

# JOB ROLE – DAIRY FARMER-I

Sector – Agriculture

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Class XI<sup>th</sup>



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# **UNIT 2 : Livestock Accommodation**

## **Session 2 : Housing Layout for Dairy Animals**

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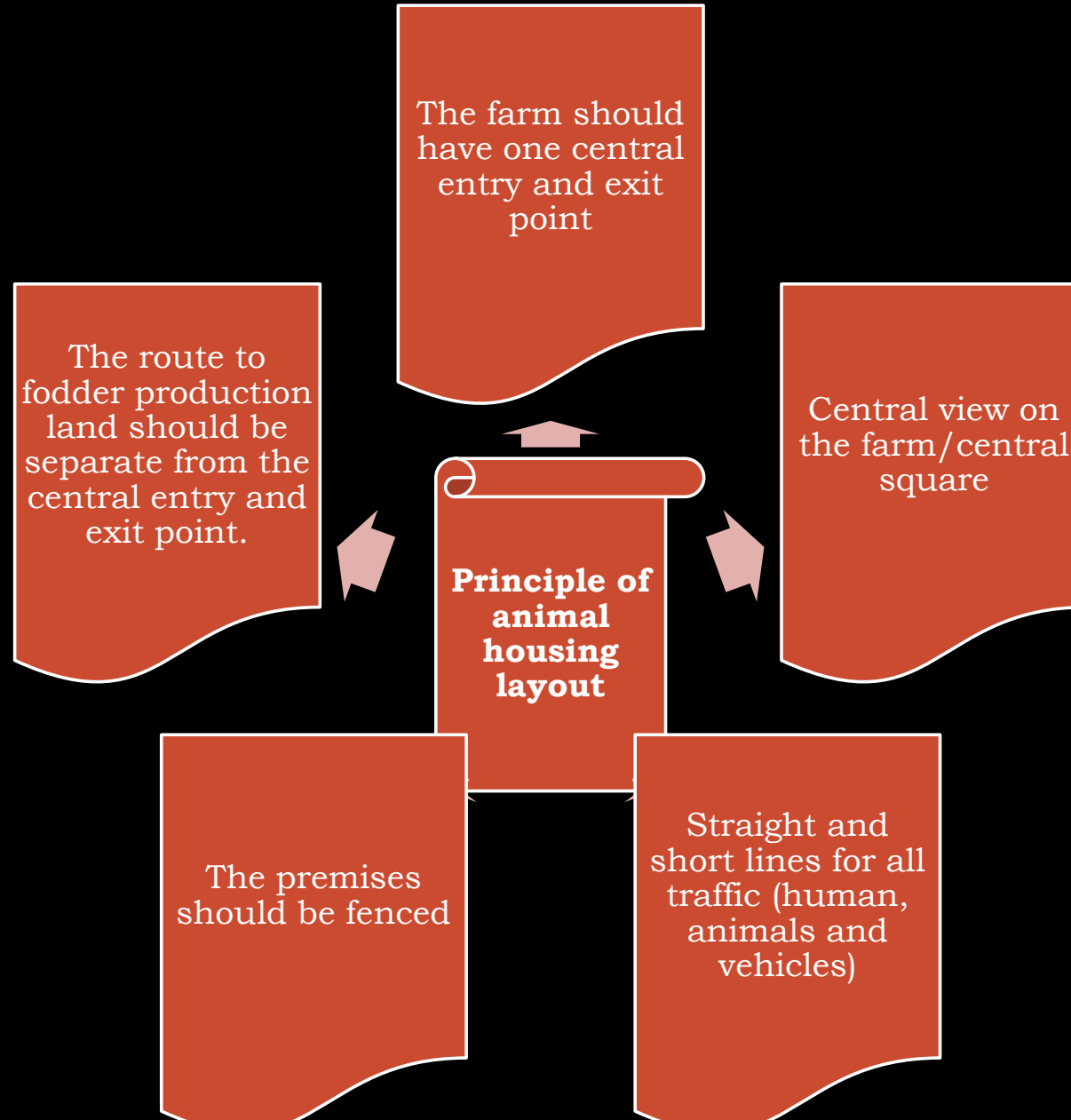
# Session Objectives

