PRACTICAL MANUAL

of

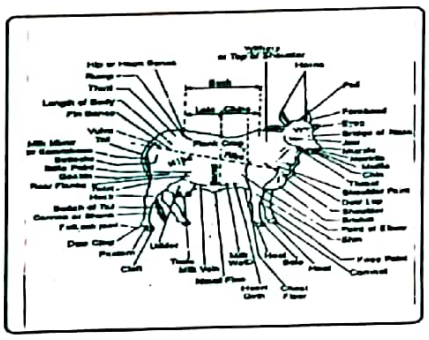
AHDS - 111

Livestock Production and Management

For

B.Sc. (Hons.) Agriculture

I Semester (New)



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PRACTICAL MANUAL

Course No. : AHDS-111 Course : B.Sc. (Hons) Agriculture
Course Title : Livestock Production and Management
Semester : Ist (New) Credits : 2(1+1)

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EXERCISE NO. 1

TITLE : EXTERNAL BODY PARTS OF CATTLE AND BUFFALO

Objectives :

To acquaint and distinguish the species, breed and individuals phenotype.
To know usefulness and functions of each part

Relevant information :

The study of body parts helps in identifying the individual phenotype and also in carrying out scientific studies related to growth and development of animals. The study also helps in assessing defective body parts, if any. Judging of animals of different type requires a thorough knowledge about body parts.

Precautions :

1. Be careful and cautious while approaching the animal.
2. Do not forget to win its confidence.
3. Carefully restrain the animal in travis or crate.
4. Do not excite the animal.

Materials required :

1. Live specimen of cow / buffalo / sheep / goat
2. Rope
3. Travis / crate
4. Green or dry fodder, concentrate and ration
5. Peg
6. Measuring tape
7. Photograph / chart/model of cattle / buffalo / sheep / goat.

Procedure

1. Cow / Buffalo :

- Carefully put the cow or buffalo in a travis or crate
- Secure the animal against a pole / any support
- Stabilize the animal by providing green or dry fodder
- Study the parts with the help of chart / model
- Memorise the parts of the animal body.

The body of large animals / ruminants generally has four regions viz.

A. Head	B. Neck	C. Body	D. Limbs	
			Fore Quarters	Hind quarters
1.Horn	1.Neck	1.Withers	1.Hump	1.Sacrum
2.Head	2.Neck quest	2.Back	2.Shoulder Blude	2.Rump
3. Face		a.Chine	3.Arms	3.Pin bone
a.Fore head	3.Dew lap	b.Loin	4.Fore arms	4.Thigh
b.Nostrils	4.Brisket	c.Hollow of flank	5.Knee joints	5.Tail
c.Muzzle		3.Hip bone	6.Shank	6.Milk vein
d.Mouth		4.Chest	7.Pestern	7.Milk Mirror
e.Eyes		5.Abdomen	8.Fetock	8.Udder
f.Cheeks / chin			9.Coronet	9.Anus
g.Ears			10.Hoof	10.Vulva
			11.Dew claw	11.Scrotum
				12.Sheath

A) HEAD :

This is one of the important regions, which helps to differentiate the breeds from each other. The function and locations of different part of head region are as under :

1. Horn : They are in pair and situated on head. Functions are (a) Self defense (b) Age estimation (c) graceful appearance and (d) Breed character.

2. Head crest line : Joining the roots of the horns. The raised portion of crest is called Poll or Nimbori and is prominent in exotic animals.

3. Face : This is the portion between the crest and opening of the mouth and has following sub parts:

a. Fore head : The portion between the line of head crest and line of two eyes is called as fore head.

b. Nostril / nose : This includes the control bridge, starting from control line of joining eyes and elongated up to muzzle. Nostrils are the two opening at the lower end of nose. Respiration is the main function.

c. Muzzle : This is black portion devoid of hair and provided with greyish spots above the upper tip. Muzzle indicates the general health condition. During sound health it is moist. In horse, this is called muffle.

d. Mouth : It is opening for intake of food / water. It includes upper jaw, lower jaw, tongue, teeth and dental pad (upper jaw).

e. Eyes : Eyes are situated in either side of bridge / nose and comprise of eyebrow, lashes and eye lids. Appearance may be defined as bright, dull and sleepy.

f. Cheeks : Side portion of face is called as check.

g. Chin : This is raised portion of lower jaw.

h. Ears : Ears are located on the either side of the horn.

B) NECK : This is the portion between head and body.

1. Neck crest : It is line between couture of poll to humps. This line is supported with heavy muscular growth.

2. Dewlap : It is the fold of loose skin hanging below neck and in between chin and brisket. It is prominently developed in cattle and absent is buffaloes and exotic cattle. It is large in males than females.

3.Brisket : Fleshy bell like structure hanging in between forelegs is known as "Brisket". Prominent in buffalo than cows.

C) BODY :

1. Withers : Upper higher part of shoulder is called as "Wither" or it is a fleshy portion below the hump and above the shoulder.

2. Back : Top portion situated between hump and sacrum, supported by ribs.
a. Chine : It is a portion just behind the hump and up to the point where last two ribs meet.
b. Loin : A triangular portion between chine and sacrum.
c. Hollow of flank : Triangular depressions just below the loin on both the side.

3. Hipbone: The raised bone of hollow of flank is termed as "hipbone" situated at both sides. The distance between two bones indicate the development of reproductive organs in females.

4. Chest : Bottom portion of body covered by ribs. Heart or chest girth is the circumference of the chest measured at the point of wither.

5. Abdomen : The ventral portion of the body region uncovered by ribs is called "Abdomen". It consists of naval flap and naval point. A fold of skin hanging in between the chest and udder or scrotum is called "Naval flap".

D. LIMBS :
It includes two : 1. Fore limbs 2. Hind limbs.

1. Fore limbs : This portion region has an importance in selecting the animal for draft quality.
i) Hump : Bulging and fleshy portion above the shoulder is called as "Hump". It is well developed in males as compared to females. Well developed in Indian breeds and absent in exotic / cross bred animals / buffalo.
ii) Shoulder : Upper portion of front legs.
iii) Shoulder Blade : Flat bones of the shoulder is called "Shoulder blade".
iv) Arms : This is a portion of leg in between shoulder and point of elbow.
v) Knee joint : This is a joint between fore arm and shank.
vi) Shank : Portion between knee and pastern.
vii) Pastern : The portion between shank and hoof.
viii) Fet lock: The portion between pastern and cornet.
ix) Cornet : Portion covered with hair just above the hoof.
x) Hoof : Lower most hard portion of the leg is called as "Hoof". There are two digits of the hoof. The gap between the digits is termed as "Interdigital space". Hardback portion is heel, front portion is toe and lower most portion is called as sole.
xi) Dewclaws : The hind finger like projections on back side of the fetlock joint are called as "Dewclaws".

2. Hind limbs : This region provides the information on the development of reproductive organs and mammary glands. Hence, it has important role in selection of dairy animals.

i) Sacrum : It is the portion extending from lean to the tail root.
ii) Rump : It is the sloppy portion located between the sacrum.
iii) Pin bone : The projection on each side of anus called "Pin bone".
iv) Thigh : It is thick and fleshy portion of hind legs in between rump and hock. Generally used for putting identification marks in branding method.
v) Tail : It is a long whip like structure in continuation of vertebral column.
vi) Milk vein : A prominent zigzag vein starting from heart to the udder. The veins get curved and bulged at the heart region with the depression is called as "Milk vein".
vii) Milk mirror : This is the portion situated in between vulva and rear udder. Its wider size indicates capacious udder, which indicates high milk producing ability.
viii) Udder : Also known as "Mammary glands". Complete udder has four quarters; front two of quarters make fore udder while hind to make rear udder. Each quarter extended with tube like structure known as teat.
ix) Anus : Extreme end of the alimentary canal located below the base of the tail.
x) Vulva : The outer most portion of female genital organ, triangular in shape and situated below the anus. It has an opening with two vulva lips. This opening is common passage for urination and mating.

xi) Scrotum : A male genital organ, which is a pouch like structure situated in between two hind legs, which accommodate testicles. It regulates the temperature for sperm production.

xii) Sheath : It is a skin flap, which covers penis and attached to the body extended unto navel flop. It protects the penis from external injuries.

OBSERVATIONS

* Practice locating parts of the cow / buffalo.
* Draw a neat sketch of cow / buffalo and lable the body parts.

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EXERCISE NO. 2

TITLE : ROUTINE MANAGEMENT PRACTICES FOLLOWED ON LIVESTOCK FARMS.

Objectives :

1. To get the farm jobs completed in time and properly.
2. To utilize labour efficiently.
3. To provide better and regular care to the animals.
4. To get higher returns through efficient management practices.

Relevant information :

The livestock farm is the full time job, which starts from morning till evening. The farm manager organises the various activities on the farm as a routine. The daily routine operations include feeding, breeding, health cover, cleaning, milking etc. On livestock farm it is necessary to prepare schedule for dairy farm operations so that persons working on farm can carry out the operations regularly. The routine management practices are modified slightly by Dairy Manager looking to the urgency and feasibility of agroclimatic condition.

Precautions :

1. See that daily programme is carefully prepared in advance.
2. Keep pursuing the programme and complete it by close to the working hour.

Materials required :

Different inputs, materials, equipments required for different kinds of jobs should be kept up to date to avoid delay and wastage of labour.

Procedure :

1.Daily inspection	2.A.I. animals
3.Cleaning of animals /byres	4. Cutting / chaffing of fodder.
5.Feeding of animals	6. Soaking of concentrates
7.Milking of animals	7. Trimming of horns
9.Disposal of milk	10.Exercise
11.Care of calves	12. Grooming
13.providing water to animals	14. Dusting / spraying
15.Identification of animals	16. Preparation of concentrate mixture
17.Castration	18. Repair of equipments
19.Vaccination / treatment	20. Clipping of hair.
21. Deworming	22. Dipping
23.Detection of heat	24. Grazing of animals.

