass (Chlorisgayana), Blue panic grass (Panicumantidotale) and Sudan grass (Sorghum vulgarevar Sudanense).

Dry Fodders of Livestock Feeding:

Dry fodders contain more than 85% dry matter, i. e. less than 15% or moisture. They are highly fibrous, bulky, and less digestible and mostly help in filling the large digestive tracts of ruminants.

Grasslands, Trees & Shrubs Used for Livestock Feeding:

Grasslands are those covered with grasses and other edible plants of the locality that can be used for grazing livestock. Though the grasses grow naturally season wise, farmers can also carry out reseeding and develop the grasslands. We do not have specific pastures (cultivated grasslands) for livestock like in western countries.

Lucerne

Leucaena

S.Hamata

Guinea Grass

Fodder Maize

Fodder Cholam

Fodder Cumbu

Fodder Cow Pea

Cumbu Napier

Fig 4.1.1 Dry Fodders of Livestock Feeding

Exercise

1. Write a short note on Fodder Production in Dairy Farming.

Answer: .....

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2. Identify the Specimen..

Answer:.....

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3. What is balanced Feed ?

Answer:.....

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4. What are the main components for the animal feed preparation?

Answer:.....

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5.Identify the Fodder crop.

Answer:.....

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Notes

UNIT 4.2: Understand The Nutrition Requirements For Animals

Unit Objectives

At the end of this unit, you will be able to:

- Identify the nutrition required for the Dairy animal
- Identify the components of nutrient rich diet

4.2.1 Understand the nutrition requirements for animals Nutrition and Feeding

Nutrition requirements for cows include proteins, energy and fibre in balanced portion. Dairy nutrition is the nutrient requirements of dairy cows at various stages of lactation and combining various feed ingredients to meeting the needs in the cost effective manner.
Animals need a daily supply of all nutrients required for maintenance and production: milk, meat, growth and pregnancy. Any type of nutrient can disturb the performance levels. Care has to be taken for high and average yielding cows, most likely to be in short supply are energy and protein.
Further, the nutrient rich diet should additionally be

- Cost effective
- Palatable
- Free of anti nutrients

The critical ones for practical rationing on farm are energy and protein, as these are the most costly nutrients to supply

Energy;

A dairy cow's energy requirement(Metabolisable Energy (ME)) is provided in the 'Feed into Milk' model that take account of several factors including live weight, live weight change, milk energy output, milk fat, efficiency of energy use, pregnancy and teen edgy density of the diet. ME is expressed as mega joules per kilogram dry matter (M J /kg DM).

For basic feed planning, it is the overall ME requirement that is important, irrespective of how that requirement is met by grass, forages, or other feeds.

The cow's response to energy depends not only on the amount supplied, but also on the way the carbohydrates and fats are presented. Carbohydrates like simple sugars and starches and more complex hemicellulose and cellulose are fermented in the rumen and broken down to volatile fatty acids to provide the energy required.

Sugars and Starch

Presence of sugar and starch increase the fermentation rate in rumen. Excess sugar and starch will lead to acidosis. While less of sugar and starch in the diet, lead to less fermentable energy by rumen microbes for protein synthesis. It is advisable to include right amount of sugars and starch for optimum performance of dairy cow

Fibre

Expressed as Neutral Detergent FIbre (NDF) Cellulose, hemicellulose and lignin are dietary fibre that is digested in slower rates. Excess of fibre will reduce the rate of fermentation rate while less of fibre will cause acidosis.

Proteins:

In ruminant diets protein is expressed as crude protein (CP),which is a simple measure of the nitrogen content of a feed.This is measured as the nitrogen content of the food multiplied by 6.25, as the nitrogen content ofprotein is 16%. It is expressed in feed analysis as grams per kilogram dry matter (g/kg DM) or as % DM.

The proteins in feeds are broken down in the rumen – known as Effective Rumen Degradable Protein (ERDP), to the building blocks of amino acids and ammonia. Rumen microbes act on ERDP and reform into the protein the animal requires to live, grow and produce milk and offspring.

Feeds are character isedby the extent to which they are degraded in the rumen to provide nitrogen for microbial protein synthesis. Meta bolisable protein is supplied from both micro besand from by-pass protein which is digested in the intestine.

Digestible **crude protein (DCP)** is used to evaluate protein requirements, and it means the crude protein remains after losses in the faces. For high-yielding cows, which have been shown, to benefit from protein that escape microbial degradation in the rumen and is absorbed as amino-acids in the small intestine.

Following this approach crude protein can be split into

1. **Rumen degradable Nitrogen (RDN)** and
2. **Undegraded** Dietary Nitrogen (UDN).

If sufficient RDP is not available, the rate of digestion of fibrous as well as concentrate rich diets will be reduced. This leads to a reduction in intake, lower energy supply and reduced milk production. Some protein nitrogen can resist microbial breakdown in the rumen and can pass directly to the cows intestine is called by-pass protein. This is especially profitable for high-yielding cows, therefore important to have the optimum balance of UDP and RDP in the diet.

Fats

Fats are composed of different fatty acids and act asimportant sources and stores of energy. Dairy cows can produce fats from excess energy intake. But diet need to by supplied with some essential fattyacids that are not produced by the animal.Fats form importantparts of cell walls and are involved in energy transfer.

Fats increase the energy density of the ration because theyhave a much higher ME content than carbohydrates. However,their inclusion should not exceed 5–6%, as at high levels theycoat the rumen microbes which reduces their fermentationcapacity and efficiency.

Minerals and Vitamins

The major mineral requirements for dairy cows are calcium and phosphorus. The calcium phosphorus ratio is important, and an imbalance can cause infertility. Seashells and fish meal are good mineral sources. All the required minerals can be incorporated in feed supplements.

Other major minerals that dairy cows require for production are Potassium, Magnisium, Sodium and Sulphur. Dairy cows need minor minerals such as Copper, Cobalt, Selenium, and Zinc for maintenance, growth and health.

Vitamin supplements are often added to balanced rations prepared as feed to be used in animals housed and reared in intensive systems. Vitamin A is one of the most important vitamins in animal nutrition. This vitamin is found in the carotenoid pigment of green plants; Vitamins D, E and K are also present in green plants.

Animals feeding on green pasture normally receive all vitamins that are needed.

Nutritional needs of cows depend on age, live weight and production levels. The requirements of ME and DCP for maintenance, milk production, pregnancy and live weight change are supplied.

Water

Water is essential for carrying nutrients around the body, rumen fermentation and digestion, control of bodytemperature and as a major component of milk.

A dairy cow yielding 45 litres of milk requires approximately 120 litres of water per day. It is essential that an adequatesupply of good clean water is available to all stock.

How much nutrients the dairy animals need?

For Dairy Cows

Liveweight (kg)	ME allowance (MJ/day)
450	50
550	70
650	80

Table 1: Guidelines for the daily energy allowance for maintenance

Daily energy required for milk production is 5.3MJ ME/litre milk.

A 650kg cow producing 7,500 litres in a lactation will need (80 x 365) + (5.3 x 7,500) = 68,950MJ ME over the course of a production year.

This same cow will need approximately 650kg of CP over theyear plus or minus 120kg CP for every 1,000 litres variancefrom the 7,500.

Exercise

1.The nutrient rich diet should be
Answer:(a)----------
(b)----------
(c)----------
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2. Excess of fibre will reduce the rate of fermentation rate while less of fibre will cause ----------
Answer:.....
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3. What is DCP and its role.
Answer:.....
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4. What do you mean by RDN and UDN?
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UNIT 4.3: Identify And Procure The Inputs Required For The Feed Preparation

Unit Objectives

At the end of this unit, you will be able to:

- Identify the inputs required for the feed preparation
- Procure the inputs for the feed preparation

4.3.1 Identify and procure the inputs required for The feed preparation

Feeds purchased can show wide variations in quality both between farms and also within the same farm. This cansignifcantly affect animalperformance potential.

The difference in ME between the poorest feed purchased and the average can equate to around 5 litres of milk.

It is important to assess forage stocks to ensure a balanced feeding programme through to turnout, withoutincurring large swings in ingredients, which may cause loss of performance, and dietary upsets.
There are many options for growing different feeds on-farm (see Table 1). It is worth considering not only the feedscurrently fed, but also what could be produced at home toreduce costs and improve overall feeding efficiency.

Dairy farms need to buy feeds to meet all the nutrient requirements of production.
These tend to be higher in energy and/or protein content than forages (see Table 2).

Think about feed nutrients in the whole system. Nutrients,particularly N and P, that cycle in the biology of productionsystems go from feed to animal, to soil to grass and foragecrops, and back to animals.

As grass and forage drives production and profitability, the more efficiently these recycled nutrients are used, the moreefficient the feeding.

Nutrient and feed management plans are intrinsically linked.

The more the N, P, K and S from the soil and manures can be used, with any deficit in crop requirement met with inorganicfertiliser sources, the more the energy and protein from homegrowngrass and forage can contribute.

However this can only be done if the nutrients in the soils, grass, crops and feeds are measured and known. This thenallows a targeted approach to buying-in only that which istruly needed for optimum grass/crop growth and feeding.

Table 1: Typical nutrient content of some home-grown forages and feeds

Feed	Dry Matter	ME	CP
	(%)	(MJ/kg DM)	(g/kg DM)
Grazed grass (good quality)	18	12.0	220
Grazed grass (average quality)	20	10.5	180
Grass silage	25	11.2	140
Forage maize	30	11.2	90
Crimped maize	70	14.0	100
Maize grain	86	14.0	100
Wheat	86	13.6	100
Crimped wheat	70	13.6	100
Cereal wholecrop	30	11.0	100
Barley	86	13.2	120
Peas	85	12.8	240
Beans	86	13.3	290
Potatoes	21	13.3	90
Hay	85	8.8	90
Wheat straw	85	5.0	40
Fodder beet	18	12.0	60
Kale	14	12.0	170
Stubble turnips	8	12.0	120
Swedes	11	13.0	90

Table 2: Typical nutrient content of some bought-in forages and feeds

Feed	Dry Matter	ME	CP
	(%)	(MJ/kg DM)	(g/kg DM)
Sugar beet pulp	89	12.5	100
Citrus pulp	88	12.6	70
Cane molasses	75	12.7	40
Maize distillers	89	14.0	310
Maize gluten	88	12.9	220
Wheat distillers	89	13.5	280
Biscuit meal	90	15.0	130
Rapeseed meal	90	12.0	400
Hipro soya	89	13.8	560
Brazilian soya	89	13.4	500
Trafford Gold	44	13.6	200
Brewers' grains	28	11.4	250

Exercise

1. Identify the fodder.

Answer: .....

2. Write a note on Feed Inputs and procurement.

Answer:.....

Notes

UNIT 4.4: Arrange For Various Feed And Feed Supplements Essential For Animal Nutrition And Growth

Unit Objectives

At the end of this unit, you will be able to:

- Plan for inputs procurement
- Procure the quality inputs
- Check the quality of the feed delivered

4.4.1 Arrange for various feed and feed supplements essential for animal nutrition and growth

Dairy farmer needs to be careful when buying animal feed, because quality of the feed should be good. Don't compromise on the quality for cost. Pay to the seller only when the quality of the feed materials is high.

Dairy farmer need to evaluate different market rates have clear idea on quality of produce and its cost. Getting feedback or opinion with other fellow farmers will give a fair indication on the price and indented quality.

Three steps of the buying process

1. Plan well a. Regularly prepare feed budgets and
b. Decide on the maximum feed price to pay without making any loss.

2. Buy right a. Top priority is feed quality, feed supply as well as price risks.

3. Feed carefully – a. Avoid unnecessary losses
b. Wastage at i. delivery,

ii. storage and
iii. feed-out.

Feed buying methods

farm-to-farm verses trade purchases

Buying directly from a grain or fodder producer may seem appealing, but it's always good to have a closer look. Farmer need to consider supply chain costs, market volatility and supplier risk. Direct purchase from the farmer will have quality or grading issues.

Buying from the market or trader has its own advantages. The feed will be graded and sorted. There will be reference price prevailing in the market for that grade. Disadvantage is it might be costly.

• Visually assess a feed's physical quality first.

• Look beyond the price tag – crunch the numbers using feed lab analysis results.

• Use reliable feed analysis results for value assessments.

• Use yardsticks to determine value per unit energy and protein.

• Factor your time to manage all the tasks associated with managing feed supply.

• Effective management doesn't happen by itself; merchant or trader can take these tasks off your hands.

Dairy farmer need to monitor feed prices on a daily/weekly basis to know what is happening in the market or he should access reliable information source to get these updates. Dairy farmer need to manage supplier risk.

He need to have contingency plans if the supplier doesn't have the feed or fails to deliver.

Buying on value, not price. Visually assess a feed's physical quality first. Look beyond the price tag – crunch the numbers using feed lab analysis results. Use yardsticks to determine value per unit energy and protein.

Also includes:

• Using your senses and experience first

• Things to look for (table)

• Look beyond price tag

• Incorporates series of examples on working out calculations

• Buying energy and protein

Feed Type	Things to look for while buying
Whole grains or grain mixes	• Excessive small grains, which may result in poor feed digestibility and wastage if grain crusher isn't up to scratch. • Visual signs of weather damage or mould, which can increase the risk of fungal toxins (mycotoxins). • Excessive whole grains, which may result in poor feed digestibility and wastage. • Poor uniformity of mix, which may lead to uneven animal intakes and performance.
Pelleted feeds	• Loads delivered still warm, which may lead to development of mould during silo storage. • Excess dust level, which may result in excessive feed wastage
Hay	• Visual signs and odours that may indicate hay was baled at too high a moisture level, or has been weather damaged, which can reduce nutritional value andincrease the risk of fungal toxins (mycotoxins). • Leaf content, which will influence nutritional quality.
Silages	• Dry matter too high or too low for good fermentation. • Excessively long chop length, which may result in sorting by cows and excess wastage. • Off odour, which indicates an unstable fermentation. • Mould, which indicates poor sealing, or black strips of silage material (butyric acid silage).
Co products	• An unusual appearance or inconsistency between deliveries or seasons. • Material too wet or too dry. • Any contaminants or foreign materials, which may reduce nutritional value or cause digestive problems. • Signs of mould, which can increase the risk of fungal toxins (mycotoxins)

• Weigh the feed in the farm during delivery. Deduct the amount if there are any transport losses from the supplier.
• Check the quality of the feed delivered.
• Send the feed sample to laboratory for analysis
○ Dry matter (DM)
○ Metab. Energy (ME)
○ Crude Protein (CP)

• Calculate Value per unit Dry Matter

○ Value per Unit DM (Paise/kg DM)= Cost of feed * 10 / % DM (Lab result)

• Calculate Value per unit ME

○ Value per unit ME (Paise/kg ME)= Value per Unit DM/ ME per KG (Lab result)

• Calculate Value per unit CP

○ Value per unit CP (Paise/kg CP)= Value per Unit DM/ % CP (Lab result)

Exercise

1. What are the main steps of procurement of feeds and inputs? Explain.

Answer: .....

2. What are the things to be considered while buying the feed ?

Answer:.....

Notes

UNIT 4.5: Follow Feeding Chart And Store Feed Appropriately

Unit Objectives

At the end of this unit, you will be able to:

- Estimate the Vitamins and minerals requirement
- Feed milch animals

4.5.1 Follow feeding chart and store feed appropriately

- While preparing the feeding chart for dairy cow, dairy farmer need to ascertain and to meet up the total requirement in terms of, Dry matter (DM), Digestible crude protein (DCP), Total digesible Energy (TDN), Minerals and Vitamins.
- Body weight of the animal and production status of the animals determines the quantity of dry matter
- Cattle will need daily 2.0 to 2.5 kg dry matter while crossbred cows need 2.4 to 3.0 kg dry matter for every 100 kg of live weight.
- All its requirements whether organic nutrients like carbohydrate, protein and fat or minerals or vitamins should come from the total dry matter that has to be allotted.

Dry matter

The dry matter allowance should be divided as follows:

Digestible Crude Protein (DCP) requirement

- The DCP requirement for maintenance is 2.84 g /kg $W^{0.75}$.
- The DCP requirement per kg of 4% fat corrected milk is 132 g of digestible nitrogen for 100 g of milk nitrogen.
- In high yellers about 8% of the total protein requirement should be in the form of 'bypass protein'.
- During the last trimester of gestation an additional amount of 90 to 130 g of DCP have to be provided to cattle of 350 kg to 500 kg body weight.

Total digestible Nutrient (TDN) requirement

- The energy requirements for maintenance are calculated using 122 kcal of ME /kg $W^{0.75}$ (33.74 g TDN) for cattle and buffaloes.
- The requirement for TDN per kg of 4% fat corrected milk is 1188 kcal of ME (328 g TDN).
- During the last trimester of gestation an additional amount of 1.0 to 1.1 kg TDN have to be provided to cattle of 350 kg to 500 kg body weight.

Daily nutrient requirements for maintenance, pregnancy and lactation for cattle and buffaloes

For maintenance of mature Cows/Buffaloes.

Body Weight (kg)	Dry feed (kg)	DCP (g)	ME Mcal	TDN kg	Ca g	P g	Carotene mg	Vitamin A 1000 IU
200	3.5	150	6.0	1.7	8	7	21	9
250	4.0	170	7.2	2.0	10	9	26	11
300	4.5	200	8.4	2.4	12	10	32	13
350	5.0	230	9.4	2.7	14	11	37	15
400	5.5	250	10.8	3.0	17	13	42	17
450	6.0	280	12.4	3.4	18	14	48	19
500	6.5	300	13.2	3.7	20	15	53	21
550	7.0	330	14.4	4.0	21	16	58	23
600	7.5	350	15.5	4.2	22	17	64	26

For maintenance and pregnancy (last 2 months of gestation)

Body Weight (kg)	Dry feed (kg)	DCP (g)	ME Mcal	TDN kg	Ca g	P g	Carotene mg	Vitamin A 1000 IU
250	4.9	270	10.8	3.0	14	12	51	21
300	5.6	290	12.4	3.4	16	14	56	25
350	6.4	320	13.2	3.7	21	16	67	27
400	7.2	350	14.1	4.0	23	18	76	30

450	7.9	400	15.9	4.4	26	20	86	34
500	8.6	430	17.3	4.8	29	22	95	38
550	9.3	465	18.8	5.2	31	24	105	42
600	10.0	500	20.2	5.6	34	26	114	46
650	10.6	530	21.6	6.0	36	28	124	50

Feeding of milch animals

• The nutrient requirement of a lactating cow /buffalo can be conveniently divided into two parts, viz. requirement for maintenance and milk production. If the lactating animal is in first and second lactation, extra allowance, is needed to take care of growth and production.

• Similarly pregnant animals are to be offered extra nutrients during the last two months of gestation. The aim is that by the end of gestation period the cows should not only gain their initial body weight but also put on an extra 25 to 30 kg of body weight.This is necessary to enable the animal to withstand the stress of parturition and to maintain the persisitency of milk production during the subsequent lactation period. The provision of extra nutrients should be given in the form of concentrate mixture and not as forage because roughages are not as efficient as concentrate in increasing the body weight. The rest of the ration must contain sufficient gree feeds so that the colostrum secreted after parturition should be rich in vitamin A.

• During the last 3 days prior to calving, the amount of concentrate mixture should be reduced and a little warm bran is fed to keep the animal in laxative condition before calving.

• After parturition, the cow /buffalo should be given fresh warm water and a mash consisting of 1 kg wheat bran, 1-1.5 kg ground/cooked grains, 0.5 kg jaggery and 25 g each of common salt and mineral mixture. This mash may be continued for 3 to 4 days after calving; theafter, the regular feed is gradually introduced to the cow.

• In feeding high-milk yielder, quality feed, ie., nutrient dense feed need to be given. Ration should contain a minimum 25% DM from forages.Forage should be of superior quality and 30 to 50% of this should be from leguminous crops. Ration may be in the form of complete feed. Frequency of feeding is three to four times a day. To ensure proper nutrient intake, optimum roughage concentrate ratio need to be maintained.

Nutrient requirement per kg of milk production

Fat %	DCP (g)	ME (Mcal)	TDN (kg)	Ca (g)	P (g)
3.0	40	0.97	0.270	2.5	1.8
4.0	45	1.13	0.315	2.7	2.0
5.0	51	1.28	0.370	2.9	2.2
6.0	57	1.36	0.410	3.1	2.4
7.0	63	1.54	0.460	3.3	2.6
8.0	69	1.80	0.510	3.5	2.8
9.0	75	2.06	0.500	3.7	3.0
10.0	81	2.16	0.600	3.9	3.2
11.0	85	2.34	0.650	4.1	3.4

Exercise

1. Write notes on the following

a) Dry matter (DM)

Answer: .....

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b) Digestible crude protein (DCP)

Answer:.....

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c) Total digestible Energy (TDN)

Answer:.....

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UNIT 4.6: Feed Preparation

Unit Objectives

At the end of this unit, you will be able to:

- Identify and use the proper machine for feed mix
- Prepare Feed mix
- Quality check of the feed mix
- Store the prepared feed mix

4.6.1 Prepare Feed with the mixture of right components or procure quality compound feed from suppliers

Storing and mixing feed

The process of storing and mixing feed needs careful attention. The basics of mixing and storing feed are the same as buying fodder and grain/ concentrates:

- Know what's in the feed before you buy it. Get a feed test.
- Store it in a way that you minimize spoilage and wastage.
- Make sure the ingredients fit your flexible feeding system
- Be aware of any potential hazards with certain types of feeds.

When mixing and delivering feed to your herd, check that:

- Follow the machine manufacturer's standard operating procedures for loading and mixing.
- Know what a well-mixed diet looks like and so does everyone in your farm team.
- The feed trough is higher than a foot off the ground.
- There is enough trough space for all the animals in the group.
- There is sufficient cow access to drinking water.
- The diet is palatable for cows, and not too wet, too dry or spoiling too quickly.
- Feed values can change between loads. Get a feed test on a representative sample. Wet feeds can 'shrink' by up to 25% after delivery. Get a feed test and use the figures to compare the costs based on dry matter, energy and protein
- Focus on securing your fodder requirements first, as fibre is essential in the diets of ruminants such as cattle. Then you can think about contracting energy-dense concentrates and protein sources to ensure a continuous supply.
- Use a blend of fibre sources
- Calculate concentrate feed requirement and plan to buy a proportion of your required tonnage on contract so there are no surprises ○ With little pasture, you will have little protein to work with. Make sure you have secured protein sources.
- Remember that co-products such as brewers grains are now commonly used by dairy farmers.

Storage of Feeds

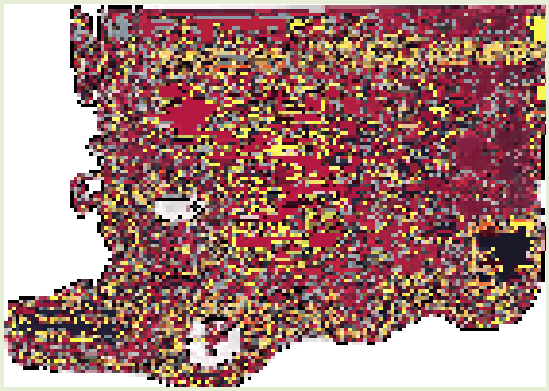
Don't wait until the truck arrives before you work out whereto store feed ingredients.

Cheap and inexpensive feed storage facilities can solve temporary storage issues in the short term but they usually involve higher feed spoilage and wastage costs Other storage factors to consider are

- Dry feeds are subject to wind loss.
- In Wet protein sources, Flies might be problem.
- Mycotoxins (fungal toxins) that can be found in some feed ingredients

Feed mixing and delivery equipment

- Feed mixing and delivery equipment needs to: Be easy and safe to operate.
- Fit with existing farm infrastructure.
- Provide the same diet to all animals in the group.
- Deliver a diet that adds to farm profit
- Be easy to maintain (having local mechanical support is important).

Image	Feed Mixing and Delivery Units
	**Tractor and Bucket Front Loader** •Can only mix dry processed feeds • Time consuming to mix and feed • Uneven mix, so can't include feed minerals, feed additives or urea • Long material separates and is wasted • No weighing (unless fit load cells) • Uneven results re. animal feed intakes and performance
	**Silage Cart** • Can't incorporate long and chopped materials • Uneven mix and feed-out, so can't include feed minerals, feed additives or urea • Long material separates and tends to be wasted. Cows can sort out less palatable ingredients • May be able to weigh if load cells fitted • If has a wide feed-out, this increases wastage • Uneven results re. animal feed intakes and performance

	**Paddle Mixer** **-Cuts feed for processing hay, straw, silage** **-No dead spots and water tight** **-Slow moving** **-Hard to over-process** **-Lower horsepower needed and fuel usage** **-Good for delivering feed on feed-out facilities and in paddocks** **-Simple drive, no gear boxes** **-Volume will depend on feed bulk density** **-Relatively heavy** **-Higher loading height required**
	**Vertical Mixer** -Single or twin cone -Mixes by throwing feed in air -Processes dry materials -Mix uniformity depends on brand. -Take care not to over-process -May not be water tight -Good for delivering feed on feed-out facilities. -Wheel arrangement less ideal for paddock feeding -Good capacity -High horsepower needed -Lower loading height required -Need to do mix to machine's size
	**Horizantal Mixer** -Single, twin or more augers -Works well with grain mixes -Will process dry hay, but some do not take whole bales -Some are not as good with a high proportion of hay in mix -Can compact feed -Some designs have dead spots -High horsepower needed and fuel usage -Some work well in the paddock, as well as on feed-out facilities -Lower loading height required

Exercise

1. Write a note on Feed Mix and Storage.

Answer: .....

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2. Identify the Feed Mixture Machine and mention its role.

Answer:.....

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Notes

UNIT 4.7: Provide The Feed And Water To Cattle

Unit Objectives

At the end of this unit, you will be able to:

- Estimate the monthly feed requirement
- Provide the feed and water to Dairy animals
- Perform effective regular check

4.7.1 Provide the feed and water to cattle

Measuring, mixing and providing the feed

- Poor ingredient measuring can increase acidosis risk, reduce production and be potentially dangerous to the cows.
- Poor mixing can result in feed settling/sorting. Some cows consume too little fibre and increase acidosis risk.
- Poor mixing where cows end up eating lumps of ingredients, such as urea, can have disastrous health consequences.
- Do not allow more than 4-5 hours in mud and slurry. It will increase risk of foot rot.
- Provide more time in the feed-out area (less feeds). It will decrease acidosis risk.
- High fecal contamination and poor teat end condition are two big risk factors for mastitis. Avoid Teat end contact with manure in the first 2 hours after every milking (especially the first 30 minutes)
- Prepare the feed-out area surface well so that it can be scraped/cleaned.
- A good scraping/cleaning program will reduce faucal contamination.
- Crowded cows push. Pressure on hooves can increase lameness risk.
- Work on 9-10 square meters per cow and 0.75 meters per cow of trough area.
- Disease spread is greater when cows spend time in a smaller area. For example, separate a cow with Salmonella quickly to avoid spread.

Planning for what lies ahead is one of the most important skills a successful dairy farmer can have.

Calculate monthly feed

- Accurate head count
- Realistic ME requirements of different classes of stock
- Estimate of pasture supply available on your farm
- Do a feed budget to estimate feed requirements for all stock

Calculate your total feed deficit for each month

This is the animals' DM requirement (from Step 1) less the amount of home-grown DM available (pasture, other standing crops, silage and hay on-hand).
If necessary, seek help from an adviser to estimate quantities of pasture and other home-grown feeds on.

Calculate your monthly feed demand	a. Count how many animals there are to feed, and milk production/growth targets. b. Calculate the daily Metabolisable Energy (ME) requirements of each class of stock milkers, dry cows, yearlings and calves. c. Calculate tonnes of Dry Matter (DM) required for all stock each month, based on animals' daily Metabolisable Energy (ME) requirements and stock numbers.
Calculate your total feed deficit for each month	a. Calculate tonnes of home-grown DM available each month (pasture, other standing crops, silage and hay on hand). b. Subtract tonnes of home-grown DM from tonnes of DM required for all stock each month.
Calculate quantities of each bought-in feed you require each month	a. Describe what feeds you intend to buy to fill the feed deficit for each month. b. Formulate diets for each class of stock – milkers, dry cows, yearlings and calves. c. Using these diets and the stock numbers from Step 1, calculate the total tonnes of each feed that need to be bought each month.
Daily ME requirements for different classes of stock.	
Milking Cows	70-90 MJ ME for maintenance (depending on liveweight) plus 5-5.5 MJ ME per litre milk*
Dry Cows *(550 Kg – No change in wt)*	90-100 MJ ME
Calves	40-80 MJ ME / day
Heifers	80-100 MJ ME
Bulls *(700 kg No change in wt)*	90-100 MJ ME

Calculate bought in feed
Calculate quantities of each bought-in feed you require each month

a. Describe what feeds you intend to buy to fill each month's feed deficit. What are the dry matter, meta bolisable energy (ME), crude protein (CP) and neutral detergent fibre (NDF) contents of the grains or concentrates, hay, silage and co-products you intend to buy?

b. Formulate diets for each class of stock – milkers, dry cows, yearlings and calves.

c. Using these diets and the stock numbers from Step 1) calculate the total tonnes of each feed that needs to be bought each month.

Closing your feed gap - key considerations

- Home-grown pasture and crops
- Feeding more grain/concentrates safely
- Extending forage reserves with high fibre by-products
- Drying off early

Supplementary forages and forage extenders available - key considerations

- Feed market information
- Cost / tonne and comparative $ value per unit energy and protein
- Limits to recommended daily feeding rates for specific feeds

- Risks eg. my cotoxins, chemical residues

Diet formulation - key considerations

- Meeting cows' daily energy and protein requirements for target milk production level within their appetite limit
- Ensuring adequate effective fibre for good rumen function
- Feed additives

Effective Feeding Checks

1. Concentrate left in the feed trough

a. Feed left behind in the dairy indicates a problem
b. If half the bails have more than 10% of grain / concentrate left behind after milking, check the accuracy of the feeding system by weighing feed allocation in 10–20 individual feeders.
c. If the feeders are working correctly, consider reducing feed.
d. If more than one bail in 10 has more than 50% left, some cows may have substantially reduced appetites.
e. Check cud chewing and manure consistency to determine if this is caused by acidosis and seek help from an adviser.

2. Effective Fibre Value

a. Two feeds have similar N DF contents, but with Effective Fibre Values are very different.
b. The long fibre length helps to keep the rumen environment stable
c. Low risk diets—75% of fibre sources are more than 1.5 cm long

3. Check for Vat

a. Is the fat test less than 3.6% for Holsteins or 5% for Jerseys?
b. Has the fat test dropped between 0.3 and 0.5 % in a week?
c. Has the protein test dropped more than 0.3% in a week?
d. Are your current fat and protein tests similar to this time last year?

Changes in milk composition are directly linked to the cow's diet. Both fibre content and energy intake contribute to the percentage of milk fat and milk protein.

A low fat test may be a sign of acidosis, especially if it falls below the protein test. A falling protein test is a sign that energy intake has dropped. Less commonly, acidosis can also cause the milk protein percentage to drop. Monitoring changes over a one week period and looking for changes from year to year can help to spot signs of acidosis.

Exercise

1. Write a note on - Measuring, mixing and providing the feed.

Answer: .....

2. Write a note on - Estimate, calculate and plan for the feed requirement in the Dairy Farm.

Answer:.....

Notes

UNIT 4.8: Understand the wastage minimization

Unit Objectives

At the end of this unit, you will be able to:

- Identify and estimate the wastage in the dairy farm
- Manage the feeding
- Minimize the waste

4.8.1 Understand the wastage minimization

Losses in dry matter and quality

The purpose of buying feed is to feed the cows. If feed is getting wasted in the process and cows does not receive the feed, then it is revenue loss to the farm.

The cost of feed wastage is calculated in two methodss:
1. Quantity Loss - Total dry matter feed to cows but not eaten
2. Quality Loss – Reduced energy and protein value, contamination with moulds / fungal toxins, moisture damage and leaching.

The most obvious example of this is deterioration in silage quality during storage due to poor sealing.
Feed losses occur during:

- Delivery and storage
- Mixing of diets
- Feed-out to cows – Most significant

If significant quantities of hay, silage or mixed rations are fed out, investment in feeding infrastructure to reduce waste may be money well spent.
Allow for feed wastage in feed budget

When doing feed budgets, materialistic allowances for feed wastage during feed delivery and storage, feed mixing and feed-out

Feed-out methods: the trade-offs

Feed wastage rates vary between different feed-out methods.
Low capital cost methods usually waste much more feed than high capital cost methods, and visa versa.
Farmers who decide to invest in higher capital cost feed out facilities are often driven by a desire to better control feed wastage. Many are surprised how short the payback period is on such an investment after they do a realistic estimate of the value of the feed being wasted in their current system. It may be worth crunching the numbers with help from an adviser.

% Feed likely to be wasted in feed-out method	Infrastructure type	Capital Cost (Dollars)/ cow
< 30	Temporary, relocatable feed-out area. Forages or mixed rations are fed out on the bare ground in the paddock, in hay rings or old tyre tractors or under an electric fence line, etc.	< 50
15 - 20	Semi-permanent feed-out area. Compacted surface and low-cost troughing, such as conveyor belting and second-hand feed or water troughs.	50 -100
6 – 15	Permanent, basic, feed-out facility. Compacted surface and concrete feed troughs or cement strip under electric wires.	100 – 250
< 5	Permanent, fully developed, feed-out facility. Cement surfaces and feed alley. May be covered by a roof.	> 250

Ways to minimize waste during feed-out

Feed ingredients / rations

- Pay close attention to chop length when cutting hay/ silage – if it is too long, the cows will sort through it and waste more.
- Offer cows fresh, palatable, high-quality feed at all times. Discard any spoiled/mouldy feed ingredients.
- If feeding a Partial Mixed Ration (PMR) using a mixer wagon, ensure the mix is not under or over processed. Follow the manufacturer's instructions. Use ration conditioners such as water, molasses or oil to reduce fines, sorting of feed and rejection or wastage of feed.

Feeding infrastructure design

- Use hay feeders that encourage cows to keep their heads in the feeder opening, reach for feed, and not easily back away and drop hay on the ground, e.g. a slatted bar design on a ring feeder that forces cows to rotate their heads when entering or leaving the feeder.
- If using troughs:
- Ensure you provide adequate space for the number of cows (rec.: 75cm/cow).
- Aim for a trough height that allows cows to eat with their head in their natural grazing position
- about 10-15cm above the ground. This position also helps cows produce more saliva to help buffer their rumen.
- Ensure trough surfaces are smooth to avoid build-up of waste feed, moulds, odours and are easy to clean.
- Consider concrete aprons around troughs to prevent mud and slush reducing feed palatability

Feeding management

- Offer cows the right amount of feed at the right time of the day – don't overfill troughs.
- Sequence feeds carefully during each 24-hour period.
- Clean feed-out surfaces regularly.
- If feeding out on pasture, avoid long pastures.
- Consider cows social order (aggressive versus less dominant cows).
- Adapt to the prevailing weather conditions (feed wastage may be much higher under wet conditions versus dry conditions).
- Within any given feed-out system, feed wastage rates can vary substantially. Some farmers achieve very low wastage with careful management and attention to feed quality and palatability

How to minimize the wastage

- More than 30% of feed can easily be wasted using these feed-out methods!
- High feed wastage can also occur when using troughs that are not well designed.
- Conveyor belting is used to best effect, with cables applying tension to keep the trough's shape
- Periodically set to keep feed in feed-out facility where it belongs – in front of the cows
- Even in a purpose-built feed-out facility, it is difficult to totally eliminate feed wastage, as cows tend to toss feed over their backs while eating. Head locks are one way to minimize this.