- In this session the students will learn about the
- Principles of Animal Housing layout
- Grouping of cattle in a herd
- Various terms used for cattle
- Layout of animal housing

# Introduction

- Housing for animals is designed in such a way that it can accommodate animals of all age groups separately.
- At the same time, the animal house facilitates various farm activities such as milking, feeding and cleaning in a safe and efficient manner.
- The animal house also provides comfort to the animals for optimal milk production and protection against unfavorable weather conditions (for example, heat, rain and wind).

# Principles of Animal Housing Layout



## Grouping of cattle in a herd

- A dairy farmer divides the dairy herd into different groups, especially when the size of the dairy farm is large.
- The grouping of the animals is based on the nutritional as well as operational requirements. Animals can be categorized as heifers, lactating cows (early, mid and late), dry cows, advanced pregnant cows, sick animals, breeding bulls, suckling calves and young calves.
- Appropriate grouping of animals reduces labor requirement, chances of fighting among the animals and helps in their better management.

# Various terms used for cattle

Category of animal	Cattle	Buffalo
Adult male	Bull	Buffalo bull
Adult female	Cow	She buffalo/ buffalo cow
New born up to one year	Calf	Buffalo calf
Male above 1 year up to sexual maturity	Yearling male/ bull calf	Buffalo yearling male/ buffalo bull calf
Female above 1 year up to age at first calving	Heifer	Buffalo heifer
Castrated male	Bullock	Buffalo bullock
Act of parturition	Calving	Calving
Act of mating	Servicing	Servicing
Group of animals	Herd	Herd