Observations :

Sr.No.	Particulars	Observations
1.	Kind of farm (Specialized / mixed)	
2.	Number of animals	
A)	Male	
B)	Female i Milch	
	ii) Dry	
	iii) Pregnant	
C)	Young stock	
	i) < 6 months	
	ii) 6 months to 1 year	
	iii) > One year	
D)	Bulls	
E)	Bullock	
F)	Staff employed	
	a. Ministerial	
	b. Agril. Supervisor	
	c. L.S.S.	
	d. Farm labourers	
	e. Routine workers	

Questions :

1. Prepare a programme of operation on milk / dry stock farm.
2. State the importance of routine management and dairy programme.
3. Enlist various activities of forage farm.

EXERCISE NO. 3

TITLE : METHODS OF HANDLING AND RESTRAINING OF ANIMALS

Objectives :

To control the animal for examination, treatment and operation like castration.

Relevant information :

1. Farm animals are required to be handled for various purposes e.g. Examining their health, milking, displacement, grooming, judging etc.
2. One has to follow scientific method in approaching the animal and with its confidence so that the animal will not get excited.
3. Handling of animal will be without trouble.

Precautions :

1. While approaching the animal follow scruplously the hints given for the purpose.
2. Do not be over confidence with animals.
3. Take care of communicable disease of animal.

Materials required : 1. Rope, 2. fixed pole, 3. Travis, 4. Mouth gags.

Procedure :

1. First secure the animal.
2. Bring it into the travis. If travis is not available then tie it to any fixed pole or tree.
3. Do not take in hand.
4. Always approach from left side of animal.
5. Before approaching get information about the temperament of the animal.
6. Make friendship with it by calling its name or any familiar sound known to the animal.
7. Pat the animal on the back, neck, move hand over its body so that animal may feel that you are not causing any harm to him.
8. Examine the part which is under observation. If animal is reluctant or not allowing examination then use following methods for restraining.

A. Halters:

1. It is made up of ropes.
2. With this animal may be controlled easily.

B. Bull holders:

1. No need to make hole in the nasal septum.
2. Can be used for other animals, as there is a device to remove it after use/handling of animal.

C. Nose string:

1. It is cotton rope of sufficient thickness and length.
2. A hole is made into anterior part of the nasal septum by sharp and sufficient thick needle or even with a pointed stick.
3. After making a hole, string is passed through it and tied behind the horns at the pole.
4. Apply tincture iodine to the hole.

D. Nose ring:

1. It is a copper, brass or stainless steel ring of approximately 8 mm. thickness and 6-8 cm. in diameter.
2. It is inserted in nasal septum.

Use of cotton rope:

1. Sizable cotton rope (8 knot) is applied above the hock before milking or examination of udder.
2. For lifting fore limb : A knot is given above the fore limb and pass the rope either front or back side of the hump or withers and pull the rope so that limb is lifted and fixed at the knee. It required tie a rope around the cannon and fore arm till examination.
3. For lifting hind limb : Tie knot over fat lock then pass the rope from the angle of the ileum of the same side and pull the rope till the limb is lifted or pass it between hind limbs as required till the examination.

Casting : It is the last resort to control the animal by which animal can be controlled perfectly.

Use of hand : Lower jaw of animal is should be caught by keeping thumbs inter dental space and other finger grasping lower side of jaw by left hand and caught the base of horn tightly by right hand. Small animals may also be controlled by this way.

Observations :

Draw the figure of ring, nose string, halters and lifting of hind leg.

EXERCISE NO. 4

TITLE : METHODS OF IDENTIFICATION MARKS AND DEHORNING OF ANIMAL

(A) METHODS OF IDENTIFICATION

Objectives : To establish the identity of animals.

Relevant information :

Identity of an animal has to be established soon after its birth. Some dairymen name their animals but do not have any marks of identification except they know them personally. For a small herd naming will serve the purpose to some extent, but for large farm it is always necessary to put some identification marks on the animals which will help in :.

i) Identifying the animal if lost or stolen.
ii) Recording the details of animal in respect of breeding, feeding, management and treatment.
iii) Pedigree of the animal tracing back to its ancestors becomes easy and accurate.

Precautions :

i) Check and ensure the number to be given to the animal before actual marking from breeding records.
ii) Use proper method of putting the identification marks for adjacent categories of animals.
iii) Restrain the animal before putting the identification marks.
iv) Keep the record of the code numbers in the livestock register to avoid the confusion.
v) The same number should not be repeated on dairy farm.

MATERIAL REQUIRED :

i) Tattooing ink
ii) Tattooing set
(iii) Tags and strings
iv) Branding number (cold)
v) Branding ink
(vi) Rope
vii) Hot branding number
viii) Travis
(ix) Cotton
x) Spirit
xi) Iodine
xii) Zinc oxide in oil
xiii) Knotching punch

Procedure : There are **different methods** of identification of animals. They are as under :

A) Tattoning :

1. Find out and decide the number to be tattooed.
2. Arrange the desired number in the tattooing forceps.
3. Check this number on the piece of thick paper.
4. Secure the calf and hold the ear horizontally.
5. Locate the place on the inner side of ear between the large veins.
6. Clean the place with sprit to remove dirt and ear –wax / grease.
7. Sterilize the numbers fixed on tattoo set by using spirit.
8. Apply same ink on the numbers.
9. Hold the tattooing forceps with pad outside & tattoo number inside the ear.
10. Press the handle with gentle pressure stopping at clicking sound and hold it for a while.
11. Open and remove the tattooing forceps.
12. Apply ink with a swab and rub well with the thumb so as to fillup the holes with ink.
13. Release the calf.
14. Clean the tattoo set properly.

B) Hot branding :

1. Get the firewood burning.
2. Keep the branding number on the fire.
3. Cast the animal on the soft ground and secure the legs with rope.
4. Clean the thigh with a brush.
5. Remove the numbers from fire in a dull red condition.
6. Gently press the number uniformly on the skin.
7. Swab dressing oil on the brand mark lift on skin.
8. Apply dressing oil daily and watch the numbers until wound heals properly.

C) Cold branding :

1. Tie hind leg of animal.
2. Fasten the tail to the legs.
3. Shake the branding solution well and pour it in a shallow porcelain or disc or enamel pot.
4. Dip the number in branding solution just to fill up the groove drainoff, if needed.
5. Press the number on the thigh till a clean impression of number is made.
6. Do not release animal for at least an hour.

D) Freeze branding :

In this method the numbers are kept in liquid nitrogen for cooling for few hours and then it is pressed on the thigh of the animal which leaves a permanent mark on the skin. In this method the skin is not damaged and postoperative care is not required.

E) Tagging :

1. Hold the calf properly.

2. Sterilize the self- pearcing tag with spirit or tincture iodine.
3. Clean the portion of the ear with spirit where tag is to be fixed.
4. Fix the self pearcing tag directly with the help of forceps keeping the number visible outside of the upper edge of the ear.
5. Keep the number neither tight nor swinging lose on the ear.
6. Apply tincture iodine to wound to prevent infection.
7. In case of non pearcing tab, make the hole on upper edge of the ear close to head.

F) Notching of ear :

1. Sterilize the side ear punch and central ear punch or pair of sharp scissors of pincering.
2. Clean the ear with the help of cotton and spirit.
3. Side ear knotches must be 'V' shaped.
4. In case of hole is required make use of sterilizing central punch.
5. Care should be taken not to make knotches too small to close soon and not too large to deform the shape of ear.

Note : This method is common in buffalo, calves and pigs.

Observations : Following observations are to be recorded :

1. Legibility of the mark after the week / month / 6 months.
2. Extent of healing of wound.
3. Intensity of colour of marking.
4. Visibility of marking.

Questions :

1. Name different methods of identification.
2. Name the system of allotting of numbers at your farm.
3. Why is spirit used for cleaning of ear ?
4. why precautions are necessary in branding, notching and tagging ?
5. Difference between hot and cold branding.

(B) DEHORNING OF ANIMALS

Objectives :

1. Easy and safe handling of animals.
2. To protect the animals against injury.

Relevant information :

Often injuries are caused to self, other animals and owner or handling persons by horned animals. Also horned animals particularly buffaloes require more space. Hence, animals are dehorned at early age so as to overcome these demerits. Dehorning can be effected by mechanical, chemical, electrical method or rubber band method.

However, farmers on account of show, and identification of the animals do not prefer dehorned animals.

Precautions :

1. Dehorning should be done before 7 days of age.
2. Choose appropriate method and master it.
3. Handle the young one carefully while dehorning.
4. Avoid injury due to excess of dehorning process.

Materials required :

A) Chemical method :

1. KOH
2. Scissors
3 Vaseline
4. Cotton wool
5. Dusting powder
6 Tray
7. Suitable beeding
8. Surgical spirit.

B) Mechanical method :

1. Mechanical dehorning clippers (horn princers) and saw.
2. Bandage
3. Cotton wool
4. Surgical spirit
5. Pine tar
6. Sulpha nelamide powder

C) Electrical method :

1. Electrical dehorner
2. Scissors

D) Rubber band method :

1. Tight rubber bands
2. Scalpel
3. Elastrater

Procedure :

A) Chemical method :

1. Secure calf and throw gently on the bedding.
2. Turn the head slightly towards the operator.
3. Locate the horn bud button.
4. Clip the hair two cm. all around the horn bud.
5. Rub the horn bud with a cotton wool soaked in surgical spirit.
6. Apply Vaseline in a ring shape around horn bud.
7. Hold KOH stick on the holder or with a piece of paper or cotton.
8. Rub it briskly in clockwise motion on the horn bud.
9. Stop it as soon as entire rubbed surface becomes reddish in appearance.
10. Wipe the surface with cotton.

11. Put some disinfectant powder.
12. Repeat the same procedure for other side horn bud.
13. The optimum age for dehorning is one week.

B) Mechanical method :

The mechanical method of dehorning is used in grown-up animals around two years of age. The animal is casted on ground. The horn pineer / saw clipper is used to cut the horn. Carefully the horns are spinced. The wound is covered with sulpha namide powder mixed with iodophors or it may be treated with pine tar or cotton soaked in pine tar and then bandaged.

C) Electrical method :

Secure the calf (3 weeks age) and allow it to lay on a flat ground. Locate the horn bud properly. Clip the hairs all around the buds. Switch on the current to make the electrical dehorner red hot (540 °C). The horn is cauterised by applying red hot tip to the electronic dehorner just for 8-10 seconds till the golden colour appears at the site of cauterised horn buds. If the electrical dehorner is used properly the calf never bleeds and method is safe and quick.