Exercise

1. Write a note on Waste minimization in dairy farm.

Answer: .....

Notes

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

5. Maintain healthy Performance of livestock

Unit 5.1 - Understand the Healthy Animal parameters
Unit 5.2 - Monitor the physical condition of the animals
Unit 5.3 - Check livestock for presence of external parasites
Unit 5.4 - Understand the health maintenance procedure of livestock
Unit 5.5 - Understand the pregnancy period of cow
Unit 5.6 - Care during pregnancy
Unit 5.7 - Understand handling of calf
Unit 5.8 - Record the health check up of the animal and treatment

AGR/N4104

Key Learning Outcomes

At the end of this module, you will be able to:

- Understand the Healthy Animal parameters
- Treat animals as per animal welfare regulations.
- Monitor the physical condition of the animals at suitable intervals, and recognize, record and report any abnormal signs
- Check livestock for presence of external parasites
- Understand the health maintenance procedure of livestock
- Understand the pregnancy period of the cattle
- Take Care during Pregnancy
- Understand handling of calf
- Record the health check up of the animal and treatment provided.

UNIT 5.1: Understand the Healthy Animal parameters

Unit Objectives

At the end of this unit, participants will be able to:

- Identify and distinguish between health and sick animals
- Understand the symptoms of sick animals
- Understand the medication requirement for the sick animals

5.1.1 Understand the Healthy Animal parameters

A health cow gives signals all the time about her welfare and health. She does this by behaviour, attitude, body language and body condition. You need to use these cow signs to optimize your results. Start by looking carefully, searching for causes, and translating the answers into positive action to benefit your cows and ultimately your dairy business. Train yourself to observe for the animal parameters in cows.

This will help you to evaluate, and find solutions.

1. Temperature
2. Mobility
3. Rumination
4. Alertness
5. Appetite
6. Loneliness
7. Neck
8. Hooves

9. Udder

10. Manure

11. Breathing

12. Heart rate

13. Body Condition Scoring

1. Temperature

A cow should have a temperature of 38 to 39°C. Cold ears might indicate milk fever or blood circulation problems. There are special conditions during which the temperature needs to monitored regularly.

- Heat stress conditions
- Recently calved cows (First 10 days)
- High Temperature indicate Illness, metritis, mastitis or pneumonia
- Low temperature indicate milk fever, ketosis etc

How to take temperature

If cows are mobile, Cows need to be restrained in crush, race or by halter. In the case of small calves the animals could be restrained manually.

Ensure that the thermometer has been shaken down. Lubricate the end of the thermometer to allow easy passage.

Rectal Measurement.

Pass the thermometer through the anal sphincter and position so that at least 50mm of the thermometer lies within the rectum with the tip positioned against the rectal wall. Do not let go of the thermometer while it is in place. Remove after 30 seconds record the temperature.

Vaginal Measurement.

In females, pass the thermometer through the lips of the vulva and position the tip of the thermometer along the dorsal wall of the vagina, approximately 50mm anterior to the lips of the vulva. Do not let go of the thermometer while it is in place. Remove after 30 seconds and record the temperature.

2. Mobility

Heel erosion or skinned heels are mainly caused by problems with bedding or bedding materials, incorrectly adjusted barn equipment and/or hoof infection. When it comes to health issues on a dairy farm, lameness is usually a main concern along with mastitis and reproductive issues. Lameness includes any abnormality which causes a cow to change the way she walks. It can be caused by a range of foot and leg conditions including foot rot, digital dermatitis, laminitis, and claw disease. Lameness can be influenced by nutrition, disease, genetic influences, management, and environmental factors. Not only does lameness cause pain and distress for dairy cattle, but it also has a large economic impact on the dairy operation. Lameness is commonly identified by locomotion scoring, but it can be difficult to detect until clinical signs are present.

Key benefits of scoring mobility

1. Every cow is regularly assessed for the early signs of poor mobility prompting foot trimming and action lists.

2. Mobility trends can be monitored to identify new problems at an early stage.

3. Provision of figures for benchmarking performance.

4. General foot health awareness is increased.

5. Motivates farm staff to improve herd mobility and therefore overall herd health.

How to score your herd:

1. Check your herd ideally at least once a month.
2. Choose a time and a place which will allow you to observe cows, ideally on a hard (ie, concrete) non-slip surface. Monitor each cow individually allowing them to make between 6-10 uninterrupted strides. Watch the cow from the side and the rear, and if possible ensure the cow turns a corner as part of her test.
3. Record the identities of cows scoring 3 or 4 and schedule treatment with regular checks to ensure treatment is working.
4. Keep a tally of cows that are score 1 and 2. 5. If you are uncertain about the exact score of a cow, make repeat observations. If you are still unsure, examine her feet.

3. Rumination

A cow should ruminate for seven to ten hours per day, ruminating 40 to 70 times on a cud. Taking less time indicates inadequate rations.

Rumen

The rumen should be filled with feed. The left side of the stomach should protrude. If you press your fist into the rumen it should contract firmly about 10 to 12 times within five minutes.

4. Alertness

A healthy cow looks alert and powerful, with a glossy skin and a full stomach. Most animals will cut back on their activity levels when they are feeling sick. This may mean they spend more time in their shady shelter instead of lying out in the sunshine during the day, it may mean they spend most of the day near their feed and water sources instead of roaming the pasture, or it may mean they hang back when the rest of their herd wanders off to look for a new spot in the pasture to graze. Any change in activity can be a sign that something isn't right.

5. Appetite

Healthy cows should eat regularly. Make a habit of watching all the animals at feeding time, and you should start to notice some patterns. There is probably one (or two) “boss” animals who are always up to eat first, and tend to push some of the others out of their way. There will be the “middle of the pack” eaters, and then one or two “clean up” eaters who tend to sit back and wait for the initial pushing to stop before they come up to get their meal. Any changes in behavior around feeding time or food can indicate that one of your animals isn't feeling well. Cows that do not come to feed bunk may be due to illness.

6. Loneliness

Because farm animals are herd animals, they really enjoy spending time with their friends. Any farm animal who starts spending time alone (away from the rest of the herd) is probably already pretty sick. Staying with the herd is their best form of protection from predators, and this is the very last behavior that changes when they are sick.

7. Neck

A swollen neck is mainly caused by a feed fence being too low or incorrectly adjusted barn equipment.

8. Hooves

Healthy cows stand straight and still while eating. Tipping or walking with lame gait are signs of poor hoof health, from bad rations, poor floors or lack of hoof treatment.

9. Udder

To assess udder health, look carefully at the teats after milking. Good teats are flexible and naturally coloured. Poor udder health can be caused by hygiene problems, poor milking equipment installation or inadequate feed rations.

10. Manure

Should not be too thick or thin and should never have undigested particles in it.

11.Breathing

Normal breathing ranges from 10 to 30 breaths a minute for a cow. Faster breathing indicates heat stress or pain and fever.

12.Heart Rate

Cows normal heart rate – 60 -70 beats per minute

13. Body Condition Scoring

- Observe all the animals regularly to assess body condition
- Monitor early signs of weight loss

Body condition scoring is a method of evaluating fatness or thinness in cows according to a five-point scale and using the score to fine-tune dairy herd nutrition and health. Body condition influences productivity, reproduction, health, and longevity of dairy cattle. Thinness or fatness can be a clue to underlying nutritional deficiencies, health problems, or improper herd management. If done on a regular basis, body condition scoring can be used to troubleshoot problems and improve the health, longevity, and productivity of the dairy herd.

Body condition scoring in dairy cattle is a visual and tactile evaluation of body fat reserves using a 5-point scale with 0.25-point increments. Body condition scores (BCS) are an indirect estimate of energy balance. A score of 1 denotes a very thin cow, while 5 denotes an excessively fat cow, and 3 is an average body condition.

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Body Condition Score 1: Emaciated The ends of the short ribs are sharp to the touch and together give a prominent shelf-like appearance to the loin. The individual vertebrae of the backbone are prominent. The hook and pin bones are sharply defined. The anal area has receded and the vulva is prominent.

Body Condition Score 2: Thin The ends of the short ribs can be felt but they and the individual vertebrae are less visibly prominent. The short ribs do not form as obvi-ous of a shelf effect. The hook and pin bones are prominent but the depression of the thurl region is less severe. The area around the anus is less sunken and the vulva less prominent.

Body Condition Score 3: Average The short ribs can be felt by applying slight pressure. The overhanging shelf-like appearance of these bones is gone. The back- bone is a rounded ridge and hook and pin bones are round and smoothed over. The anal area is filled out but there is no evidence of fat deposit.

Body Condition Score 4: Heavy The individual short ribs can be felt only when firm pressure is applied. Together they are rounded over with no shelf effect. The ridge of the backbone is flattening over the loin and rump areas. The hook bones are smoothed over and the span between the hook bones over the backbone is flat. The area around the pin bones is beginning to show patches of fat deposit.

Body Condition Score 5: Fat The bone structure of the topline, hook and pin bones and the short ribs is not visible. Fat deposits around the tailbone and over the ribs are obvious. The thighs curve out, the brisket and flanks are heavy and the chine very round.

Fig 5.1.1 Rectal measurements

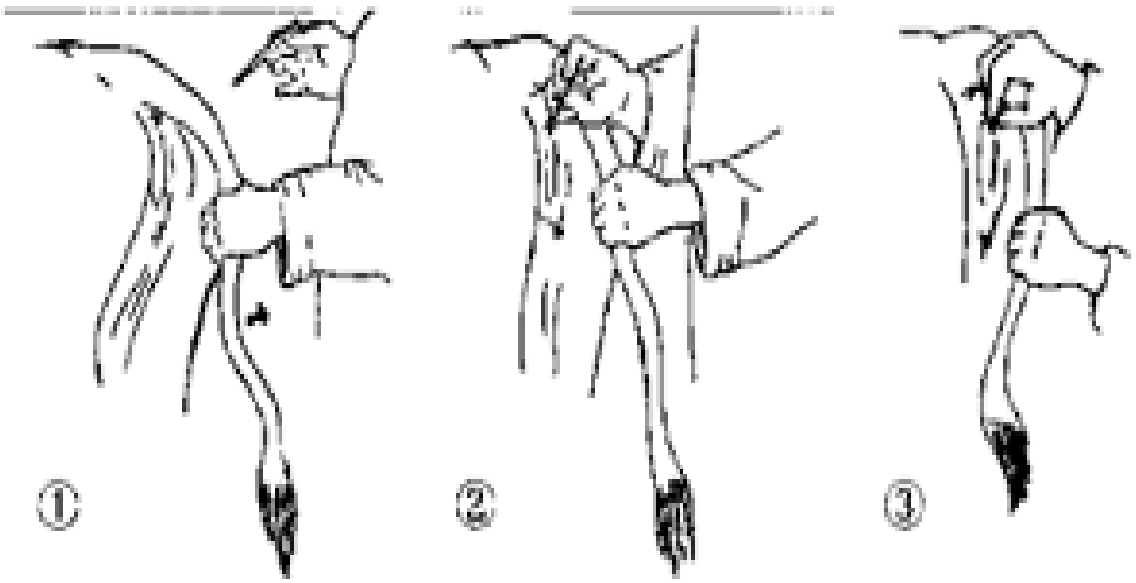


Fig 5.1.1 Vaginal measurement

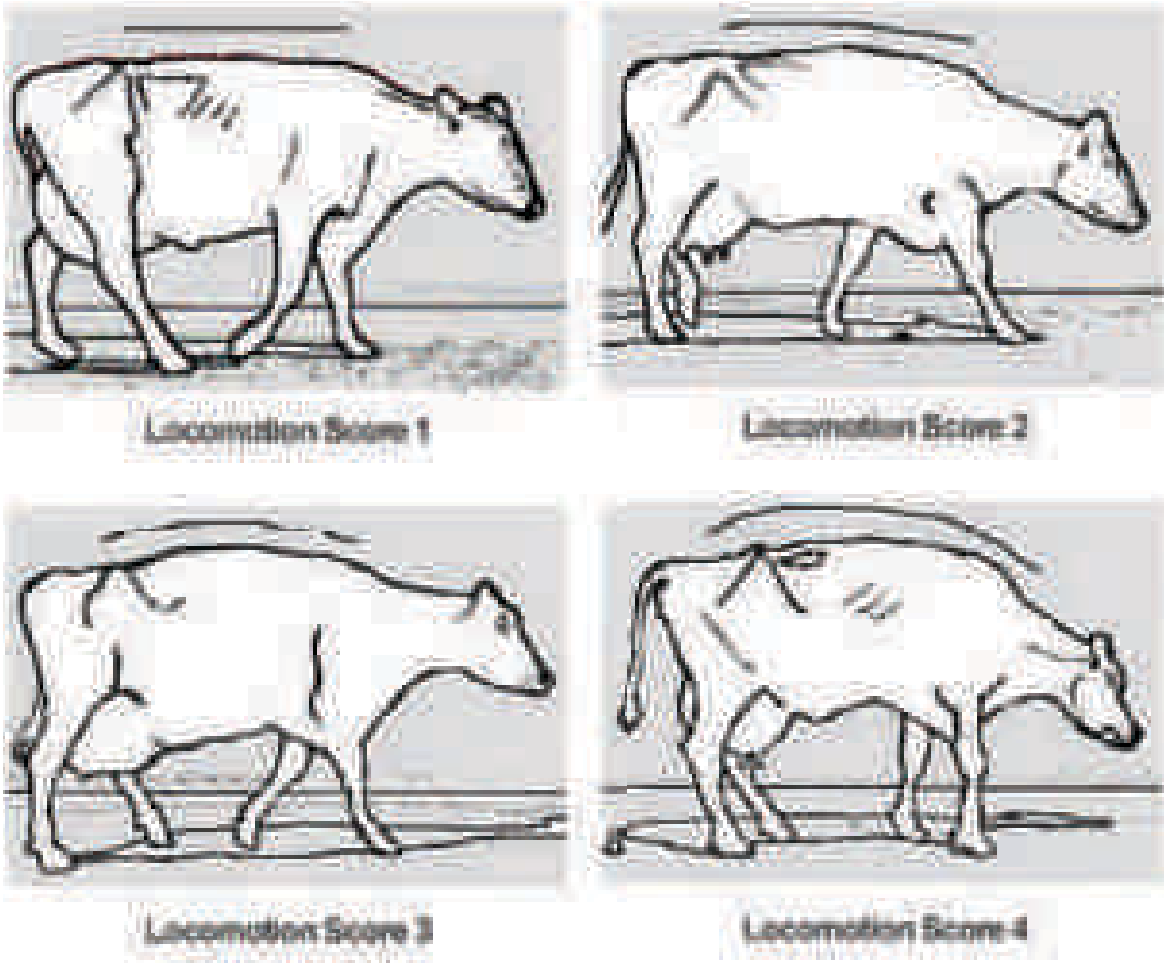
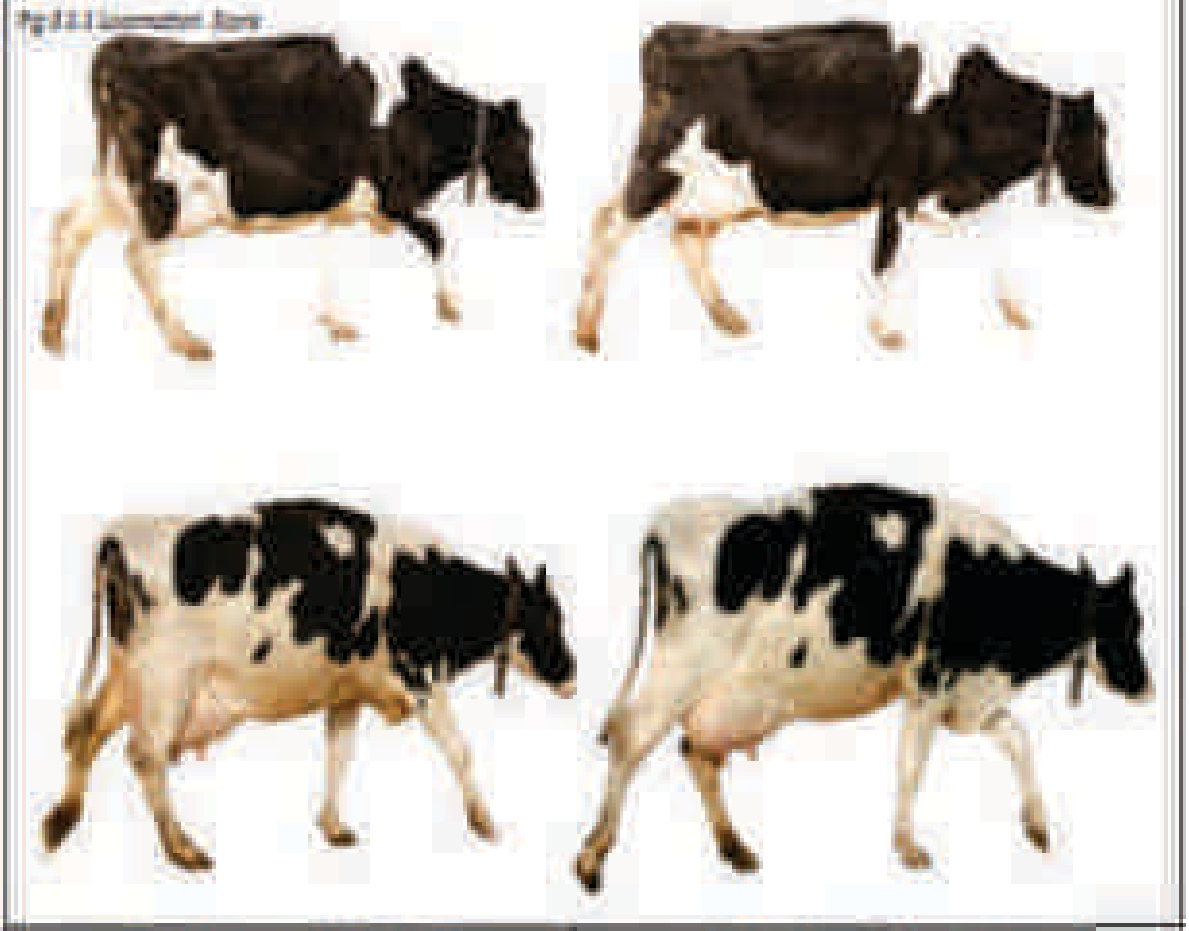


Fig 5.1.1 Locomotion Score

Gait mobility	Score 4
	
Walk with even weight bearing and rhythm on all four feet, with a flat back. Long, fluid strides possible.	no action needed. Routine (preventative) foot trimming when if required. Record mobility at next scoring session.

Imperfect mobility	Score-2
	
Steps uneven (rhythm or weight bearing) or stride shortened, affected limb or limbs not immediately identifiable	•Could benefit from routine preventative foot trimming when if required. •Further observation recommended.

Impaired mobility	Score - 3
	
Uneven weight bearing on/Cs limb that is immediately identifiable and/or obviously shortened stride (usually with an arch to the centre of the back)	•Lame and likely to benefit from treatment. ☑ •Foot should be lifted to establish the cause of lameness before treatment. ☑ •Should be attended to as soon as practically possible. ☑

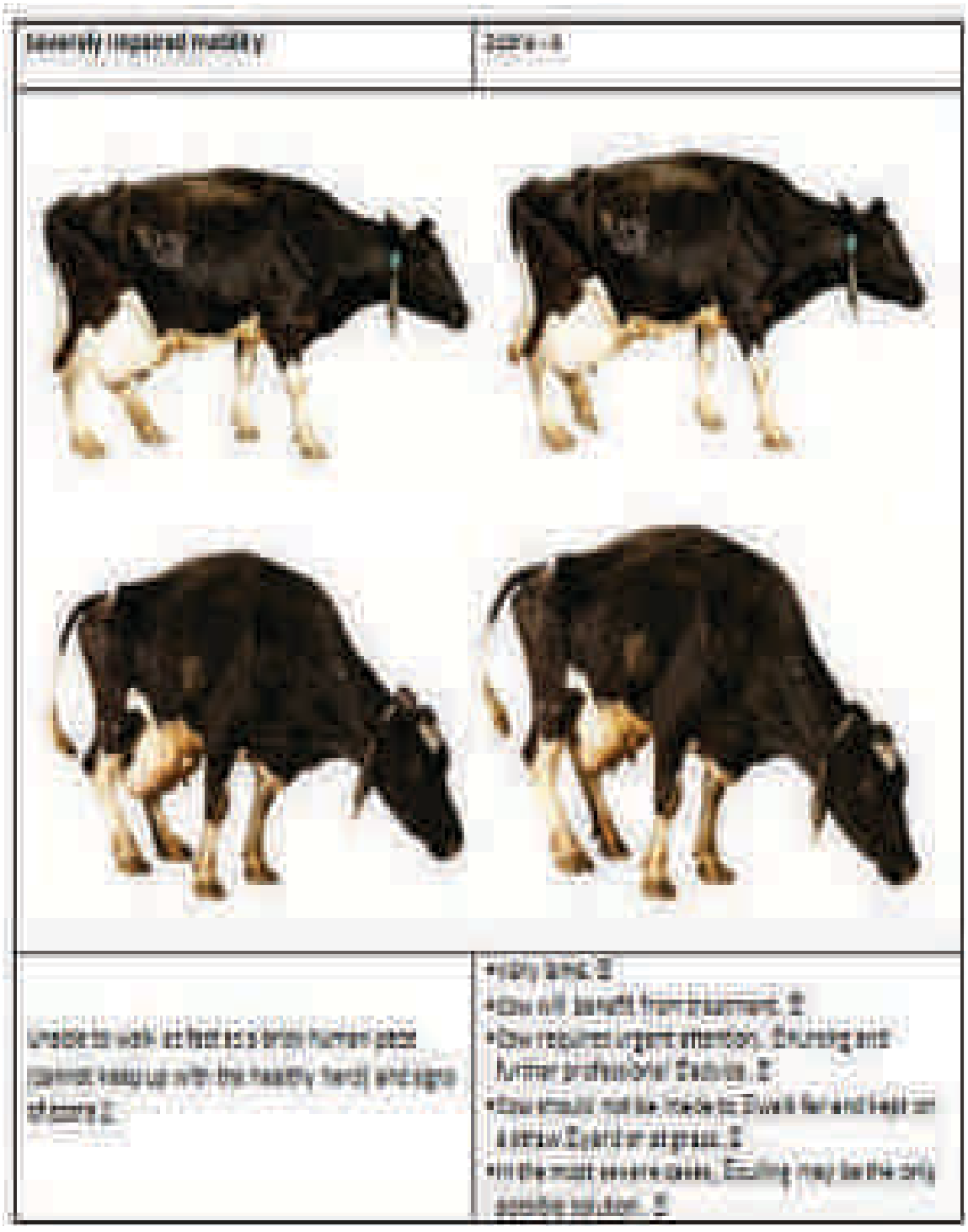
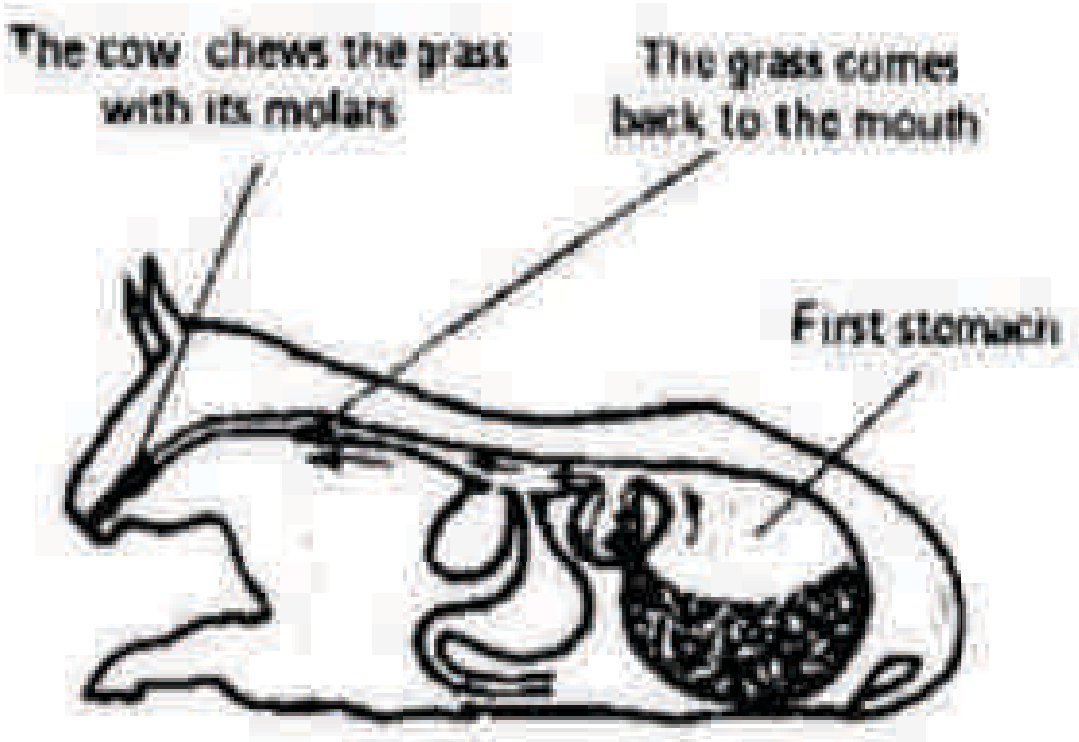
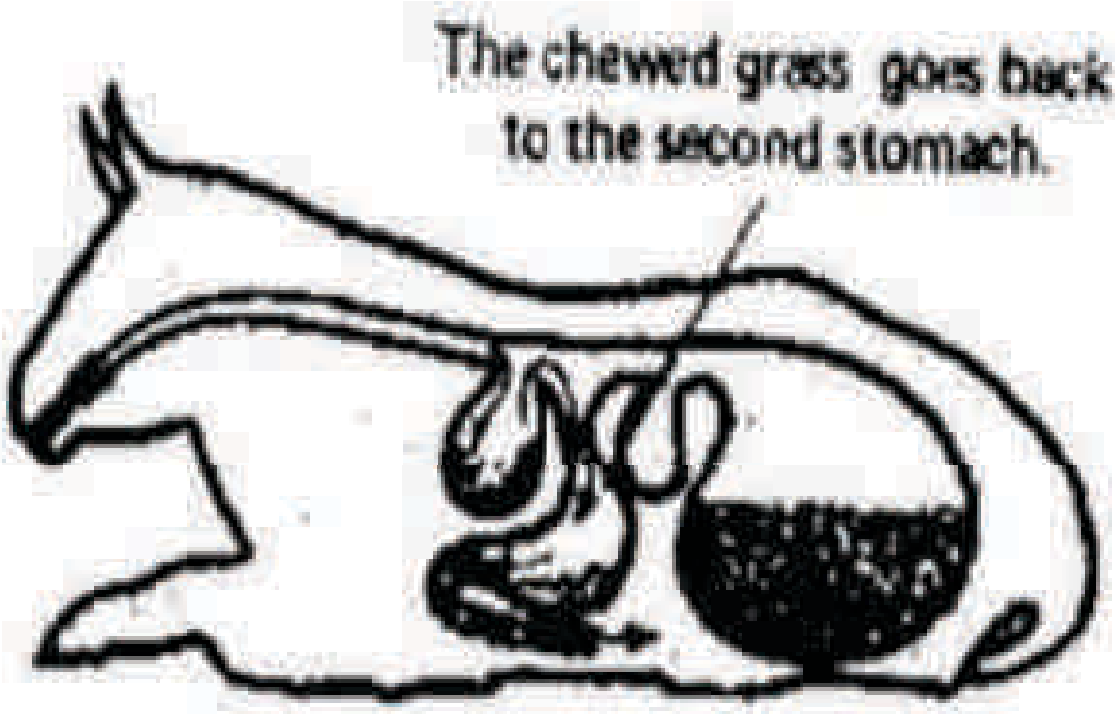


Fig 5.1.1 Locomotion Score


The cow chews the grass with its molars
The grass comes back to the mouth
First stomach


The chewed grass goes back to the second stomach.

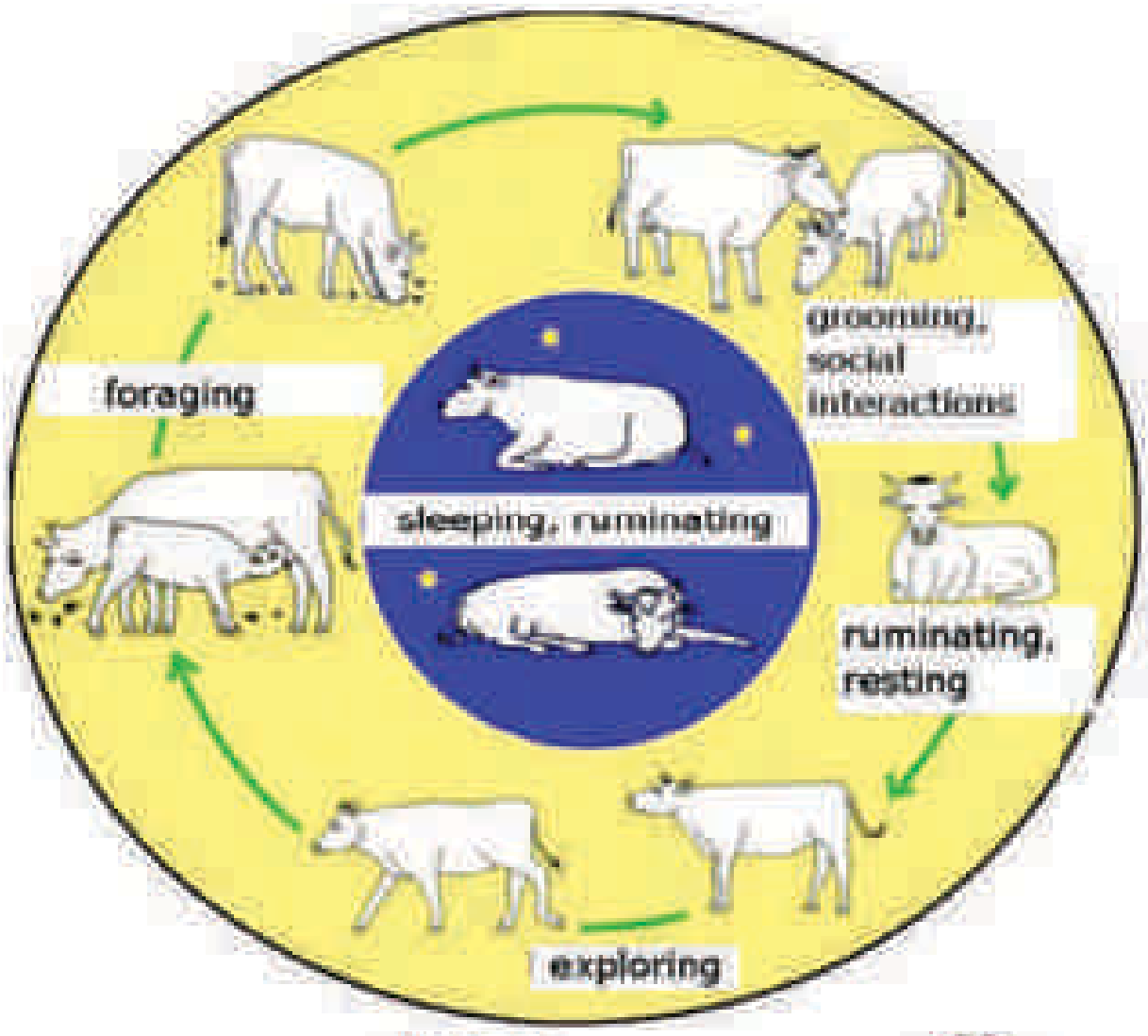


Fig 5.1.1 Rumination

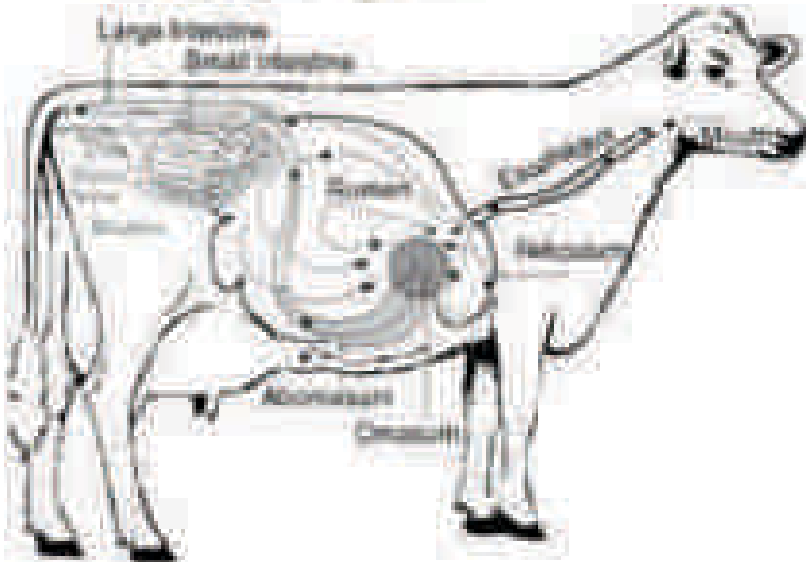


Fig 5.1.1 Rumen

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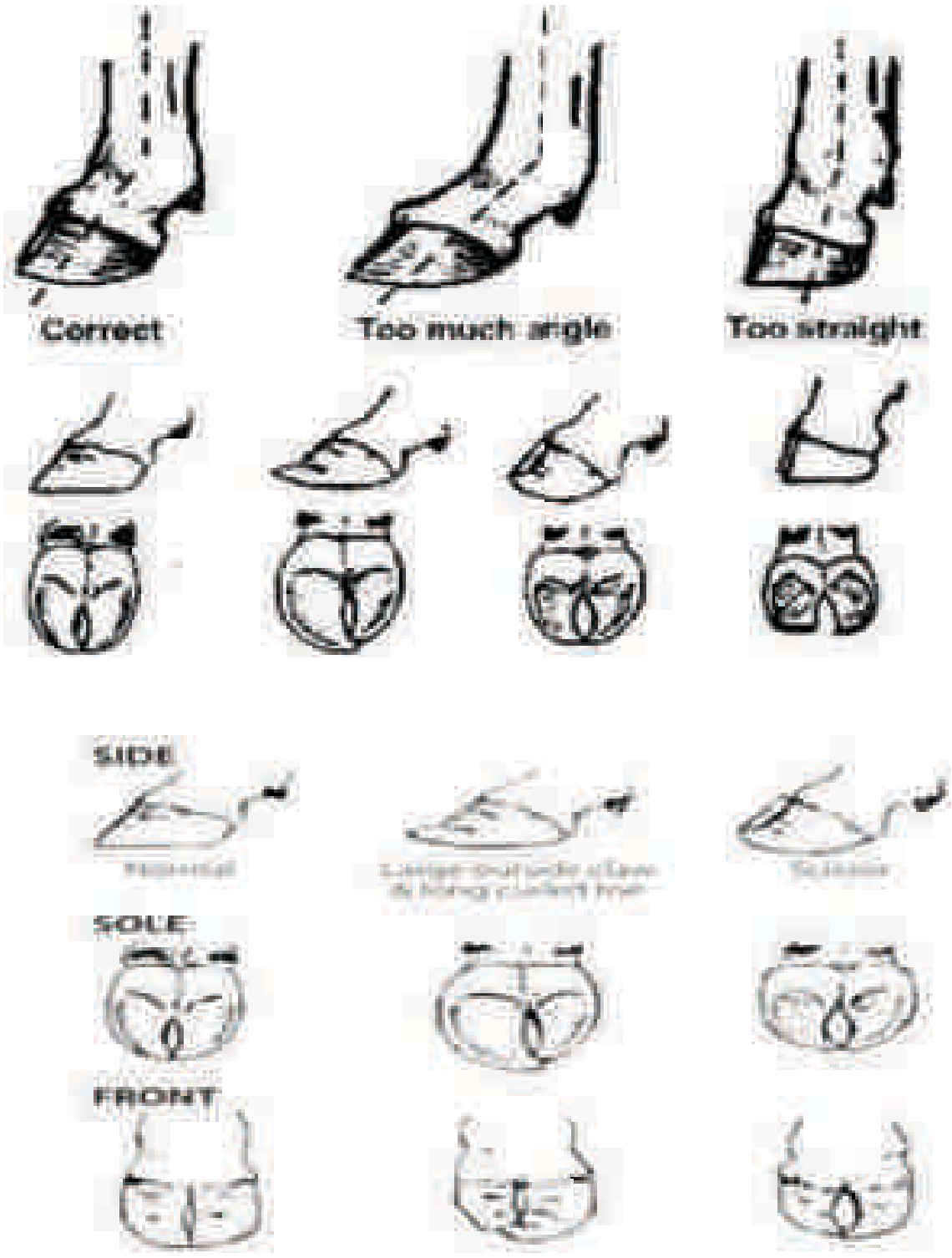