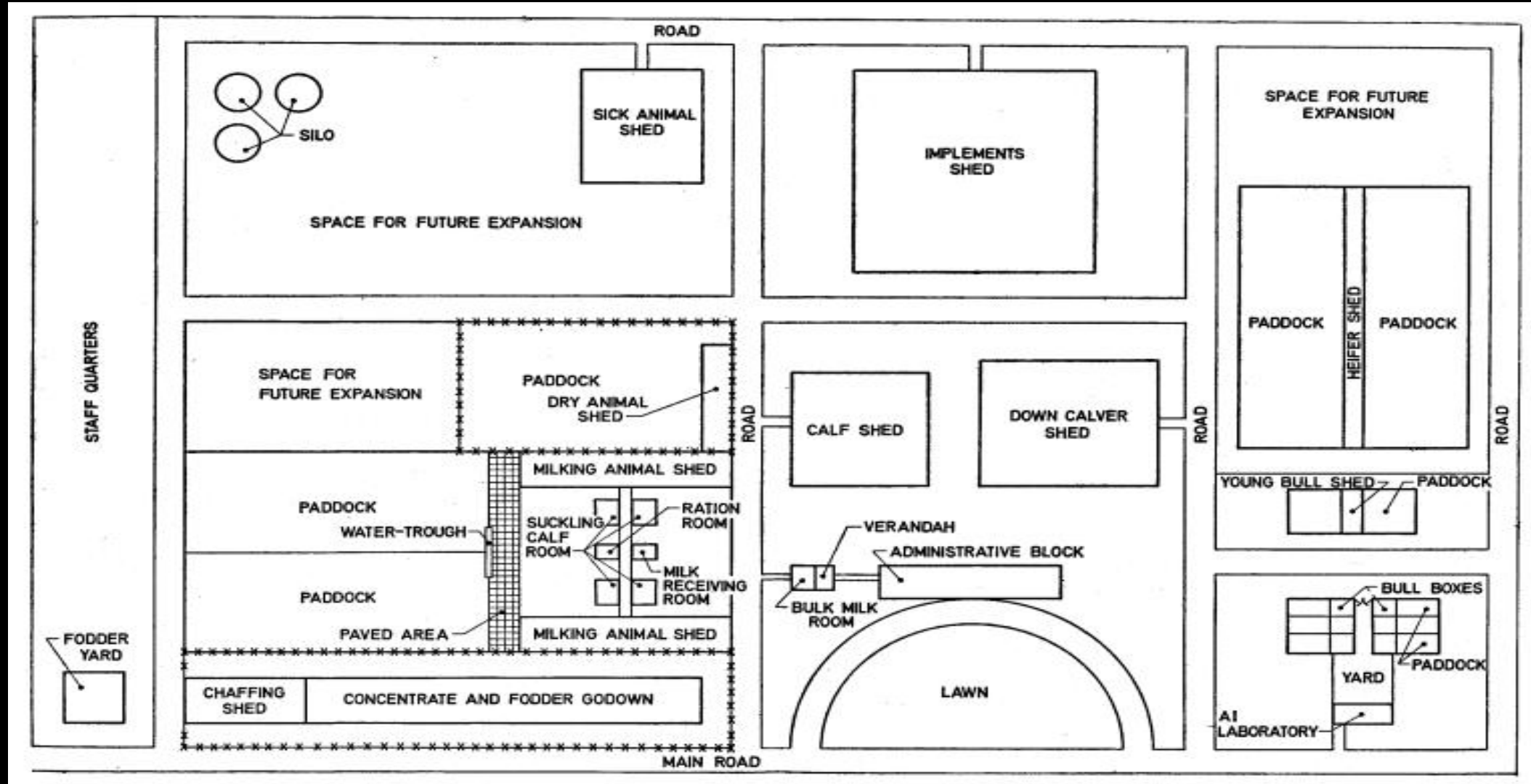
# Layout of animal housing

- A large dairy farm has three essential sections - cattle section, dairy section and fodder production section.

Cattle section	Animal shed	Milking animal shed
		Dry animal shed
		Calving box or calving pen
		Heifer shed
		Calf shed
		Bull shed
		Milking parlour
		Sick animal shed
	Ancillary structure	Artificial insemination cum veterinary dispensary
		Concentrate godown
		Dry fodder godown
		Chaffing shed
		Handling yard
		Manure disposal area
		Silo
		Travis
		Wallowing tank

<b>Dairy section</b>		<b>Milk receiving room</b>
		<b>Milking utensils storage room</b>
<b>Fodder production section</b>		<b>Implements and workshop shed</b>
		<b>Fertilizer and fodder seed storage room</b>

# Layout of a dairy farm (as per Bureau of Indian Standards )



# Cattle section

- This is the most important section in a dairy farm.
- It has various units which are planned in such a way that they provide comfort and protection to the animals and operational convenience to the farm workers.

## 1. Animal Shed

- a. Milch animal shed* : The length and width of the floor area shall be decided according to the average size of the animals.
- The width of the central passage may be 1.8 m. The central passage shall have slope of 1 in 25 from the central axis towards both the sides.
- There are two drains laid on either side of the central passage with two continuous mangers on outer side of the area.

- b. *Milking parlor* : A milking parlour is part of a building where cows are milked on a dairy farm.
- Milking parlour is constructed where the animals are maintained in loose housing system.
- Milking parlour is usually part of a larger complex known as the milking centre, which contains supporting structures and equipments for the parlour
- A milking parlour has the holding area, milk room and the utility room.



**Milking Parlour**

- Cows are brought to the milking parlour to be milked and after milking the animals are returned to a feeding and/or resting area.
- Milking parlour is usually part of a larger complex known as the milking centre, which contains supporting structures and equipments for the parlour.
- A milking parlour has the holding area, milk room and the utility room.