D) Rubber band method :

Secure the calf. Turn the calf's head slightly towards the operator, make a shallow groove around the base of horn forming a ring. Slip and tight rubber ring over the horn with the help of elastrator and fix it to the groove. After few days horn will set out and fall because tight rubber ring will shut off the blood supply to the horn. It is not a dependable and satisfactory method.

Precautions :

1. Apply the dehorning instrument near the head of the horn.
2. Dehorning is done in hot and rainy weather must have a follow up to avoid infection.
3. Dehorning should not be done at an early age to avoid scar formation.
4. to minimize or arrest bleeding, the horn artery may be tighten with a silk thread.
5. Sanitary precautions must be observed.

Observations :

Sr.No.	Particulars	Observations
1.	No. of calves	
2.	Breed	
3.	Date of birth and age	
4.	Bleeding if any and treatment given	
5.	Time taken and dehorning	
6.	Time taken to dry off completely	

Questions :

1. Name different methods of dehorning.
2. Why is it advisable to dehorn calves when young ?
3. Why is Vasaline applied around the bud?
4. List the advantage and disadvantages of dehorning.

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11. Put some disinfectant powder.
12. Repeat the same procedure for other side horn bud.
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2. Why is it advisable to dehorn calves when young ?
3. Why is Vasaline applied around the bud?
4. List the advantage and disadvantages of dehorning.

EXERCISE NO. 5

TITLE : RECORDING OF PULSE RATE, RESPIRATION RATE AND BODY TEMPERATURE OF ANIMAL

Objectives:

1. To know normal health status of animal.
2. To know normal physiological process of animal.

Relevant information :

Amongst the physiological norms to understand the health, recording pulse, respiration and temperature and study them with normal gives a quick clue regarding ill health of animal.

Precautions :

While recording pulse, respiration and temperature, it should be recorded without disturbing the animal and the man alongwith instrument.

Materials required :

Animal, travis, antiseptic solutions, cotton and Vaseline.

Apparatus : Clinical thermometers, stethoscope.

Procedure :

After arrival of the animal allow it a little rest, secure it or put in the travis and allow it to stand for few minutes quietly before taking pulse.

(A) RECORDING OF PULSE RATE

1. Pulse is recorded in the arteries.
2. In cattle it is taken generally in middle coccygeal artery or auxiliary artery.
3. In small animals in femoral artery.
4. Coccygeal artery is felt by keeping index and central finger below the root of the tail.
5. Auxiliary artery is felt by keeping the fingers half way between the angle of the jaw.
6. Femoral artery can be felt inner side of the thigh at the middle of the femoral part.
7. Pulse rate is faster in fever, in acute disease, painful condition, severe hemorrhage and after exercise.
8. It is little just more in very young and very old age and in hot weather.

Normal pulse rate/min.

Ox	-	45 - 55
Horse	-	30 - 45
Sheep/goat	-	70 - 80
Dog	-	90 - 100
Chicken	-	120 - 200
Swine	-	60 - 70

(B) RECORDING OF RESPIRATION

1. Secure the animal and put it into the travis and allow standing for few minutes quiet before recording respiration.
2. Put palm of the hand on the flank region, count how many times flunk elevates/minutes, that is respiration rate or keep the hand before nostrils and count the expirations per minutes.
3. Respiration rate is accelerated during and after exercise, excitement, very cold and very hot whether, very fat animal.
4. A physiological increase occurs in fever during rise in temperature, lungs or chest trouble.
5. Young animal breathe faster than old. Female especially during pregnancy breathes faster than males.

Normal respiration rate / minute

Cattle	-	12 - 16
Sheep/goat	-	10 - 20
Buffalo	-	15 - 20
Horse	-	08 - 16
Dog	-	20 - 50
Chicken	-	05 - 45

(C) RECORDING OF BODY TEMPERATURE

1. In all animals temperature is noted through rectum.
2. Take the temperature, read the temperature against the base wall of the thermometer, bring the mercury column below the normal temperature of the animal species.
3. Apply vaseline to the bulb of the thermometer.
4. Keep thermometer in right hand, holding it between index figure and thumb firmly.
5. Do not allow the fingers to touch the bulb of the thermometer.
6. Insert the thermometer to its full length in the rectum.
7. Allow the bulb to touch the rectal muscus membrane.

8. Keep it for ½ to one minute, remove it, clean with cotton swab, then read it without touching the bulb and record the temperature in Celsius or Fahrenheit.
9. Surrounding temperature or weather change has practically little influence on the temperature of animal.
10. Rise or reduction in normal temperature indicates disease.
11. Infectious diseases rise the body temperature.
12. Fluctuating temperature which does not return to normal indicate infection in the body.
13. Sudden rise or fall in temperature is an unfavorable sign.
14. Subnormal temperature is unfavorable sign and is suggestive of loss of blood, starvation, and collapse, certain kind of chronic diseases and poisoning.

Normal range of temperature :

Animal	Fahrenheit	Celsius
Cattle	101.5-102.5	38.5-39.0
Sheep/Goat	101.5-103.5	38.5-40.0
Dogs	100.5-101.5	38.0-38.5
Fowl	105.0-107.0	40.5-41.5
Buffalo	98.3-103.0	37.0-39.5

Observations :

Record the temperature, pulse and respiration of the animals of different categories.

EXERCISE NO. 6

TITLE : PREPARATION OF FEEDING SCHEDULE AND FEEDING DIFFERENT CATEGORIES OF CATTLE AND BUFFALO

Objectives : To know the feeding schedule and feeding of animals for maintenance and production

Relevant information :

Food is essential for the maintenance of life. The nutrients in a feeding stuff enable the animal body to maintain the energy to perform the various vital processes of life and to provide the material to replace the essential tissue breakdown occurring in the body continuously. Food also provides the constituents and energy required for body growth and production. Various species and categories of animals require different amounts of nutrients and their proportion is according to the type of production i.e. dry cow has different nutrient requirement compaired to milch cow; growing animals require more proteins for their growth while working animals require more energy.

Precautions :

- Use appropriate tables of nutrient requirements for each species and category of animals.
- Calculate the nutrient requirement correctly.

Materials required :

Standard tables of nutrient requirements for different types of animals.

Procedure :

Read and study the tables carefully and note down the nutrient requirements for given body weight and also production **(Tables 1, 2, 3, 4, 5 and 6).**

Table 1:Nutrients required for maintenance of audit cattle per head per day.

Live weight (kg)	Digestible crude protein (kg)	Starch equivalent	Total Digestible nutrients	Calcium (g)	Phosphorus (g)
150	0.102	0.95	1.27	4	4
200	0.148	1.24	1.66	5	5
250	1.168	1.56	2.02	6	6
300	0.197	1.77	2.36	7	7
350	0.227	2.02	2.70	8	8
400	0.254	2.26	3.03	9	9
450	0.282	2.51	3.37	10	10
500	0.296	2.92	3.69	11	11
550	0.336	3.18	3.71	12	12

Table 2 : Nutrients required for production per kg milk to be added to the maintenance allowance

Fat % in milk	Digestible crude protein (kg)	Starch equivalent	Total Digestible nutrients (kg)	Calcium (g)	Phosphorus (g)
3.0	0.040	0.233	0.269	2	1.4
4.0	0.045	0.275	0.316	2	1.4
5.0	0.051	0.316	0.363	2	1.4
6.0	0.057	0.357	0.411	2	1.4
7.0	0.063	0.398	0.458	2	1.4
8.0	0.069	0.439	0.506	2	1.4
9.0	0.075	0.480	0.553	2	1.4
10.0	0.081	0.521	0.602	2	1.4
11.0	0.085	0.562	0.650	2	1.4

Table 3 : Nutrients required for working animals per head per day

Live wt. (kg)	Normal work		Heavy work	
	Digestible crude protein(kg)	Total digestible nutrients (kg)	Digestible crude protein (kg)	Total digestible nutrients
200	0.24	2.0	0.25	2.7
300	0.33	3.1	0.42	4.9
400	0.45	4.0	0.57	4.0
500	0.56	4.0	0.71	6.4

Table 4 : Nutrients required for breeding bulls per day.

Live weight kg	Digestible crude protein (kg)	Starch equivalent (kg)	Total digestible nutrients (kg)	Calcium (g)	Phosphorus (g)
400	0.38	2.7	3.6	9	9
500	0.45	3.4	4.5	11	11
600	0.53	4.2	5.4	13	13

Table 5 : Nutrient requirements for growing cattle per head per day

Live weight (kg)	Digestible crude protein	Total digestible nutrients (kg)	Calcium (g)	Phosphorus (g)
065	0.15	0.8	07	06
075	0.22	1.3	12	10
100	0.28	1.9	13	10
150	0.35	2.6	13	12
200	0.40	3.0	13	12
300	0.47	4.0	13	12
450	0.48	5.0	12	12

Table 6 :Maintenance and pregnancy requirement during last 2 months of gestation.

Body wt.	Dry feed (kg)	DCP (g)	TDN (kg)	ME mcal	Ca (g)	P (g)	Caroten e	Vit.-A (1000 iu)
250	4.9	270	3.0	10.8	14	12	51	21
300	5.6	290	3.4	12.4	16	14	56	25
350	6.4	320	3.7	13.2	21	16	67	27
400	7.2	350	4.0	14.1	23	18	76	30
450	7.9	400	4.4	15.9	26	20	86	34
500	8.6	430	4.8	17.3	29	22	95	38
550	9.3	465	5.2	18.8	31	24	105	42
600	10.0	500	5.6	20.2	34	26	114	46
650	10.6	530	6.0	21.6	36	28	124	50
700	11.3	550	6.3	22.7	39	30	133	53
750	12.0	600	6.7	24.2	42	32	143	57
800	12.6	630	7.1	25.6	44	34	152	61

7. Observation and Calculations :

Calculate the nutrient requirement for following category of animals per day :

i) Calf weighing 30 kg.

ii) Dairy cow weighting 300 kg.

iii) Milking cow weighing 350 kg and producing 8 kg of milk with 4.5% fat.