Fig 5.1.1 Hooves

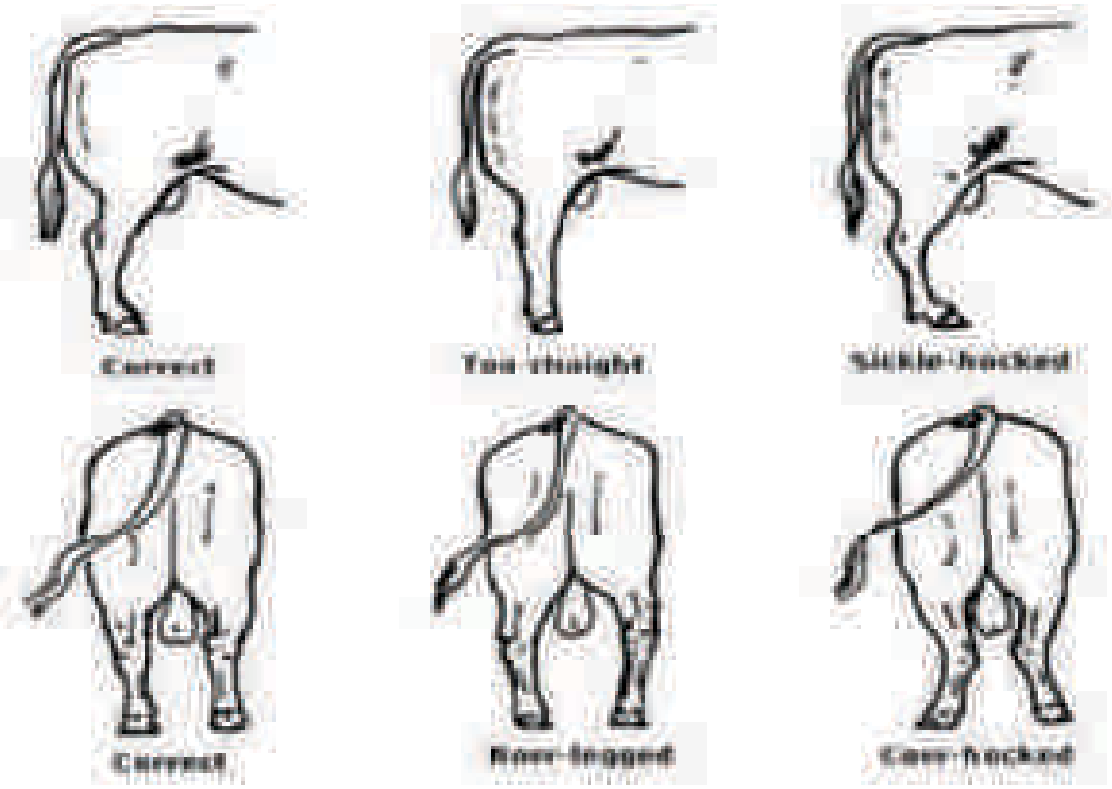

Fig 5.1.1 Hooves

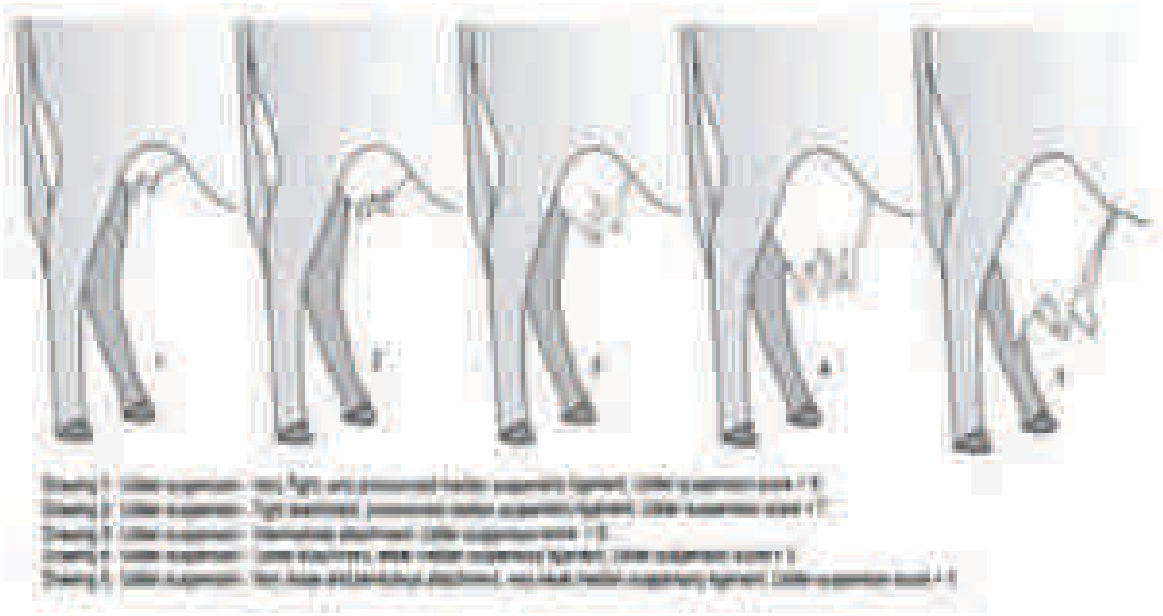

Fig 5.1.1 Udder

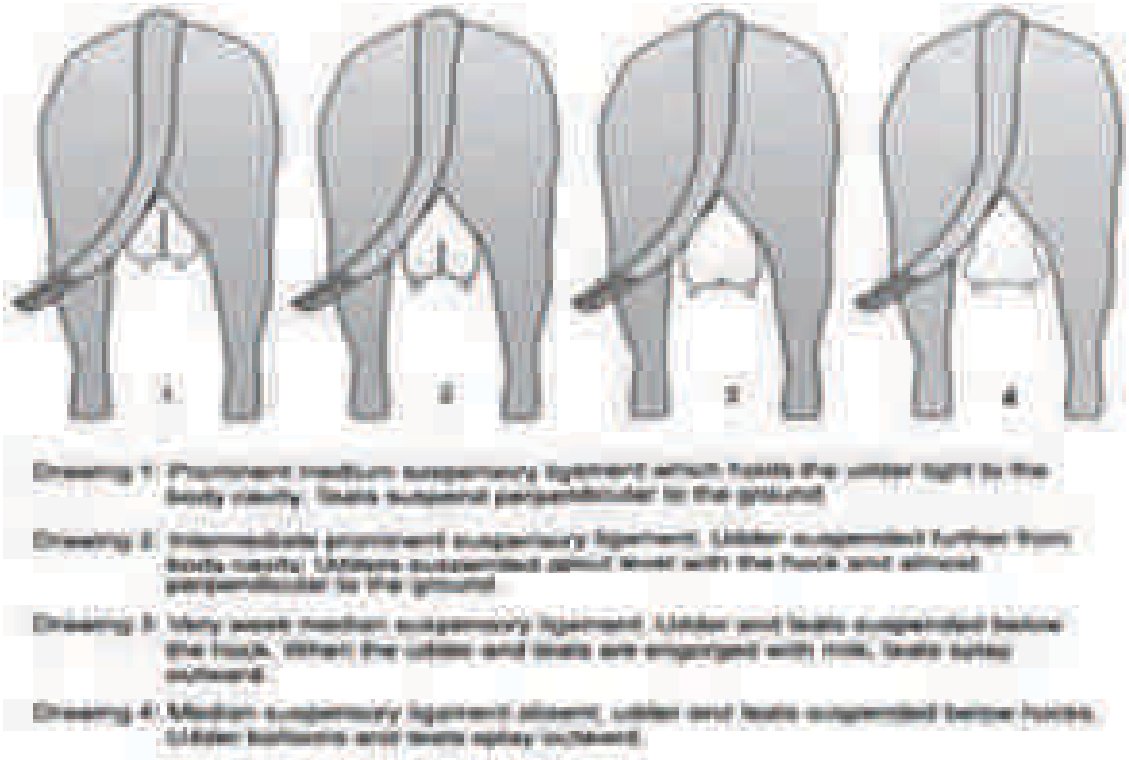

Fig 5.1.1 Udder

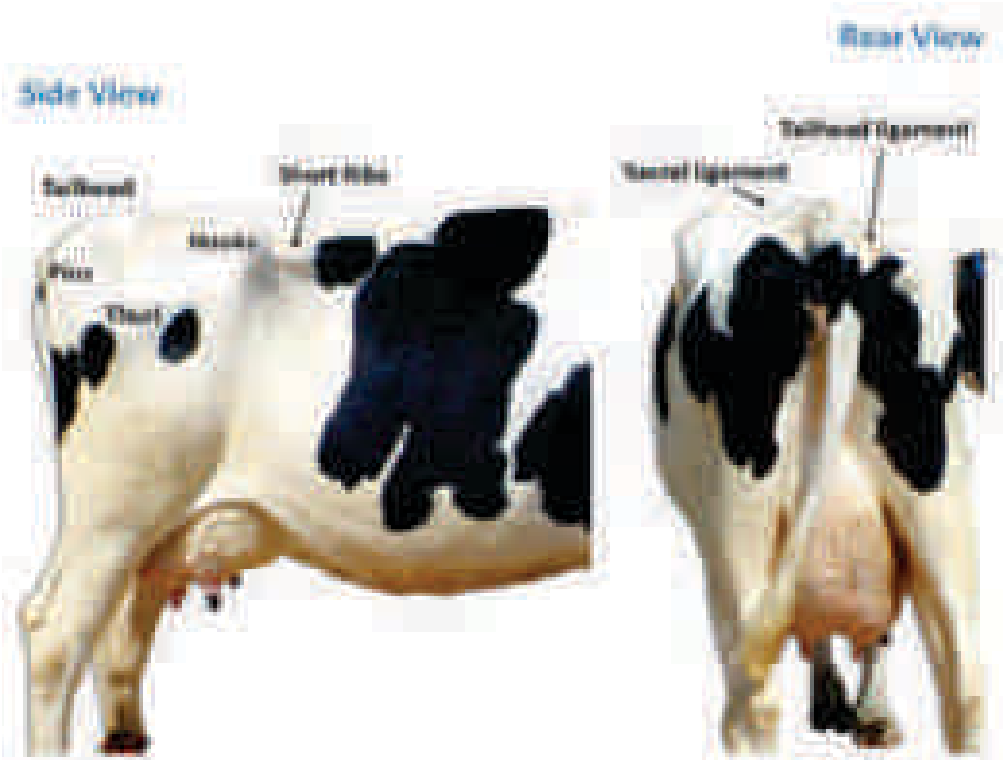

Fig 5.1.1 Body condition scoring

Suggested Body Condition Scores for Cows by Stage of Lactation (days in milk, DIM

Stage of Lactation	Days in Milk	BCS Goal	Min	Max
Calving	0	3.50	3.25	3.75
Early Lactation	1 - 30	3.00	2.75	3.25
Peak Milk	31 - 100	2.75	2.50	3.00
Mid Lactation	101 – 200	3.00	2.75	3.25
Late Lactation	201- 300	3.25	3.00	3.50
Dry Off	> 300	3.50	3.25	3.75
Dry	-60 - -1	3.50	3.25	3.75

Table 5.1.1 Suggested Body Condition Scores for Cows by Stage of Lactation (days in milk, DIM)

Events	Age in months	BCS Goal	Min	Max
	0 – 4	2.25	2.00	2.50
	4 – 10	2.50	2.25	2.75
Pre Breeding	10 – 12	2.75	2.50	3.00
Breeding	12 – 15	3.00	2.50	3.25
Bred	15 - 20	3.25	3.00	3.50
Calving	> 20	3.50	3.50	3.75

Table 5.1.1 Suggested Body Condition Scores for growing heifers by age in months

Notes

UNIT 5.2: Monitor the physical condition of the animals

Unit Objectives

At the end of this unit, participants will be able to:

- Monitor the activities of animals in the shed or outside
- Observe the physical condition of the animals

5.2.1 Treat animals as per animal welfare regulations

How to restrain the dairy animal with minimal stress?
Cattle restraining squeeze chute with angled rubber louvres on the side which prevent the cattle from seeing people. The side can be opened for easy access for injections and other veterinary procedures. The louvres block the animal's vision the same way that louvred shutters block vision through windows in a house.

1. Solid sides or barriers around the cattle to prevent them from seeing people deep inside their flight zones. This is especially important for wild or excitable cattle.
2. To prevent lunging at the headgate, the bovine's view of an escape pathway must be blocked until it is fully restrained.
3. Provide non-slip flooring for all species of animals.

A good example of a non-slick surface for livestock.

1. Slow steady motion of a restraint device is calming, while sudden jerky motion excite.
2. Use the concept of optimal pressure. Excessive pressure that causes pain or discomfort must be avoided where as sufficient pressure might be applied to provide the feeling of restraint
3. The entrance of the restraint device must be well lighted, however, lamps must not glare into the eyes of approaching animals. All species must be able to see a place to go.
4. Livestock will remain calmer if they can see other animals within touching distance.
5. Engineer equipment to minimize noise. High pitched noise is more disturbing to livestock than a low pitched rumble.
6. Restraint devices must be designed to avoid uncomfortable pressure points on the animal's body.
7. Restrain livestock in an upright position.

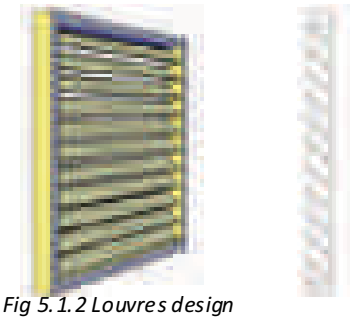

Fig 5.1.2 Louvres design

Fig 5.1.2 Louvres design

Herd recording assists farmers with accurate information in making herd management decisions.

- Dry cows or choose dry cow therapy
- Sell cows
- Assess the production level of first-calf heifers to see how well replacements are being reared,
- Assess herd reproductive performance,
- Identify actions to improve cell count,
- Select the best cows to breed from,

Recording herd health

Accurate recording of all animal health events is important for timely identification of disease outbreaks, identification of cows for culling, effective management of sick cows, information for your vet and design of preventative programs.

Monitoring this information allows any increasing levels of disease in the herd to be identified early and managed, which is particularly important for larger herds where small and subtle changes can quickly lead to significant effects. Make sure there is a designated area in the dairy where this information can be recorded.

Types of records

- Daily stock register
- Birth/calving register
- Calf/young stock register
- Adult stock register
- Breeding register/AI register
- Weighment/growth register
- Milk yield and distribution register
- Sales/disposal register
- Mortality register
- Feed stock register
- Fodder stock register
- Receipt/Income register
- Herd health register

- **Herd Health register must include**
  - the milking animal number.
  - condition/disease and veterinarian (if consulted).
  - the type of treatment (including dose).
  - the date of each treatment.
  - the date of last treatment.
  - the date that milk re-entered the bulk milk tank.

- **Displaying records**

Whatever system is used, written records are also required. This is particularly important for any cow that has received treatments or remedies

A clear list of all problem cows displayed on the wall within sight of the milker will save time and prevent mistakes.If you use a white board make sure you keep the information somewhere else permanently, i.e. take a photo of the board and transfer it into your records.

Early detection of disease

Disease detection can be difficult and cases are sometimes not detected until later in the course of the disease. Look for 'cow signals', for example, how to identify early signs of lameness, teat damage and mastitis.

- if more than 10% of your herd have lameness throughout the season or;
- more than 10% of your herd fails to get in calf or;
- more than 15% of your herd have a SCC above 150,000 at any herd test.

Recording such cow signals in the herd will help to detect disease

Signs of a sick cow

- dull coat
- dull/sunken eyes
- arched back
- sunken flanks or rapid weight loss
- ears droopy
- head lowered

Animals showing clinical signs of, or have been diagnosed with a disease or illness, must be removed from the main milking herd, marked and recorded, and their milk withheld from the bulk milk tank until the clinical signs have been resolved.

Prompt treatment of sick and lame cows is best for the cow's welfare and will also mean there is less of a drop in milk production. Recording the cause of lameness is an important part of prevention.

Steps to safeguard animal health

- protocols around teat disinfection as part of the milking routine.
- milking hygiene to prevent cow to cow transfer.
- milking machine maintenance.
- drying off management.
- recording and monitoring of infected animals.
- treatment of cases.
- and monitoring of SCC.

To prevent the transfer of other infections between animals, protocols dealing with the segregation of infected animals and the quarantining of new stock are important.

Steps to segregate treated cows

If separating treated cows alone is not practical, then they need to be drafted out and milked last to prevent cross contamination. Do not milk them first.
If treated cows are run as a separate herd consider the following points:

- Ensure they are clearly marked.
- Ensure the animals are secure. Preferably the water trough should be away from main race. Try not to walk the main herd past prior to milking.

Wait until the main herd has left before the treated cows enter the platform. Consider holding them in a separate small yard while the main herd is being milked. This will also allow for checking that all are present and correct at each milking.

Steps to carry out for problem cows

A problem cow is any cow that needs to be identified for special treatment.Problem cows might include

- cows treated with drugs,
- high SCC cows,
- Segregated for herd health procedures
- Artificial inseminatino
- cows that impact on the milking routine - three titters, colostrum cows, kicking cows or slow milkers.

The benefits of identifying problem cows include:

- Increased milking efficiency - by making sure problem cows e.g. those to be segregated or treated, are not missed at milking.
- Maintain milk quality - by ensuring the milk from cows that have been treated is withheld.

Steps to mark the problem cows

It is critical for milking efficiency that these cows are easily identifiable by all milkers, particularly if their milk must be withheld from the bulk milk tank.
A good marking system will meet the following requirements:

- It must be clearly visible and alert the milker to the presence of a treated cow.
- Durable and visible in all weather conditions.
- All milkers must know and understand the system - display the markings in the dairy somewhere so people know what each marking means.
- The system must be able to be removed or cancelled once the cow is clear.
- Colostrum and treated cows must be marked differently.
- Uses two marking systems just in case one fails.

Prevention:

Biosecurity, herd health programs, equipment and stall designs, as well as early identification of herd or facility-related problems will help to prevent many animal health problems.
Observation: Cattle should be observed several times a day, especially during milking or feeding. The key elements in minimizing disease and discomfort are early detection of illness and their appropriate treatment.

Treatment:

Treatment should be determined and administered as soon as possible to prevent conditions from deteriorating. Consult with a veterinarian to develop treatment strategies and protocols for common ailments.

Separation:

Segregate compromised animals into designated 'hospital' pens or areas to permit close observation, treatment and easy access to feed and water.

Transport:

If animals are fit for transport, decide where and when to ship them, ensuring all medicine withdrawal times have been observed.

Euthanize:

All animals unfit for transport or unfit for human consumption must be euthanized on-farm.

Notes

UNIT 5.3: Check livestock for presence of external parasites

Unit Objectives

At the end of this unit, you will be able to:

- Observe the body of the animal to check the parasites
- Remove the parasites from the animal body if any
- Consult the veterinary doctor in case of emergency

5.3.1 Check livestock for presence of external parasites

External parasites live on the skin of cattle or visit them to feed. The most important groups of external parasites are flies and ticks. Lice and mites are usually not very important, but do occur occasionally. Most of these parasites can be seen with naked eye while mites are microscopical.

Why are external parasites important?

- Cause a nuisance to the animals.
- Cause skin and eye irritation and damage, which can lead to bacterial infection and fly maggot attack.
- Create large wounds.
- Suck blood, causing the animals to become weak.
- Spread diseases between animals.
- Cause disease through poisonous bites (toxins).
- All of this can result in decreased production and even death.

Flies:

Flies are scavengers that feed on sweat, tears, saliva, manure. Some flies do bite and suck blood. Most flies lay eggs near moist environments. Larval stage needs moisture to survive. Flies grow on Manure, rotting vegetation, mud while some species lay eggs in open flesh. Life cycle of flies include

Adult > egg > larvae (maggot) > pupa >Adult

House flies (Muscadomestica). They lay eggs in feces, manure plies, garbage, or other decomposing organic material. They survive in Optimal temperature is 30-37° C. House flies complete life cycle in as short as 7-10 days and in a good summer 10 12 generations. Flies are only active in daylight hours. House flies tends to be an annoyance and can carry bacteria.

Horn Flies are about half the size of house flies and are dark gray with 2 stripes. They are blood-sucking flies that stay on the shoulders and backs of cattle almost continuously. During extremely hot weather or when it rains, they may move to the protected underside of the animal. When disturbed, horn flies will fly up in a swarm but they will return to the animals almost immediately. A horn fly leaves the back of a cow or calf only to lay eggs in fresh manure. They suck blood from the host 24 hours a day. Individual flies pierce the skin with their short, tube-like mouthparts 20 to 30 times per day to ingest blood. Their feeding activity is painful and annoys the animals, as well as causing some blood loss

Face Flies

(Muscaautumnalis) closely resemble house flies. Face flies cluster on the faces of cattle and feed on secretions from the mucus membranes of the eyes, nose, and lips and cause pink eye infections. Face flies do not suck blood. They do irritate the surface of the eyeball and carry and spread bacteria and viruses that contribute to pinkeye problems. They lay eggs on manure paddle and are around fresh manure. They spend only a small portion of their life on cattle which makes them more difficult to control than horn flies. Face flies prefer to feed on broad daylight.

Stable flies

(Stomoxyscalictrans) are sometimes called biting house flies. The look very much like house flies and has 4 stripes. They feed primarily on legs and lower abdomen of cattle. The mouth parts penetrate the skin and allow them to engorge on blood two to three times a day depending on the weather. Once full they move to a resting place, usually in the shade, to digest the blood meal. The blood loss and pain associated with the bite of stable flies results in substantial economic loss. Stable flies attack legs, flanks and lower body. Stable flies lay eggs in manure, wet straw and old bedding.

Animal Health Concerns

- Production losses
- Annoyance factor
- Animal welfare concern
    - Stress factor for animals with docked tails –
- Reduce milk yield upto 25 %
- Dry matter intake is reduced –
- Some animals could lose as much as 100 ml blood /day –
- House or stable fly carry bacteria onto skin around teat end
- Blood borne pathogens
    - Anaplasmosis – Re-emerging disease of concern.Most often ticks then needles but also biting flies
    - Bovine Leukemia Virus

New cases by transfer of infected white cells

Pinkeye

Reduce overall fly burden – Identify stable vs. pasture problems – Immunize in advance of challenge (midSpring) Very painful, prompt treatment – Vaccines: doses and multiple antigens – Some reports that Gram negative core antigen vaccines reduce severity (Coliform vaccines) – Ear tags can help - remove ear tags at end of season to reduce development of resistance by flies

Control of flies

- Physical control
  - Practise good stable and kraal hygiene (clean regularly)
  - Drain damp areas to stop breeding of mosquitoes and biting midges
  - Immediately treat skin wounds so that strikes do not occur
  - Remove manure or stir bedding ~ every 10 days or less
  - Compost, stack, or agitate manure –
  - On pasture - Remove weeds and brush around buildings and fencerows
  - Use barrier teat dips
  - Fly control in pasture and fans in barns
  - Gram negative core bacteria vaccines
- Biological Control
  - Use of natural fly enemies
    - Certain beetles and mites eat fly eggs and larvae
  - Parasitic wasps attack fly pupa (available for sale)
  - Add them early in Spring as fly population starts to increase
  - Will hold population in check but will not kill every fly
- Chemical Control
  - Use Premise sprays – Space sprays-short term
    - Usually premethrins and/or pyrethrins
    - Usually short term with good knock down of flies
  - Residual – longer term
    - Usually synthesized pyrethrins with dicholovos or diazinon or chlorpyrifos
    - Remove animals from buildings as directed
    - Baits
      Usually methomyl
  - Organophosphates (rarely chlorinated hydrocarbon)
  - Some are effective for grubs – Avermectins for grubs/ticks/mites/lice
  - Larvicides Usually in feed or by bolus - kill larval stage in manure
    - Difubenzuron, Tetrachlorvinphos, or Methoprene

Ticks

cause blood loss, discomfort, and spread diseases like anaplasmosis. Tick control is extremely difficult in areas with high tick populations. High concentrations of ticks usually occur in brushy pastures and woodlands so habitat management is an important part of tick control.

Control of ticks

- Apply acaricides that kill ticks or prevent their attachment. They can be applied as handsprays or race-sprays, dips, pour-ons, spot treatment or injectable drugs
- Some breeds of cattle are more resistant to ticks and tick-borne diseases
- Seek advice from veterinarian or animal health technician on specific control methods for ticks in your area.

Lice

cause skin irritation and itching. Both biting and sucking lice infest cattle. Infested cattle can experience reduced appetite and appear unthrifty. Lice reside entirely on the host cow. Lice are present year around but increase in numbers in winter. In spring most parasites are lost with the winter hair coat.

Control of Lice:

- Lice Control measure during fall and early winter when the lice populations increase.
- Treat with approved products. Repeat the treatment in three weeks to kill hatching lice since most insecticides do not successfully kill eggs.
- Sprays and pour-ons are common methods to treat cattle lice.

Mite

infestation is called mange in cattle. A serious form of mange is called scabies. Scabies is caused by sarcoptic and psoroptic mites and must be reported to the disease control authorities. A less severe mange is caused by chorioptes, demodex, or psorergates mites. Mites are spread through close contact. Cattle infested with mites suffer hair loss and a thickening of the skin. Severe infestations can weaken cattle and make them vulnerable to diseases. Scabies can result in severely debilitated animal.

- Control of Mites
    - Avermectins for mites

Fig 5.3.1 Horn flies on cow

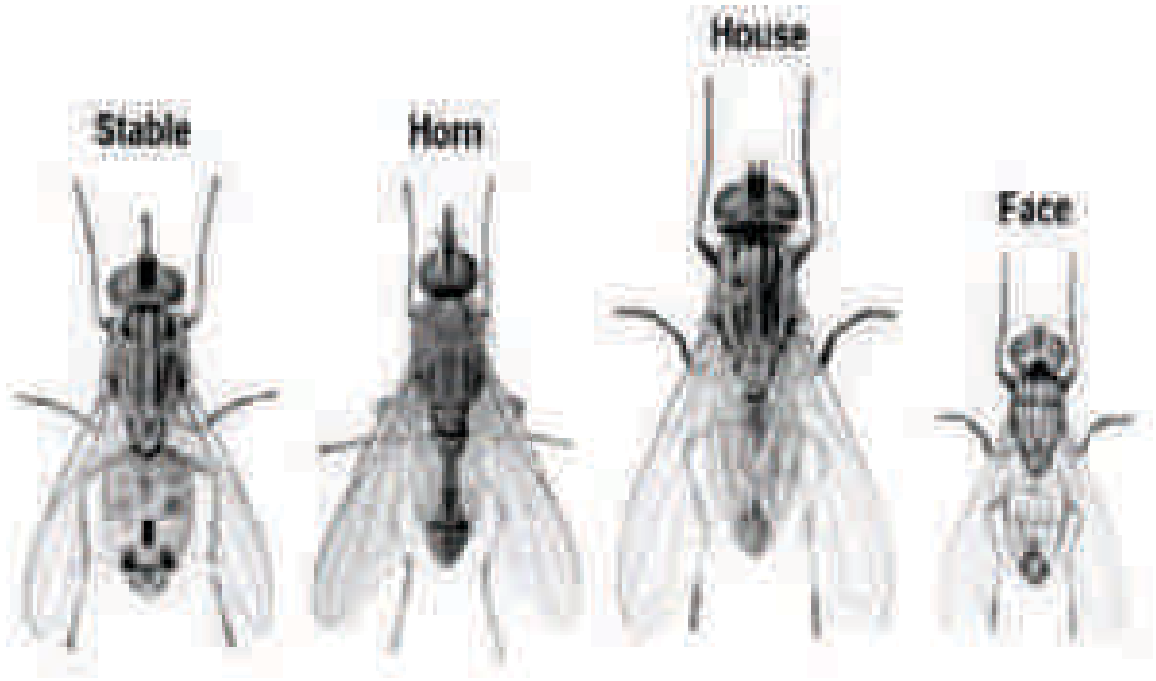

Fig 5.3.1 Flies

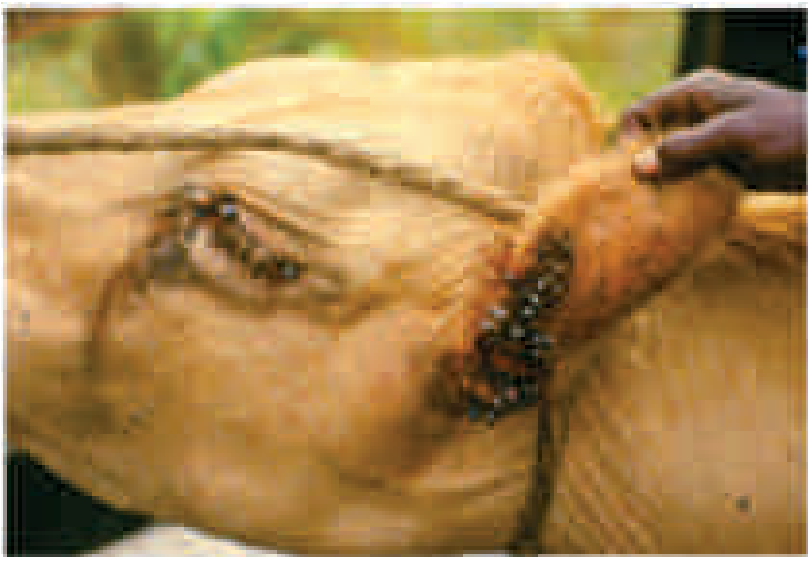

Fig 5.3.1 Ticks

Fig 5.3.1 Cattle lice

Notes

UNIT 5.4: Understand the Health Maintenance Procedure of livestock

Unit Objectives

At the end of this unit, you will be able to:

- Understand and practice the health maintenance procedure of livestock

5.4.1 Understand the health maintenance procedure of livestock

Interaction with animals

Good stock handling skills are essential in dairy farms and are critical for successful animal management.Dairy cows have close daily contact with people. The nature and frequency of this contact affects the way cows behave and their productivity.If the interactions are positive, cows become easier to handle because they are less afraid of people. If the interactions are negative, fear responses increase, handling becomes more difficult, and animal production, health and reproduction suffer.

Understand your cow

Good dairy farmers are able to empathise with the cow and, therefore, understand why cows behave the way they do in certain situations. Understanding this relationship between cow behaviour and how people act is vital to working with cattle successfully.

between cow behaviour and how people act is vital to working with cattle successfully.

Cow vision

A cow's view of the world is different from a human's. Their eyes are positioned on the sides of their heads, rather than facing forward. This means that they can see all around them (panoramic vision), but have blind spots at the front and rear. As a result, they can be easily spooked when people approach from these points.

For a comparison, imagine how spooked you would be if someone you didn't trust approached you from behind (your blind spot).

The position of their eyes also means that they have poor depth perception and, therefore, will baulk at shadows and lines on the ground.

Cow hearing

Cows have good hearing and respond positively when talked to in a calm voice. They don't like loud high-pitched noises. This is why noises from pumps and motors should be minimised, especially at milking.

Cumulative effects

The way a cow responds to a person will be a reflection of how that animal has been treated in the past; these effects are cumulative. There is evidence that cattle can discriminate between people. They do this using a mix of sight, smell and sound. For example, colour is a particularly strong cue and young calves will learn to discriminate people on the colour of their overalls.

Balance is important

On dairy farms not all interactions with people will be positive. For example, human-cow interactions during painful veterinary procedures are negative. Although these interactions will be few for most cows, the number of positive interactions must outweigh the negative. It is important, therefore, to take every opportunity to interact positively with the animal. In addition, the impact of the negative procedures can be minimised through better planning, well lit areas, minimising noise, etc.

Cow learning

Cows have an impressive ability to learn.

Cows' learning abilities are utilised in automatic milking systems, where cows physically operate a series of gates and laneways on their own to get milked.

Good stock people like to spend time with young calves. As well as the enjoyment factor, this interaction has a long-term benefit for the relationship between those animals and people.

The cumulative effects of interactions between cows and people are most obvious during milking as this is the time of most regular and close contact with cows.

The best handlers are confident, calm and consistent and often use verbal encouragement and body position relative to the cow to move cows in and through the dairy. They are working with the learning abilities of cows to get the job done efficiently.

Downer condition can be prevented if the animals are maintained healthily

- Maintain your handling facilities to prevent the occurrence of downer-causing injuries.
- Handle cattle quietly and gently to prevent injury.
- Develop good health protocols and observe cows closely. This will allow for early detection of health problems and subsequent treatment during early stages of these problems when a successful outcome is more likely.
- Evaluate cows routinely for lameness.
- Reduce calving problems. Nerve damage during calving is one of the most common reasons cows become non-ambulatory. Select sires with appropriate genetics for calving ease and birth weight.
- Cull cows before they become extremely thin.
- Provide adequate nutrition to cows.
- Monitor body condition of cows. Cows with body condition scores of 2.5 or less (on a 1-9 scale) are more likely to go down during transport.

If a cow does go down and is unable to get back up without assistance the following are management suggestions for consideration:

- Consult with your veterinarian to determine whether the cow should be treated or humanely euthanized.
- Provide fresh feed and water to non-ambulatory cows twice daily.