# Dimensions of milking barn/ parlour

Length of standing space	1.5 – 1.7 m
Width of standing space	1.05 – 1.2m (80% of length, of standing space)
Width of central passage	1.5 – 1.8 m
Width of feed alley	0.75 m
Width of gutter	0.30 m
Width of manger	1.4 m

### ***c. Dry animal Shed***

- The shed for dry animals may be of loose housing type and consist of a centrally placed manger under a roof in the paddock.
- The manger is surrounded by a 2.2 metre-wide paved platform with drainage.

### ***d. Calving pens***

- After calving, the animal needs to be with her calf to establish a bond with the newly born calf.
- The calving pen is sufficiently spacious, well lit, draught free and easy to reach and clean
- Advanced pregnant animals are transferred to a calving pen 2 to 3 weeks before the expected date of calving and remained there 3-5 days after calving



- There should be one calving pen for every 20 cows, i.e., 5% of the breedable animals.
- Special accommodation in the form of loose-boxes enclosed from all sides with a door should be furnished to all parturient cows.
- It should have an area of about 12 square metre with ample soft bedding.
- Sand can be used as bedding material with a minimum height of 30 centimeter sand.
- The floor of the calving pen must be non-slippery and each pen should be connected to an independent drain.



**Closed area of calving pen**



**Open area of calving pens**

**e. Calf shed :** Newborn calves are individually housed during the first few weeks.

- Since a calf is quite susceptible to all kinds of infections, special attention is paid to hygiene and climatic conditions.
- The calves are housed in individual pens up to the age of eight weeks and then they are placed in group housing system.

**f. Individual housing for calves :** Calves are housed separately because they have a natural tendency of suckling, in the absence of such stimulus they have a tendency of cross-sucking (suck one another), which can cause easy transmission of diseases in them.

- Individual pens for calves help in feeding them individually, for easy observation and keeping a check on diseases.
- The pens are constructed in such a manner that the calves can see and hear the other calves.
- The height of the partition of the pens is about 75 cm. Feeding box is attached to the gate which facilitates feeding of calf starter to them.

***g. Group Housing for calves*** : After rearing the calves in individual pens for about two months.

- They are housed in groups of 3–5 calves per pen, preferably on straw bedding.

- Calves are never accommodated with adults in the cattle shed. The calf house has provisions for daylight, proper ventilation and good drainage, as damp and wet floors can make calves susceptible to respiratory problems.
- The floor space requirement per calf is about 20–25 square feet for calves below 3 months and 30 square feet for those in the 3–6 months age group
- The whole area of the calf shed including paddock is well protected from birds as they can create wounds by pecking the calves.
- ***h. Housing for heifers and young males :*** A heifer is a young female cattle over one year of age until first calving and a young male cattle over one year of age until sexual maturity is known as young male

- As a standard practice, the heifers are housed separately from young males, otherwise undesirable mating may occur.

**i. *Bull shed* :** Breeding bulls are always maintained in individual pens, to allow them sufficient open space for free movement.

- If bulls are not adequately exercised, it leads to overgrowth of the hoofs creating difficulty in mounting the breedable cows.
- The shed for bulls has mangers and a water trough. From its shed, the bull can see other animals of the herd so that it does not feel isolated

**j. *Ancillary structures*** : The secondary structures which are useful for day-to-day farm operations are called ancillary structures, and these are useful for both loose and conventional systems of animal housing.

- The size and number of different ancillary structures depends on the herd size. The various ancillary structures are described below.
- ***I. Artificial insemination (AI) laboratory*** : Adjacent to a bull shed, there is a 10 x 10 metre service yard with a service crate for the collection of semen. The AI laboratory is attached to the service yard where testing, processing and storage of semen is carried.
- The minimum dimensions for laboratory are  $3 \times 4$  metres. An area of 3 x 4 metre each is required for wash-up room and room for supervising staff out.

## **II. Trevis :** Trevis is used for purposes of both treatment and

- artificial insemination of cattle.
- It is a U-shaped structure made of 2 inches diameter galvanized steel pipes supported by five or seven pillars.
- One horizontal pipe is welded on the sides across the two rear pillars to protect the working technician from sidekicks by the animal.