Category of animal	Body wt. (kg)	**Nutrient requirement**		Remarks
		DCP	TN	
Calf	90	0.26	1.7	For 70 kg DCP is 0.22 and for 100 kg DCP is 0.28. Hence for 90 kg 0.26 DCP TDN for 70 kg is 1.3 and for 100 kg 1.9. Hence for 90 kg as 1.7 kg.
Milch cow	350 with 8 kg milk of 4% fat.	0.580	5.228 **Total**	For maintenance : DCP TDN 0.227 2.7 For production : 0.360 2.528 **0.587** **5.228**

8. Questions :

1. Why the food is essential for the body ?
2. Calculate the nutrient requirement for cattle (Dry and milch pregnant)

EXERCISE NO. 7

TITLE : ESTIMATION OF AGE AND BODY WEIGHT OF ANIMAL

A) ESTIMATION OF AGE

Objective : To find out the age of different categories of animals.

Relevant information :

Performance and economic returns from animals depend upon their age. Hence, age estimate is an important factor in selection and purchase of animals. Medicine doses are decided according to the age of animal. In the absence of records, it becomes necessary to determine the age of animal by indirect methods. There are three methods of aging animals.

1. General appearance 2. Number of horns 3. Dentition method

Precautions :

1. Approach the animals carefully.
2. Handle the animal kindly.
3. Take normal animal for estimation.

Materials required :

1. Animals of different age groups 2. Herd register 3.Travis 4. Rope

Procedure : Secure all animals of different age groups in standing position.

A) Methods for estimation of age of animals

a) Ageing of animals by general appearance :

Dairyman make certain observations on the animal and its approximate age on the basis of breed, temperament and type of animal, shining and tightness of skin, activeness, vigour etc. are some of the characters suggestive of animal age.

i) Younger animals :

Smaller in size, having active disposition, smooth and tight skin, soft hair coat, full mouth.

ii) Older animals :

Large in size having normal look, rough hair coat, broken mouth, loose skin, weak joints, roughened stature etc.

Limitations :

1. Actual age of the animal cannot be determined.
2. Clever preparation of animal adds to difficulty in determining age by appearance.

Based on general appearance animals are categorised into age groups, such as very young, yearlings, adults, old etc.

b) Ageing of animals by horn rings :

With the increase in age the horn ring grows in size and rings are formed on it. First ring appears on the horn at three years of age in cattle. Thereafter one ring appears yearly. Hence following formula for estimation of age may be used.

Age of animal in year = N + 2

Where, N = Number of horn rings.

Limitations :

When animals are prepared for show their horns are also given finishing touch, sometimes misguide the person. Removal of rings with rasp or file and oiling thereafter makes it difficult to make read the rings on the horn and difficult to determine the correct age. In some breeds rings are not clear on smaller horns. Also present trend of dehorning the animals renders difficulty limitation in determining age of animal by this method.

c) Ageing of animals by dentition method :

Open the mouth of animal and count various types of teeth like incisors, canine, premolars and molars. Ruminants do not have canines.

Formula and number of teeth in cattle

S.N.	Type of teeth	Temporary		Permanent	
		Lower jaw	Upper jaw	Lower jaw	Upper jaw
1.	Incisors	4 + 4	Nil	4 + 4	Nil
2.	Canine	-	-	-	-
3.	Premolars	3 + 3	3 + 3	3 + 3	3 + 3
4.	Molars	-	-	3 + 3	3 + 3
	Total	20		32	

Number of teeth varies as per age in animals. **Incisors are commonly used for estimation of age.** Temporary incisors are snow white and sharp. While permanent incisors are pale in colour and larger in size with deposition of tartar with age. There are four pairs of incisors viz. 1. Central (2) Middle pair (3) Lateral pair (4) Corner pair.

Following table gives the types of teeth, their eruption and wearing out stage in upper jaw (UJ) and lower jaw (LJ) at different age in Indian cattle.

Age for teeth eruption and wearing

Type	Pair position	Total number		Temporary		Permanent	
		UJ	LJ	Eruption weeks	Wearing months	Eruption years	Wearing years
Incisors	Central	-	2	At birth	10	2	7 – 8
	Middle	-	2	2nd	15	3	8 – 9
	Lateral	-	2	3rd	18	4	9 – 10
	Corner	-	2	4th	21	5	10 – 11
		Month				Months	
Premolars	Lateral	2	2	2	6	18	-
	Cheek	2	2	4	10	20	-
	Teeth	2	2	6	15	24	-
	Total		12				
Molars	Lateral	2	2	-	-	6	-
	Cheek	2	2	-	-	12	-
	Teeth	2	2	-	-	18	-
	Total		12				

Compared to other methods, dentition is useful and fairly reliable method of age determination though nutrition and management influence it. The following chart gives the eruption of teeth at different age in cross breed animals.

Age of eruption of teeth	Incisors				Cheek teeth					
					Premolars			Molars		
	1	2	3	4	Pair	1	2	3	4	Pairs
Birth to one month	T	T	T	T	T	T	T	-	-	-
6 months	T	T	T	T	T	T	T	P	-	-
1 year 3 month	T	T	T	T	T	T	T	P	P	-
1 year 9 months	P	T	T	T	T	T	T	P	P	P
2 year	P	T	T	T	P	P	T	P	P	P
2 years 3 months	P	P	T	T	P	P	T	P	P	P
2 years 9 month	P	P	P	T	P	P	P	P	P	P
3 years 3 months	P	P	P	P	P	P	P	P	P	P

Observations :

The student will estimate the age of about five animals of different age groups and record it in the table.

Questions :

1. What are the methods of determining the age of animals ? Give merits and demerits of each
2. What are the difference between temporary and permanent incisors?
3. Draw the diagram of jaws showing position of different teeth.
4. At what stage the first pair of permanent incisors appears in Zebu and Taurus cattle ?
5. Give the identification formula of different age groups of animals.

Table : Ageing of Animals ..... Observations

S.N.	Animal	Breed	Sex	No. of rings on horn	Temporary		Permanent incissors		Age		Difference
					No. and colour position	Condition	No. and colour position	Condition	Estimated	Actual	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

B) ESTIMATION OF BODY WEIGHTS OF ANIMALS

Objectives :

- Body weight is useful for computation of balanced ration.
- Useful for determination of growth (Growth rate)
- It is good check on health of animals.

Relevant information :

Estimation of body weight of the animal is necessary to have the information on size of the animal. It is the basic parameter with which the stockman has to decide good number of operations to be acted on. Breeding, feeding, administration of drugs, slaughtering the animal, requires information of body weight. Body weight for breeding the heifer for first time should be more than 250 kg i.e. at the time of first service or insemination. The information of body weights of animal is necessary to calculate the Dry Matter (DM) requirement and also for the medical doses of an animal depends on the breed characters, management factor, health factor etc. Periodic weighing of stock gives an idea about their condition and well being. General loss of weight of animal in the herd is an indication of the existence of some chronic trouble like work infestation, nutritional deficiencies, infections diseases like tuberculosis, Johne's disease etc.

Precautions :

All the animals to be weighed should preferably be starved for at least for twenty four hours and kept away from water for six hours before actual weighing. A practical way of doing this will be to feed the animal for the last time in the evening, drain off watering sources on the same evening and weigh them the next morning.

- Check the accuracy of weigh bridge prior to use.
- Measuring tape should be accurate.
- At the time of weighing / measurement the animal should be on levelled plat form.

Materials required :

1.Measuring tape 2.Weigh bridge 3.Hanging balance (for small animals)
4. Slings (made of good cotton rope or leather belt or an old cycle tyre)
5. Measuring plat form 6. Animals of different age groups.

Methods :

A) Direct weighing
B) Estimating weight by body measurement (Use of Weight formula)

A) Direct weighing : On well organised farm the body weight (live weight) of the animal is recorded on Weigh Bridge. The orderlyness of the weigh bridge is checked. Animal under study should be starved as stated under precautions. Animal under study is allowed to stand on the weigh bridge properly. Allow the needle to come to a halt and only then record the weight.

For small animals : Slings are to be used for hanging small animals. Pass the sling under the belly of the animal. Adjust one stand of the sling just behind the elbows and the other just before the stiles. Then lift the animal off the ground by holding the ends, the latter should be entangled to the hook of the balance. Note the weight accurately.

B) Estimation of body weight by body measurement (Use of Weight formulas) :

There is some relationship between the weight of an animal and its length, girth etc. After taking a number of observations on different animals, certain formulas have been developed to predict the weight of an animal from its length and girth. These formulas can be used for determining weight of animals when no balance is available.

Procedure: Make the animal to stand on levelled ground. Measure Girth (G) and Length (L).

The Girth of the animal is known by measuring the circumference of chest just behind elbows by means of a measuring tape. The length of the animal is the distance between point of shoulder and point of pin bones. A measuring rod is needed for measuring length.

Formulas: 1. Shaeffer's Formula : This is the most common formula used for estimating body weight of an adult cattle and buffalo.

$$\text{Live weight in pounds} = \frac{\text{Length} \times \text{Girth}^2}{300}$$

Where, length and girth is measured in Inches.

2. Aggarvale' s modified Shaeffer' s formula:

For Indian cattles:

$$\text{Live weigth in Seer} = \frac{\text{Girth} \times \text{Length}}{Y}$$

Where, Y = 9.0 if girth is less than 65 inches
8.5 if girth is between 65- 80 inches
8.0 if girth is over 80 inches

(1 Seer = 0. 93 kg and 2.2 lbs = 1 kg)

3. Mullick's formula for buffaloes:

$X = 25.156 (Y'') - 960.232$

where,

X = Estimate of body weigt in lbs.

Y = Heart girth in inches.

4. Formula for Hariana cattles:

Body wt.(kg) = 3.3 (Chest girth in cm) + posterior girth cm + 0.7(Length in cm) – 490.

OBSERVATIONS:

1.

Sr. No.	Particulars	Heart girth (G)	Length (L)	Height (H)	Posterior girth	Weight	
						Estimated	Actual
1.	Animal No.						
	Breed						
	Age						
	Class						

2. Students should draw an neat diagram showing the points where Girth, length and Height should be measured.

QUESTIONS:

1. When the animals are to be weighed and why?
2. Write the advantages and disadvantages of findings out body weight by measurement and actual weighing.

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EXERCISE NO. 8

TITLE : CLEAN AND HYGIENIC MILK PRODUCTION AND MILKING METHODS

Objectives

1. To know / learn the technique of milking operation.
2. To learn the skill in handling the animal while milking.
3. To obtain high quality milk with no damage to the udder.
4. To detect the abnormality, if any.