Never Drag Cattle:

- If it is necessary to move the cow use caretakers to humanely roll her onto a sled or low-boy trailer, or into the bucket of a large loader. Be careful to control the animal's head to prevent trauma during this process.
- If the cow is unable to sit up unaided or refuses to drink or eat 36 hours after becoming non-ambulatory she should be euthanized.
- Do not send non-ambulatory cows to an auction market or harvesting facility.
- Dispose of the carcass in an approved manner - bury, compost or render.

Notes

UNIT 5.5: Understand The Pregnancy Period of Cow

Unit Objectives

At the end of this unit, you will be able to:

- Observe the pregnancy symptoms in animals
- Care the animals during the pregnancy
- Arrange the required facilities

5.5.1 Understand the pregnancy period of cow

Pregnancy in cows

- Gestation period in cows – 280 days (average)
- Embryonic phase – 0 – 42 days
- Foetal Phase – 42 to end of term

Pregnancy diagnosis in heifers and cows

1. Non-return to oestrus

Non pregnant cows come to oestrus in 3 weeks after insemination. If oestrus signs are not observed around same time, the cow is assumed to be pregnant. There are several false positive cows that does not show oestrus and not pregnant. 7% of pregnant cows will show false negative signs ie. show some signs of oestrus during pregnancy. Insemination of these animals may result in embryonic or foetal death.

More reliable methods for detecting early pregnancy in cattle are

- Rectal palpation
- Hormone measurements
- Early Pregnancy-associated Protein
- Ultrasound examination

Comparison of early pregnancy diagnosis techniques

Technique	Early testing	+ve diagnosis accuracy	-ve diagnosis accuracy
Rectal palpation	+	+++	++++
Transrectal ultrasound	++	++++	++++
Milk progesterone	+++	++	+++
Early Conception Factor	++++	+	+

Table 5.5.1 Pregnancy diagnosis techniques

1. Rectal palpation

Fig 5.5.1 Rectal palpation

Advantage: immediate result enabling early treatment of non-pregnant cattle.

Accuracy:

- depends on the experience of the practitioner and can reach 95%.
- Rectal examination is usually carried done between 35 and 65 days post AI.

Early pregnancy diagnosis

(1-3 months)
Based on a combination of the following:

- asymmetry of the uterine horns
- decrease in the tone of the pregnant horn
- fluctuant contents in the pregnant horn (later both horns)
- a palpable corpus luteum on the ovary on the same side as the pregnant horn
- membrane slip
- appreciation of an amniotic vesicle.

Diagnosis in later pregnancy

(>3 months)

- cervix is located anterior to the pelvic rim and the uterus cannot be retracted
- uterus is flaccid
- placentomes, and sometimes the foetus, are palpable
- the median uterine artery increases in diameter and fremitus can be detected.

Common reasons for errors in rectal palpation

- failure to retract the uterus
- abnormal uterine contents (pyometra or mucometra)
- incorrect service dates.

Safety

Rectal palpation is widely used and considered a safe method for pregnancy diagnosis in cattle. Nonetheless early or inappropriate palpation of the amniotic vesicle may damage the embryo and cause embryonic mortality.

2. Hormone measurements

Progesterone assay

The progesterone secreted by a functional corpus luteum between 18 and 24 days after service or insemination is an early indication of pregnancy. It can be assayed in milk or plasma. Optimal assay time is 24 days after service or AI, this eliminates the possibility of long oestrus intervals which might result in false positives.

Accuracy

Accuracy in detecting pregnancy of the cow-side milk progesterone (EIA) test was 93.1% in a study. However,specificity (i.e. accuracy in detecting non-pregnancy) was only 39.3%. A large number of non pregnant may thus be diagnosed as pregnant.

Common reasons for errors in hormone measurements

- yometra/persistent corpus luteum
- shortoestrus intervals
- cystic ovarian disease (luteal cysts)
- incorrect handling of the samples and test kit

3. Early Pregnancy-associated Protein

Recently available tests detect so called early conception factor (ECF) or pregnancy-associated glycoprotein in blood samples. They are reported to detect the pregnancy-associated glycoprotein within 48 hours of conception.

Because of the high incidence of embryonic mortality this test should be treated solely as an indication of conception. Pregnancy should be confirmed later by rectal or ultrasound examination.

4. Ultrasound examination

Pregnancy examination using ultrasound early identification of non-pregnant cows post breeding improves reproductive efficiency and pregnancy rate in cattle by decreasing the interval between AI services and increasing AI service rate.
Real time (B-mode) ultrasound is a reliable and relatively simple method of diagnosing pregnancy as early as day 26.

Accuracy

An accuracy of over 99% can be achieved, enabling fertility problems to be identified rapidly.
Two factors affect the speed at which ultrasound examinations can be conducted on a dairy farm:

1. Operator proficiency and availability
2. Restraint of animals

When both factors are optimised, the speed of ultrasonography can approach that of rectal palpation, while exceeding palpation in the amount of information gathered from each animal. The main advantage of scanning is that it can give an accurate diagnosis earlier than rectal palpation.

Early pregnancy diagnosis and embryonic loss

Pregnancy can be detected earlier with ultrasound compared with rectal palpation. The rate of detection of early embryonic loss is thus also higher.
10 to 16% of cows diagnosed pregnant at 28 days post AI, experience early embryonic loss by 56 days post AI. Cows diagnosed pregnant at 28 days post AI days post AI, when the rate of embryonic loss per day decreases dramatically.

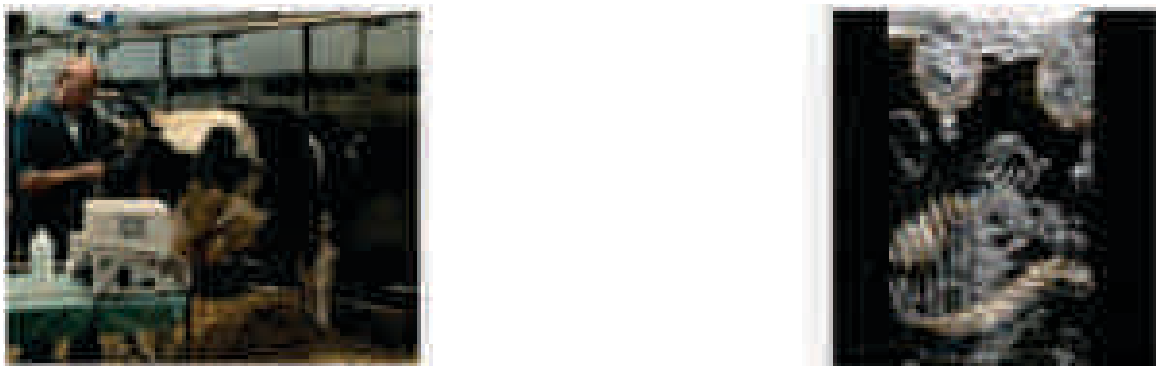

Fig 5.5.1 Pregnancy examination using ultrasound

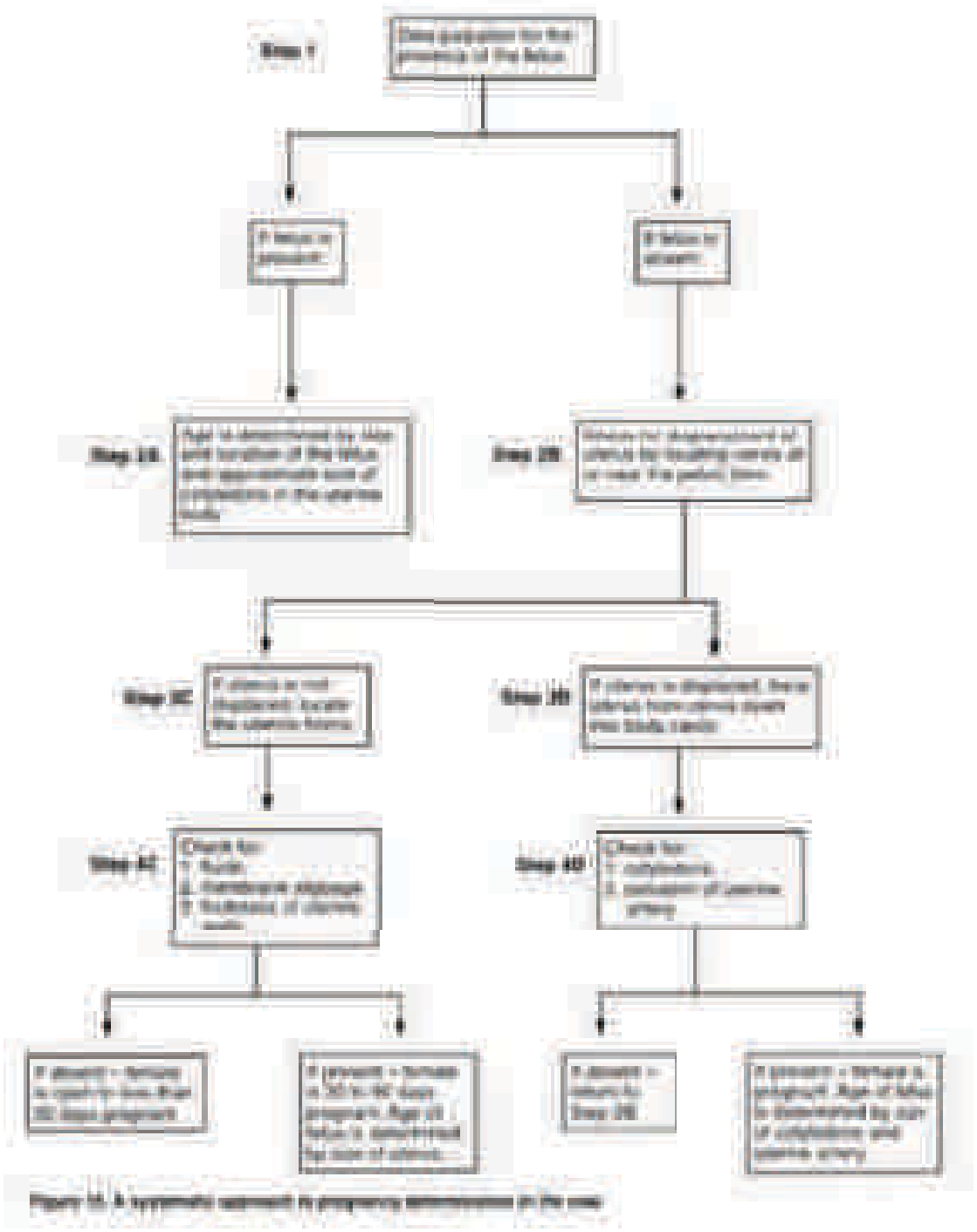

Fig 5.5.1 A systematic approach to pregnancy determination in the cow

An outline of factors for determining pregnancy at different stages of gestation

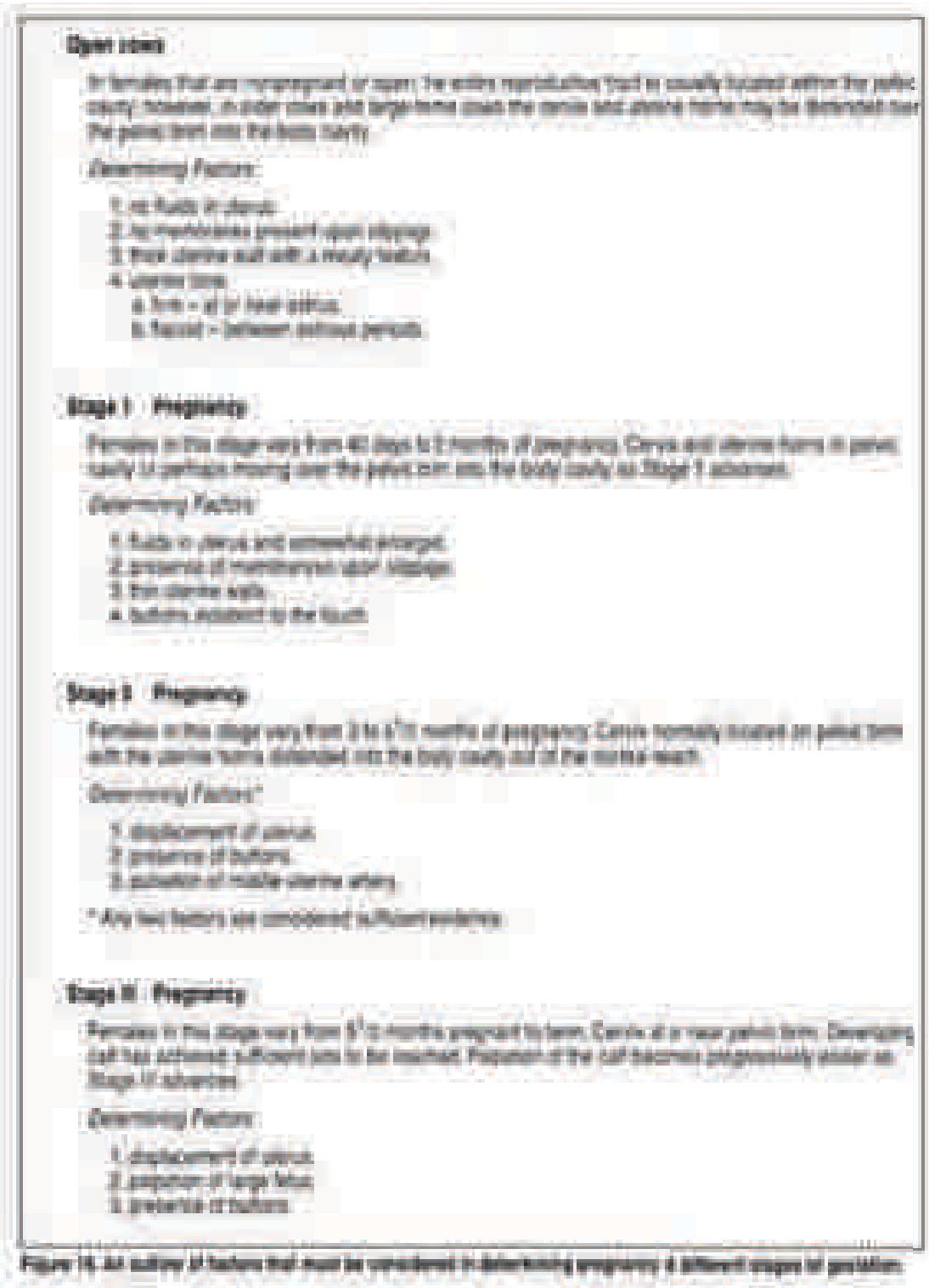

Figure 16. An outline of factors that must be considered in determining pregnancy at different stages of gestation.

Notes

UNIT 5.6: Take care during pregnancy

Unit Objectives

At the end of this unit, you will be able to:

- Care the animals during the pregnancy

5.6.1 Take care during pregnancy

Adequate health care and nutrition can ensure rapid growth of female calf as well as attaining puberty at an early age. Timely insemination of such animals can help them to calve at 2 to 2 ½ years of age. As foetus develops rapidly during last 3 months of pregnancy, adequate care needs to be taken during this time. The good care and management practices given to pregnant animal will give good calf and also high milk yield during the successive lactation.

- Pregnant animals should be provided with extra ration to meet the requirement of fast growing foetus as well as store energy for future lactation.
    - Provide extra concentrate mix of 1.25 to 1.75 kgs should be provided for pregnant animal as pregnancy allowance. Feed good quality of leguminous fodder.
    - Feed one kg extra concentrate during last 8 weeks of gestation.
    - Feed laxative about 3 - 5 days before and after calving (Wheat bran 3 kgs + 0.5 gs of Groundnut cake + 100 gms of mineral mixture of salt).
    - Do not allow pregnant animal lose or gain weight to become too lean or too fat.
    - Pregnant animals need suitable ration to reduce the possibility of diseases like milk fever and ketosis at the time of calving and also to ensure adequate milk production.
    - DAILY FEED REQUIREMENT OF A PREGNANT ANIMAL
        - Green fodder 15-20 Kg
        - Oil cake 1 Kg
        - Dry fodder 4-5 Kg
        - Mineral Mixure 50gm
        - Compound cattle feed 3 Kg
        - Salt 30 gm

- Provide clean drinking water and protection from thermal stress. Water should be provided round the clock to pregnant animals with a minimum of 75-80 litres of fresh and clean drinking water daily.
- Do not allow them to mix with other animals that have aborted or that are suffering from or carriers of diseases like brucellosis.A heifer after 6-7 months of gestation should be tied with milking animals; and its body, back and udder should be massaged.
- Allow moderate exercise, which helps in calving normally. Do not tire them by making long distances especially on uneven surfaces.

- Avoid slippery conditions, which causes the animal to fall receiving fractures, dislocation etc.
- A lactating animal should be dried within a period of 15 days after the 7th month of gestation.
- If accurate breeding records are available, calculate the expected date of calving. Separate it one or 2 weeks before and shifted to individual parturition pens.
- Calving pens are thoroughly cleaned and fresh bedding may be provided.

Parturition

- One month prior to predicted calving, cows are checked a minimum of 3 times / day
- Cows are monitored for any physical changes leading to parturition
- Bedding materials like paddy straw should be spread on the ground for the animal.
- Pregnant animals should have enough space for standing and sitting comfortably
- The Cow Check Folder accompanies staff on checks so that any changes in the cows can be notated and so that staff can check off each eartag number as it is observed
- When a calf is born, the staff member/s present make sure it is breathing freely, stands and nurses and is healthy
- After a calf is born, it is ear tagged as soon as possible

Normal Stages of Calving

- Calving is the act of giving birth to calf of aStages of CalvingDuration in HrsSymptomsFirst2 - 6 Preparing the birth canal in positioning of calf for proper delivery
- Swelling of reproductive region
- Plumping of teats
- Restlessness
- Isolation from other cows
- Protrusion of water sacSecond1 – 2
- (If this stage lasts more than 2 hrs, then it is due to abnormal presentation of calf in the birth canal.)Physical delivery of cow through the birth canal
- Animal should be placed in individual, clean, dry and well bedded pens
- Frequent Abdominal contractions
- Thick mucus discharge from vulva
- Occasional kicking at obdomen with hind legs.
- Cow lies down and gets up frequently.
- Slight increase in pulse and respiration rate.Third1 - 8
- (If this stage lasts more than 8 hrs, then it is called retained placenta)Detachment of placenta from uterine connections

  pregnant cow. It has three stages. Depending upon cow's age, calving takes 3 – 24 hours

Stages of Calving	Duration in Hrs	Symptoms
First	2 - 6	Preparing the birth canal in positioning of calf for proper delivery Swelling of reproductive region Plumping of teats Restlessness Isolation from other cows Protrusion of water sac
Second	1 – 2 (If this stage lasts more than 2 hrs, then it is due to abnormal presentation of calf in the birth canal.)	Physical delivery of cow through the birth canal Animal should be placed in individual, clean, dry and well bedded pens Frequent Abdominal contractions Thick mucus discharge from vulva Occasional kicking at obdomen with hind legs. Cow lies down and gets up frequently. Slight increase in pulse and respiration rate.
Third	1 - 8 (If this stage lasts more than 8 hrs, then it is called retained placenta)	Detachment of placenta from uterine connections

Normally, the cow calve on their own and occasionally they need assistance. If you try and intervene too early or too late, then you run into risk of

1. Damaging the birth canal
2. Contamination of the uterus
3. Injury to Calf

Presentation of Calf

Normal Presentation	Abnormal Presentation
Fore-limbs extended and calf head lies between the knees, straight body and hind limbs.	Any deviation from the normal presentation of calf if occurs, help of expert veterinarian should be taken (Distokia) Causes of Distokia - Calf is too large or misformed - Cow is too small, pelvic abnormalities or had previous history of distokia - Malpositioned calf - Head bent back - One or two legs flexed at body or mid joint - Transverse presentation - Twins

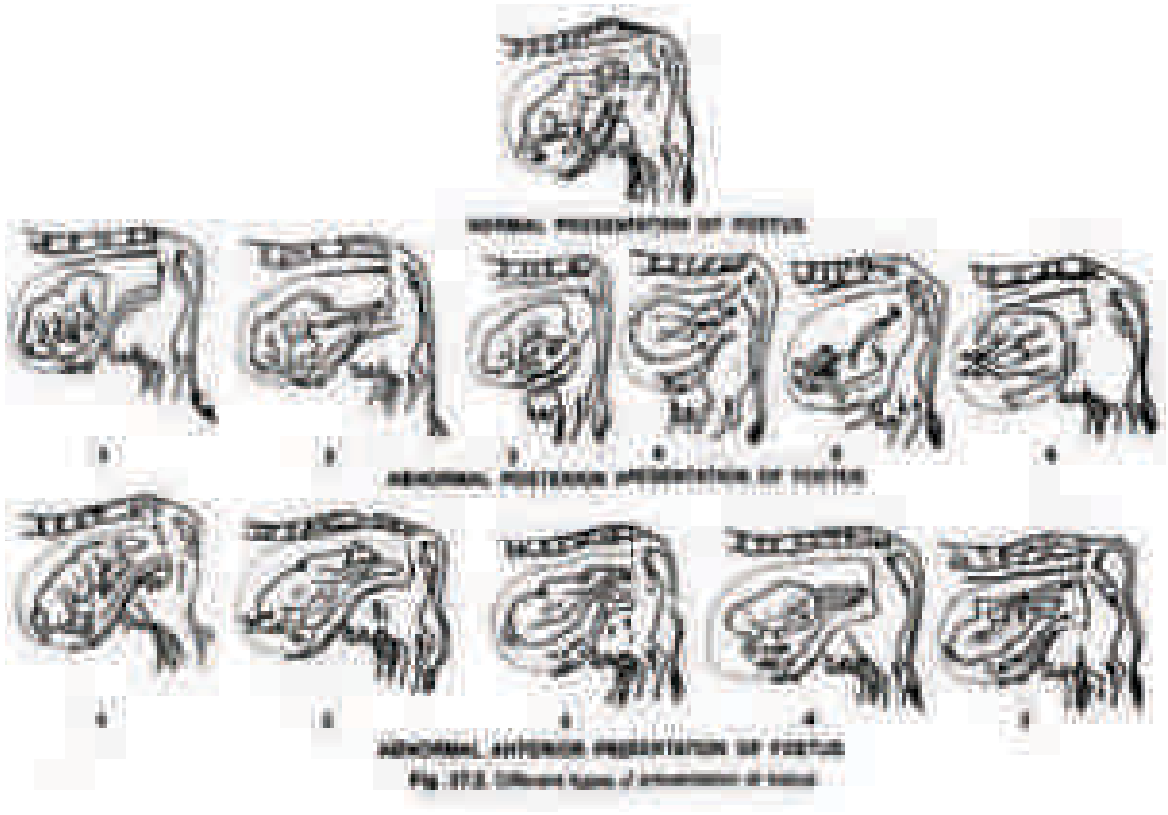

Fig 5.6.1 Abnormal development of Foetus

- After parturition external genitalia, flank should be cleaned arid protect the animal from chill and give warm water.
- Take care of the animal before calving from milk fever. Give calcium supplement.
- Some times the udder will be swollen just before calving. Remove the milk partially.
- Take care, of the animal, if at all any abortion.
- Provide always free access to drinking water.

Retained Placenta

Causes of Retention of Placenta:

(a) Old age of cow.

(b) Low condition of health.

(c) Brucellosis.

(d) Other bacterial infection.

(e) Lack of tonicity of muscles of uterus.

(b) Signs of Retention of Placenta:

A portion of placenta may be seen hanging from vagina.If this portion of placenta contained week blood solution and not forthcoming, then it is called retention of placenta.

(c) Results of Retained Placenta:

Retention of placenta longer than 24 hours signifies the following results:

(i) Inflammation of uterus.

(ii) Putrefaction within the uterus.

(iii) Production of toxic substances.

(iv) Loss of appetite,

(v) Fever.

(vi) Other evidences of severe trouble.

(d) Treatment:

- Symptoms of delivery may be observed i.e. swelling of external genitalia, swelling of udder, usually majority of animals will deliver without any help.
- If there is any difficulty, provide veterinary help.

Notes

UNIT 5.7: Understand Handling of Calf

Unit Objectives

At the end of this unit, you will be able to:

- Understand the care and maintenance required for the calf
- Handle the calf
- Arrange the necessary facilities

5.7.1 Understand handling of calf

Calves are the future dairy herd. Replace 20 -30 % cows in the herd regularly with freshly calved heifer-cows to maintain production efficiency. Calves raised in one's own farm are highly reliable. Calf sale forms a major component of income in the dairy business.

Raising calves is the most difficult operation in a dairy farm which requires a great deal of management skill. Care of calf starts in the womb of the cow where it is a foetus. During dry stage the cow often neglected and fed with inferior quality fodder results in poor growth of calf

Calving Observation & Response

- Stay a good distance away so that the cow feels comfortable to lay down and get up in order to expel the calf
- Notify the Livestock Technician (if on duty) of an impending birth
- If, after the water breaks, the cow continues to struggle in labor for an hour, humane intervention most likely should occur
- As the calf emerges, observe the orientation of the calf (front feet and
- nose first)
- Notify the veterinarian or Livestock Technician or Farm Manager as soon as possible, if dystocia is suspected
- The cow should be moved into the separate Barn so that she can be helped
- Do not put the cow in the cattle squeeze chute to pull a calf
- Follow the directions of the Livestock Technician, Farm Manager or Livestock Veterinarian onhow to proceed with the dystocia

Care of calf at birth

- Calving pen
    - It is a individual loose box or stall used for calving, which should be 3 m x 4 m size (12 m^2) and well ventilated. Sufficient lighting is essential.
    - It provided better protection to the cow and calf and avoid disturbances from other cows.
    - Special attention can be provided for which attendant quarters may be nearer to calving pen.
    - Attendant quarters may be established nearer to calving pen to monitor calving process during night time.

- n the calving pen following items should be made available in all time.

- Antiseptic solution like tincture Iodine or Povidone iodine, thread, scissors, lubricants like liquid paraffin, vegetable oils, obstertical equipment like hook, snare, calf puller, wire saw; emergency drugs like local anesthetics, antibiotics, analgesic, calciumboroglugonate, other items like emergency light, towel, soap, buckets, aprons etc.
- In villages or farmers those who are maintaining only one or two animals must tie the animal in advanced stage of pregnancy separately under visibility.
- It must be protected from predators. The floor should be dry and clean and having clean grass cover is essential.
- The cow should not be tethered too close, it must be tied with sufficient rope so that animal can move freely and care the new born easily during night time when calving is unnoticed.
- If any abortion, calves should be examined thoroughly to ascertain the possible cause for abortion (age of the foetus, condition, necrotic foci if any etc).
- In such case the calving pen should be thoroughly sterilized with 4 per cent caustic soda.

Management immediately after calving

- Udder and hind quarter should be washed with lukewarm water containing an antiseptic solution and dried with clean cloth.
- Cows may be milked to relieve the pressure from the udder.
- If day old weaning is not practiced the calf can be allowed to remain with the mother in the calving pen for 7 to 10 days.
- Otherwise the calves can be removed immediately to calf pen.
- The maternal instinct is more, cow's eyes can be blindfolded before the calf is removed.
- The placenta should be expelled within 12 hours after parturition, if not it should be removed manually. (Refer Retained Placenta)

Fig 5.7.1 Care of new born calf

- Normally cow will lick and dry the calf immediately after parturition which may stimulate circulation and respiration.
- If the cow fails to do, it can be stimulated to lick by sprinkling handful of bran or salt over the body of the calf.
- Sometime primiparous cows may be nervous and inexperienced or cow may exhaust after a prolonged labour.
- Under such circumstances the mucus (phlegm) from the nostrils of the newborn calf should be wiped and cleaned with a dry towel.
- The calf should be massaged vigorously for some times with a handful of straw rolled into a ball.
- Some times respiratory passage may be block with mucus and interfere with calf's respiration.
- Under such condition the calf should be lifted by holding the hock in such a way that the head is down, so that the phlegm may flow off.
- Care should be taken while lifting the calf, it may slip off. A hand full of straw can be used to have a grip while lifting.
- The calf can also made to sneeze by tickling a twig of hay or grass inside the nostrils.
- If the above methods are failing, little time is left to lose. The attending person should apply his mouth to the nostrils of the animal and suck out the mucus.
- After that he should blow in his expired air through the calf's nostrils closing its mouth.
- Carbon dioxide in the expired air which has been blown-in the lungs of the calf will act as respiratory stimulant to initiate respiration.
- This should be followed with intermittent pressing and releasing of pressure on the chest wall of the calf to give artificial respiration.
- *Attending naval:* naval or umbilical chord should be ligatured with a sterile thread one inch from the body (under field condition the thread can be soaked with tincture iodine) severed 1 to 2 cm distal to the ligature and tincture iodine or povidone iodine should be painted liberally.
- This is very important because infection can gain easily through naval and cause serious illness like naval ill, naval abscess and joint ill.
- A single oral dose of 10 g piperazineadepate is recommended for the calves.

Colostrum feeding

- Colostrum is the first milk secreted after parturition.
- It contains large amount of gama globulins which are nothing but anti-bodies produced by the cow against antigens encounter during her life including those against may disease producing organisms.

- Absorption of these antibodies provide the calf with an umbrella of passive immunity.
- Newborn calf should void meconium in 4 to 6 hours of first colostrum feeding and first faeces is tarry in colour and consistency.

Lactation

- Cow/Calf pairs are checked 3 times per day until told otherwise
- Cows should be observed for good body condition
- Cows should be observed for good udder condition
- Calves should be observed for good body condition, alertness and activity level
- Calves should be observed nursing, grazing, eating hay and drinking water
- If problems associated with lactation are observed or suspected, the affected animal/s should be brought into the separate unit and penned for observation
- Veterinarian or Livestock Technician or Farm Manager should be notified of any Lactating issues

Weaning

- Making the calf independent of its mother or separating the calf from its mother is known as weaning.
- Under early weaning system, the cow is not allowed to suckle its calf. Instead, the cow is completely milked out and required quantity of whole milk or skim milk are fed to the calf.
- During weaning, cows are checked a minimum of 3 times per day
- Animals are observed for good health and well being
- Animals are counted daily to ensure none have gone through fences or left the property
- Once weaning is completed, cows are checked 2 times per day until the Livestock Technician determines it is no longer necessary

Disadvantages

- Weaning is a problematic in Bosindicus and buffaloes due to strong maternal instinct.
- 0 day weaning can cause reduced milk yield in such animals, and also cause early drying and temperamental problems.

Milk feeding

- In day old weaning method, following points should be adhered strictly.
- Each calf should be treated individually, it should be weighed weekly and feed according to the body weight and growth response.
- Group feeding should be avoided to minimize over feeding or under feeding.
- Calves should be fed twice or more times in a day. One time feeding may cause indigestion and diarrhea results in dehydration.
- Milk container, milk pails/buckets and other appliances should be kept clean and hygienic.
- Milk should be boiled and cooled to body temperature (39°C) before feeding.

- Milk feeding should be 3 or 4 times in a day during the first week and can be reduced to 2 times in a day up to 90 days of age.
- Milk allowance should be correct to the body weight of the calf and over feeding should be avoided in the first month of age.
- If the calves not consume milk, the next allowance should be withheld and it can be drenched with 30-50 ml of castor oil.
- If the milk or milk replacer contains large amount of foam, it should be removed by drawing a paddle on the surface or by filtering through a clean cloth.
- Foam causes the calves to take in entrapped air which may lead to bloating.
- Clean drinking water should be made available all times and the pen floor should be sloped adequately and the pen should kept dry always.
- Calves should be dewormed in the first week itself for ascariasis.
- Antibiotics and feed additives should be mixed in the milk or concentrate to improve the growth rate.

Pail feeding

- Weaned calves should be trained to drink milk from pails so that feeding management is easier.
- Generally crossbred calves learn quickly to drink milk from pail or nipple. But it is little difficult to train buffalo calves.
- Buffalo calves and lazy and slow in learning to drink milk or milk replacer from the pail or bucket.
- The scheduled quantity of boiled and cooled milk poured in the milk pail and should be moved to the calf.
- Care should be taken to avoid frightening.
- The calves should not be forced to drink milk by immersing the head in to the bail.
- Frightened calves may refuse to come close to the pail.
- The attendant should first dip his two fingers (index and middle fingers) in to the milk after cleaning and kept close to the mouth of calf.
- After testing the milk calf will start suckle the fingers.
- Gradually the fingers should be lower to the bail and should be dipped in to the milk.
- When the calf takes one or two mouthfuls of milk remove the fingers.
- This process may be repeated whenever the calf stops drinking and lifts its head.

Feeding management of calves

- Reticulo-rumen is non functional in calves and hence feeding of calves should be treated as non-ruminant and they are not equipped to utilize roughages
- To encourage the early development of rumen and reticulum the calves should be fed with good quality leguminous hay and other roughages.
- Because of non availability of good quality protein due to lack of ruminal microbial digestion.
- The calves have little capacity to utilize non-protein nitrogenous coumpounds and therefore substance like urea should not be included in their ration.
- Due to the same reason, B-complex vitamins also are dietary essential for calves in addition to vitamin A and D.
- For digestion of milk and enzymatic digestion in the abomasums and small intestine is more important for calves. To avoid this oesophageal groove exist in the reticulum connecting the oesophagus with the omasum.During nursing and milk feeding, the sides of the groove are raised by reflex action to form a tunnel through which milk passes from oesophagus to omasumby-passing the rumen and reticulum.This continues to function even after considerable development of the rumen if milk feeding is continued.

Other management practices

- Identity the calf by tattooing in the ear at birth, and branding after one year.
- Dehorn the calf within 7-10 days after birth with red hot Iron or caustic potash stick or electrical method.
- Deworm the calf regularly to remove worms using deworming drugs. Deworm at 30 days interval.
- Fresh water should be given from second week onwards.
- House the calves in individual calf pens for 3 months afterwards in groups.
- After six months males and females calves should be housed separately.
- Weigh the calves at weekly interval up to 6 months arid at monthly interval afterward know the growth rate.
- Mortality in calves is more in first month due to pneumonia, diarrhoea and worms.
- Extra teats beyond 4 should be removed at 1-2 months of age.
- 8-9 weeks of age, males should be castrated.
- Keep the body clean and dry to avoid fungal infection.
- Mineral-blocks should be provided, so that the calves lick and no changes for mineral deficiency.

Notes

UNIT 5.8 : Record The Health Check Up of The Animal and Treatment

Unit Objectives

At the end of this unit, you will be able to:

- Arrange the regular health check up of the animals
- Record the details

5.8.1 Record the health check up of the animal and treatment

Importance of recording

- The performance of the farming enterprise can be seen through the records.
- The value of the farm enterprise will be available only from the records.
- From the health register, it is possible to collect the details of incidence of diseases in the past and the precautions to be taken in the future.

Recording of information

- The recording must be simple and involve little paper work for farmers.
- The recording must be carried out in an appropriate time
- The frequency of recording should be as low as possible. At the same time information should not be missed
- The recording must be appealing to the average farmer; they should feel that it benefits them in managing the animals better.
- The direct cost to the farmer should be small.
- The records kept should enable the farmers to identify the best and the poorest producer and should make it possible for progeny testing of bulls.
- The information from the records should be made available to the farmer quickly and in simple form and should be utilized for extension and research purpose.
- The records containing expenditure and income details should be checked daily.