**One type of travis**



**Cow is taken into travis  
for examination**



**III. Casting Pit :** It is the area where animals are forced to lie down for treatment or other purposes.

- In large farms, it is desirable and economical to construct one casting pit that can be used for vaccination and treatment of animals.
- The dimension of the casting pit is usually 0.31 m deep and 2.4 m high along with a diameter of 7.62 m.
- The casting pit contains about 15 cm of sand or saw dust or a mixture of both, which acts as a comfortable bedding material for the animals



Casting Pit

- ***IV. Sick animals' shed and veterinary dispensary:*** The shed for sick animals is located away from the healthy animal sheds.
- Each sick animal is accommodated in a single pen within the sick animal shed. The dimensions and arrangements of sick animal pens are same as for calving pens.
- The paddock of the sick animals is paved and regularly washed. A trevis is placed at one of the corners of the paddock.
- For the treatment of sick animals, a room of 3 x 4 metres is provided with a dispensing counter, shelves and two or three cupboards.
- It is also provided with a porcelain sink and a power plug for sterilization of material. The pharmacy has built-in shelves and cupboards and a working table.
- A diagnostic laboratory of 3 × 4 metres is provided adjacent to the pharmacy room.

**V. Isolation yard :** Animals suffering from infectious diseases are segregated from the rest of the herd.

- The number of isolation yards depends upon the size of the herd, and for every 40 animals one isolation yard is provided
- One isolation yard can accommodate two to six animals depending upon the size of the animals.
- It has independent drainage which is connected to the main drainage running behind the shed, so that no animal comes in contact with potentially infected discharges, etc.
- The yard is suitably fenced, and provided with a manger and a water trough. A fly-proof wire netting door is provided in the yard, to avoid insects. The dimension of an isolation yard is about  $5 \times 3$  metres and has a stanchion or tie-stall in one corner.

***vi. Post-mortem platform :*** The post-mortem platform is a raised structure of 3 x 4 metres with a roof

- It is used for performing post-mortem examination of dead animals, and is kept at a considerable distance from the animal shed.
- An incinerator is provided to completely burn-off the carcass of animals suffering from contagious diseases.
- ***vii. Stores for concentrates and dry fodder :*** Another important ancillary structure of animal houses are concentrate and dry fodder stores. For uninterrupted feeding of animals, sufficient quantity of feed and fodder is kept ready in the stores.

- The size and type of buildings for these stores depends on the quantity of feed and fodder required to be stored on the farm
- The structure of the feed room is made in such a way that it is damp-proof and rodent-proof.
- The size of the shed needed to store dry fodder can be calculated according the feeding needs of the cattle present there.
- **viii . Ration room :** In a medium-sized farm, a room of at least 3 x 4 meters is provided near the milking shed, which stores concentrates to meet the daily requirements of animals.
- It is important to ensure that the ration room is damp proof and rodent-proof

***ix. Chaffing shed :*** The chaffing shed is used for cutting the grasses and green fodder into very small pieces with the help of the chaffing machine, to improve the overall palatability and digestibility of the green fodder.

- A chaffing shed consists of two portions, one for storing the fodder to be chaffed, and the other portion for storing the chaffed material.
- The location of the chaffing shed is such that it facilitates the chaffing and removal of the chaffed fodder.

***x. Silos :*** Silos are the structures meant for storing the silage, through the process of silage, the nutritive profile of the green fodder is maintained.

- Silage is a method to preserve the green fodder for cows and buffaloes for consumption at a time when green fodder is not available in required quantity.

- The grasses and green fodder are cut and then fermented to retain as much sugars and proteins present in them.
- Many microscopic organisms living in the grasses and green fodder carry out the process of fermentation to convert the green fodder and grasses into silage.
- Silos can be of two types tower-type and pit or trench type. In India, trench-type of silos are more practicable and convenient. The silos are preferably constructed near the animal shed.
- They are constructed on elevated ground to provide sufficient amount of silage during the months of May to June and October to November, when there is shortage of green fodder.