Relevant information :

Milking of dairy animal is an art requiring practice, experience and skill. It is one of the major operations directly linked with the economy of the herd. Once the letting down process is started milking should be completed within 5 to 7 minutes. Clean and healthy (disease free) animals, hygiene conditions, clean utensils, milkers with clean habits and free from communicable diseases are some of the primary requirements for clean milk production.

Precautions :

1. Ensure good health of animal.
2. Ensure hygienic conditions of milking shed
3. Adopt dry hand milking.
4. Ensure complete milking to avoid damage to udder due to residual milk.
5. Adopt full hand milking or avoid milking by knuckling.
6. Ensure that animal is not excited during and before milking.

Materials required :

1. Grooming brush	2. Clean water
3. Cotton ropes, if necessary	4. White apron
5. Herd recorder	6. Milk recording register
7. Healthy cow	8. Milking pail
9. Towell napkin	10. Strip cup
11. $KmnO_4$ solution (0.2%)	12. Petroleum jelly

Procedure :

1. Clean the milking parlour with water before milking..
2. Secure cow / buffalo to milking parlour / milking platform
3. Brush the hind legs.
4. Wash the udder with very dilute (0.1-0.2%) $KMnO_4$ solution.
5. Wipe the udder and surrounding body with towel / napkin.
6. Maintain calm and quietness in the milking parlour. Take the animal in confidence by putting on its back to make the animal to release the reflex action quickly. This will allow the animal to release hormone oxytocin which will effect the letting down of milk. Often the animal passes urine and / or faeces at the time of milking; let she be free of these natural calls. Remove the faeces and allow the animal to stand.

7. Apply the petroleum jelly to soften the teat.
8. Massage the udder for letting down the milk.
9. Draw off few strips of fore milk from each teat in the strip cup and observe the abnormality, if any.
10. Record the quantity of milk in milk yield register.
11. Transfer the milk in the milk can through strainer or muslin cloth.
12. Keep cow and buffalo milk separately.

General hints :

1. Clip the milch cows regularly and shave the buffaloes when required.
2. Milk the animals from left side.

Methods of milking : There are two methods of milking.

1. Machine milking
2. Hand milking (a) Stripping (b) full hand milking (c) Knuckling

1. Machine milking :

Generally it is used on the large and Government dairy farms having high yielding animals.

Principles of machine milking :

1. The main principle of machine milking lies in generating the mechanism of application of suction pressure followed by its release in a rhythmic form. The whole mechanism is termed as pulsation (which follows a sequence of suction – pressure – release). The entire rhythum is completed within few seconds. The cyclic rhythm is continued till complete milking si over. The suction and pressure punp are operated with 1 to 1.25 HP.
2. Machine milking is advised for a commercial herd of > 20 milch animal which are elite in milk production (i.e. production > 15-20 litres milk each time).
3. Buffaloes and cows can efficiently be milked with machine milking.

Advantages of machine milking :

1. Almost all the elite breeds of cattle and buffalo are milked by machine milking.
2. It is efficient method of milking the animals as :

i) It provides confort to the animal.
ii) Uniform rhythmic action stimulation complete release of milk and also provides confort.
iii) requires less time (4-5 minutes)

3. Low maintenance cost, beneficial.
4. This avoids the strain the teats and the milkers.
5. It provides the confort to the animal.
6. Milk is drawn in most hygenic conditions.
7. The udder and teats do not get irritated neither they lose their shape in long term.

Limitations :

1. Machine milking does not milk low yielder and animals having uneven teats.
2. Skilled person is required to operate.
3. Initial cost is higher and it needs regular washing and cleaning after each milking.
4. Failure in power supply limits the operation of milking.

2. Hand milking :

Milking is an art and requires an experience and skill. It should be conducted gently, quietly, quickly cleanly and completely. Complete milking has to avoid mastitis as the organisms of mastitis develop on the residual milk of teats.

Teats may be milked cross wise or fore quarters together and then hind quarters together. During milking, the milk must be sequezed and not dragged out of teats. First 3-4 streams of milk from each teat are to be collected on to a strip cup to (I) get rid of bacteria collected in the teat canal and (ii) to see the possibility of the incidence of mastitis.

Teats may be milked crosswise or fore quarters together and then hind quarters together. During milking, the milk must be squeezed and not dragged out of teats. First 3-4 streams of milk from each teat are to be collected on to a strip cup to (1) get rid of bacteria collected in the teat canal and (2) to see the possibility of the incidence of mastitis.

Methods of hand milking :

1. Stripping :

Hold the teat at its base between the thumb and forefinger, then draw them down throughout the entire length of teat but pressing it simultaneously to cause the milk to flow down in the form of stream into the milking pail. Repeat this process in quick successions. In this method, skilled milkers use both the hands each holding a different teat but stripping alternatively.

2. Full hand milking :

Hold the whole teat in the fist while fingers encircling the teat. (The base of the teat is closed in the ring formed by the thumb and fore finger trapping the milk in the teat sirus thereby not slipping it back into gland cistern). Squeeze the teat between the middle, ring and little fingers and the hollow of the palm forcing the milk down into the milking pail.

3. Knuckling :

In this, teat is hold in four fingers and folded thumb. Milking is completed with the pressure of thumb and downward pulling. This method is defective which crushes the internal tissues teat and form the lumps.

Observations :

Record the milk yield of individual animal in yield book.

Sr.No.	Particulars	Observations
1.	Date	
2.	Date of calving	
3.	Current lactation number	
4.	Quantity of milk drawn	
5.	Time taken for milking	
6.	Any abnormality	
7.	Size and texture of teat	
8.	Sediment test	

Calculations :

1. Compare the milking of different methods.
2. Calculate the efficiency of milker.

EXERCISE No. 9

1. TITLE : **JUDGING OF ANIMALS FOR DAIRY AND DRAFT PURPOSE**

Objective : Selection of animals on the basis of body conformations.

Relevant information :

Judging of animals is an act of examining the phenotype of animal on the basis of its breed characteristics and its placements. It needs experience. It promotes healthy competition among the livestock owners to raise ideal specimen and contribute to the refinement of breed and breed characteristics.

Two methods of judging the animals widely used are :

1. Score card method and 2) Study of performance record.

In countries where the organizations are not existing, the score card method is adopted for selection of individuals. Most of the students learn judging by experience and observations. However, lack in scientific principles underlying the techniques of judging are likely to go wrong.

Qualities of good judge:

1. The judge should be livestock minded.
2. He should possess thorough knowledge of each body parts of animal and should be able to sort out desirable and undesirable points of the animal.
3. Quick and accurate power of conformation.
4. Ability to form a mental image of many individuals animal to rank them by making comparison.
5. Ability to reach at definite decision.
6. Extreme honesty and sincerity in order to avoid bias prejudice.
7. Sound knowledge acquired through practice and experience in order to give effective reason for decisions.
8. A pleasant and even temperament. Good judges however do not fraternize with exhibitors or friends along the ring side.
9. Firmness to stand by and defend one's placing without offending or in any way implying that one's decisions infallible.

Precautions : Observe the animals carefully from a safe distance.

Materials required :

1.Different kinds of animal like cows, buffaloes, heifers etc. 2.Score card

3. Show ring.

Procedure :

Study the score cards and marks fixed for each part. Form a picture of an ideal animal in the mind. Mark animals as A,B,C,D or 1, 2, 3, 4. Allow the animals to stabilize in the ring in a row. Study different animals carefully and make comparison among all the four animals in ring and decide the score for each point and record the allotted score marks in respective columns against each animals in the perfect score card.

A. General appearance :

A good dairy temperament, docility, attractive quality, feminine look, proportionate head and neck, a graceful carriage, broad forehead, possessive vitality and vigour, thin skin.

B. Dairy type :

Dairy type as expressed by the Milking ability, appearance and freedom from courseness and dairy wedges.

C. Body capacity :

As exhibited by the chest, girth, length and depth of barrel with an ample strength and vigor.

D. Mammary development :

Strongly attached, well balanced, capacious, fine udder. The udder should be symmetrical, moderately long and wide, deep, free from quartering, soft and pliable. Rear attachment high. Teats of convenient size and squarely placed. It should be with numerous folds of skin when viewed between the thigh. Milk vein prominent with numerous curves.

E. Other features :

Hip and pin bones wide apart. Thigh wide with well apart hind legs. Ask the attendant to take animals one behind the other for short walk of five meters walking. Bring the animal again and arrange by making close inspection for age by dentition, quality, skin and udder. Make total of the marks allotted and arrange the results on animals according to the order oe merits, based on to the obtained by the animals i.e. 1,2,3 or 4 and support placing with brief but sound reasons.

Classify the animals based on dairy type as follows :

Sr.No.	Grade	Score point
1.	Excellent	90 and above
2.	Very good	85 to 90
3	Good	80 to 85
4.	Acceptable	70 to 80
5.	Fair	60 to 70
6.	Poor	Below 60

Observations :

Sr.No.	Particulars	Observations
1.	Date	
2.	Ring No.	
3.	Animal class	
4.	Breed	
5.	Placing	I II III
6.	Estimated age	
7.	Estimated value	
8.	Comments for placing	

EXERCISE No. 10

1. TITLE : **STUDY OF COMPUTERISED DATA BASE ON DAIRY FARM**

Objective :

- To know the history of animals
- To know the daily, total and average milk yield
- Milk / dry and lactational milk yield of an animal
- To know regularly in calving of the animal
- To prepare breeding plan on the dairy farm
- To know the sex ratio on the dairy farm
- To know the mortality percentage on the dairy farm.
- To fix up the valuation of the animal at the time of sale.
- To know the feeding cost of the animal
- To know economic condition of the dairy farm
- To know the feeds and fodders requirement of the herd
- To know the outbreak of any diseases during the year on the dairy farm
- To know the vaccination programme of the animal
- To know the susceptibility of any particular disease of animals on the dairy farm

Dairy records : The dairy records are classified into following four groups.