Prevent residues:

Simple management practises will prevent contamination of milk. To prevent residues:

- record all treatments given;
- visibly mark all treated cows;
- inform all people involved in milking of treated cows;
- milk treated cows last or use separate "bypass" equipment to insure that no contaminated milk enters the milk supply;
- discard milk from all quarters of treated cows;
- discard milk from all cows calving within 30 or 42 days of dry treatment according to label directions;
- discard milk from fresh cows for the required period if dry treatment was used;
- use antibiotic test kits as needed; and follow label directions for all medications used. These include feed additives, medicated feeds such as calf starter, topical preparations, as well as injectable and infusion products.

Drug Inventory

The drug inventory on the farm can be managed using the following procedures:

- purchase drugs in quantities which will be used in a reasonable amount of time;
- check product expiry dates before purchase;
- clean and reorganize the drug cabinet regularly;
- use products with older dates first; and
- discard all expired products.

Preventive Health Management Practises

- Enrolled in a veterinarian supervised health management program
- Environmental management includes provision of:
    - Adequate space per animal
    - Clean, dry bedding
    - Good ventilation
    - Clean, readily available water
    - A ration formulated to meet animal requirements
- Proper milking practices are used to prevent mastitis:
    - Post-milking teat dipping
    - Treatment of all cows at the time of dry-off
    - Treatment of lactating cows as recommended by a veterinarian

Treatment Records

Many antibiotic residue violations result from failure to: identify treated cows, maintain treatment records, and use proper milk withholding times. The record system must make all staff involved in milking aware of treated cows and the period for withholding milk from sale. Identify treated cows in a manner clearly visible to the person milking. Some methods used are:

- leg bands,
- coloured tape or fluorescent hockey tape around the legs or tail, or
- paint markings on the cow's flank, rump or legs.

In larger herds identification may be colour coded to show the last day to withhold milk. In tie-stall barns where cows always occupy the same stall, coloured tape or tags attached to the milk inlet of the pipeline can identify a treated animal (Figure 2).

Re-enforce cow identification systems with a prominent chalk board or bulletin board in the milking parlour or barn entrance.

The identity of all treated cows and the date and time of the last milking withheld should be clearly visible (Figure 3). Train all staff involved in milking to refer to this board immediately before each milking.

Keep a permanent, detailed treatment record for reference and management purposes. Write this in the herd health book or in the individual cow record files. This record should identify the animal, the product and dosage administered, the date of treatment and the milk withholding period (Table 1). Before shipping any animal for slaughter, check this record to insure pre-slaughter treatment withholding requirements are met.

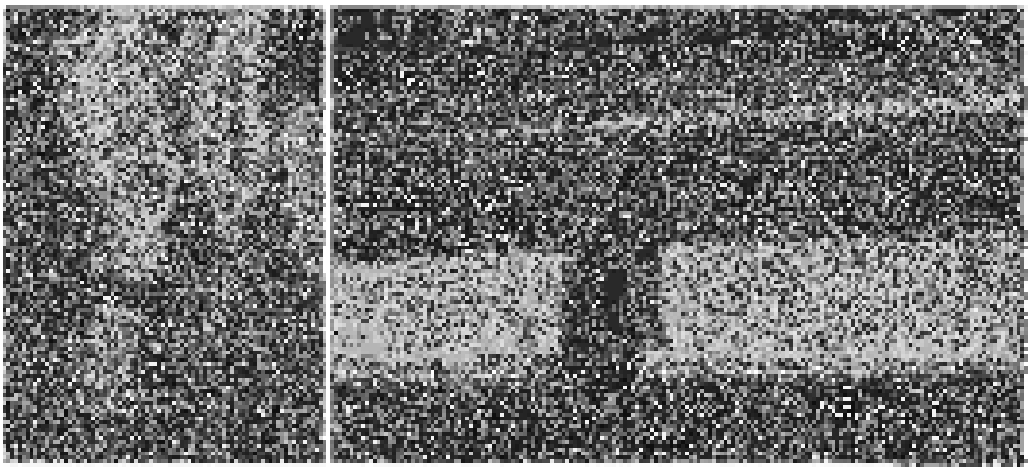

Fig 5.8.1 Clearly visible identification of treated animals such as leg bands (left) or tags on the pipeline (right).

Figure 5.8.1 Example of Bulletin Board identifying treated cows clearly visible to milking staff

Treatment Record Example

	Identity						
	Diagnosis	Treatment	Dosage	Duration of Treatment	Label Withdrawal (No. ofmilkings)	Date Tested	Milking Returned to Tank

Table 5.8.1 Treatment Record Example

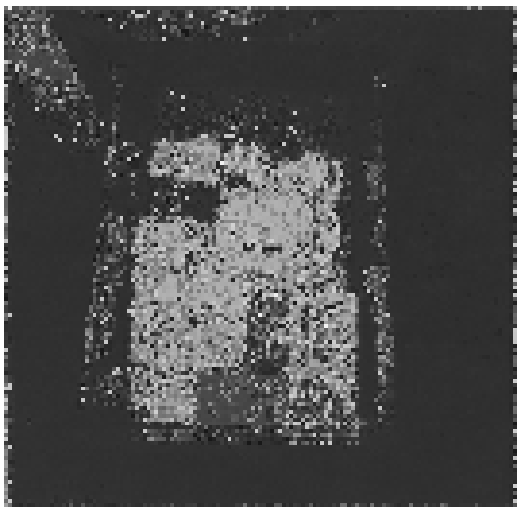

Figure 5.8.1 Example of box top file

In addition, store product inserts and packaging from all livestock medicines in a file folder. This "box top file" (Figure 4) will provide additional information if questions about previous treatments arise.

On Farm Antibiotic Testing

The persistence of antibiotic residue in milk of treated cows may vary in amount and duration of time present. This may depend on the cow, her metabolism, the medicine type, the use of a combination of medications, the dosage of medication and the method of administration. Test milk suspected of contamination using antibiotic test kits. Examples of these situations where milk contamination may occur include:

- the addition of purchased milking cows to the herd for which the treatment history is unknown,
- fresh cows purchased during their dry period who have unknown dry off dates or dry treatment histories, cows treated in an extra-label manner, cows treated with more than one product, cows which are severely ill at the time of treatment,
- cows which calve before the end of the milk withholding time following dry treatment,
- establishing the identity of a treated cow when an error in identification may have occurred, and
- the testing of milk in the bulk tank when contamination with milk containing medication may have occurred.

A variety of kits are commercially available. When selecting a test kit the user should recognize that kits vary in the type of antibiotics and amount of antibiotic they detect. No single kit can detect all commonly used antibiotics. Confirm that the kit you use "matches" the antibiotic you need to detect. Antibiotic testing services may also be available from veterinarians, milk processing plants, and others.

Disposing Of Milk From Treated Cows

All unmarketable milk must be disposed of in a manner which protects the environment and keeps drug residues out of all food products. Do not feed milk from treated cows to calves. Milk from treated cows cannot be used in a sour colostrum program since antibiotics prevent normal fermentation. Do not feed milk from treated cows to calves or other livestock which may be sold or slaughtered before they are residue free.

Milk from treated cows can be added to a liquid manure storage, or along with straw to absorb it, to a solid manure storage. Do not add milk containing antibiotic to milk house wash water entering a septic tank or treatment trench system. Milk solids will plug the trench tile.

Exercise

1. Write a note on Livestock and health maintenance.

Answer: .....

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Notes

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

6. Performing Hand and Machine Milking

Unit 6.1 - Understand pre milking and post milking activities
Unit 6.2 - Understand mastitis and precautions
Unit 6.3 - Identify and use milking machine and equipment
Unit 6.4 - Understand the adjustments of milking machine and equipment
Unit 6.5 - Understand right milking technique
Unit 6.6 - Follow procedure for clean milk production

AGR/N4105

Key Learning Outcomes

At the end of this module, you will be able to:

- Understand the Pre-Milking, Milking and Post Milking activities
- Understand the Mastitis disease and precautions to be taken
- Identify and use the milking machine and equipment
- Understand the adjustments of the machine and equipment
- Understand and perform proper milking procedures
- Understand the right milking technique
- Follow procedure for clean milk production

UNIT 6.1: Understand Pre Milking and Post Milking Activities

Unit Objectives

At the end of this unit, you will be able to:

- Understand the pre milking activities, its importance
- Practice the post milking activities

6.1.1 Understand pre milking and post milking activities

Preparing Conducive milking environment

1. Milking is an art requiring experience and skill. Milking should be done gently, quietly, quickly, cleanly and completely.
2. Comfortable cows yield more milk than a roughly handled and excited cow.
3. The milking process should be completed within 5 to 7 minutes.
4. Complete milking has to be done. If any residual milk is left it may act as nidus for mastitis causing organism and the overall yield also getting affected.
5. Provide cows a clean and stress free environment for milking
6. Provide cows a calm place for milking. Cows should be away from loud noise and other frightening causes
7. Provide cows a well lit area for milking. Dark and narrow spaces should be avoided for milking.
8. Provide cows a warm and cool place. And avoid contact of extreme hot and cold air or surroundings to the cows during milking.
9. A milking environment that chronically stresses cows may predispose cows to a greater rate of mastitis. Proper udder stimulation enhances oxytocin release and milk letdown
10. If a number of cows are refusing to enter the parlor or are defecating frequently in the milking parlor, operator and parlor performance should be examined.

Restrain the cow for milking

1. Apply the figure “8” just above the hock to prevent kicking while milking.
2. Hock twitch is the milkers delight. It prevents a cow from raising the rear legs and thus prevents kicking. It is simple and effective.
3. Get a rope made of heavy cotton between 18-22 inches around the hind legs just above the hock joint in figure of “8” pattern crossing between the two legs.
4. A strong stick or piece about a foot long is put through the eye by turning the stick, the rope is twisted until it binds the legs tightly and presses the tendon down. Thus it prevents the animal raising its legs and make milking possible.

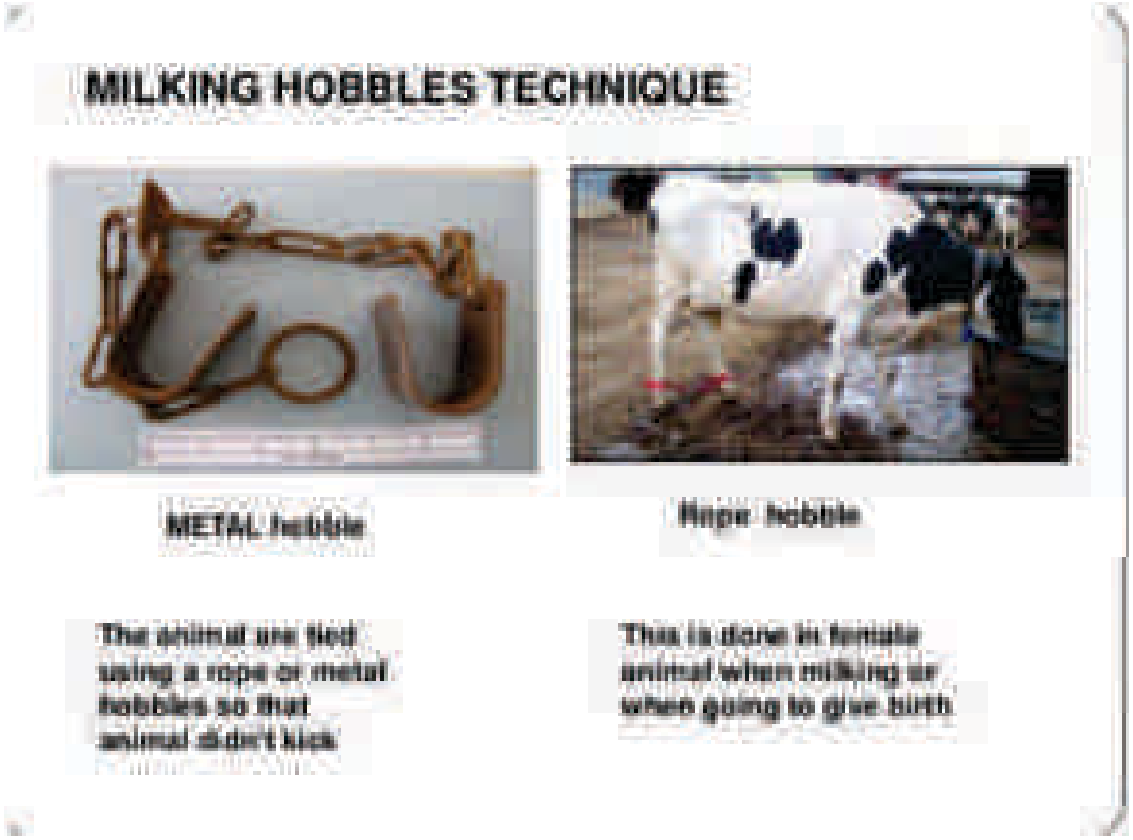


Fig 6.1.1 Milking Hobbles Technique

12 golden rules for conventional milking

Before milking

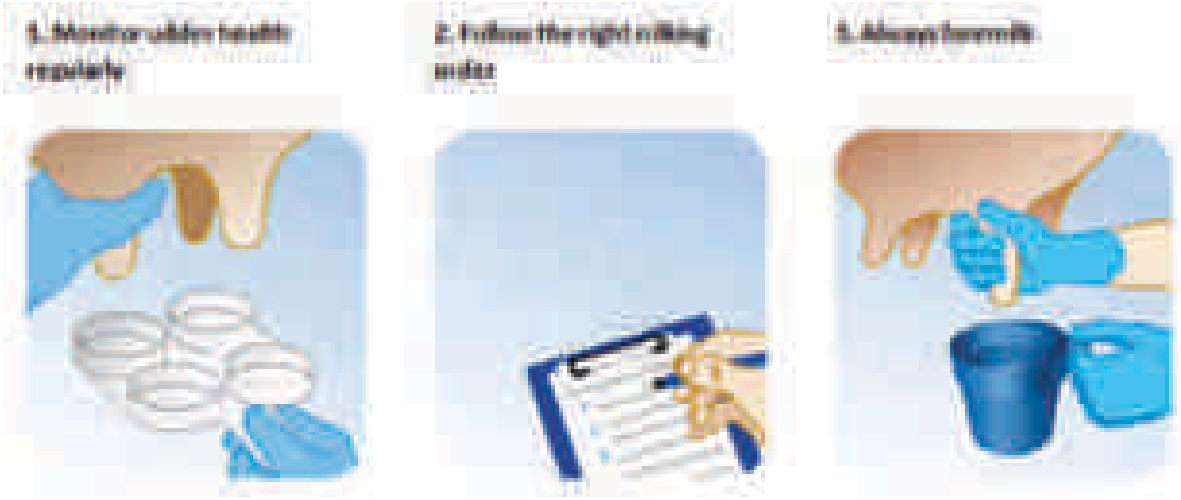


Fig 6.1.1 golden rules for conventional milking

Before milking

1. Monitor udder health regularly

- Examine the udder for swelling, heat, or pain, and, using a strip cup or plate, examine the foremilk from each quarter prior to every milking.
- Removing hair from udders reduces the amount of dirt and manure that may adhere to the udder and contaminate milk. Udders with long hair are difficult to clean and dry.
- Clean the teats with soapy water or iodine. (Warm water may help coax or "bring down" the milk.) Dry the teats, but don't rub or irritate them.
- Always use disposable gloves and always ensure they are clean
- Check udder health regularly; first check fresh first-calf heifers and cows 1–2 weeks after calving (use California Mastitis Test CMT, Cell Counter DCC, Herd Navigator HN, etc)
- Regularly review the dairy processor info on milk quality
- Keep record of udder health results for each cow
- Always keep milk of identified sick cows separate

2. Follow the right Milking order

- First start with milking healthy cows and healthy first calvers
- Follow by fresh milking cows and first calvers—until they are checked for udder health status
- Always milk older and sick cows last or milk in a separate group
- Always follow a standardized milking routine. Any variable milking routine will cause drop in milk production.
- Sit or squat in a position that will allow you to move away quickly if the cow becomes uncooperative. Sitting cross-legged on the ground, for example, is not safe. (See Warnings below.) An ordinary milk stool can be fabricated with two 2x4's cut and nailed to form a "T" - cut to fit your behind and make sure it is low enough to afford comfortable access to the cow's teats.

3. Always foremilk

- Always use disposable gloves and always ensure they are clean
- Never strip milk onto the floor or in the hand of the milkman.
- Strip 2–3 milk jets from each teat into a foremilk or strip cup. After each milking strip cups should be cleaned and sanitized.
- Examine the milk for flocculation, colour changes or other inconsistencies
- Always keep abnormal milk separate
- Foremilking also stimulates the milk letdown

4. Clean and/or disinfect Teats before milking

- Use your hands to remove debris from teats. Only the teats should be cleaned, as washing and wetting the whole udder makes it difficult to adequately dry the udder before milking machines are attached.
- Always use disposable gloves and always ensure they are clean
- When pre-milking teat disinfection is allowed: use approved pre-milking teat disinfectant and wait 30 sec before removing
- In all case use disposable paper or udder towels to clean off and carefully dry each teat properly
- Never use paper or towels for more than one cow
- Milking wet udders and teats may lead to increased mastitis and bacteria counts in bulk milk.

During milking

5. Check milking vacuum

- Always check the milking vacuum at the start of each milking
- Vacuum level, pulsation rate and pulsator ratio should be in accordance with Equipment supplier recommendations

6. Attach milking cluster in time

- Always use disposable gloves and always ensure they are clean
- Always make sure to clean or, when necessary, disinfect clusters in between cows
- Attach milking cluster within 60 sec after teat preparation
- Avoid air entry during cluster attachment
- Check cluster positioning
- Make sure that long milk tubes are aligned with pulse tube, avoiding twisting of tubes
- Adjust units for proper alignment.
- If teat cups are seated excessively high on teats, irritation to the lining of the teat may result.
- Improperly aligned units may block milk flow and increase the amount of milk remaining in the udder at the end of milking. Of greatest concern is slipping or squawking teat cups. Only about one-third of slips produce audible squawks. Such occurrences can result in an increase in infected quarters.

7. Avoid over-milking

- Watch the milking process during milking; don't do anything else
- Over milking could damage teat ends
- Identify the end of milking; by direct observation of milk flow; or via flow sensors in case of automatic cluster removal

8. Remove clusters correctly

- Always use disposable gloves and always ensure they are clean
- Shut off vacuum to the cluster when milking completed (manually or automatically)
- Allow claw vacuum to decline fully before removing cluster
- Do not squeeze the udder. Do not do machine stripping.
- Take off cluster after vacuum shut-off. Avoid pulling off the cluster as it will result in liner slips.
- Avoid liner slips during the end of milking to prevent future infections.

After milking

9. Disinfect teats Immediately

- Always use disposable gloves and always ensure they are clean
- Dip or spray teats as soon as the milking cluster has been removed
- Use an approved post milking teat disinfectant as this is the most effective way to prevent the spread of mastitis
- Keep the cows standing up for 30 minutes after milking
- Care should be taken to ensure that all four teats are covered.
-

10. Clean/disinfect milking equipment

- Clean outside milking units and all surfaces in the parlour
- After each milking rinse and clean internal milking system, either manually or automatically
- Use approved detergents, following dosing, routine and temperature instructions on the label
- When required disinfect the milking system using approved sanitizers, following label instructions
- Remove clusters from cluster cleaners and allow milking system and milking units to dry

11. Ensure proper milk cooling

- Always check temperatures to ensure correct cooling is reached during and after milking
- Make sure always to follow dairy specific recommendations for cooling temperatures
- Milk cooling and milk storage tanks need to be cleaned immediately after emptying, using approved detergents

12. Regularly monitor Milking results

- Review dairy processor info on milk quality and milk composition regularly
- If available, cross check with data from CMT, DCC, HN, etc on a regular basis
- Regular preventative maintenance including replacement of liners , tubes and other parts, according to recommendations, is the best way to ensure a well functioning milking system

Fig 6.1.1 Disinfecting Teats

Notes

UNIT 6.2: Understand Mastitis and Precautions to be Taken

Unit Objectives

At the end of this unit participants will be able to:

- Understand the udder diseases occur in dairy animals
- Take precautions for mastitis disease

6.2.1 Understand mastitis and precautions to be taken

- Mastitis
    - Inflammation of mammary gland is Mastitis. It is caused by physical, chemical and biological agents such as bacteria, fungi, virus, yeast etc.
    - Mastitis is characterized by physical and chemical change in milk, and pathological changes in glandular tissues.
    - Changes in Udder include
        - Hardness
        - Reddening
        - Swelling
        - Hot to touch
        - Pain to the animal on touching/palpation
    - Changes in milk include
        - Presence of flakes, clots or serous milk
        - Coloration – Yellow or Pink or red or watery
        - Increased electrical conductivity
        - Observation of first stream of milk (foremilk) permits the detection of abnormal milk that should be withheld and discarded promptly.
    - The most important bacterias responsible are *Streptococcus agalactiae, Staphylococcus aureus, Corynebacteriumpyogenes, Corynebacteriumbovis, Mycobacterium species* and *E.coli*.
    - Classification of mastitis

	Acute Mastitis	Chronic Mastitis
Onset of symptoms	Quick	Recurrent
Severity	Reddening, swelling, high temperature, painful to touch, discoloured secretion	Little change in milk. Slow in onset of symptoms
Classification	Fever and loss of appetite in per acute cases	Clinical symptoms not visible. Diagnosed by lab tests.

Table 6.2.1 Classification of mastitis

- Detection of mastitis in herd
  - It is difficult to detect mastitis in a herd because few animals have the disease with or without clinical symptoms (subclinical form).
  - Routine Milk sample for lab tests will reveal presence of mastitis in the herd. It is tool to monitor mastitis prevalence in the herd over time.
  - Subclinical Mastitis does not show visible changes. It is difficult to diagnose subclinical mastitis and hence it is more problematic.
  - Often there is a decrease in milk production in a herd with mastitis.

Somatic cell count	**Sub clinical Mastitis**
< 1 lakh	Absence
< 2 lakhs	Presence
> 5 lakhs	Presence (1/3 of mammary gland affected)

Table 6.2.1 Detection of mastitis

  - Disadvantage:
    - The somatic cell count of a composite sample does not reveal the type of infection nor identify the infected cows.

Best Milking Practices checklist

This checklist will help you to pinpoint areas in your milking routine that need improvement. Producing quality milk to help to increase your farms income.

1. Observation of Cow Cleanliness. Is there manure on the udder and teats?
2. Observation of milking Parlor and Equipment Cleanliness.
3. Are milking person/employees using gloves?
4. Proper use and coverage of Pre-dip. Test proper coverage with "Paper Towel Test"
5. Length of time dip is on teat before drying. (Follow Label most 15-30 seconds)
6. Is the employee stripping each teat vigorously and getting good milk flow?
7. Is a strip cup being used? This can help to detect early cases of mastitis and decrease change of pathogen spread.
8. Is CMT test being performed on animals that are suspected to have an infection?
9. Is water being used to clean udder? No Water should be used. Aids in bacteria growth.
10. What is the milking preparation procedure? Dip-Strip–Dry–Apply (Dry must be the last step before application of unit)
11. Are teats being thoroughly dried (including teat ends) before unit attachment? (Clean Dry Towels) Test teat end cleanliness with "Alcohol Swab Test".
12. Are teats farthest away from milking being dried first? (reduce risk of recontamination).
13. What is the time from first contact with the teat until the unit is fully attached? This is referred to as Lag Time. Should be between 60-90 seconds.
14. Are units properly adjusted to squarely hang under the udder?
15. Are employees properly using the automatic take offs? (Should not be switching to manual).
16. What is the length of time from until attachment to unit removal? This is referred to as "Unit On Time." This should be 3.5 to 5 minutes in length with proper milking stimulation.
17. Observe teat ends of damage or tops of teats for purple ring.
18. Are employees getting proper post dip teat coverage? Use the "Paper Towel Test".
19. Are all employees following the same procedure. Consistency is very important.
20. Observe milk filter post milking for dirt or mastitis.

steps

Steps to control mastitis:

1) Identify the problem organism.

a) Culture Bulk Tank

b) Two main categories of organism:

i) Contagious Bacteria – Streptococcus agalactia and Staphylococcus aureus. These types of bacteria infect the udder of the cow and are transmitted from cow to cow usually through milking.

ii) Environmental bacteria – Coliforms, Streptococcus (nonagalactia), Staphylococcus (non- aureus). These bacteria come from the cow's environment

2) Control Contagious Bacteria

a) Isolate infected cows -

It is important to remove them from the milking herd and treat them so that the infection does not spread. They should be milked last or completely separate from the herd, so long as their milk does not enter the bulk tank. Often, newly purchased cows coming into the herd bring mastitis infections with them.

b) Milk infected cows often -

Bacteria use the milk as a growth medium, so removing their nutrient source often, increases the rate of recovery for a cow being treated for mastitis.

c) Whole teat dipping

i) Instead of spraying, dip whole teat with a teat cup

ii) Teat dips should contain an iodine solution.

iii) Make sure teats are clean

d) Antibiotic treatment

i) After milking, treat each infected quarter

ii) A withdraw period occurs after treatment with antibiotics. During this period no milk from the treated cow can be put in the bulk tank.

iii) Treatments are typically given as intra mammary infusions.

e) Dry-Cow Therapy

I) Measures to control and prevent mastitis infections during a cow's non-lactating period.

3) Control Environmental Bacteria

a) Clean and dry teats thoroughly before milking. This reduces the likelihood of milk becoming infected during the milking process

b) Pre-dip teats to help sanitize them and prevent spread of infection. Many environmental bacteria may be resistant to several germicides, so it is necessary to make sure other control measures are taken as well.

c) Keep milking parlor clean. A clean parlor discourages the growth of bacteria.

d) Maintain sanitary housing conditions for cows. Manure on bedding, floors, aisles, etc. can breed bacteria and become caked onto cow udders. Identify potential problem spots such as muddy areas, manure pits, stagnant ponds, and soiled bedding. Take steps to eliminate or reduce their potential to breed pathogens

How to prevent Mastitis

- Maintain good hygiene during milking
- Disinfect all teats after every milking
- Keep equipment clean and functional
- Carry out annual inspection and servicing of milking equipment
- Environment should be clean and dry as possible
- Exchange bedding material every 48 hrs
- Don't over stock the barn
- Provide nutritious and healthy diet
- Treat new and clinical cases of mastitis and record data
- Choose appropriate cases for treatment

- Major infections occur during dry period during first 21 days at the end of lactation or around calving
- Separate healthy cows with infected cows
- Eventually cull infected cows when you have a replacement

Handling of Teat Disinfectants

- Store teat disinfectants in cool, dry areas.
- Do not allow disinfectants to freeze!
- Keep containers closed to prevent contamination, and do not use after the expiration date.
- Do not assume that teat disinfectants will kill all pathogens. Some pathogens can survive in disinfectant under some conditions.
- Follow label instructions for use.
- Use teat disinfectants at the recommended concentration.
- Do not dilute unless indicated on the label. o If dilution is necessary, be sure that water quality standards (bacteria, pH, hardness, etc.) are met.
- Use a clean container for diluting, and thoroughly mix the final product.

- Disinfectant cups should be emptied and cleaned as part of the routine wash-up after each milking or if they become contaminated during milking.
- Never pour used disinfectant back into the original container.

Teat end condition scorecard

Score	Description	Illustration
(Adapted from Hein, et. al., 2001. A Scoring System for Teat End Condition) [1]		
1	**No Ring** The teat-end is smooth with a small, even orifice. This is a typical status for many teats soon after the start of lactation.	
2	**Smooth or Slightly Rough Ring** A raised ring encircles the orifice. The surface of the ring is smooth or it may feel slightly rough but no fronds of old keratin are evident.	
3	**Rough Ring** A raised, roughened ring with isolated fronds or mounds of old keratin extending 1 to 3 mm from the orifice.	
4	**Very Rough Ring** A raised ring with rough fronds or mounds of old keratin extending 4 mm or more from the orifice. The rim of the ring is rough and cracked, often giving the teat end a 'flowered' appearance.	
5	**Open Lesions or Scabs** Teat end is severely damaged and ulcerative with scabs or open lesions.	

Fig 6.2.1 ***Teat end condition scorecard***

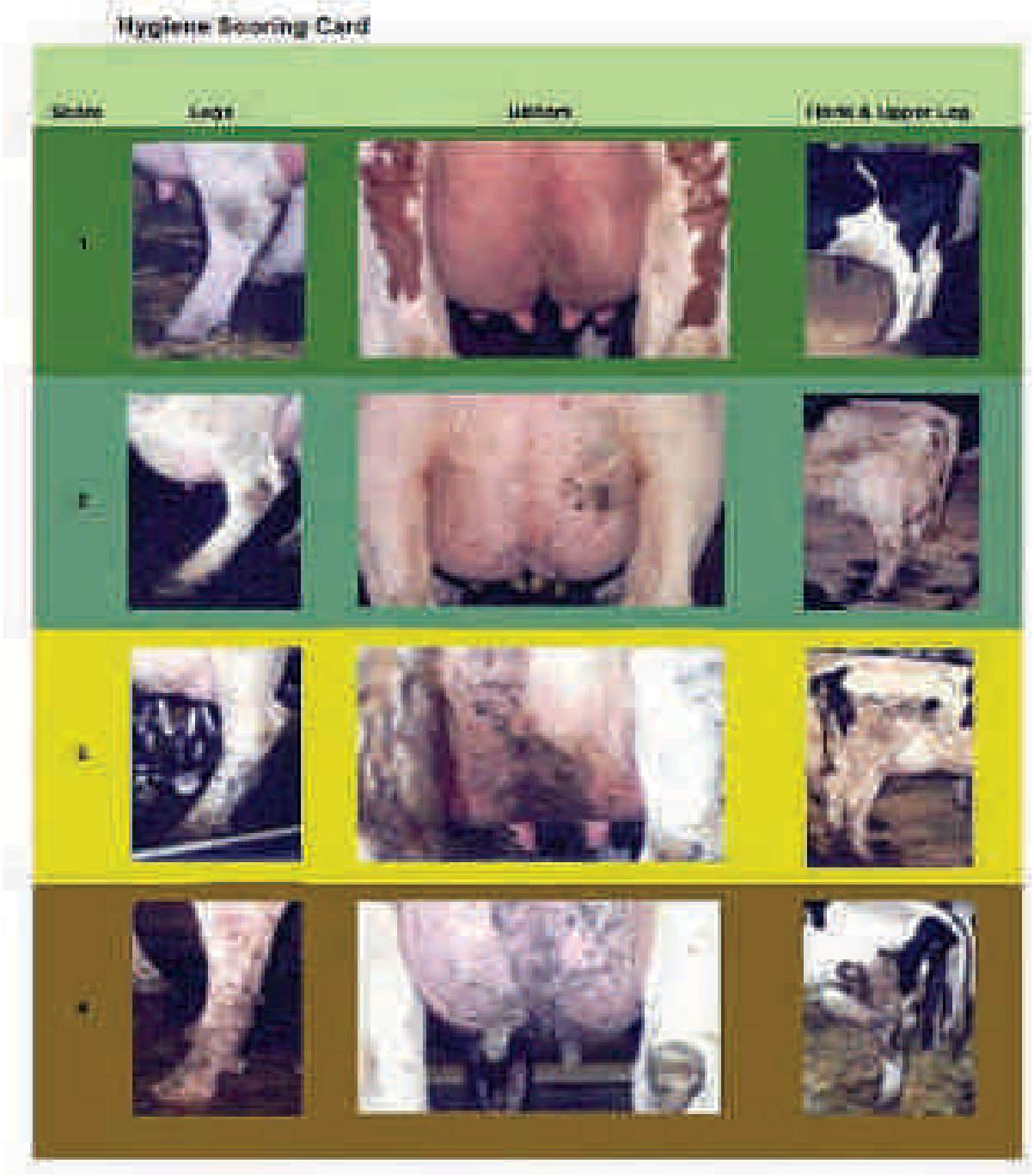


Fig 6.2.1 Hygiene Scoring Card

Notes

UNIT 6.3 : Identify And Use Milking Machine And Equipment

Unit Objectives

At the end of this unit, you will be able to:

- Identify the convenient milking machine as per the requirement
- Use the milking machine properly

6.3.1 Identify and use milking machine and equipment

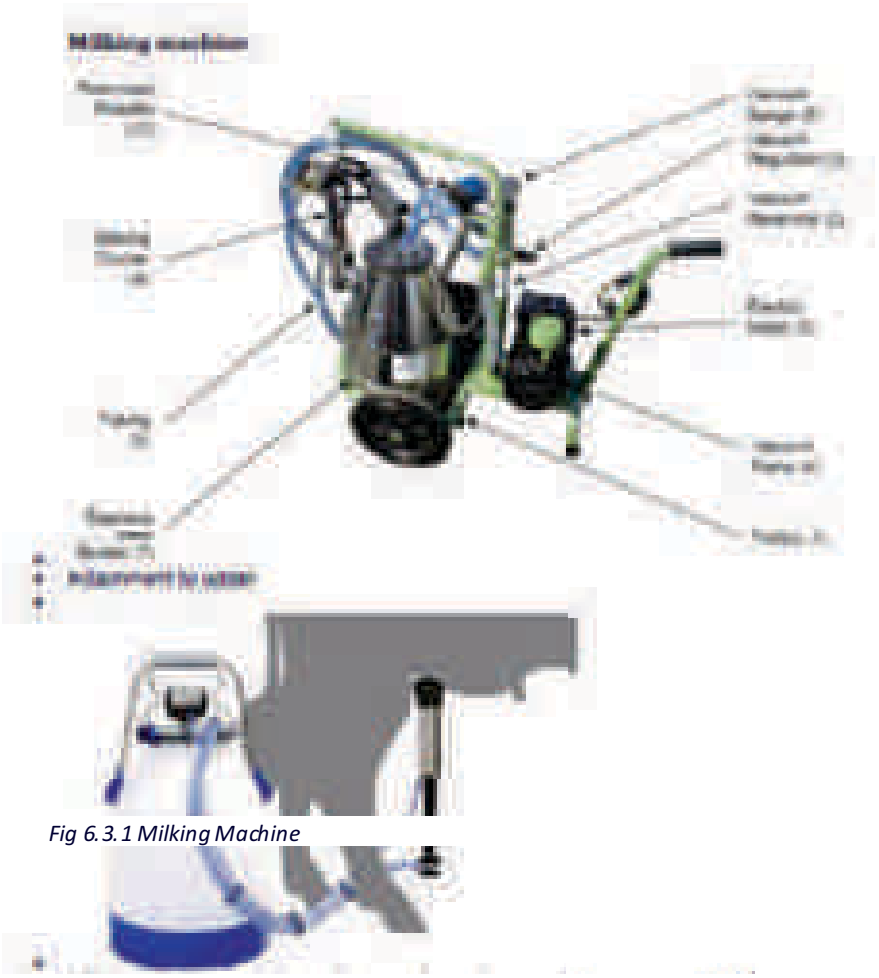


Fig 6.3.1 Milking Machine

Milking machine use alternating negative and atmospheric pressure with the help of double chambered teat cup assembly, the continuous partial vacuum inside the inflatable rubber tube that is teat cup liner into which teat is inserted.

- A partial vacuum and normal atmospheric pressure is alternated in the space between rubber liner and metal shelf of the teat cup by means of pulsator.
- When negative pressure is applied between the liner and shelf, milk flows from the teat.
- When atmospheric pressure enters the chamber, the rubber liner inflation collapses with the result the teat is compressed and massaged.
- The continuous vacuum would cause congestion and irritation of teats.