***xi. Wallowing tanks for buffaloes :*** Wallowing means rolling or lying in mud or water to cool the body, It is a natural instinct of buffaloes to wallow in pond and muddy pools especially during the summer season.

- During high environmental temperature and humidity, buffaloes may wallow at a stretch up to 5 hours in which they completely immerse themselves into the water except nostrils and chew with half-closed eyes.
- Buffaloes experience summer stress as they have dark skin, sparse hair, less number of sweat glands which have less sweating ability and are deeply sited into the skin
- Besides cooling, wallowing also helps in removing ecto-parasites and other pests, therefore, it is important to have a wallowing tank





- **Dairy section** : The primary function of the dairy farm is to produce milk. Suitable arrangement is made for hygienic handling, processing and disposal of milk. The dairy section has the following components

***i. Milk receiving room*** : In the milk receiving room, the milk is collected after milking, weighed and stored in cans for small periods before being transported to the bulk milk room and ultimately reaches milk plants or market.

- The doors and windows of the milk receiving room are made fly-proof to ensure hygiene.
- The flooring of the room is made impervious and wear-resistant. The dimensions of a milk receiving room depend upon the quantity of milk handled daily.

- In a large farm, the recording-cum-milk cooling room, the room for milk utensils and equipment, and washing room are constructed separately.
- **ii. Bulk milk room and ancillary structures :** In a large dairy farm, there is a separate bulk milk room, the floor area of which is at least 4 x 5 m. The area of a bulk milk room depends upon the amount of milk produced per day.
- After the milk is collected in the milk receiving room, it is transferred in cans to the bulk milk room.
- The milk cans are placed here in insulated tanks filled with refrigerated water.
- To inhibit bacterial growth and prevent spoilage of milk, the temperature of milk is kept around 4–5°C.
- An office room, compressor room and utensil wash-up room are located adjacent to the bulk milk room.

- **Fodder section** : Continuous supply of green fodder to the ruminants like cows and buffaloes is a prerequisite for the health and economy of the farm.
- **Implements and workshop shed** : Implements shed is constructed to accommodate tractors and other implements used for various farm activities.
- The width of the shed is preferably 8 meters. The eaves project out about a meter.
- There is a 10 metre wide open space on three sides and 13 metres on the front side of the shed for easy turning and movement of vehicles



- **Manure disposal area :** Animal excreta is often mixed with straw and can be used as manure and fertilizers in the field. Proper storage of manure is an important part of manure management.
- The manure from cattle shed is removed at least twice a day. It can be disposed of either in solid or in liquid form (slurry).
- **Solid manure disposal :** Manure is treated as solid when the dry matter content exceeds 25 per cent, and which can be temporarily stockpiled. The height of the stack can be 1.5 to 2 metres.
- Stockpiled manure is kept on a concrete pad or plastic sheet at least 100 feet from wells and other water sources. Hard floors prevent moisture present in the manure to seep into the soil, and thus, avoids contamination of groundwater.
- The manure is loaded in a trolley or cart and hauled away to the compost pits or vermicomposting unit.
- **Manure pit :** It is constructed sufficiently away from the animal houses to avoid bad smell and infestation of flies and other insects. However, it need not be constructed very far which could require more labour for transporting manure. The manure pit is cleared every 6 to 8 weeks.

***Liquid manure disposal*** : The mixture of dung and urine is known as slurry. A manure with less than 20 per cent solids has the consistency of thick slurry, which can be directly disposed into the fields.