A) Records pertaining to Livestock unit
B) Records pertaining to Dairy Unit
C) Records pertaining to Cultivation unit
D) Records pertaining to Store unit

A) Records pertaining to Livestock unit :

- Livestock register
- Cattle yard report
- Service register
- Calving register
- Feeds and feeding register
- Sick animal register
- Death register / disposal register
- Livestock account register
- Feed and fodder account register
- History and pedigree sheets

B) **Records pertaining to Dairy unit :**

- Milk yield register
- Milk disposal register
- Milk products and their disposal registers
- Bill register and bill book
- Recovery register and money receipts
- Milk customer register

C) **Records pertaining to Cultivation unit :**

- Plot history register
- Cultivation sheets
- Requisition register
- Delivery memo
- Daily labour sheet
- Logue book
- Muster roll

D) **Records pertaining to Store unit**

- Store journal
- Store ledger
- Issue book
- Bill book
- Receipt book
- General inventory
- Dead stock book

Records pertaining to Livestock Unit :

1. Livestock register

Sr. No.	Name of animal	Age	Colour and identification marks	Authority under which received	Date of receipt	Cost in Rs.	Date of disposal	Amount received	Amount written of

2. Cattle yard report

Sr. No.	Cows milking	Cows dry	Cow heifer	Cow bull calves	Cows breeding buy	Total	Buffalo milking	Buffalo	
								Dry	Heifers
1	2	3	4	5	6	7	8	9	10

Buffalo bull calves	Buffalo breeding bulls	Total	Grand total	Remarks
11	12	13	14	15

Signature of the Supervisor

3) Service register :

Sr. No.	Date of service	Name of cow	Brand No.	Bull used	Due date of calving	Remarks	Signature of the Supervisor
1	2	3	4	5	6	7	8

4. Calving Register

Sr. No.	Name of animal and Brand No.	Breed	Date of calving	Sex of born calf	Weight of calf birth	Bull used	Date of service	Gestation period in days	Remarks	Signature
1	2	3	4	5	6	7	8	9	10	11

5. Feeds and Feeding register

S. N.	Name of animal / Brand No.	Maintenance ration (kg)			Pregnancy ration (kg)			Production ration (kg)			Total kg			Sign.of Sup.
		Conc.	Greed	Dry	Conc.	Greed	Dry	Conc.	Greed	Dry	Conc.	Greed	Dry	

6. Sick animal register

Sr. No.	Date	Name of the animal	Breed	Date of sickness	Nature of sickness	Whether shown to Vety. Officer	Treatment given	Remarks	Sign of Sup.

7. Death register / Disposal register

Sr. No.	Name of animal	Brand No.	Date of death	Age at death time	Book value at death time	Reasons for death	Postmortem report	Remarks	Sign of Sup.

8) *Livestock account register*

S.N.	Name of animal	Brand No.	Value on Ist of the moth	Date of purchase			Date of birth		
				Adult	Bull calf	Cow calf	Adult	Bull calf	Cow calf
1	2	3	4	5	6	7	8	9	10

Date of sale			Date of death			Date of calving	Page No. in History sheet	Remarks	Sign. of Sup.
Adult	Bull calf	Cow calf	Adult	Bull calf	Cow calf				
11-	12	13	14	15	16	17	18	19	20
-									
-									
-									
-									

9) Feeds and fodder account register

S.N.	Date	Maize				Jowar			
		Balance in hand at starting of day	Received during the day	Feed during the day	Balance in hand at the close of the day	Balance in hand at starting of day	Received during the day	Feed during the day	Balance in hand at the close of the day
1	2	3	4	5	6	7	8	9	10

Hay				Lucerns				Remarks	Sign. of Sup.
Balance in hand at starting of day	Received during the day	Feed during the day	Balance in hand at the close of the day	Balance in hand at starting of day	Received during the day	Feed during the day	Balance in hand at the close of the day		
11	12	13	14	15	16	17	18	19	20

EXERCISE NO. 11

TITLE : VACCINATION AND CONTROL OF ECTO AND ENDO PARASITES IN CATTLE AND BUFFALO

A) VACCINATION

The practice of artificially building up immunity against specific infectious diseases by injecting biological agents / veterinary medicines is called "vaccination".

Objectives :

1. To know the symptoms and treatment of various diseases of livestock and poultry.
2. To know the general health cover measures and vaccination programme to prevent diseases.
3. to keep proper health of livestock and poultry birds.

Relevant information ::

Livestock and poultry birds suffer from number of diseases. High mortality and morbidity results into heavy losses. For avoiding infection in livestock and poultry maintain the proper hygienic and clean condition in livestock barns and poultry houses and also keep infected animals and birds away from the healthy animals and birds. Give the proper vaccines at proper time.

Materials required :

1. Cotton wool
2. Bandages
3. Rubber tubing
4. Forceps, splints
5. Clinical thermometers
6. Disinfectants
7. Phenol, terpentine
8. Pocket knife
9. Tray
10. Different medicines / vaccines
11. Distilled water
12. Injection syringes

Procedure :

1. Vaccination should be done through adequate preventive measures.
2. Keep hygienic conditions at the time of vaccination.
3. Give proper dose of vaccines.
4. Use adequate material and instruments at the time of vaccination.
5. Treatment and care for any diseases is possible but its economics and post treatment performance needs conditions to be done.
6. Handle animals properly.
7. Do not vaccinate clinically ill patients.
8. Ensure that when last dose of vaccine is administered.

Procedure for vaccination / vaccination programme

1. CATTLE AND BUFFALOES			
Name of disease	Time for vaccination	Vaccine used	Dose
1. Black quarters	2nd week of April	B.Q. Vaccine	5 ml s/c
2. Haemorrhagic septicemia	4th week of April	a. Alum precipitate b. Oil adjuvant	5 ml s/c 5 ml s/c
3. Anthrax	Premonsoon season (only in affected area)	Spore vaccine	1ml s/c
4. Rinder pest	2nd week of May	Freezed dried goat tissue vaccine Tissue culture	1 ml s/c 1 ml s/c
5. Foot and mouth diseases	Oct / Nov.	Vaccines manufactured by Hoechst, BAIF, IVRI etc. are available in market	10 ml s/c. (Booster dose given to calves)

B) Control of Ecto and Endo Parasites in Cattle and Buffalo

1. Objectives :

- To know the ecto and endo parasites of the animals
- To study the harmful effect from the ecto and endo parasites.
- To control ecto and endo parasites.

2. Relevant information :

An animal or plant which gets its food from another is called as parasites. There is a variety of parasites, each one of them has complex life cycles. According to place of presence parasites may ecto or endo. At some stage of their life cycle, some of them harbor inside specific organs (like those of digestive system, muscular system, nervous system, respiratory system etc.) and hence called as internal (endo) parasites. Similarly, few others appear and thrive outside the body of host are called as external (ecto) parasites.

2.1 Harmful effects of Parasites :

- Competition to its host for nutrition.
- Lower vitality and resistance to infection.
- Reduces reproductive and reproduction efficiency, occurrence of skin diseases.
- Economic losses by lowering the production.

3. External parasites :

The important external parasites (insects) are lice, mange, ticks, biting flies etc. They harm the animal directly by bitting, blood sucking, itching, etc

as well as indirectly by transmitting infectious diseases. Damp and dark corners, stagnant water, manures, etc are the favourable breeding places of insects. Some of them live on animal skin, though some may borrow into the skin. Therefore, any control measure should be aimed at the chinning the animal and its surrounding.

3.1 Control measures of ecto-parasites :

- Periodical dipping or spraying of animals with suitable insecticides like malathion, parathion, neguvon.
- Daily scrubbing and cleaning of animal sheds to remove all filth.
- Area around animal shed should also be kept clean and dry.
- Interior of animals shed (roofs, walls and corners) should be cleaned regularly for cobwebs and spider-webs and spray with insectaries at least once in a month.
- Groom the body of the animal regularly and watch for the external harmful external parasites if any.

3.2 Precautions while using insecticides :

- Use proper concentration of insecticide solution for dipping or spraying.
- Avoid dipping in a rainy and cold days.
- Supply sufficient amount of drinking water for the animals.
- Animals having wounds / cuts or spraying provide green fodder to avoid licking.
- Always keep the antidote read

Some commonly available insecticides :

Sr. No.	Insecticides	Mode of application	Concentration (%)	antidote
1	Lindane	Spraying	0.03	Barbiturate
2.	Toxaphene	Spraying	0.03	Barbiturate
3.	Malathion	Spraying	0.5	Atropine sulphate (1%)
4.	Sumithion	Spraying	0.5	Atropine sulphate (1%)
5.	Deltamethrin	Spray	0.025 - 0.5	Atropine sulphate (1%)
6..	Cyoermethrin	Spray	0.025-0.05	Atropine sulphate (1%)

4. Internal parasites :

Various kinds of the internal parasites such as tape warms, round worms, and flukes, which harbor in the digestive tract of the animal are economically important. The feeds and drinking water of animals usually gets polluted by parasitic eggs through the faeces of infected animals. Animals which consume

such feed and / or water get infected. The worm infestation would be maifested with one or many of the symptoms such as low appetite, stunted growth in calves, frequent illness, diarrhoea, rough body coat, rough hair, anemia etc. Heavy parasitic worm load leads to economic losses because, animal may become under weight leading to late maturity and / poor fertility. Feed conversion efficiency of host is adversely affected, since parasites derive nutrition from it. It is estimated that worms utilize as much as 18-27 % of feed consumed by the host animal.

4.1 General guidelines for control of internal parasites :

- Maintain the clean and hygiene around the animals.
- Observe the body condition and general health status of the animal regularly.
- Examine the excreta of the animal. If found any parasite in it, concern the veterinarian and adopt the control measure.
- Regular deworming of animal should be done with appropriate anthelmentic (deworming agent).
- All the animal in the herd or locality should be dewormed at a time and at regular interval so that the drug becomes an ecological agent rather than a means of treating affected animals. The most suitable time of deworming is the early stage of infection when the worm load is less.
- During deworming all the animals should be fasted for 24 hours before giving the anthelmentic, young animals should be dewormed every months using a suitable anthelmentic, older stock can be dewormed at 4-6 months intervals.