Factors influencing efficiency of milking machine

Vacuum level

- The degree of vacuum in a milking system during operation, expressed as inches of mercury/Kilo Pascal (mmHg / kpa) differential measured from atmospheric pressure and indicated by the vacuum gauge.
- Ideal vacuum level – 45 -48 Kpa

Pulsation rate

- The number of cycles of alternating vacuum and atmospheric air which occur per minute.
- It may vary between 40 to 60 cycles per minute on most machines.

Milking or Pulsation ratio

- The proportion of time spent under vacuum and atmospheric air and is usually approximately 60:40.

Notes

UNIT 6.4 : Understand The Adjustments of Milking Machine And Equipment

Unit Objectives

At the end of this unit, you will be able to:

- Make adjustments of milking machine and equipment

6.4.1 Understand the adjustments of milking machine and equipment

Liner replacement

Fig 6.3.1 Liner replacement

- Only Teatcup liners have contact with teat and udder from the milking machine.
- Teatcup liners should hold teat firmly and gently and do not cause injury to the teat.
- Due to regular usage, these liners undergo regular wear and tear. Their lifespan depends on the material. o Rubber based liners – 2500 milkings
- Silicone based liners – 10000 milkings
- If not properly maintained, teat cup liners undergo excess wear and tear and cause mastitis
- Disinfectants make the inner surface rough, splitting and damage teatcup liners.
- Lifespan of teatcup liner is calculated in number of cows in herd **× number of times milked per day ×**

liner life in days

Notes

UNIT 6.5 : Understand Right Milking Technique

Unit Objectives

At the end of this unit, you will be able to:

- Use the proper milking technique
- Understand the problems due to improper milking

Getting Clean Milk while Hand milking

- The persons milking the cows should be clean, healthy and free of infectious diseases.
- Keep the cows free of dirt. Prevent their hindquarters from becoming matted with manure and mud.
- Groom the cows regularly to remove loose hair and dirt because these can fall into the pail during milking.
- Detect and treat all cows showing signs of udder infection
- Tie the cow's hind legs so that the tail does not swish around.
- Do not use a dirty/ wet cloth to clean the udder and teats because it is unhygienic and can cause problems such as mastitis.
- Wash your hands before milking. Your hands should be moist but not dripping wet.
- Do not dip your hands into the milk because this can spread diseases.
- Pour the milk into a container through a fine metal gauze strainer or muslin. Tie the muslin so that dirt cannot bypass it.
- Keep the milk refrigerated or in a cool place after milking.

Hand Milking steps

1. Milking should be done at regular times, if possible by the same person and at intervals of 12 hours.
2. Avoid noise in the dairy because it will have a negative influence on the release of milk.
3. Get proper training in the correct procedures and have patience with the cows.
4. Milk cows with dry hands and never use milk to lubricate the cow's teats. Use a milking salve if needed.
5. Always test the first milk to come out for mastitis (ask your agricultural extension officer how to do this).
6. Wash dirty udders and teats by hand under running water. If they are clean, massage the udders for about 1 minute.
7. Complete milking in 5 to 7 minutes because the cow will stop giving milk after that.
8. After milking, if the cow's calf does not suckle, use a teat dip to prevent mastitis.
9. Supervise the milking process and maintain the same routine in every milking. This will get the cows used to the process and will also reduce stress, which will result in a successful dairy operation.

Fig 6.5.1 Hand Milking

Hand Milking

Two Methods are followed

- Wet hand milking - Use of oil or water in the hand. This will lead to cracks and sores in teats. Painful to cows.
- Dry hand milking – No lubrication. Best method.

Premilking routines are important. Always use a smooth and comfortable technique for milking. Make sure the cow has a halter and is tied to a sturdy post or held in a stanchion.

Clean each teat and teat end, preferably using an approved pre-milking teat cleaner.

Place a bucket underneath the udder. Better yet, hold it between your legs. It takes practice, but this can be done easily and comfortably. This position reduces the chance of the cow kicking over the pail of milk.

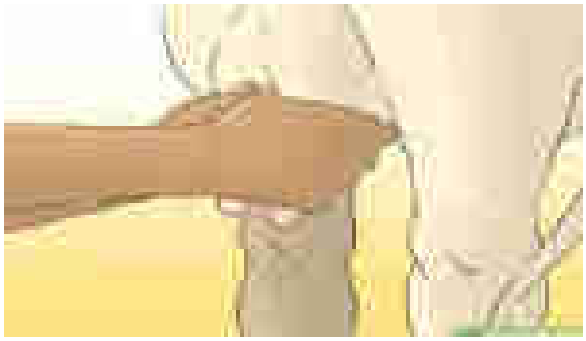
Sit or squat in a position that will allow you to move away quickly if the cow becomes uncooperative. Sitting cross-legged on the ground, for example, is not safe. (See Warnings below.) An ordinary milk stool can be fabricated with two 2x4's cut and nailed to form a "T" - cut to fit your behind and make sure it is low enough to afford comfortable access to the cow's teats.

Apply a lubricant such as Vaseline to your hands to minimize friction.

Wrap your warm hands around two of the four teat s. Choose diagonal teats (front left and rear right, for example). Or, try the front teats first, then the back pair.

Squeeze the base of the teat and start teat massaging, after gently clamping each teat between your extended thumb and first finger, so that the teat fills your palm as you squeeze down. The recommended method is "full hand milking followed by stripping".

Use Full hand milking action. Squeeze down to push out the milk, maintaining your grip on the base of the teat so that the milk doesn't flow back up into the udder. Do not jerk or yank the teats. This motion is performed by sequentially squeezing your fingers from the middle to the pinky to force the milk out. Be gentle yet firm. Keep your eyes peeled for mastitis (see Tips).



Repeat with your other hand. Most people prefer to alternate (right hand, left hand, right hand, etc.) The downward squeezing motions takes less effort doing it in alter nate steps than all at the same time.

Continue until the quarter that you're milking looks deflated. Use stripping action in the final stages of milking to let down remaining milk in each quarter. Stripping action is done with fingers only. Experienced farmers can feel the udder to know exactly when all the milk has

come down. Often even looking at the quarter just milked can tell you if it's been emptied enough or not.

Move on to milk the other two teats. If you use the diagonal method, switching sides is not necessary.

By Milking Machine

- Advantages
    - Peak yield is achieved quicker and remains longer than hand milking.
    - Total yield is more than hand milking

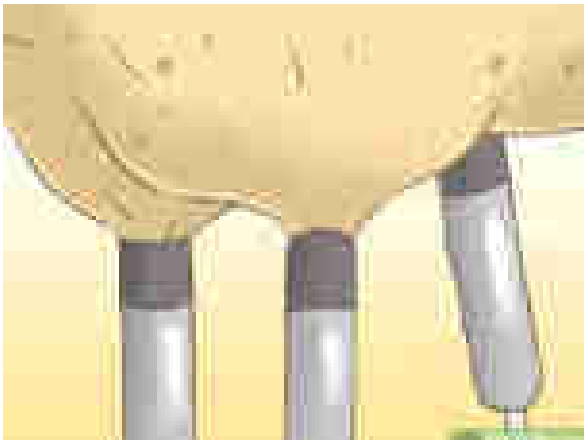
Secure the cow in position as outlined above.

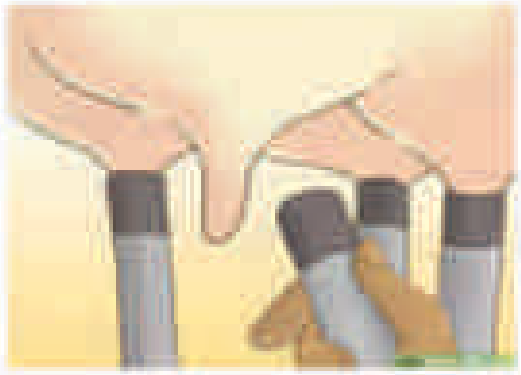
Clean the teats as outlined above.

Turn on the milking machine and allow it to build pressure.

Hand-milk each teat a few times to let down the milk and check for mastitis (see Tips).

Release the pressure so that suction begins.





Aim is to remove contagious pathogens on the teat surface immediately after milking. It will also protect opened teat canal when the liner and clawpiece is removed. **It is important to dip or spray immediately after cluster unit removal, before the teat canal sphincter begins to close and before any bacteria have the opportunity to colonise and multiply.**

Dip chemicals also kill bacteria present on any sores on the teats, promoting quicker healing. Chemicals with emollients and humectants are added to prevent irritation and dry -out of teat skin. They also soften and improve teat skin condition after milking.

Post milking teat treatment products are available

- in ready-to-use form or
- may require dilution

Chemicals	Require emollients	Advantage	Disadvantage
Iodophors	Yes	Common, Effective on bacteria	
Chlorhexidine	Yes	Effective on Bacteria	Ineffective against Organic matter
Hypochlorite	Yes	Cheap, effective on Bacteria	Ineffective against Organic matter
Quarternary Ammonium Compounds	Yes	Less irritating	
Dodecyl Benzene Sulphonic Acid	No	Effective on most bacteria and organic matter	Not on spores

Table 6.5.1 Post milking teat treatment products

- **Barrier dips** are also used for post-milking only; they are a gel-like substance that dries to create a plasticised barrier that covers the teat and requires removal immediately before the next milking. This barrier stops bacteria from colonising on the teat surface or invading the teat orifice.

Fig 6.5.1 Barrier dips

Dipping	**Spraying**
to achieve better coverage and uses less chemical	Quicker and more care, costly to install spraying equipments
To be Cleaned between milking	Less coverage, inconsistent and use more chemical

Table 6.5.1 Barrier dips

Notes

UNIT 6.6: Follow Procedure For Clean Milk Production

Unit Objectives

At the end of this unit, you will be able to:

- Understand and practice the clean milk production

Follow procedure for clean milk production

- Always milk animals in calm and quite atmosphere preferably play light music (if possible)
- Milk animals in the following order
    - Recently calved
    - Heavy milking cows
    - Poor milking cows
    - Cows in the last phase of lactation.
- Milk sick or mastitis affected animals separately at the end.
- Fix Milking schedule. Do not change the process frequently. Make changes in the schedule gradually.
- Clean Milking parlor at least half an hour before milking.
- Clean and dry Milking vessels or cans
- Use round shaped vessels for milking without any joints.
- Heat milking vessel before milking (dry heat application) to improve the keeping quality of milk.
- Add few crystals of potassium permanganate in lukewarm water and wash the udder (Amount sufficient to change the colour)
- Massage(light) the udder while washing.
- Check for personal hygiene of milking person: clean hand and trimmed nails are must.
- Dry the udder with clean cloth from the tip of the teat upward.
- Always ensure full handmethod milking while milking (Not with folded thumb),
- Complete milking quickly, fully and comfortably (Animal should feel comfortable).
- Do not drag or give jerks to teats.

- Complete the process from washing to milking within 8 minutes.
- Dip the teats in disinfectant solutions e.g. weak iodine solution, after milking
- Milk twice a day if cows give upto 10 liters. Milk thrice a day, if it gives upto 25 litres
- Do not mix milk from medicated teat
- Strain the milk through muslin cloth (four layers) or through thin nylon mesh.
- Cool the milk (by putting ice around the milk can) and transport it to the retailcenter or collection center of the cooperative society as early as possible.
- Use clean water for washing utensils.

Milking routine

- An appropriate milking routine is important for hygienic reasons as well as for creating a comfortable and smooth environment for animals and milkers.
- It is easier to maintain a good hygiene if a consistent milking routine is applied.
- In dairy cows, strict milking routine results in increased milk production.
- The routine mentioned below can be followed by both hand and machine milkers.
- Routine check of the milking machine should be done before each milking session according to the manufacturers recommendations.

Exercise

1. What are the importance of clean milk production?

Answer: .....

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Notes

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
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National
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Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

7. Forage Conservation

Unit 7.1 - Gain Knowledge on different fodder crops
Unit 7.2 - Right time of harvesting of crops
Unit 7.3 - Use of tool and Equipment for preparation of forage
Unit 7.4 - Fodder Conservation Activities
Unit 7.5- Understand the method of minimization of spoilage

AGR/N4106

Key Learning Outcomes

At the end of this module, you will be able to:

- Gain knowledge about different Fodder crops
- Understand the right time of harvesting of crops
- Identify and use the tools and equipments for preparation of forage
- Understand the method of forage conservation – hay making, silage preparation, chemical treatment etc
- Understand the method of minimization of spoilage

UNIT 7.1: Gain Knowledge on Different Fodder Crops

Unit Objectives

At the end of this unit, you will be able to:

- Identify the different fodder crops suitable for dairy farming
- Understand the different verities of crop

7.1.1 Gain Knowledge on different fodder crops

Fodder crops are cultivated plant species used as livestock feed. Usually harvested and stall feed to animals.

Forages are vegetative matter fresh or preserved utilized as feed for livestock.

Eg. grasses, legumes, crucifers and other crops cultivated and used in the form of hay, pasture, fodder and silage.

CLASSIFICATION OF FORAGES

Forages are classified on different ways.

ON THE BASIS OF SEASON OF CULTIVATION

Seaaon	Forages
Kharif(June - September)	Cowpea, Cluster bean, Field bean, Bajra, Sorghum, Maize
Rabi(October -Dec/Jan)	Berseem, Lucerne, Oats, Barley

ON THE BASIS OF NUTRIENT DENSITY IN THE DRY MATTER

Nutrient Density	Crops
Non - maintenance	Eg. Wheat straw, Rice straw, Ragi straw, Maize and Sorghum stover, Jungle hay, cereal forages harvested at advanced maturity
Maintenance	Eg. Sorghum, Maize, Bajra, Hybrid napier, Para grass and all grasses
Production	**Low protein**-Maize, Oats, Barley, Sorghum Root crops etc.
	High protein- Berseem, Lucerne Cowpea, Subabool and all Legumes

ON THE BASIS OF PLANT TYPES

Type	Crops
Cultivated	**Cereals** - Sorghum, Oats, Maize, Bajra, **Legumes** - Lucerne ,Berseem, Cowpea and **Root crops**- Turnips, Carrots
Grasslands/Pasture	Managed - Legume, Grass, Shrubs, Fodder trees, etc.,
	Unmanaged - Grasses, Bushes etc.
Forests edibles	Grasses, Shrubs and tree leaves etc.
Plantation	Grass and Tree leaves
	Fruits and fruit tree wastes
Aquatic	Fresh Water hyacinth lotus etc
	Marine Algae

ON THE BASIS OF DURATION OF THE CROP

Cereal - Annual	Grass		Legume		Tree
	Annual	Perennial	Annual	Perennial	
Maize, Sorghum	Deenanath grass	Hybrid Napier, Guinea grass	Cowpea, Berseem	Lucerne , Stylosanthes	Soobabul, Sesbania

ON THE BASIS OF PLANT FAMILY AND DURATION OF THE CROP

Legumes	Non-legumes
Eg. Berseem, Cowpea, Stylosanthes etc. Annual :Berseem, Cowpea Perennial :Stylo, Desmanthes	Eg. Hybrid Napier, Guinea grass, Fodder sorghum, etc. Annual : Fodder Maize, Sorghum Perennial : Hybrid Napier grass, Para grass

Table 7.1.1 Classification of forages

Proper stage of harvest of grass fodders:

Grass Fodders	Harvest stage
Hybrid Napier:	6-7 weeks (40 to 45 days advocated to have less oxalate toxicity)
Guinea Grass:	At 6 weeks intervals
Para grass:	4-6 weeks intervals
Blue panic grass:	Every two months
Cenchrus:	At 50% flowering

Deenanath:	**At mid flowering**
Rhodes grass:	At flowering

Table 7.1.1 Stage of harvest of grass fodders

Characteristics of fodders crops

- Quick regrowth and short duration.
- Profuse foliage and heavy yield of fodders.
- Should have high palatability and nutritive value.
- Should be adaptable to various agro-climatic conditions and different soils.
- Capacity to ratoon and give continuous supply of green fodder.
- Resistance to diseases and pests and safe to feed at all stages of its growth without any deleterious effect on animal health and growth.

Plant sources of animal feed - Various parts of plants are used as animal feeds

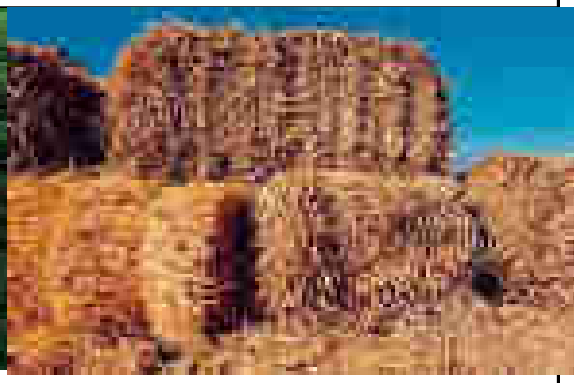
Straw	Silage
	
Husk and hulls	Haulms
	
Grasses	Hay
	
Stovers	Bhusa

Fig 7.1.1 Plant sources of animal feed

Notes

UNIT 7.2: Right Time of Harvesting of Crops

Unit Objectives

At the end of this unit, you will be able to:

- Prepare for the harvesting of crop at right time
- Harvest the crop when it reaches the maturity

7.2.1 Right time of harvesting of crops

- Factors Affecting Fodder Quality
- The major challenge in fodder production is preserving the feed quality during monsoons and summer season. Factors that affect the feed quality of fodder include:
    - **The stage of harvesting.** As the fodder matures in the field, it becomes fibrous and loses almost all its feeding value.
    - **The method of harvesting.** Poor harvesting methods can lead to loss of biomass that has the highest nutritive value.
    - **Handling and storage.** Poor handling and storage can lead to spoilage of fodder, especially when it is exposed to adverse weather conditions such as rain and/or too much sunshine.
- Harvesting is done at 50% flowering . For most of the cereal crops 50% flowering will occur between 60-75 days. At this stage animals will get maximum nutrients from the plants. For other minor/small millets 50% flowering may occur 10-15 days earlier i.e., 50-65 days.Harvest at the above period produces forage of good quality with higher nutrients to animals and also highly palatable stage with higher forage production.

Proper time for harvest

Crops	Harvesting day	Time of harvest	Yield (tons)
Sorghum/Jowar	First cut on 6o days after sowing and once in 35 – 40 days	immediately after flowering and upto 50% flowering.	35 – 40
Maize	60 -70 days	Cob formation to milk stage	35 – 40
Bajra	First cut at boot leaf stage and once in 35 – 40 days	Boot leaf stage to early flowering.	30 -35
Ragi			15 – 20
Other minor millets			10 – 20

Table 7.2.1 Crop Harvesting time

Comparative yield of small millets:

S. No	Crop	Duration (days)	Green fodder (t/ha)	Crude protein (%)
1	Arisipillu (Brachiaria ramosa)	54	18.70	13.53
2	Kudiraivali (Echinochloa colona)	53	18.20	11.93
3	Tenai (Setaria italica)	53	14.57	9.95
4	Varagu (Paspalam scrobiculatum)	64	13.92	9.95
5	Ragi (Eleusine coracana)	66	13.00	9.95

Table 7.2.1 Yield details

Proper stage of harvest of grass fodders:

Grass fodder types	**Harvesting time**
Hybrid Napier:	6-7 weeks (40 to 45 days advocated to have less oxalate toxicity)
Para grass:	4 to 6 weeks intervals
Blue panic grass:	Every two months
Cenchrus:	At 50% flowering
Guinea Grass	At 6 weeks intervals
Deenanath:	At Mid flowering
Rhodes grass:	At flowering

Table 7.2.1 Proper stage of harvest of grass fodders

Notes

UNIT 7.3: Use of Tool and Equipment For Preparation of Forage

Unit Objectives

At the end of this unit, you will be able to:

- Use the tools and equipment for preparation of forage
- Identify the suitable tools and equipments for the preparation of forage

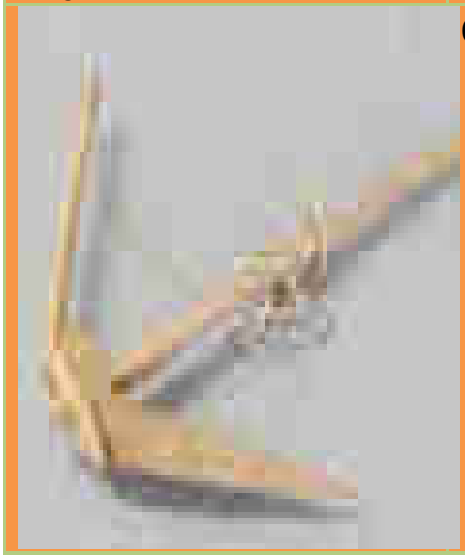
7.3.1 Use of tool and Equipment for preparation of forage

The farm machines have reduced the burden and human dependency of farm work to a great extent.

Tillage: it s the preparation of soil for sowing seeds and the process of providing adaptable conditions in the soil by improving the soil tilth for good crop growth.

Objectives of Tillages

- To increase soil aeration.
- To improve the moisture retaining capacity of the soil.
- To destroy soil insects and their breeding places.
- To add humus and fertility to the soil by covering the crop residues.
- To destroy the competitive weeds.

Tools and Equipment: Tillage	
Image	Description
	**Country plough** • Most common practice in India. The shape and size of the country plough varies from place to place depending on the type of soil and tillage requirements. • The main parts of the plough are body, shoe, share, beam and handle. • All the parts except share are made of wood. Share is made of mild steel. The share makes an angle of 10° to 30° with ground level.

Mould board Plough

The mould board plough does the following functions:

- **Cutting**
- **Lifting**
- **Turning and**
- **Pulverisation**

Cultivator

- It breaks the clods.
- It does weeding and intercultural operations in between standing rows of crops.
- It aerates the soil.
- It conserves soil moisture by preparing soil mulch.

Harrows

- Harrows are used to break the clods, to stir the soil and to destroy weeds after ploughing.

Leveller

Levelling of agricultural land is necessary for

- Effective application of irrigation water.
- Reducing water logging and
- Controlling soil erosion.

RIDGER

- **The ridger is useful in forming ridges and to facilitate sowing of seeds**

BUND FORMER

- It makes bunds by gathering the top soil Bunds are formed in the field to prevent water run – off and to reduce soil erosion.
- In dry land, bunds are formed across the slope to conserve soil moisture

BASIN LISTER

- It is a soil conservation equipment especially useful in dry farming areas receiving meagre rainfall.
- Using this equipment furrows are formed in the field intermittently.
- The precipitated water is retained in the furrows, thus reducing the top soil erosion and conserving moisture.

Tools and Equipment: Sowing

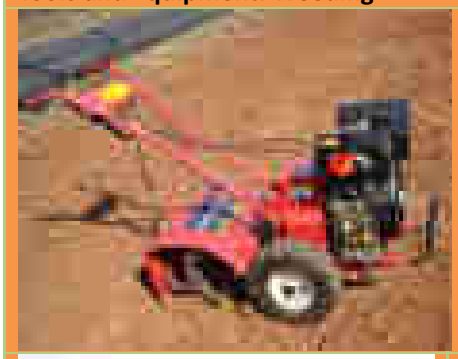
SOWING EQUIPMENT

- Placing seeds into the soil at optimum row to row and plant to plant spacing.
- To get high yield, the right amount of seed should be placed at the right time at a predetermined depth and spacing in the soil.

The operational requirement is as follows:

- Provision to change the seed rate, depth
- Seeds should not be exposed to injury by the seeding devices.
- Operating efficiency of the seed drill should not be dependent on field undulation
- Travel speed should be 6-15 km/h.

Tools and Equipment: Weeding



Weeder

- It is used for removing weeds in between line sown crops in rainfed and garden lands.
- The weeder is operated by one person. For best results, the operator has to give push – pull movements to the handle and walk behind in the field.

MINI POWER TILLER FOR WEEDING AND INTERCULTURE

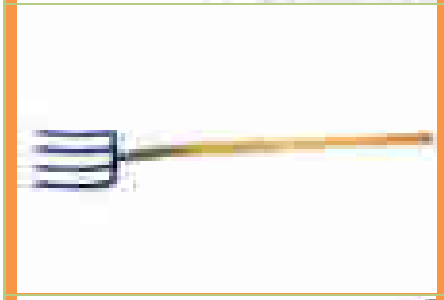
An engine operated mini power-tiller has been developed for weeding and interculture in between rows of crops such as maize, tapioca, cotton, pulses, sugarcane and grape.

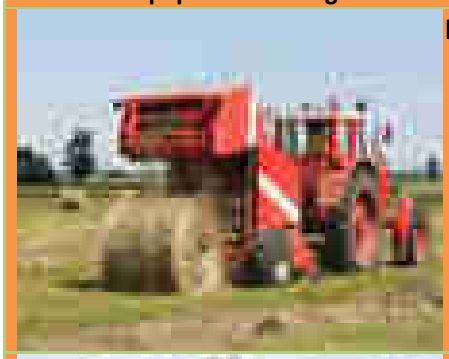
Compression sprayer

- The air pump builds up pressure in the space above the liquid.
- When the nozzle is opened, spray liquid is forced out through the nozzle opening by the compressed air.

Lever operated backpack sprayer or knapsack sprayer

- It is useful for spraying small trees, shrubs and row crops.
- A uniform pressure can be maintained by keeping the pump in operation. One man can spray 0.4 ha in a day.

Tools and Equipment: Harvesting	
	**Mower conditioner**
	**Scythe** to cut large amounts of fodder in a short period of time. This tool is especially suitable for women as it eliminates bending (as in the case of the traditional sickle)
	**Pitch Fork** For lifting hay
	**Metal rake** for gathering hay. This tool is strongerand more durable than a wooden rake.

	**Wooden rake** **for gathering hay. If a farmer can'tafford a metal rake, the farmer can make a woodenrake.**
	**Tedder rake**
Tools and Equipment: Bailing	
	**Round hay baler**
	**Square hay baler**
	**Hay Rack** A fodder storage rack to keep hay dry
Tools and Equipment: Storage	

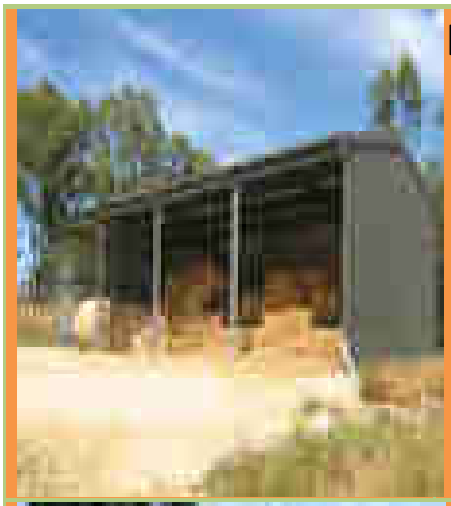
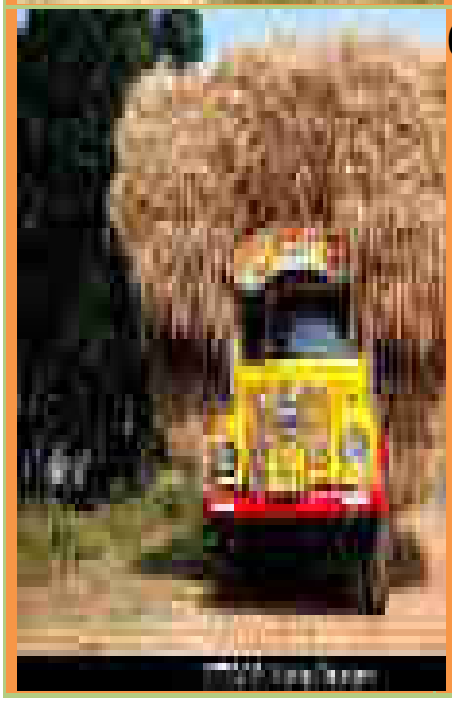
	Hay storage area
	Collection & Transportation

Table 7.3.1 Tools and equipments

Notes

UNIT 7.4: Fodder Conservation Activities

Unit Objectives

At the end of this unit, you will be able to:

- Understand the method of forage conservation
- Understand the Structures to be used for forage conservation
- Conserve the Fodder

7.4.1 Fodder Conservation Activities

Dairy farms need continuous and year round supply of high quality feed and fodder for dairy animals. However, seasonal climatic variation causes feed and fodder shortage during summer and excess during winter / rainy season. Dairy farmer need to adopt conservation techniques to store the forage during abundance and utilize it during lean period. Additionally, fodder conversation will help feeding during floods or droughts or transfer to distant areas.

Conserved fodder crops do NOT match the nutritive value of fresh forage, as some storage losses (due to fermentation, spoilage) are expected. Thorough conservation techniques, forage losses are minimized.

Major Forage Conservation options

Silage

- Silage is forage conservation through a natural'pickling' process. Silage is a fermented feed resulting from the storage of high moisture crops, usually green forages, under anaerobic conditions in a structure known as a silo.
- Sileage is usually made from a grain crop that has been cut and chopped and put in bulk silos, ie... bunks,bags ,or upright silos
    - Silos are air tight structures designed for storage of high moisture feeds
- Forage conserved this way is known as 'ensiled forage' or'silage' and will keep for up to five years without deteriorating.
- Forage conserved in lactic acid that are produced through fermentation of its water soluble carbohydrate (WSC) by anaerobic lactic acid bacteria (LAB) when it is stored in the absence of air
- Silage has 60 – 70% moisture and is very palatable to livestockand can be fed at any time.
    - **Advantages**
        - More economical with high moisture content.
        - Preserves 85% of feed value of the crop (Grass silage)
        - Can be stored for longer duration – 5 years
        - Economical way of storing and preserving corn and sorghum
        - Low wastage – Entire plant is ensiled
        - Minimal nutrient loss – 10 percent
        - Can be produced in cold and cloudy weather
        - Reduces harmful plant substances thorough fermentation

- Less storage space – one – tenth of space required for hay
- Not easily inflammable
- Good weed control
- Uniform quality

- **Disadvantages**
  - Difficult to transport to long distance
  - Low Vitamin D content
  - Difficult to determine the quality
  - Requires a permanent structure
  - Risk of wastage, if not done properly
  - Additional farm expenditure
- **Risks**
  - Air contact will spoil the silage
  - Rain or weather conditions (humidity, duration of sunlight) will spoil the silage
  - Plastic wraps will get accidentally consumed
  - Injury due to specialized equipment
  - Damage due to Rats and Rodents
- **Mitigation**
  - Use plastic wraps or bags
  - Dispose unwrapped plastic wraps or bags properly
  - Use weather forecast to plan and mange your spoilage preparation
  - Proper storage of spoilage and usage of rodenticides

- **Characteristics of silo pits**

  - Animal number, type, feeding period length, forage availability determine the size of the silos
  - Silo should be air tight completely
  - Side walls of silos should be smooth and straight to prevent air pocket formation
  - Reinforcement of side walls is needed as pressure builds up inside the silos during fermentation. Or make the side walls strong and rigid.
  - Silo pits should be deep less exposure and better packing
  - Provide a drain for escape of juices from the silage.
  - Should be weather proof and accessible thorough out.

- **Types of silos**

Image	Silo type
	**Tower Silo** Upright and Circular Series of doors for removal of silage Recent ones have bottom unloading facility Gas tight silo is specialized tower silo Complete anaerobic condition Store high moisture grain (50 – 75%)
	Inverted tower silo Made in Low water table areas Not damaged by storm and Require less reinforcing. Danger of CO2 suffocation Difficult to remove silo from the pit
	Bunker Silo Above ground silo Labour saving

	Trench Silo Below ground silo Low cost Easy to construct Require larger space to seal
	Temporary silos Modified trench stack silo
	Plastic silo bag

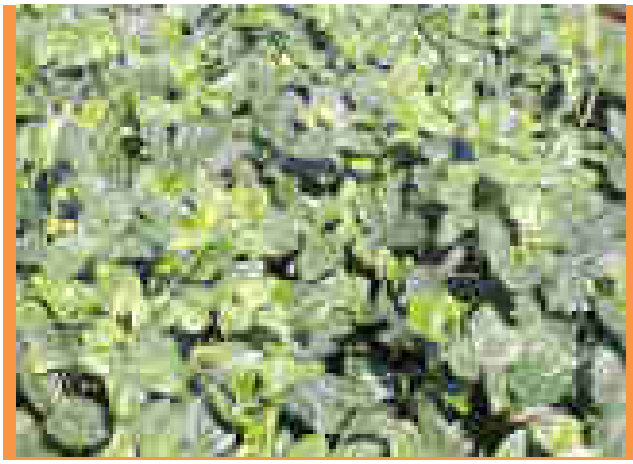
- **Crops suitable for silage making**

Image	Crop
	**Corn** **Best for silo**
	**Sorghum** **Best for silo**
	**Napier**

Bajra

Lucerne

Berseem



Cow pea

Additives and preservatives

To Add nutrients.Provide fermentable carbohydrates.Furnish additional acids. Inhibit undesirable types of bacteria and moulds. Reduce the amount of oxygen present, directly or indirectly.Reduce the moisture content of the silage. Absorb some acids which might otherwise be lost in seepage.Increase nitrogen content.

Molasses

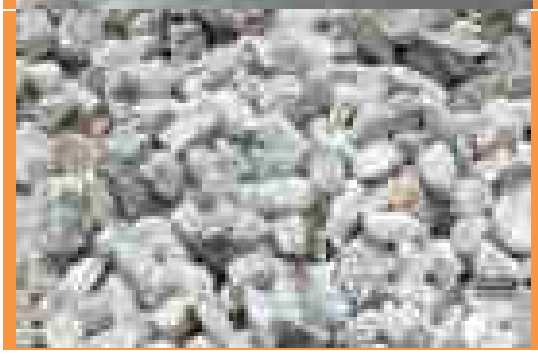
Add 3.5 – 4 %

To increase palatability, nutritive value and lactic acid production (formation)

Urea

Add 0.5 %

To enrich silo with nitrogen



Limestone

Add 0.5 – 1 %

To increase acid production

Sodium Metabisulphite
Good antibacterial preservative

Improves carotene content

Organic acids – Propionic and formic acid
Improves preservation

Add 1%

Bacterial cultures (Lactobacillus, Bacillus sp) – Rapid fermentation

Silage Making

Automatic mechanical harvesting cum chopping for maize

Simple mechanical chopping
Cut to proper length
The length of the cut sections affects the packing by eliminating air pockets.
Chopping forage crops into 1 to 2 cm length is ideal.
Finely chop Grass silages than maize or sorghum.
Finely chop Wilted and dry forages and forage with hollow stems than forage of high moisture content

Chopped Forage

Unloading in the pit
If moisture content is hight, How to reduce?
Conditioning - wilting: For 3 – 4 hrs sundrying reduces 10 - 15 % moisture in grass silage
Adding dry hay or straw – 5 – 20 %
Combining high and low moisture crops:
Addling dry preservative: ground grains, maize or cob meal
Additives or preservatives:

Silage filling
Fill silo in two days or less.
Compress the forages during filling
Do not fill a silo when it is raining.
Distribute forage uniformly in the Silo:
Avoid the presence of air pockets and spoilage, chopped forage should uniformly be distributed in the silo and packed well.