Species	Manure output (kg/day)	Dry matter content (%)
Cattle	30-35	18-20
Buffalo	35-40	16-18
Sheep and goat	1.0-2.5	38-40

# Schedule of daily farm operations

- Animals prefer to follow a certain routine. At the same time, certain work of the dairy farm like cleaning, feeding, milking, etc., consume majority of the time and it has to be finished on the same day.
- Cleaning of animal sheds and paddocks requires major inputs of labour. Therefore, proper scheduling of dairy farm operation is very much essential



**An unclean cow**



**A perfectly clean cow**

# Typical Schedule of daily farm operations

Approximate time (hours)	Farm operations	Resource/ materials required
04: 00- 04: 30	Cleaning/brushing of milch animals	<ul style="list-style-type: none"> <li>• Hose pipe</li> <li>• Water supply,</li> <li>• Grooming brush</li> </ul>
04: 30- 06:30	<p>Feeding half of the daily concentrate ration just before milking.</p> <p>Milking of animals</p>	<ul style="list-style-type: none"> <li>• Concentrate mixture</li> <li>• Measuring appliances</li> <li>• Towel</li> <li>• Milking bucket</li> <li>• Post milking teat dips</li> </ul>

06: 00- 06: 30	Delivery of raw milk (in cans) to the milk venders	<ul style="list-style-type: none"> <li>• Milk collection and storage container</li> </ul>
	Washing and disinfections of milking barns.	<ul style="list-style-type: none"> <li>• Hose pipe</li> <li>• Water supply</li> </ul>
06: 30- 08: 00	Cleaning of milk cowsheds and paddock	<ul style="list-style-type: none"> <li>• Hose pipe</li> <li>• Water supply</li> </ul>
	Cleaning farm premises	<ul style="list-style-type: none"> <li>• Hose pipe</li> <li>• Water supply</li> <li>• Broom</li> </ul>
	Isolation of sick animals	<ul style="list-style-type: none"> <li>• Rope</li> </ul>
	Isolation of “in-heat” cows for artificial insemination.	<ul style="list-style-type: none"> <li>• Rope</li> </ul>



08: 00- 11: 00	Cleaning of calf pen, calving box, dry stock, bullock and bull shed.	<ul style="list-style-type: none"> <li>• Broom</li> <li>• Disinfectants</li> </ul>
	Feeding of dry/green fodder to milch stock	Dry/ green fodder, feed distribution trolley or tractor
	Feeding half of the daily concentrate ration to calves, pregnant cows and bulls	Concentrate, feed distribution trolley
	Exercising and grooming of bulls	Bull exerciser, grooming brush
	Treating sick animals	Isolation shed, medicines
	Breeding cows which are “in-heat”.	Materials required for artificial insemination

	Harvesting, chaffing and feeding of green fodder to all the stock.	Chaff cutter, feed distribution trolley or tractor
	Mangers in all sheds should be filled with green fodder.	Feed distribution trolley or tractor
11: 00- 14: 00	Lunch-cum rest period for labourers	
14: 00- 17: 00	Miscellaneous jobs of dairy farm stock identification; preparation of concentrate mixture; repair of farm fences, fittings and repair of equipments; rope and halter making; weekly scrubbing and white-washing of drinking water tanks; manure disposal/conservation; hay and silage making; periodical spraying of animal houses with suitable pesticides; periodical deworming of stock; clipping hair from sides and hind-quarters of cows ; grooming, hoof trimming, dehorning of calves and attending to sale and purchase of livestock and their transportation ; fitting and training of cows for show.	

14: 30- 15: 30	Washing/brushing of milch cows by milkers.	Hose pipe, water supply
15: 30- 17: 30	Feeding the other half of daily concentrate ration to milch cows just before milking	
	Evening milking	Towel, milking bucket, post milking teat dips
	Cleaning calf pen, calving box, dry-stock and bull sheds and feeding the other half of concentrate ration to calves, pregnant cows & bulls	Hose pipe, water supply Broom
	Feeding of dry/ green fodder to milch stock	
16: 00- 17: 30	Cleaning of milch cow shed	
	Feeding green/ dry fodder to milch stock	
	Cleaning farm premises	
18: 30- 04: 00	Night watchman on duty	

# Summary

- In this session you have learnt about the
- Principles of Animal Housing layout
- Grouping of cattle in a herd
- Various terms used for cattle
- Layout of animal housing

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