4.2 Deworming schedule for cattle and buffaloes :

Type of worm	Deworming schedule	Anthelmentic drug
Roundworms	First dose at 10 days of age and thereafter at monthly interval upto 6 months. Thrice a year in animals above 6 months of age	Albendazole, Fenbendazole, Mebendazole (5-10 mg/kg BS)
Liver flukes	Twice a year in endemic area (before and after monsoon)	Oxyclozanide (10-15 mg/kg BW)
Tapeworms	Twice a year (Jan. and June) in calves in problem herds	Niclozamie (50-100 mg BW)

6. Questions : Give the deworming programming for control of internal worms in dairy calves.

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EXERCISE NO. 12

TITLE : STUDY OF VARIOUS DAIRY STRUCTURES

Objectives :

1. To study different housing systems.
2. Better care and management of animals.
3. Better efficiency of herd and labour
4. To economise the production.

Relevant information :

The farm animals require housing or shelter to have protection against natural vagaries. Also it is necessary for safety of animals to provide them the shelter. Routine working goes easy due to housing of animals. While planning for housing following considerations should be effected.

1. **Elevation and drainage :** Dairy building should be at higher place to facilitate the drainage effectively. Well-cultivated land should be selected.

2. **Site :** Possibly unfertile piece of land should be utilized for dairy structures. The site should not be too dehydrated / descicated; such site is susceptible to considerable swelling during rainy season and exhibits numerous cracks in summer.

3. **Direction and layout :** A dairy building should have such a location as to have a maximum exposure to the sun in south and protection form prevailing strong cold wind currents.

4. **Accessibility :** Easy accessibility is always desirable. Cattle barn should be aimed at 100 meters (approx.) distance from the main road.

5. **Durability and attractiveness :** It is always attractive when the buildings open up to a seeing view with added comfort. Along with this durability of the structure is obviously important criterion in dairy structure.

6. **Water supply :** Abundant supplies of fresh, clean and soft water should be all time at a cheaper rate.

7. **Surroundings :** Areas infested with wild animals and unwanted social elements should be avoided, narrow gates, higher manger curbs, loose protruding, nails, smooth finished floor in an surrounding areas should be avoided.

8. **Labour :** Honest, economic and regular supply of labour is available.

9. **Electricity :** Electricity is the most important method of lighting a dairy. Since, the modern dairy always handles electric equipments. it is desirable to have an adequate, regular and proper voltage supply of electricity.

10. Marketing facility : Marketing facility should be at a short distance.

11. Facility to labour and feed supply :

i) Labour should be available at cheaper rate regularly.
ii) Feed stroage should be located at hand near the center of the cow barn.
iii) Milk house should be located almost at the center of barn.

Types of housing :

It is quite easy to understand that unless cattles are provided with good housing facilities, they may not exhibit the good performance. Two types of dairy barns are in general use :

A) CONVENTIONAL DAIRY BARN :

The conventional dairy barns are comparatively costly and becoming less popular day by day. However, animals are more protected in conventional houses. The following barns are of the general need for proper housing of different classes of dairy stock on the farm.

1. Cow shed
2. Calving box
3. Isolation box
4. Sheds for young stock
5. Bull or bullock shed.

Cow shed :

Cow shed should be arranged in a single row if number of cows is small i.e. less than 10, in double row if number exceeds 10. Ordinarily, not more than 60 cows should be placed in one cow shed. In double row system cows may be arranged face out or face in manner.

Advantage of face out (Tail to tail) system :

1. On an average 125 – 150 man hour of labours are required per year per cow.
2. **Study of time :** Motion studies in dairy showed that 15 % of the expended time is spent in front of the cow and 25 % is in other parts of the barn and milk house and 60 % of the time is spent behind the cow. Time spent at the back of the cow is 4 times more than the time spent in front of the cow.
3. In cleaning and milking of cow, the wide central alley is of great advantage.
4. Less danger of spread of diseases.
5. Cow can get more fresh air from out side.
6. The supervisor can inspect more number of milkmen while milking due to central alley.
7. Any sort of minor change in hindquarters of the animals can be detected quickly.
8. Cows in heat can also be noticed while moving in alley.

Advantages of face in / face to face a system :

1. Cows make a better showing for visitors when heads are together.
2. The cows feel easier to get into their stalls.
3. Sunshine is more in the gutter when needed more without back tracking.
4. Feeding of cow is easier. Both rows can be fed without back tracking.
5. It is better for narrow barns.

Best for dairy stock / bullocks.
6. Economical.
7.

Floor space requirement under conventional system :

The flour space required in a barn is 6.5 to 7.0 m^2 per adult animal.

1. Feed passage (feed alley) – width 120 – 180 cm
2. Manger length for cow – 90 cm, width - 70
3. Height towards stall – 30 cm, towards passage – 60 cm
4. Stall standing place for cow – 150 x 90 cm
5. Gutter 30-40 cm wide and 12 cm deep.
6. Manure alley 180 – 240 cm
7. Cross alley 120 – 150 cm wide
8.

Note : Gutter should have a 1 % gradient.

B) LOOSE HOUSING SYSTEM :

1. Loose housing can be defined as system where animals are kept loose, except at the time of milking and treatment. The system is more economical.
2. Cost of construction is significantly lower than conventional type.
3. It is possible to make further expansion without making much changes.
4. Easy detection of heat.
5. Animals feel free and therefore, prove more extremely important for better health and production.
6. Overall better management can be rendered.

Floor space requirement under loose housing system :

The floor space requirement for different categories of dairy animals under the loose housing system are given in the following table. Following specifications are suggested for covered area in the loose housing system :

Height of roof	:	3 meters
Covered area	:	240-300 sq. m
Manger length for		
Adult animal	:	60-75 cm
Width	:	60 cm
Depth	:	40 cm
For calves -		
Length	:	40-50 cm
Width	:	40 cm
Depth	:	25 cm

Table : Space requirement under loose housing system

Animal	Floor space (m^2)		Max. no. of animal / house
	Covered area / animal	Paddock area / animal	
Cows	3.5	7.0	60
Buffalo	4.0	8.0	60
Down calvers.	12.0	12.0	1
Calves	1.0	2.0	30
Growing stock	2.0	4.0	30
Bulls	12.0	12.0	1
Goat / sheep	1.0	3.0	50

C) FREE RANGE :

Free ranges of the recalled ranches indicate a type of stock management rather than a type of housing. This comprises living stock free in a large estate, sometimes extending the thousands of square meters. The farm head quarter is generally situated at the centre of the estate. The area is generally natural or cultivated pasture based with watering points and shelter located at convenient places. This type of farming and housing is suitable for those animals that are not handled daily, such as beef cattle, sheep and goats.

Materials required

1. Facilities to visit a dairy farm. 2. Measuring tape, pencil 3.Drawing sheet, drawing boards.

Precautions :

1. Do not select site near heavy traffic roads, industries and railway lines.
2. Choose cheap but durable construction materials locally available for buildings.
3. Select the site at higher elevation.
4. Provide enough space for future expansion.

Procedure :

1. Visit a diary farm based on prior information and study the arrangements of various structures.
2. Note down the various types of structure and building./
3. Prepare your own plan for a required number of animals and draw diagram for different structures along with details.
4. Draw a linear sketch of the barn showing its minor details.

Observations :

1. Note the number of animals kept in the barn.
2. Calculate floor area provided for animal.
3. The type of materials used for construction of building.
4. Note down tying arrangement of animals.
5. Draw sketches of different housings.

EXERCISE NO. 13

TITLE : COLLECTIN OF SEMEN AND ARTIFICIAL INSEMINATION AND PREGNANCY DIAGNOSIS IN FARM ANIMAL

A) COLLECTION OF SEMEN

The common methods and modern techniques are as :

1) **Use of an artificial vagina (A.V.) :** this is the best method and most commonly used. Diffierent kinds of AVs used for different classes of animals. The main parts of AV are (i) an outer heavy rubber cylinder. (ii) inner sleevs of rubber, (iii) the semen receiving cone. (iv) semen collecting vial glass or plastic.

Prior to collections all parts are sterilized and assembled making AV. The outer cylinder, inner sleeve in between water of temp. 40-50 °C is filled, cone attached with vial at one end tightly secured (to collect semen).

Prior to collection, bulls usually are allowed to become excited bringing to cows or dummy cow. When bull makes attemts to ride, the assembled AV held at an angle of 55 with horzontal plane of dummy. When the bull mounts, the penis is quickly guided into AV at that angle. As bull dismounts, the penis is quickly guided into AV at that angle. As bull dismounts, the AV is taken off the penis and kept in upright position. The volume of ejaculate collected from cone to vial is taken to laboratory for examination.

Advantages :

i) Whole ejaculate is collected in uncontaminated and natural stage.
ii) It is free from extraneous secretions
iii) Sterile condition of apparatus ensures disease control.
iv) The viability of sperm is better.

Disadvantages :

i) Occasionally, it is difficult to get the males to serve the artificial vagina.
ii) The apparatus involved is slightly costly & requires technical hands.

2) **By Electro Stimulation Method :**

By this method ejaculation of semen is brought about by inserting a electrode in sire's rectum and stimulating nerves of the reproductive system by gradually increasing voltage in rhythmic fashion. The success depends upon skill, experience & knowledge of individual requirement of stimulation.

The method is used on males where AV is not possible or practical. It is used to collect large number of semen samples for experiment. Also, in case of bulls for AI when bull is extremely slow or physically incapable of mounting.

Advantages :

i) Semen can be collected from males too young or old or unable mount due to weak or injured.

ii) No female or dummy required for collection.

iii) Less chance of contamination.

Disadvantages :

i) Method slightly technical and need skill and practice

ii) Semen geneally gets contaminated with urine

iii) Sciatic nerves get temporarily affected during operation

iv) Some males resist & refuse collection

3) Massage method :

Method involves technique of semen collection by massaging seminal vesicles and ampulae. It is commonly used to collect semen from cock, turkey & dog. In this system the person collecing semen requires a considerable training to adopt and skill.

4) Vaginal spoon method
5) Sponge method
6) Breeder's Bag method

| All these methods are at present outdated, hence not in use.

B) ARTIFICIAL INSEMINATION

Artificial Insemination (A.I.) :

Artificial Insemination is the deposition of male reproductive cells (spermatozoa) in the female reproductive tract by mechanical means rather than by natural mating.