Sealing of Silo:
For maintaining the silo anaerobic it is a must to stop the entrance of atmospheric air in the silo.
This may be done as follows :
Level the top and tramp the last few feet, especially near the walls.
Cover the top by using any type of insulator like mud, plastic or loose earth.
For bunker or trench silo apply sufficient load on top to facilitate compactness

Quality of silage

Quality	Description
	**Very good silage** • It is clean, the taste is acidic, and has no butyric acid , no moulds, no sliminess nor proteolyses. • pH - *3.5 and 4.2.* • Ammonical nitrogen <10 % of total N2 • Uniform in moisture and green or brownish in colour. Taste is pleasing, not bitter or sharp.
	**Good silage** • The taste is acidic. There may be traces of butyric acid. • pH - 4.2 and 4.5. • Ammonical nitrogen 10% - 15% of total N2 • Other qualities are same as that of very good silage
	**Fair silage** • The silage is mixed with a little amount of butyric acid. There may be slight proteolysis along with some mould. pH - 4.5 and 4.8. • Ammonical nitrogen 15% - 20% of total N2 • Colour of silage varies between tobacco brown to dark brown.
	**Poor silage** • It has a bad smell due to high butyric acid and high proteolysis. The silage may be infested with moulds. • Less acidity, • pH > 4.8. • Ammonical nitrogen >20% of total N2 • Colour tends to be blackish and should not be fed.

Fig 7.4.1 Quality of silage

When to open the silo?

- In 2-3 weeks, forages are converted in to silage. However, in 6 – 8 weeks the fermentation will be complete.
- Type of forage, silo pit, packing, anaerobic condition, duration determines the fermentation process or silage making process
- Where to open
    - Tower and Trench silo – Top
    - Bunker silo – Front
    - 2 to 4 inch layer is removed daily

- **Haylage**
    - Haylage is ananaerobic method of conserving forage whenthe energy is at its highest. Moisture content in haylage is between 40 – 60 percent.
    - In Haylage, Grass is usually baled and plastic film wrapped at a higher moisture
    - Baleage is usually reffering a grain crop that has been cut and baled at the higher moisture as stated above
    - Advantages
        - Brings Cost and labor saving
        - More palatable than hay
        - Can be made with hay making equipment
    - Disadvantages
        - Need to have air tight condition for fermentation
        - Difficult to make than hay making
    - Risks
        - Air contact will spoil the haylage
        - Rain or weather conditions (humidity, duration of sunlight) will spoil the haylage
        - Plastic wraps will get accidentally consumed
        - Injury due to specialized
        - Damage due to Rats and Rodents
    - Mitigation
        - Use plastic wraps or bags
        - Dispose unwrapped plastic wraps or bags properly
        - Use weather forecast to plan and mange your haylage preparation
        - Proper storage of haylage and usage of rodenticides

- **Crops suitable for haylage making**

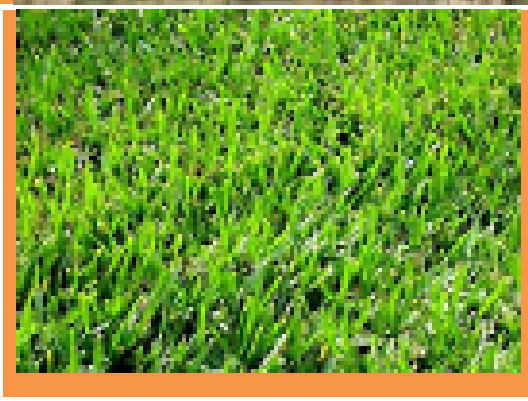
Image	Crop
	**Alfalfa** **Best for haylage**
	**Rye grass**
	**Switch grass**
	**Bermuda grass**

Fig 7.4.1 Crops suitable for haylage making

- **Hay**
  - Hay is defined as forage conserved under aerobic dry or limited moisture conditions. Moisture content is less than 12- 14 percent.
  - Advantages
    - Very long period of storage
    - Easy to handle
    - Easy to transport and distribute
    - Provide good dry matter content
  - Disadvantages
    - More nutrient loss – 30 percent
    - Rainfall affects the quality. Not suitable for wet regions
    - Machinery and equipment are expensive.
    - Requires large storage area
  - Risks
    - Rain or weather conditions (humidity, duration of sunlight) will spoil the hay
    - Fire will destroy hay if not stored properly
  - Mitigation
    - Use weather forecast to plan and mange your haylage preparation
    - Proper storage of hay in closed environment
    - Take fire safety steps in hay storage place

Wastelage

- A material obtained after ensiling of waste material (animal organ waste) in a suitable combination with forages and additives, under anaerobic condition through fermentation by lactic acid producing bacteria.
- Except for this, the other steps in the preparation of wastelage is similar to that silage.

Favorable conditions for forage conservation

	Silage	**Haylage**	**Hay**
Crops Used	Corn, Sorghum and Crop by products	Alfalfa, Rye grass, Bermuda grass, switch grass	
Moisture	60 -70 %	40-60%	12 – 20%
Dry Matter	35 -50%	50 – 70%	80 – 85 %
Anaerobic	Yes	Yes	No
Weather	Rainy		Summer
Ph	4.5	5.5	6.0
Mould Incidence	Moderate	Less	High

How to assess the dry matter content of forage using a microwave oven?
Tips to ensure accurate measurements

1. Use the full power setting.
2. Limit the sample size to less than 50 grams.
3. Use short heating intervals when drying to prevent the sample from burning. 4. Keep the sample spread out thinly to promote uniform heating.
5. Samples do not have to cool before weighing.
6. Puncture grain kernels in corn silage and high moisture grains to ensure more complete drying.
7. Do not place a glass of water in the microwave with the sample; it will add moisture to the sample as it boils.
8. Use a scale that reads to one-tenth of a gram (0.1).

The procedure

1. Weigh a paper plate; tare the scale with its weight.
2. Collect a small sample of forage and place it on the plate.
3. Weigh the sample on the plate.
4. Record this weight as the "Initial Weight."
5. Dry the sample using the guidelines in the table to the right. Feel the sample after each drying period; it should get more brittle after each drying.
6. After the fourth drying, weigh the sample and record this amount.
7. Place the sample in the microwave for another 10 to 20 seconds.
8. Weigh the sample again.
9. Repeat steps 7 and 8 until the sample weight does not change.
10. Record this weight as the "Final Weight."
11. Calculate dry matter by dividing the initial weight into the final weight and multiplying this result by 100. % Dry matter = (Final Weight ÷ Initial Weight) x 100

Suggested guidelines for drying time

	Corn silage	Hay-crop silage	
	< 40% DM	< 40% DM	> 40% DM
Initial drying	1.30 min	1.00 min	0.50 sec
2nd drying	0:45 sec	0:35 sec	0:40 sec
3rd drying	0:35 sec	0:25 sec	0:25 sec
4th drying	0:30 sec	0:15 sec	0:15 sec

After the fourth time, weigh sample, then dry at 10 to 20 second intervals.
Weigh after each drying until the sample weight stops changing.

Notes

UNIT 7.5: Understand The Method of Minimization of Spoilage

Unit Objectives

At the end of this unit, you will be able to:

- Minimize the spoilage of forage
- Adopt the proper method to avoid spoilage

7.5.1 Understand the method of minimization of spoilage

- Storage losses can be quantitative, qualitative, economical, nutritive or germinative.
- Storage losses can be prevented or reduced by better management at pre-harvesting stage, during harvesting, threshing and shelling, drying and by applying sound storage practices.
- Grains and fodder stored under favourable conditions for many years undergo relatively minor changes in composition and can be used as a source of nutritious and palatable food or animal feed, but under unfavorably conditions result in complete spoilage of grain for food or feed purpose within a few days.

FACTORS AFFECTING FEED VALUE AND DETERIORATION

- Basically there are some physical, biological and chemical agents that cause the damage and ulitmate loss to the stored feed and feed ingredients.
  - It may include
    - Temperature
    - Moisture
    - Insects
    - Fungus
    - Rodents etc.

Physical factors

- Regulate Moisture and temperature to ensure safe storage and to prevent spoilage
- Optimum moisture content for storage < 10%
- Optimum temperature for storage below 15° C. High temperature (21-43° C) speeds up the life process of all microorganisms

Control

- Dry the grain before storage to reduce the moisture content to 10% and keep the storage area temperature below 15 C

BIOLOGICAL FACTORS

- Principle biological agents that cause deterioration during storage are
    - Insects
    - Fungi
    - Rodents
- Insect control measures
    - Good hygiene.
    - Cleaning and checking of storage containers as well as the stored food as far as possible.
    - New dry grain should be kept separate from old grain.
    - Stores should be remote from the field to reduce the risk of infestation.
    - Traditional pest control system such as use of local herbs, mixing ash with grain and smoking are effective and should be encouraged
    - Fungal control measures
    - Apply drying and storage technology.
- Rodent control measures
    - Rodent exclusion efforts in store construction.
    - Improved sanitation.
    - Fumigation with phosphine and other gasses.
    - Trapping and hunting.
    - Use of cats and dogs.
    - Rodent repellants.
    - Poison baiting with chlorofacinone, warfarrin, coumarin, zinc phosphate, barium carbonate etc.

CHEMICAL AND ENGINEERING FACTORS

Chemical factors

- Pesticides are used in the storage area to prevent grain spoilage. However, there is risk of residues in the grain that deteroiate the value and quality.
- Hence, care should be taken for correct dose of spraying pesticides and also avoiding spray at the late stages of maturity.

Engineering factors

- Engineering factors refer such as storage structures (bag or bulk storage), mechanical (conveying of produce, threshing and shelling).
- During these process grains are broken and may result in rapid spoilage during the storage.

Storage area requirement

- Building for the storage of feeds and feed ingredients must be water proof and airtight with sealable doors and windows.
- The roof walls, doors, windows and floor must be leakproof.
- The floor must not transmit water vapour from the soil.
- The facility should have good rodent and bird control program.
- Gaps between roof and walls should be sealed with local mud, sheet metal or close netting
- Pipes, shafts, ducts etc. should be fitted with wide metal guards outside and netting inside.

Essential criteria for safe storage of products

- Entirely weather proof.
- Gas tight to enable fumigation of entire contents.
- Fitted with controllable ventilation.
- Proof against entry of rodents and birds.
- Free from light transmitting areas in the roof in order to avoid high temperature areas on top of stored produce.
- Designed to permit incorporation of few fans in the walls and ducting on the floor for special storage requirement.

Steps to prevent Silage spoilage

In hot tropical climate, Secondary fermentation occurs when

- air temperature is high,
- packing density is low,
- moisture content of raw materials is low
- the take-out amount per day is small.

Follow the steps to prevent silage spoilage

(1) Increase the packing density to about 700 kg per 1 m3.
(2) Adjust the moisture content of raw materials to about 65-75%.
(3) Adjust the size (width) of a silo so that the thickness of silage taken out per day is 20 cm or thicker.

Prevention of accidents in silo works

(1) It may happen occasionally that poison gas is produced in underground silos, causing oxygen deficiency. When a worker enters into a silo to restart packing more silage materials after silage making works were temporarily discontinued and it passed more than half a day, and when the work for silage take-out is carried out in the lower part of a silo, a burning candle (fixed on a stick) should be brought near the lower part of a silo to check whether fire is extinguished. If fire is extinguished immediately, there is a possibility that oxygen may be deficient. Since this is a very dangerous situation, air in the lower part of the silo should be ventilated before starting work by exhausting with a vacuum cleaner or sending air with a blower, etc.

(2) A ladder should be used to go up and down to prevent people from falling. When an underground silo becomes empty, a fence should be built around the silo

Exercise

1. Mention the few important fodder crops in Dairy Farming.

Answer: .....

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2. Write a note on Forage conservation.

Answer:.....

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Notes

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

8. Entrepreneurship

Unit 8.1 - Dairy Farming Economics and Finances
Unit 8.2 - Collect information on Financing Institutions for Dairy farming
Unit 8.3 - Estimate the budget for dairy farming
Unit 8.4 - Understand and update Market Information
unit 8.5 - Manage the records of the business
Unit 8.6 - Understand method of marketing
Unit 8.7 - Develop contact with market players

AGR/N4107

Key Learning Outcomes

At the end of this module, you will be able to:

- Make a business plan to start a dairy farm business
- Make a financial and budget plan to start a dairy farm
- Get prices of various inputs, milk and milk products from the market
- Assess the influence of various quality parameters of the milk on the pricing of the produce
- Assess the need and requirement of the client and make a proposal
- Establish cordial relations with various clients for developing the business
- Identify appropriate buyers for the produce
- Identify best ways of marketing one's produce
- Ensure quality before and after the sale of produce.

UNIT 8.1: Dairy Farming Economics And Finance

Unit Objectives

At the end of this unit, you will be able to:

- Identify basic requirements for entrepreneurial initiatives in dairy
- Plan for the Dairy Farm establishment
- Identify the resources required and procure

8.1.1 Dairy Farming Economics and Finances

Performance Criteria

To be competent, the individual on the job must be able to: PC1. farm Planning and Budgeting with reference to various components of Dairy Farm PC2. Keep books of accounts and various transactions of the farm PC3. Arrange for financial assistance from various quarters in the light of various schemes available for dairy development

BASIC REQUIREMENTS FOR ENTREPRENEURIAL INITIATIVES IN DAIRY

A number of critical factors are important for new-venture assessment. One way to identify and evaluate them is with a checklist. In most cases, however, such a questionnaire approach is too general. The assessment must be tailor-made for each activity.

A new venture goes through three specific phase:

pre start-up:

The pre start-up phase begins with an idea for the venture and ends when the doors are opened for business.

start-up:

The start-up phase commences with the initiation of sales activity and the delivery of products and services and ends when the business is firmly established and beyond short-term threats to survival.

post start-up:

The post start-up phase lasts until the venture is terminated or the surviving organizational entity is no longer controlled by the entrepreneur. The pre start-up and start-up phases, are the critical segments for entrepreneurs. During these two phases, five factors are critical:

1. The relative uniqueness of the venture,
2. The relative investment size at start-up,
3. The expected growth of sales and/or profits as the venture moves through its start-up phase,
4. The availability of products during the pre-start-up and start-up phases, and
5. The availability of customers during the pre-start-up and start-up phases.

SPECIFIC ACTIVITIES OF FEASIBILITY ANALYSIS

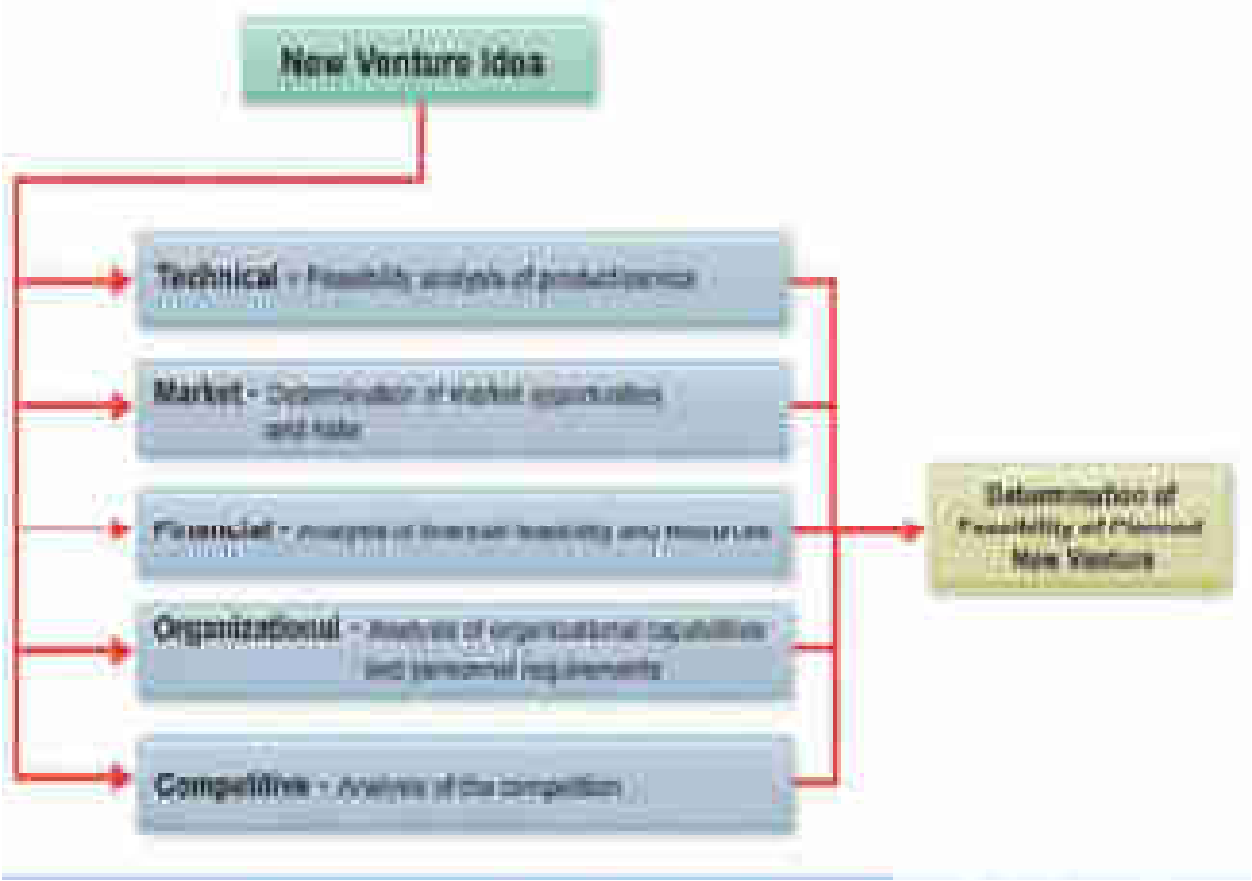


Fig 8.1.1 Dariy Farming economics and finance

Technical Feasibility Analysis	Market Feasibility Analysis	Financial Feasibility Analysis	Analysis of Organizational Capabilities	Competitive Analysis
• Standard quality specifications • Technical requirements • Product development • Product testing • Plant location	• Market potential • Market planning issues	• Required financial resources • Available financial resources	• Personnel requirements • Required skill levels of potential employees • Managerial requirements • Determination of individual responsibilities	• Existing competitors • Size, financial resources, market entrenchment • Potential reaction of competitors to newcomer • Potential new competitors • Scope for future expansion

PROJECT EVALUATION

- Project is a specific plan or design presented for consideration.
- It is a location specific activity with specific objectives, time and cost limitations and of non-repetitive nature.
- In banking, projects refer to an activity in which financial resources are expended to create capital assets that produce benefits over an extended period of time and which logically lends itself to planning, financing and implementing as a unit whereas, UNIDO defines a project as a proposal for an investment to create and or develop certain facilities in order to increase the production of goods/services in a community over a certain period of time.
- Projects are common term used by many to denote specific action plans.
- Project can be long term or short term, limited or comprehensive, single sector concentrated or multi sector concentrated.
- Project evaluation is a step-by-step process of collecting, recording and organizing information about project results, including short-term outputs (immediate results of activities, or project deliverables), and immediate and longer-term project outcomes (changes in behavior, practice or policy resulting from the project).
- Common rationales for conducting an evaluation are:
- Response to demands for accountability;
- Demonstration of effective, efficient and equitable use of financial and other resources;
- Recognition of actual changes and progress made;
- Identification of success factors, need for improvement;
- Validation for project staff and partners that desired outcomes are being achieved.

Importance

Evaluating project results is helpful in finding answers to key questions like

1. What progress has been made?
2. Whether the desired outcomes were achieved, if not why?
3. Are there ways that project activities can be refined to achieve better outcomes?
4. Do the project results justify the project inputs?

Project: can be defined thus as

- A scientifically evolved work plan
- Devised to achieve specific objectives
- Within specified time limit
- Consuming planned resources

DAIRY PROJECT PLANNING

- Project planning can be defined as a scientific and systematic process, in which logical linkages are clearly
- established among various element of projects. Successful implementation of the project lies on effective
- project plan.
- Based on the anticipated goals and objectives the project planning shall be made.
- The project plan is the blue print of the project.
- Effective planning gives proper direction in the implementation of the project and it further helps inadequate monitoring and evaluation.
- For the implementation of plan, an activity chart has to be prepared.
- The activity chart consists of all the proposed activities in the implementation process, including the start date, calendar for the entire project, dates of monitoring and evaluation periods, finishing stages, series of out puts, slack time and responsible person who is going to coordinate the activities etc.

Exercise

1. What are the basic requirements to establish a dairy farm? Explain.

Answer: .....

2. Write a note on Dairy Project Planning.

Answer:.....

Notes

UNIT 8.2: Collect Information on Financing Institutions for Dairy Farming

Unit Objectives

At the end of this unit, you will be able to:

- Identify the Financial institution
- Identify and update with the schemes related to dairy farming
- Update with the documents required for the loan proposal from the financial institutions

8.2.1 Collect information on Financing Institutions for Dairy farming

SCHEME

- The needy livestock farmer should visit bank in the local area and enquire with the bank manager about the livestock projects and after having discussion with him, he should visit the technical expert.
- A scheme can be prepared by a beneficiary after consulting local technical persons of State animal husbandry department, DRDA, SLPP, etc. livestock co-operativesociety/union/federation/commercial livestock farmers.
- If possible, the beneficiaries should also visit progressive livestock farmers and government/military/agricultural university livestock farm in the vicinity and discuss the profitability of livestock farming.
- A good practical training and experience in livestock farming will be highly desirable.
- The livestock co-operative societies established in the villages as a result of efforts by the Livestock Development Department of State Government and National Livestock Development Board would provide all supporting facilities particularly marketing of fluid milk.
- Nearness of livestock farm to such a society, veterinary aid center, artificial insemination center should be ensured.
- The scheme should include information on land, livestock markets, availability of water, feeds, fodders, veterinary aid, breeding facilities, marketing aspects, training facilities, experience of the farmer and the type of assistance available from State Government, livestock society/union/federation.
- The scheme should also include information on the number of and types of animals to be purchased, their breeds, production performance, cost and other relevant input and output costs with their description.
- Based on this, the total cost of the project, margin money to be provided by the beneficiary, requirement of bank loan, estimated annual expenditure, income, profit and loss statement, repayment period, etc. can be worked out and shown in the Project report.

Major Schemes:

1. Dairy Entrepreneurship Development Scheme (DEDS) by National Bank for Agriculture and Rural Development (NABARD)

a. Objective to bring structural changes in the unorganized sector of dairy farming. It also aims to setting up of modern dairy farms and providing employment opportunities for individuals.

b. Who can apply?

i. Farmers, individuals, self-help groups, companies etc. can apply for this scheme
ii. An individual entrepreneur is eligible for one time assistance on all the components.
iii. More than one family member can be assisted under this scheme provided that they set up different dairy unit parted by at least 500 m distance.

S.NO	Component	Unit Cost	Pattern of Assistance
1	Establishment of small dairy units with crossbred cows/ indigenous descript mulch cows like Sahiwar, Red Sindhi, Gir, Rathietc /graded buffaloes upto 10 animals. (for SHGs, Cooperatives societies , Producer Companies unit size will be 2-10 animals per member)	Rs 6.00 lakh for 10 animal unit — minimum unit size is 2 animals with an upper limit of 10 animals.	25% of the project cost (33.33% for SC / ST farmers), as back ended capital subsidy. Subsidy shall be restricted on prorata basis to a.maximum of 10 animals subject to a ceiling of Rs.15,000 per animal, (Rs 20,000 for SC/ST farmers) or actual whichever is lower.Beneficiaries may purchase animals of higher costs, however, the subsidy will be restricted to the above ceilings.
2	Rearing of heifer calves — cross bred, indigenous descript milch breeds of cattle and of graded buffaloes — upto 20 calves	Rs 5.30 lakh for 20 calf unit — with an upper limit of 20 calves	25% of the project cost (33.33 % for SC / ST farmers) as back ended capital subsidy Subsidy shall be restricted on prorata basis to a maximum of 20 calf unit subject to a ceiling of Rs.6,600/- per calf (Rs.8,800 for SC/ST farmers) or actual whichever is lower
3	Vermi compost with milch animal unit (to be considered with milch animals/small dairy farm and not separately	Rs 22,000/-	25% of the project cost (33.33 % for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 5,500 (Rs 7300/- for SC/ST farmers) or actual whichever is lower.

4	Purchase of milking machines /milkotesters/bulk milk cooling units (upto 5000 lit capacity)	Rs 20 lakh	25% of the project cost (33.33 % for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 5.0 lakh (Rs 6.67 lakh for SC / ST farmers) or actual whichever is lower
5	Purchase of dairy processing equipment-for manufacture of indigenous milk products	Rs 13.20 lakh	25% of the project cost (36.33 %for SC/ST farmers) as back ended capital subsidy subject to a ceiling of Rs 3 30 lakh (Rs 4.40 lakh for SC/ST farmers) or actual whichever is lower
6	Establishment of dairy product transportation facilities and cold chain	Rs 26.50 lakh	25% of the project cost (33.33 % for SC / ST farmers) as back ended capita! Subsidy subject to a ceiling of Rs 6.625 lakh (Rs 8.830 lakh for SC/ST -farmers) or actual whichever is lower
7	Cold storage facilities for milk and milk products	Rs 33 lakh	25% of the project cost (33.33 % for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 8.25 lakh (Rs 11.0 lakh for SC/ST farmers) or actual whichever is lower
9	Dairy marketing outlet / Dairy parlour	Rs 1.0 lakh/-	25% of the project cost (33.33% for SC / ST farmers) as back ended capital subsidy subject to a ceiling of Rs 25,000/-(Rs 33,300/- for SC/ST farmers) or actual whichever is lower

2. Dairy Plus scheme for financing dairy unit by State Bank of India

a. For construction of shed, purchase of milch animals, milking machine, chaff cutter or any other equipment required for the purpose.

b. Who can apply?

i. Individual farmers who are members of the milk procuring societies or located on milk route.

ii. They should be less than 65 years of age.

iii. Individual dairy unit having less than 10 animal - should own minimum 0.25 acre of land for every 5 animals for growing fodder and be in a position to procure the balance requirements locally.

iv. Individual dairy unit having 10 animals and above - should own or lease a minimum of one acre of land for cultivation of fodder for every 5 animals.

3. Agriculture Finance Dairy Farming - IDBI Bank Dairy Loans

Credit for Individuals and group of farmers for Purchase of high yielding milch animals (Cattle: Indigenous breed like Gir, Tharparker, etc. and exotic breeds like Jersey, Holstein friesian, etc. and in case of Buffalows: Mehsana, Jafarbadi, etc.), Construction of cattle shed, Purchase of dairy equipments, chaff cutters, etc and expenditure incurred for transportation of animals where the animals are not purchased locally.
Who can apply? Individuals and group of farmers experienced in Dairy farming and are actively engaged in such activity. Loan Amount - Min. Rs. 20,000 and Max. Rs. 10 lakh

4. Dairy Development – Bank of India

Purpose
- To establish small dairy unit with 2 to 4 milch cattle.
- To establish new medium /large unit.
- Collection, processing ,distribution of milk & manufacturing of milk products.
- Purchase of improved/crossbreed milch cattle.
- Construction of cattle shad.

Who can apply? Farmer, Agriculture labours, Registered partnership firm, limited companies, dairy co-operative societies, SHGs.(For Commercial Dairy, submission of project report is necessary)
Quantum of finance - As per unit cost approved by NABARD / Project Cost
- Security
- Loan up to Rs. 100,000/- Hypothecation of live stocks etc.
- Loans above Rs . 100,000 /-

- (i) Hypothecation of live stocks
- (ii) Mortgage of land OR declaration as per april. credit act OR collateral security of adequate worth.
- (iii) Third party guarantee if stipulated.

Exercise

1. Write a note on Major schemes which finance and support dairy farming business.

Answer: .....

Notes

UNIT 8.3: Estimate The Budget For Dairy Farming

Unit Objectives

At the end of this unit, you will be able to:

- Estimate the budget for the business
- List out the inputs required for the business
- Formulate the business proposal

8.3.1 Estimate the budget for dairy farming

• The project budgeting phase is in the project formulation phase.
• Two types of budgets are to be made.

o One is the cost category budget (materials, administration, capital; expenditures etc) and
o The second is the activity budget.

• This project budget is to calculate the cost of each project inputs.
• The estimation of the project cost should be made on fairly realistic sense of financial values.
• In the multi year projects the inflation rate also has to be anticipated in advance.

Economics of Dairy Farming

A model project with 10 buffaloes is given below. This is indicative and the applicable input and output costs as also the parameters observed at the field level may be incorporated

A. Fixed Cost

Capital expenditures are defined as investments to acquire fixed or long lived assets from which a stream of benefits is expected. Such expenditures represent an organization's commitment to produce and sell future products and engage in other activities. The estimate of the costs and benefits of a capital project should show the difference that results from making the investment. The important information is the change in cash flows as a result of undertaking the project, i.e. the differential principle.

Cost of animals	**Rs. 500000**
Transportation cost	**Rs. 10000**
Construction of animal shed	**Rs. 60000**
Construction of calf shed	**Rs. 24000**
Total	**Rs. 654000**

A.Techno economic parameters

Type of Animal	Graded Murrah Buffalo
No. of Animals	10
No. of animals/batch	5
Cost of Animal (Rs./animal)	50000
Cost of culled animal	5000
Transportation Cost/Animal	1000
Average Milk Yield (litre/day)	10
Floor space (sqft) per adult animal	50
Floor space (sqft) per calf	20
Cost of construction per sqft (Rs.)	120
Cost of chaff cutter (power operated) (Rs.)	50000
Cost of equipment per animal (Rs.)	1000
Insurance premium (% per annum)	5
Veterinary aid/animal/ year (Rs.)	1000
Quantity of Concentrate feed in one bag(kgs.)	50
Cost of concentrate feed (Rs./kg)	12
Cost of dry fodder (Rs./kg)	2
Cost of green fodder (Rs./kg)	1
No. of laborers	1
Salary of laborer per month (Rs.)	4500
Cost of electricity and water/animal/year (Rs.)	150
Margin (%)	25
Rate of interest (%)	12
Repayment period (years)	5
Selling price of milk/litre (Rs./litre)	26
Sale price of gunny bags (Rs.per bag)	10
Lactation days	270
Dry days	150

A.Feeding Schedule

Type of feed		**Lactation**		**Dry**	
	Price (Rs.)	**Qty. (kg)**	**Cost Per Day (Rs.)**	**Qty. (kg)**	**Cost Per Day (Rs.)**
Concentrate Feed	12	5	60	2	24
Green Fodder	1	25	25	20	20
Dry Fodder	2	4	8	5	10
			93		54

D. Total Concentrate Feed Consumed (Kgs.)

Year	BATCH 1		BATCH 2	
	Lactation Days	Dry Days	Lactation Days	Dry Days
I	240	30	90	0
II	240	120	210	150
III	210	150	240	120
IV	210	150	270	90
V	210	150	270	90

E. Economics

	YEARS				
Particulars	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**
Sale of Milk	429000	585000	585000	585000	624000
Sale of Gunny bags	1710	2790	2790	2880	2880
Total	**430710**	**587790**	**587790**	**587880**	**626880**
Cost of feeding during lactation	153450	209250	209250	223200	223200
Cost of feeding during dry period	8100	72900	72900	64800	64800
Veterinary aid and breeding charges	10000	10000	10000	10000	10000
Labor charges	54000	54000	54000	54000	54000
Electricity and misc. charges	1500	1500	1500	1500	1500
Insurance charges	25000	25000	25000	25000	25000
Total	**252050**	**372650**	**372650**	**378500**	**378500**
Surplus	**178660**	**215140**	**215140**	**209380**	**248380**

F. BCR, NPW & IRR

BCR is worked out by dividing the present value of cash inflows by the present value of cash outflows.

- If the BCR is more than one, that project is accepted and if BCR is less than one the project is rejected.
- Among the different projects, the project with highest BCR is to be selected.

$$BCR = \sum_{t=1}^{n} B_t/(1+r)^t - \sum_{t=1}^{n} C_t/(1+r)^t$$

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Capital Cost	654000				
Recurring Cost	252050	372650	372650	378500	378500
Total Costs	906050	372650	372650	378500	378500
Benefit	430710	587790	587790	587880	626880
Net Benefit	-475340	215140	215140	209380	248380

The Net Present Worth which is also called as Net Present Value (NPV) is nothing but the present value/worth of the cash flow stream in the project.

- The cash flow in the project is the difference between cash inflow and cash outflow.
- The investments made in the projects are generally called costs or cash outflows.
- The receipts that accrued during different time periods are called as cash inflows or gross returns.
- The cash flows discounted with an appropriate discount rate will give the net present worth of the project.

$$NPW = \sum_{t=1}^{n} B_t / (1+r)^t - \sum_{t=1}^{n} C_t / (1+r)^t$$

life span of the project.

The choice criterion using NPW is that the project with positive NPW is accepted for implementation and the project with negative NPW is rejected.

- If he is to choose among different projects, the project with highest NPW has to be chosen.

IRR is the rate of return per rupee invested in an agricultural project over its life span.

- For example if the IRR is 30 per cent in a livestock project, it means that this project gets an average annual return of Rs. 30/ per Rs. 100/ invested in the project over its life span.
- It is the rate of return at which the present value of total cash flows in a project is equal to zero. In other words, it is the discount rate at which the NPW of the project is zero, i.e.

• For a project to be viable it should have a BCR of one or greater than one at the opportunity cost of capital and a NPW of zero or greater than zero at the opportunity cost of capital and the discount rate for IRR should be greater than the opportunity cost.

PW Costs @ 15%	1719259.92
PW Benefits @ 15%	1853258.04
NPW	133998.11
B.C. Ratio	1.08
I.R.R. (%)	30

A . Loan Repayment Schedule

Payback period refers to the period of time required for the return on an investment to 'repay' the sum of the original investment. For example, a Rs.1000 investment which returned Rs.500 per year would have a two year payback period. Shorter payback periods are obviously preferable to longer payback periods, other things being equal.

Payback period as a tool of analysis is often used because it is easy to apply and easy to understand for most individuals. The payback period is considered a method of analysis with serious limitations and qualifications for its use, because it does not properly account for the time value of money , risk , financing or other important considerations such as the opportunity cost. It is generally agreed that this tool for investment decisions should not be used in isolation.

Alternative measures of 'return' preferred by economists are net present value and internal rate of return. An implicit assumption in the use of payback period is that returns to the investment continue after the payback period.

Pay back period is a simple technique of ranking projects based on the actual period of time in which one can get back total investment.

P = I/E

where, P is the payback period, I is the total investment made in the project and E is the net cash revenues / net revenues per annum.

Year	Loan Outstanding	Gross Surplus	Interest	Principal	Total Repayment	Surplus
1	490500	178660	58860	98100	156960	21700
2	392400	215140	47088	98100	145188	69952
3	294300	215140	35316	98100	133416	81724
4	196200	209380	23544	98100	121644	209380
5	98100	248380	11772	98100	109872	138508

Exercise

1. Define Fixed cost.

Answer: .....

2. Write a note on techno economic parameters to be considered in the Dairy farming B plan?

Answer:.....

3. Define Payback Period.

Answer:.....

Notes

UNIT 8.4 : Market Information Management

Unit Objectives

At the end of this unit, you will be able to:

- Ascertain the prices of various inputs and milk and milk products from the market
- Assess the influence of various quality parameters of the milk on the milk pricing

8.4.1 Market Information Management

i-DIS

- Internet-based Dairy Information System (i-DIS)
- National Dairy Development Board Developed
- To provide a platform through which all the unions and federations can share their data
- To compare its performance with other contemporary unions on varied performance parameters.
- Key information shared include o number of village dairy cooperatives societies
- Member details
- Quantum of milk procured & sold,
- Milk products made & sold and
- Technical inputs supplied among others.

INFORMATION NETWORK FOR ANIMAL PRODUCTIVITY AND HEALTH (INAPH)

- NDDB has developed an Information Network for Animal Productivity & Health (INAPH),
- Desktop/ Netbook / Android Tablet based field IT application
- Capture real time reliable data o Data type
- Breeding,
- Nutrition and Health Services delivered at farmer's doorstep.
- Beneficiaries - farmers, field functionaries, Union, Federation,

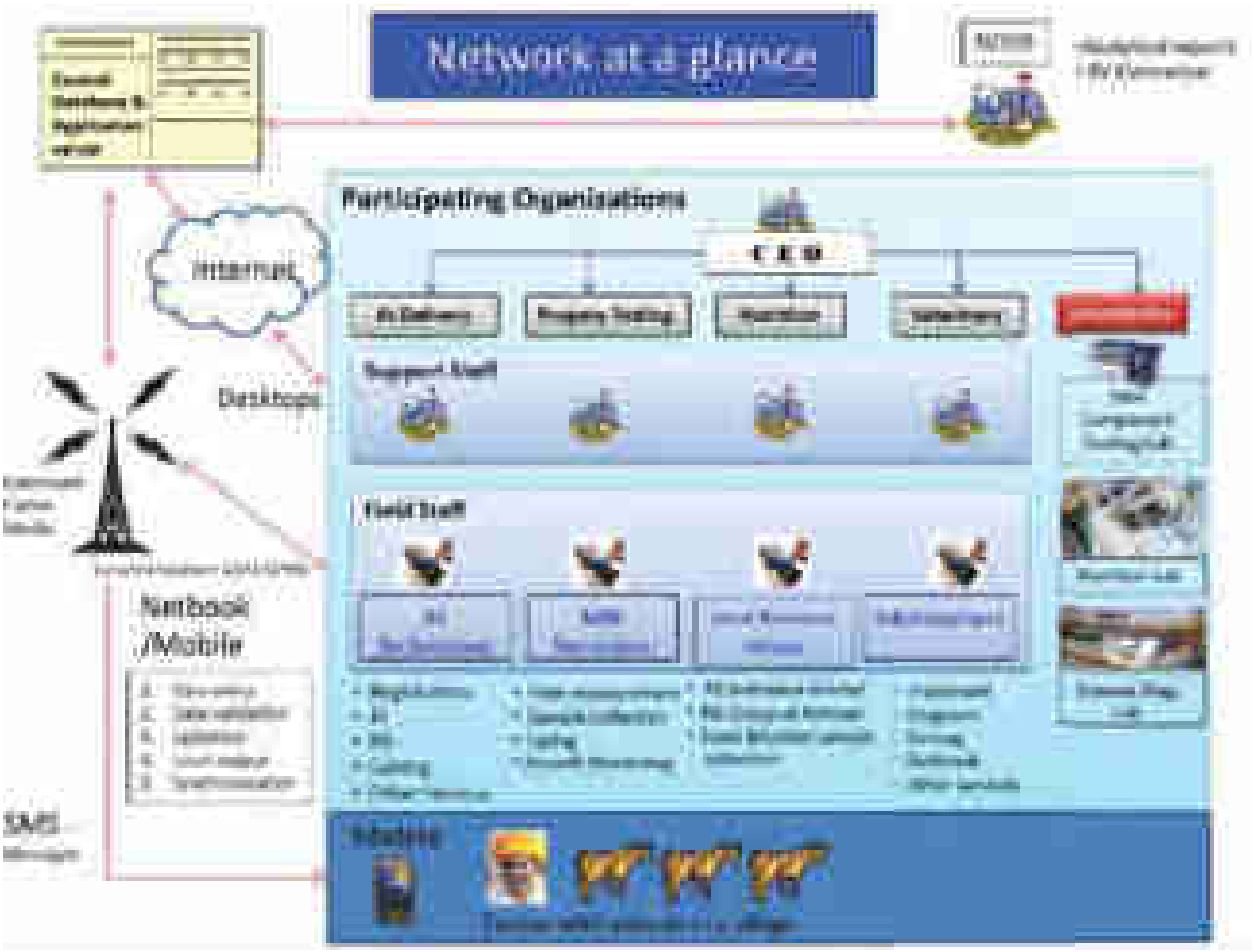


Fig 8.4.1 Maket Information Management

MARKET INFORMATION
AGMARKET

- AGMARKET is the portal developed by government of India which provides the following information useful for Dairy Farmers.
- Commodities market arrival and price information eg. Maize
- Dairy Cow/Buffalo Price Information

i5 – A farmer decision support system

- Kisan gates a leading agro - informatics organization based out of Hyderabad developed an Android based mobile APP to provide decision support to Dairy farmers based market and agro- climatic dynamics.
- Kisan Gates(KG) has also developed an APP called PANDO which provided Field force management and dairy performance monitoring services to Dairy Entrepreneurs.

The Solvent Extractors' Association of India

Solvent Extractors association of India(http://www.seaofindia.com/) provides the periodic price updates of major protein based feed ingredients i.e, Soy Bean Meal, Ground nut oil cake and Rice/Wheat Bran

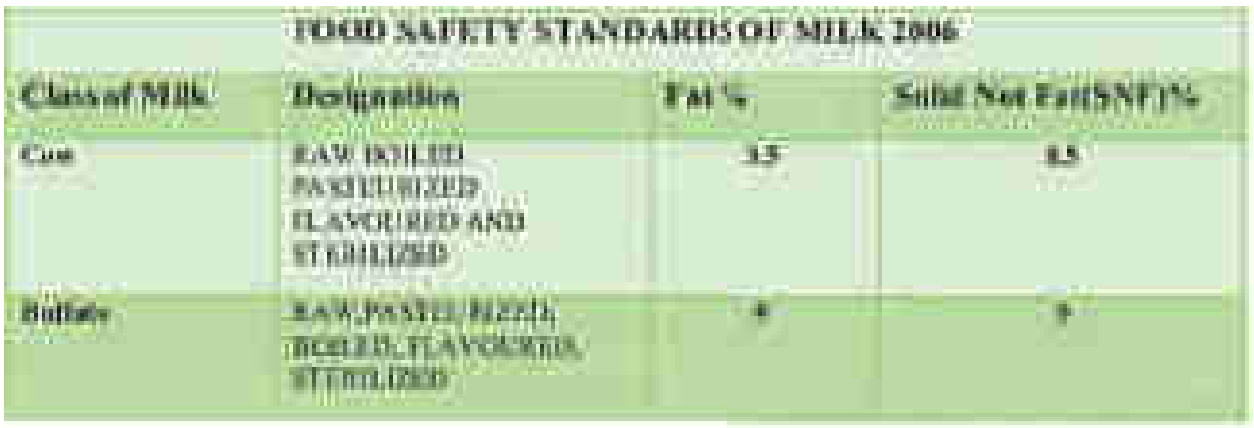
Milk Quality

Physical Quality of Milk

- Milk should be Clean
- Free from sediments, dirt, odor or foreign bodies
- Free from antibiotic residues
- Free from added water

Microbial Quality of Milk

- Aerobic Plate count – 30 x103/ml (Min) - 50x 103/ml (Max)
- Cominform Count - Absent/0.1ml (Min)
- Staphylococcus aureus - Methylene blue reduction test (MBRT) applicable at Manufacturing unit shall not decolorized in 5 hrs. w
- Yeast and Mold count - Methylene blue reduction test (MBRT) applicable at Manufacturing unit shall not decolorized in 5 hrs. w



FOOD SAFETY STANDARDS OF MILK 2006

Class of Milk	Designation	Fat %	Solid Not Fat(SNF)%
Cow	RAW (MILK) PASTEURIZED FLAVOURED AND STERILIZED	3.5	8.5
Buffalo	RAW PASTEURIZED TONED FLAVOURED STERILIZED	6	9

Exercise

1. Write a note on Market information Management.

Answer: .....

2. Write a note on Milk Quality and Marketing.

Answer:.....

Notes

UNIT 8.5 : Manage The Records of The Business

Unit Objectives

At the end of this unit, you will be able to:

- Proper maintenance of Farm Budget
- Record the Live stock and Feed Purchase
- Keep all the record of Expenditure
- Record the Income Statement and revenue etc

8.5.1 Manage the records of the business

Proper management is the key to success in any enterprise, and the dairy business is no exception. Each successful dairy farmer must have records which are accurate and reliable to make sound management decisions.

Records of identification and pedigree, production, feed, reproduction, health and costs help producers

(1) cull the least profitable cows,
(2) feed for most efficient production,
(3) make precise management decisions for greatest returns and
(4) select animals with the greatest genetic producing ability for herd replacements and for breeding a better herd for the future.

Records are important and answers the following queries

- Are the cows produce same amount of milk from the feed as compared to last year?
- Is the farmer meeting the breeding goals on this feed?
- Is the dairy farm profitable?
- Why records are important
- Scheduling and organizing day to day activities
- Monitoring for early appearance of problem
- Diagnosing problems efficiently
- Records can be used
- To provide early warning system
- Tools to diagnose problems

- Performance indicators in dairy farm o Production - milk/ cow/day
- Herd lactation status – Days in milk
- Reproduction – Pregnancy rate
- Udder Health – Somatic cell count
- Culling and replacement rate – Cull rate
- Record keeping options for the farmer o Manual calculations, working on individual sheets
- Custom excel sheet for the farm
- Commercial dairy record analysis program

- As herds increase in size, less individual attention can be paid to one particular cow. As a result, larger herds now require more effective tools for making decisions concerning the management of the dairy. These decisions are based on information summarized, which allows the dairy producer to have management reports available for an individual cow, a group of cows or the herd.
- These reports then allow the quality and effectiveness of management to be improved by using information in a condensed form
- These management reports should cover all areas of herd management, including production, nutrition, reproduction, inventory, replacements, financial and health. Everyone manages differently, so these reports should have the ability to meet the specific needs of any dairy. Printing the reports should be easy where a single command gives the producer a complete, up-to-date report. The reports should be easily understood and could serve as a temporary or a permanent record.
- Milk production records, including liters of milk, fat percentage, protein percentage and somatic cell count, are integral parts of any dairy management record system for groups of cows and are best for individual cows.
- Also, feed records should be kept for each cow or group of cows and should include feed inventory records.
- Reproductive records should include calving, breeding and fertility data as well as date of birth, date of all enthuses or heats, breeding dates including the sire used and results of veterinary checks including pregnancy checks.
- Health records should include all vaccinations, all diseases the animal has had and the somatic cell count data from the analysis of the monthly milk records. Reasons for culling animals and problems on a specific day should also be included in the records.
- Financial records should total costs of production including costs of equipment, land and facilities. Records should include the price of the milk per hundredweight and allow manipulation of the data to calculate costs per hundredweight of milk.
- Financial records are now allow dairy producers to project what an individual cow may produce in the remainder of her lactation, and a financial analysis can indicate the financial results of culling her. In turn, this may indicate whether it is more profitable for the manager tocull her, keep her or cull another cow. In other cases,these records may project his cash flow for the next month, year or other period of time using reasonably valid assumptions of future prices and yields.

Herd Summaries and Comparisons -

The dairy producer should choose a software program that best suits his/her needs. The program should provide analyses of milk production, feed, reproduction, health and financial data and allow for comparisons among individual cows within the herd, groups of cows within the herd and a comparison to other herds in the region and across the country. The data should allow dairy producers to determine how they compare to other dairy producers so they can determine the strong and weak points of their operation. This comparison allows dairy producers to determine the areas they can most improve in their herd management. The collection of raw data should also allow dairy producers to compute management reports which will provide herd summaries. These allow dairy producers to manage their herds more efficiently so they can spend less time with their records and manage only animals needing attention on a particular day

Individual Animal Records -

- By storing lifetime health information on each animal in the herd, immediate access to health history is available. For example, all health activities and treatments of an individual animal should be available on a management report if needed. Also, it is important to be able to retrieve a management report listing all animals which have had a particular disease (i.e., acute mastitis) or a management practice (i.e., dehorning) so producers can see if a particular disease or condition exists in their herds.

Farm Budget and Income statement

- Simply stated, income statement is excess of revenue over expenses. If the expenses exceed the revenue the result is a loss to the farm.
- Income statement is generally prepared for one agricultural year, i.e. at the end of the year. However it may also be prepared over a period of time, so that one can know the trend in receipts and expenses which indicates the success or failure of a farm business.
- It shows whether the farm is running under loss or profit. Hence it is also called as Profit and Loss Statement.
- It is different from balance sheet in that the balance sheet indicates about the assets and liabilities but not about the operational efficiency of the farm business in terms of receipts, expenses, profit and losses.
- The objective of preparing Income Statement is to summaries the income and expenses incurred in the farm throughout the year and present them in a schematic picture. This statement lists all the farm expenses on one hand and all the receipts on the other.

Revenue

- In the revenue realized through the sale of following items are included.

Opening Receipts

- Crops and feed
- Livestock and Poultry sold
- Livestock and Poultry Products sold
- Custom work- cash
- Government payments and patronage dividends, gifts etc.

Capital Receipts

- Breeding stock
- Machinery and equipment
- Appreciation in the value of assets

Non Farm Income

- Interest and dividends

Opening Expenses

- Labour charges
- Repairs
- Rents and Leases
- Seed and Fertilizer
- Chemicals
- Livestock expense(Breeding Vet., etc)
- Gas Fuels, Oil
- Insurance
- Utilities(Electricity, Gas, Telephone)
- Marketing and transport expense
- Interest on working capital

Live stock and Feed Purchase

Capital Expenditure/Fixed expenses

- Machinery and Equipment
- Building and Improvement
- Depreciation
- Interest on fixed Capital
- Rental value of owned land

Exercise

1. Write a note on Manage the records of the business

Answer: .....

Notes

UNIT 8.6 : Understand Method of Marketing

Unit Objectives

At the end of this unit, you will be able to:

- Plan for the marketing of dairy farm produce
- Update with the market trend
- Plan for the marketing strategy

8.6.1 Understand method of marketing

For a dairy farmer, Milk marketing can be a difficult and confusing proposition. There are so many things to think about. The farmer needs to understand answers to these questions to develop and act on a marketing plan. A solid plan is an effective weapon in managing the emotions involved in milk marketing.
Milk price has become more variable over the past decade. A milk marketing plan tries to reduce the amount of price variability. The purpose of milk marketing is to get a good average price more consistently. Trying to outguess the market can lead to more variable milk prices, rather than less.

A marketing plan is a proactive strategy to price your milk that considers your financial goals, cash flow needs, price objectives, anticipated production, and appetite for risk. The old saying 'knowledge is power' is true when it comes to developing and implementing a milk marketing plan. Knowing the milk price that will cover your needs gives you the power to act.

There are two pieces of information farmer must have to calculate for milk price: milk production and total cash needed. Milk production is the easy one to figure out. Total cash needed takes a little more time to determine but is worth the effort once you have the numbers. Having a good record system to track both direct and overhead expenses is important not only to help make business decisions throughout the year but also in order to put together a good milk marketing plan.

1 Organize a cooperative group

Small Dairy farmers have only a few animals giving milk at any one time and will have only a small surplus to sell. Dairies and retailers, on the other hand, require a reliable daily supply of milk, in a sufficient quantity and of a reliable quality.

- Organize a group of producers to produce and sell your milk. Together, you can produce enough milk to make it worthwhile for a trader to pick up, process and sell it. You will have a stronger bargaining position with the buyer, and you can share tasks, exchange information and get services such as credit and training.
- Make sure that women are part of the group: they often do the milking, make butter and cheese, and sell dairy products on local markets. They need milk for cooking and to feed to children.

Advantages	Disadvantages
Cheaper farm inputs	Conflict of interest
Better prices	Interpersonal conflict
Expert marketing	Sharing responsibility
Improved market knowledge	Lack of startup funds
More economic power	Lack of expertise of farmers as board members
Better quality products	

2 .Set up a milk-collection point

It is costly and time-consuming for a dairy to pick up small amounts of milk from scattered locations. Setting up a collection centre will encourage traders or dairies to buy your milk and get you higher prices.

- Set up a collection centre with your milk-producers' group at a convenient location.
- Arrange for all members of your group to deliver their milk to the collection
- centre each morning, and for the milk to be picked up quickly by a refrigerated truck.
- Make sure the milk that members bring to the collection centre is fresh and uncontaminated.

3. Start a small processing plant

A small processing plant nearby can buy your milk and create jobs for the community. It can serve local consumers or supply a larger dairy in town. It can be run only in the wet season when there is enough milk available for processing. It can pasteurize and package milk and turn it into yoghurt, ghee and other products.

- Before investing any money, develop a business plan: you will need to research the potential market and products.
- Set up a small-scale processing plant in a convenient place.
- To keep milk fresh, you need to boil or pasteurize it, then cool it Down. You can pasteurize milk by heating it to 63 degrees C for 30 minutes. Allow it to cool, then put it in a refrigerator.

4. Direct Marketing

Direct marketing is selling directly to consumers – individuals, families, restaurants, tour groups, big companies and others.
A typical direct marketing farmer tends to be:

- small scale
- diverse in their product range (fruit, vegetables, flowers)
- flexible – timing their production schedule with their distribution strategy
- socially adept – fostering social links with other farmers who direct market and with consumers.
- value adding – farmers who are able to value add their product, benefit from direct marketing
- using sustainable practices – small-scale production and social collaborationtend to promote social and environmental sustain ability

Advantages	Disadvantages
Capture higher share of value	Time consuming
Better product quality	Needs marketing skills
Remove/reduce middle men in the chain	Sales attitude
Low promotion cost	Area of operation is small/limited
Competitive prices	Resource constrained (to promote in radio, TV etc)
Less overhead on marketing	

Decisions that can be made using market information.

Business type	Information
Input supply industry	Forecasting sales
Food processors	timing input purchases s devising market strategies
Farmers	planting, purchasing, marketing developing business plans for credit identifying potential markets
News Media	timing purchases planning production projecting costs and returns
Food service industry	Resource constrained (to promote in radio, TV etc)
Farm Advisory Services	creating farm budgets decisions about profitability timing of operations
Exporters	timing purchases devising market strategies
Governments	operation of commodity programs formulation of farm legislation anticipating and reacting to developments

Exercise

1. Write a note on Planning and Marketing Strategy.

Answer: .....

2. Create the new innovative marketing strategy for the Dairy products (For Village and Urban Area customers)

Answer:.....

Notes

UNIT 8.7 : Develop Contact With Market Players

Unit Objectives

At the end of this unit, you will be able to:

- Build a relationship with market players
- Develop a repo with buyers
- Identify the new entry in the market

8.7.1 Develop contact with market players

Establish cordial relations with various clients for the benefit of dairy farm development

Assess the needs and requirement of the clients and assess one's own unique selling proposition
Extract critical market information that is otherwise not in the public domain

Client Relationship Management is the Strategy used to learn more about customers' needs and behaviors in order to develop stronger relationships with them. Research has shown that companies that create satisfied, loyal customers have more repeat business, lower customer-acquisition costs, and stronger brand value—all of which translates into better financial performance

Importance of CRM

- Increase customer service levels
- Improve efficiency of dairy units
- Cross-sell products more effectively
- Help sales staff close deals quickly
- Simplify marketing processes
- Increase ROI

Relationship Management focuses on

- Establishing
- Developing
- Maintaining

successful exchanges with customers
Retention of customers gives greater benefit over acquisition of new customers

- Builds trust and loyalty
- Up-sell and cross sell opportunities

- Move customers through the life cycle
- Acquisition, Growth and Retention
- Movement will maximize their value and increase profits

- Studies indicate that increasing the number of customers a company retains each year by just 5% can increase contribution to shareholder value by 40% to 95%

Types of relationships

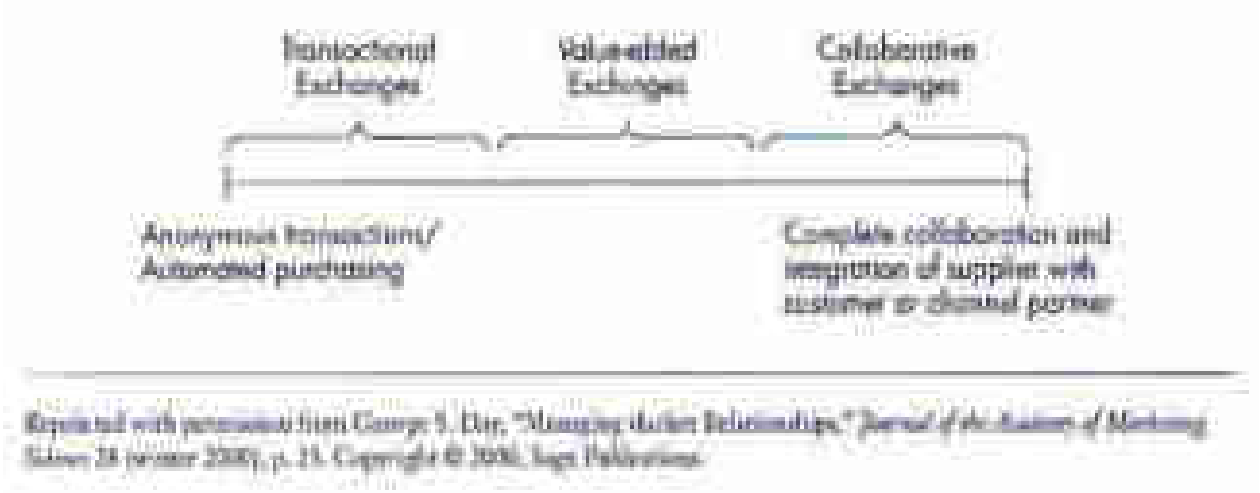


Fig 8.7.1 Types of relationships

To develop 'key supplier' status, sellers need to:

- Target the right customer.
- Match with their purchasing situation.
- Develop strategies that are appropriate for each type of buyer. Collaborative buyers seek long, strong and lasting relationships.
- Buyers perceive significant risks with suppliers, so competence and commitment are vital when starting the relationship.

Customer Relationship Management (CRM) is a cross-functional process for achieving:

a. Continuing dialog with customers across all contact and access points
b. Personalized service to the most valuable customers
c. Increased customer retention
d. Continued marketing effectiveness

A CRM program cannot help unless a company employs the proper strategy to secure and retain profitable customers. - Special attention must be given to five areas.

a. Acquire the right customer.
b. Craft the right value proposition.
c. Institute the best processes.
d. Motivate employees.
e. Learn to retain customers.

Exercise

1. Write a note one Customer Relationship Management.

Answer: .....

2. What are the importance of CRM.

Answer:.....

Notes

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9. Maintain health & safety at the work place

Unit 9.1 - Maintain a clean & efficient workplace

Unit 9.2 - Render appropriate emergency procedures

Unit 9.3 - Practice General Safety and First aid

AGR/N9903

Key Learning Outcomes

At the end of this module, you will be able to:

- Maintain a clean & efficient workplace
- Render appropriate emergency procedures
- Practice General safety and first aid

UNIT 9.1: Maintain A Clean & Efficient Workplace

Unit Objectives

At the end of this unit, you will be able to:

- Maintain the cleanliness in the farm
- Maintain the efficient and good working place

9.1.1 Maintain a clean & efficient workplace

Maintain a clean & efficient workplace

CLEANING OF ANIMAL SHEDS

The easy and quick method of cleaning animal house is with liberal use of tap water, proper lifting and disposes all of dung and used straw bedding, providing drainage, to the animal house for complete removal of liquid waste and urine.

The daily removal of feed and fodder left over in the manger, reduces the fly nuisance. Periodical cleaning of water through eliminates the growth of algae, bacterial and viral contamination and thus keeps the animal healthy.

Sanitation in dairy farm

Sanitation is necessary in the dairy farm houses for eliminations of all microorganisms that are capable of causing disease in the animals.

The presence of organisms in the animal shed contaminates the milk produced thus reducing its self-life, milk produced in an unclean environment is likely to transmit diseases which affect human health.

Fig 9.1.1 Sanitation in dairy farm

Fig 9.1.1 Sanitation in dairy farm

Dry floorings keeps the houses dry and protects from foot injury. Similarly the presence of flies and other insects in the dairy farm area are not only, disturb the animals but also spreads deadly diseases to the animals.

Sanitizers

Sunlight is the most potent and powerful sanitizer which destroy most of the disease producing organism. Disinfection of animal sheds means making these free from disease producing bacteria and is mainly-carried out by sprinkling chemical agents such as bleaching powder, Iodine and lodophor, sodium carbonate, Washing soda, Slaked Lime (Calcium hydroxide), Quick Lime (Calcium oxide) and phenol.

Bleaching powder

This is also called calcium hypo chloride. It contains upto 39 % available chlorine which has high disinfecting activity.

Iodine and lodophor

This is commercially available as lodophores and contains between 1 and 2 % available Iodine which is an effective germicide.

Sodium carbonate

A hot 4 % solution of washing soda is a powerful disinfectant against many viruses and certain bacteria.

Slaked lime and quick lime

White washing with these agents makes the walls of the sheds and the water troughs free from bacteria.

Phenol

Phenol or carbolic acid is very disinfectants which destroy bacteria as well as fungus.

Insecticide

Insecticides are the substances or preparations used for killing insects. In dairy farms, ticks usually hide in cracks and crevices of the walls and mangers. Smaller quantities of insecticide solutions are required for spraying.

Liquid insecticides can be applied with a powerful sprayer, hand sprayer, a sponge or brush; commonly used insecticides are DDT, Gramaxanewettable powders, malathion, Sevin 50 % emulsifying concentration solutions.

These are highly poisonous and need to be handled carefully and should not come in contact with food material, drinking, water, milk.

Precautions while using disinfection In Insecticide.

- Remove dung and used bedding completely.
- Avoid spilling of dung and used bedding while carrying it out.
- Avoid the use of dirty water in cleaning the sheds.
- Never put the fresh fodder over: the previous day's left over fodder in the manger.
- Prevent algae to grow in the water troughs
- Use proper concentration of disinfectant / insecticide solutions to avoid any toxic effects poisoning.
- Avoid of the mat the milking time as milk absorbs these quickly.

Procedure

- Remove the dung from the floor and urine channel with the help of a shovel and basket (iron) and transfer it to the wheel - barrow.
- Remove the used bedding and leftovers from the mangers in a similar way.
- Empty the water trough and scrape its sides and bottom with the help of a floor brush.
- Wash the water through with clean water and white wash it with the help of lime mixture once a week.
- Scrape the floor with a brush and broom and wash with water.
- Clean and disinfect the splashes of dung on the side walls, railing and stanchions.
- Remove the cobwebs periodically with the help of a wall brush.

- Sprinkle one of the available disinfecting agents in the following concentration. Bleaching powder should have more than 30% available chlorine. Phenol 1-2% solution. Washing Soda (4% solution).
- Allow adequate sunlight to enter in to the shed.
- Spray insecticides at regular intervals especially during the rainy season (Fly season).
- Whitewash the walls periodically by mixing insecticides init to eliminate ticks and mites living in cracks and crevices.

Other Provisions

- There should be feeding, drinking area and loafing area in each shed. The shed may be cemented or brick paved, but in any case it should be easy to clean. The floor should be rough, so that animals will not slip
- The drain should have a gradient of 1" for every 10" length. The roof may be of corrugated cement sheet, asbestos or brick and rafters. Cement concrete roofing is too expensive.
- Inside the open unpaved area it is always desirable to plant some good shady trees for excellent protection against direct cold winds in winter and to keep cool in summer.

Notes

UNIT 9.2: Render Appropriate Emergency Procedures

Unit Objectives

At the end of this unit, you will be able to:

- Identify the hazards & risks at the work place
- Provide the necessary emergency facilities

9.2.1 Render appropriate emergency procedures

Design for safety

- First step in rendering emergency procedures in dairy farm is to ensure safety to animal and handler. In the establishment of dairy farm and handling facilities, care should be taken to ensure safe cattle handling and appropriate warning signs
- Smooth movement of cattle, people and work is not only more efficient it is generally safer for workers, contractors and other bystanders. The comfort and health of animals is directly related to productivity and safety of handlers. Safe environment maintains milk quality.
- Cow safety
- Design Sheds, milking parlour and yards to encourage easy movement of cows and to reduce anxiety levels in cows. Review the overall design and layout of the cattle yards and facilities. Improvements can be made to existing yards, and plans for improved facilities should make safety a key factor in design. Provide clear space ahead and reducing distractions will “draw” cattle through yards.
- Care should be taken to reduce the risk of injury to handlers.
- Absence of good escape routes for the handler increases the risk of injury.
- The second one is to design for the safety and ease of work of the people – self-latching gates, ready access and escape, surfaces that reduce risk of trips and falls, and isolation from the animal hazard.

Plan for emergencies

- Identify the potential emergencies in a dairy farm. Prepare Emergency plans and procedures
- Dairy farm emergencies include
- fire, flood, cyclone or severe storms, machinery entrapment, electrical shock, snake or spider bite, chemical exposure, injuries, illness and accidents.
- Steps to deal with such emergencies

- All cattle properties must be “emergency ready”. Provide emergency facilities appropriate that might occur on the farm (e.g. deluge showers, eye washes, fire fighting equipment, first aid kits). The emergency facilities must be located where they are needed, installed correctly, regularly maintained, and access to them kept clear.
- Make sure that the correct equipment is available to contain and handle any chemical or other dangerous materials spills that might happen.
- Refer to the substance material safety data sheets for specific handling and exposure treatment needs.
- To help minimise the risk of personal injury or property damage in the event of an emergency, people working on and visiting the farm need to know and understand the emergency procedures and their responsibilities.
- Nominate someone (who is on the farm most of the time) to be responsible for emergency coordination and ensure they are trained in emergency control.
- Instruct everyone working on the farm in the emergency response procedures – include it in your induction program and make sure that contractors and visitors to the farm also know what to do in an emergency. Update emergency plan regularly and communicate to all workers should be aware of emergency plans at induction, and be regularly updated.
- Everyone should know the location of fire alarms, fire extinguishers and first aid kits; how and where to contact emergency services; and where to safely assemble in the event of an emergency. Notify emergencies immediately to the team

First aid

- A suitable first aid kit should be accessible to all workers on the property. Follow the government guideline on the requirements for the type of workplace. The kit should be suitable formanagement of common injuries and snake bite.
- At least one person, preferably two people should be trained in first aid and hold a first aid certificate.

Fire

- Work areas should be kept clear of flammable materials and the area around kept cleared.
- Fire extinguishers should be available where fire is a hazard.
- All workers should be aware of and trained in emergency fire procedures.
- If a fire is detected, immediately raise the alarm. Use the fire extinguisher if it is safe to do so. Never fight a fire alone. To reduce the risk of injury from a fire:
    - have a fire plan;
    - extinguish the fire (only if safe to do so);

- alert all persons nearby and request assistance;
- callfor help;
- assemble at the evacuation assembly point and ensure that everyone has been located;
- close the door on the fire to contain the spread;
- if threat to life exists, evacuate immediately closing all doors;
  maintain control of people at the evacuation assembly area;
- if you are exposed to smoke or fumes seek medical attention.

Hazardous material spills and leaks

- Handle chemicals and hazardous and dangerous substances on farm carefully
- Avoid possibility of spills or leaks
- Close the containers firmly and place on flat surface
- Ensure proper drainage in Storage facilities to contain spills and leaks; this includes chemicals in use in the dairy, chemical store and mixing area, and fuel storage.
- For small leaks or spills from a container, move the container or empty the contents into another container that is safe; isolate the area and keep people away.
- Clean up small spills immediately. Avoid contact with skin or breathing vapours or dust by using relevant PPE.
- A designated spill control kit should have adequate material to clean up a small spill. Dispose of products in a safe and approved manner.
- Refer to the material safety data sheets for any requirements for protective clothing and equipment for the cleaning up process.

Confined spaces

- On dairy farms potential confined spaces include milk vats and silos, grain silos, spray tanks, water tanks, effluent tanks and wells.

  It is best not to have to enter these areas at all; however, if it is necessary for anyone (including contractors) to enter any of these areas then Confined Space Regulations apply and must be followed, including a documented risk assessment, strict entry procedures and the development of emergency procedures for confined space rescue.

Notes

UNIT 9.3: Practice General Safety and First Aid

Unit Objectives

At the end of this unit, you will be able to:

- Understand the risk
- Undertake the safety procedure when required
- Practice the first aid

9.3.1 Practice General Safety and First aid

Selection of safe cattle

First and foremost, a cattle crush must be able to do the job and do it safely.A cattle crush can be assessed on the major features of:Versatility (how many different jobs can be performed using the crush - this will depend on access to the head, side and rear of the beast)
Suitability for such jobs as dehorning,pregnancy testing, artificial insemination,stripping out and mouthing

- Safety for handler
- Price
- Durability
- Serviceability (how easy it is to maintain)

Things you could do immediately to improve safety

You rarely have the opportunity to re-build your cattle yards from scratch, but here are a numberof ideas provided by the Insurance agents that you could put in place almost immediately to improve safety.

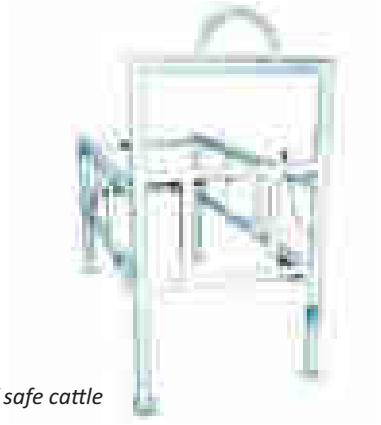

Fig 9.3.1 Selection of safe cattle

- Replace or re-hang gates so that they swing freely. Reverse the top gudgeon to prevent them being lifted off
- Build catwalks on forcing pens, races and loading ramps
- Cover catwalks securely with non-slip material
- Build in access-ways, especially between forcing pen and work area
- Make the race gate self-closing, install self-closing latches and a tail bar
- Board up forcing pen at both sides of race mouth
- Board out corners in yards
- Put shelter over the working area
- Put a roof over the working area
- Divide large, square yards into smaller narrower ones
- Divide a long race by installing gates
- Concrete the race and forcing pen
- Install a head-bail and crush, reposition to give a clear view ahead
- Put a water trough in the yard
- Reposition the entrance yard at right angles to the fence-line, up-hill or on level ground so cattle aren't moving into the sun as they enter the yards. Keep up minor maintenance
- Nails should be hammered home and flattened off
- Bolts that are too long should also be sawn down
- Loose timbers on catwalks or rails should be fastened
- The head-bail should be kept lubricated
- Gates should be kept well-oiled and free-swinging

Four important tips for successful and safe cattle control:

1. Check the yards before working them

Before setting out the yards and races should be checked, obstacles and hazards for cattle and hand lersre moved, head-bail and gates checked and adjusted.

2. Keep cattle calm

Learn when it's best to back off and let things settle down – hard sometimes when the handleris impatient to get the job done!

3. Keep an eye on what happening around you

Keep looking around so you know what the other cattle are doing. Accidents happen whenthe handler loses track of what others are doing.

4. Use your voice

Good stock handlers use their voice constantly in different ways – to soothe and calm, to assert authorityand to let cattle know where the handler is. This is important in light of their different vision from humans.

Exercise

1. Write a note on Importance of Healthy and Safety Management practice at the work place.

Answer: .....

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