Advantage (Merits) of AI over natural breeding :

1) It increases the usefulness of superior sire to an extraordinary degree i.e. at a time to unlimited area whereas in natural service few could get advantage a time
2) The services of superior proved sire can be utilized on large scale beyond limits of country i.e. by natural service one bull bred to 50-60 cows per year whereas by AI one bull can be utilized for 10,000 cows per year.
3) In AI system the herdsman need not maintain herd sire, hence no botheration about cost and management of breeding bull.
4) Dairymen have no problem to search & purchase a new herd sire every two years to avoid inbreeding.
5) The technique of A.I. extensively used for cross breeding purpose the semen can be easily transported to different continents by air and used extensively.
6) It AI is used by trained persons with complete sanitation, the intensity of spread of genital diseases are lessened.
7) Overcomes the difficulty of size and weight in case of male for breeding.
8) AI increases rate of conception.
9) The outstanding animals located apart can be .....

10) AI helps in better record keeping which helps ultimately to take correct management decisions
11) The old, heavy and injured sires can be used with advantage.

Limitations (Demerits) of A.I.

1) It requires special equipments with will trained operators.
2) It requires more time than natural service.
3) Improper cleaning of instruments and insanitary conditions may lead to lower fertility.
4) The selection of sire should be bvery rigid in all respects.
5) Necessitates trained man-power with the knowledge of structure & function of reproduction
6) Market for bulls reduced.

Problems under Indian condition:

1) The lack of understanding of AI makes misunderstanding that it produces weaker calves.
2) The success of AI requires castration of scrub bulls which is difficult because of sentimental views.
3) Disposal of bull caives is problem for breeders.
4) The severe climatic conditions are detrimental for preservation & transportation of semen.

(C) PREGNANCY DIAGNOSIS (PD)

Pregnancy or gestation is the condition of female when the developing young one is present in the uterus. Diagnosis of pregnancy as early as possible helps in the control of infertility in domestic animal. Delay in PD leads to the loss of milk, loss of calf, and the farmer has to unnecessarily pay for the feed consumed by the animal during non-productive period.

1) Method of PD :

If estrous signs are not observed around 3 weeks of service or insemination, the cow is generally assumed to be pregnant. However, the number of animal shows estrous though pregnant. Conversely, in some pathological condition, an adult female may not come in heat, although non pregnant. Therefore more accurate method of PD has been developed such as rectal palpation, vaginal biopsy, detection of hormonal changes etc. Rectal palpation is the more common method of PD in large animals.

2) Procedure for rectal palpation :

- Restrain the animal in a convenient place.
- Insert the gloved and lubricated hand through the rectum and remove the dung present in it (back racking) without taking out hand.
- Examine the genital organs (cervix, uterus, ovary, corpus luteum) and fetus by gentle palpation and feel the changes of developing uterus.
- From 6th week, onwards uterus will be enlarged and feeling fluid filled.

At 8^{th} week, the gravid horn is approximately 6 times larger than the non gravid horn.
From 8^{th} week to 12^{th} week, the gravid horn enlarges by 50 per cent more than non-gravid horn.
The uterus starts descending in the abdominal cavity. This is the most ideal period for rectal palpation.
From 12 weeks onwards the uterus enlarged very rapidly and descending into abdomen. But it can be felt up to 16^{th} week.
Thereafter, palpation of the uterus become progressively difficult as it sinks deeper and deeper into abdomen.
Depending upon the experience of palpation, the accuracy may be achieved up to 95 %.

Questions :

a) Draw the figure of AV.
b) What is importance of PD and what are the external signs of pregnancy in the farm animals.

EXERCISE NO. 14 :
TITLE : **UTILIZATION OF DAIRY FARM WASTE i.e. DUNG AND URINE ETC.**

Objectives :
1. Efficient utilization of byre waste to convert into good manure.
2. To maintain hygienic environment in the animal house.
3. To keep the housing clean, dry and prevent the breeding of parasites.
4. To increase agricultural production.

Relevant information :

The dairy farm waste includes dung, urine, bedding material, byre washing, left over from mangers, trash from diary premises. The dung contains on an average 77.50 % moisture, 22.30 % organic matter, 0.34 % nitrogen, 0.16 % phosphorus, 0.04 % potash and 0.31 % lime. On an average adult animal voides 16 to 30 kg of dung per day. The leftover from the mangers is mostly uneaten fodder. It is an important organic matter.

Properly covered byre waste will act as valuable organic manure. Regular and systematic conservation of waste yields valuable manure, which on application on fields, improves soil fertility and makes the crop growth luxuriant. It saves expenditure on fertilizers. Proper use of dung (gobar gas) produces cooking gas, an important source of energy for domestic use.

Sanitation and cleanliness are key to good health of farm animal and of human. Unsatisfactory condition provides scope for development of pathogen which cause diseases.

Precautions :
1. Do not use contaminated and dirty water for cleaning purpose.
2. Avoid spilling of dung and used up bedding material while carrying it to manure pits.
3. Avoid spoilage of dung and urine while handling for manure production for gas production.
4. Prevent entry to rain or drained water into the manure pit or gas plant.
5. Follow the steps while preparing the manure and gas correctly.
6. Avoid overflow of the pit or gas tank.
7. Do not choose the site for manure pits near the well or the milking parlour.
8. Use of appropriate proportion of water and dung for preparing the slurry for gas production is to be followed :

Materials required :
1. Showel 2. Iron basket 3. Wheel barrow 4. Pick axe 5. Spade
6. Crow bar 7. Agitator 8. Manure pit 9. Soaking pit
10. Liquid storage tank 11. Gobar gas plant

Procedure :

A) Solid waste utilization for manure :
1. Dig a manure pit of appropriate length and breadth but with 1 meter depth.
2. Gather, collect and transfer dung and fresh waste material to the manure pit.

3. Deposit the waste material in 5 to 7 cm layers and sprinkle the dung slurry over each layer till the pit is completed filledin.
4. Cover the surface of the pit with soil and paste and plaster it with dung and mud.
5. Leave the pit in cover position for about four months.
6. Note that 1 cubic meter space can hold 900 to 1000 kg of organic matter.

B) Solid waste utilization for gas production :

1. Check the gobar gas plant for proper functioning.
2. Collect the transfer the required quantity of dung to the slurry tank.
3. Remove all trash material from the dung.
4. Add water to the dung at the rate of 5 to 6 litres per kg of dung.
5. Prepare slurry of desired consistency with the help of agitator.
6. After thorough mixing let out the slurry through coarse sieve to inlet chamber of gas tank.
7. Close the inlet properly.

C) Utilization of liquid waste

1. Flush the urine, liquid-dung along with floor washing with jet of water into the pit.
2. Drain the liquid waste into a liquid storage tank
3. Lead the liquid washing into a dilution tank.
4. Dilute it with water and take it directly to the field for irrigation. Do not use the liquid waste as such without dilution for irrigation.
5. Check the leakage of the dilution tank for avoiding the wastage of liquid manure or urine.

Availability of extra per animal per day :

Category	Wet dung (kg)	Urine (lit.)
Young stock (100-200 kg)	7 – 9	4 – 8
Lactating animals	24 – 30	16 – 20
Dry animals	10 – 17	7 –12

Quantity if manure obtained per animal per year

Species	Manure (tonnes)	N (kg)	P (kg)	K (kg)
Cattle	9	36	18	27
Sheep / goat	4	1.5	1.5	1.1
Poultry birds	2	15	15	10

EXERCISE NO. 15 :

TITLE : PREPARATION OF VIABLE BANK PROPOSAL FOR CATTLE AND BUFFALO

1. Objectives :

- To know how to prepare bank proposal
- To know the requirement of bank proposal

2. Relevant information :

Dairying has been recognized as an instrument of socio economic changes for rural masses in the country. However, most of the farmers are not in a position to establish the dairy enterprise with the available resources and needs to take the financial assistance (loan) from bank. Therefore, the farmer has to prepare the loan proposal. The soundness of loan proposal or project is judged on the basis of technical feasibility and economical viability. The technical feasibility of proposal covers availability and suitability of land, equipment, resources, market etc. Whereas, economical viability of the proposal is analysed by different methods vi. Payback period (PBP), Net present value (NPV), Benefit cost ratio (BCR), or by Debit service coverage ratio (DSCR).

Students have to go through the following example and consider the assumption or conditions as it varies from one proposal to other.

Example : The proponent X is doing cultivation of some of the agronomical crops in the area. He is maintaining buffalo and cows since long. This was limited for his self-consumption and some additional income through dairy was for the purpose of day to day expenses of family. The family proposed to enter into the dairy activity on commercial basis by purchasing 4 cross breed cows. However he has insufficient capital to invest in dairy enterprise and he decided to take term loan for a period of 5 year for purchase of 4 crossbreed cows and construction of cattle shed for dairy unit. It is to be assumed that :

- All the recurring expanses are made by farmer from his own capital
- The milk production capacities of cow on an average will be 18 lit/day with a lactation period of 270 days.
- Rate of milk is Rs. 12/lit.
- All calves will be sold out. The cost of rearing these calves are offset by income from sale, hence these costs are not included in the proposal.
- Animal in 1st or 2nd lactation with calf at foot preferably female calf will be purchased.
- Banks will sanction 75% loan of total proposed expenditure (for purchase of cattle and construction of shed) with a interest rate 11.5 %.

It is to be noted that bank sanctioned loan of Rs.1,69,125 i.e. 75% of Non recurring costs (2,25,500).

I) Non recurring items and its costs

S.N.	Items of investment	Total qty.	Rate Rs.	Total cost
1.	Purchase of crossbred cows including transportation of animal	4	35000/cow	1,40,000
2.	Cattle shed for 4 adult animals @ 60 sq. ft/cow	240 sq.ft	250 /sq.ft	60,000
3.	Calf cum heifer shed for 2 animal @ 25 sq.ft/animal	50 sq. ft.	150 s1. ft	7,500
4.	Water tank construction (200 lit/day/animal)	1		10,000
5.	Chaf cutter	1		8,000
	Total non recurring cost			2,25,000

I) Recurring items and its costs

S.N.	Items of investment	Total qty.	Rate Rs.	Total cost
A.	Feed and fodder			
a.	Green fodder for period of 270 days for milking animals @ 25 kg/day/animal	27000 kg	0.50/kg	13,500
b.	Green fodder for dry period of 95 days @ 15 kg/day/animal	5700 kg	0.50/kg	2,850
c.	Dry fodder for period of 270 days for milking animals @ 4kg/day/animal	4320 kg	1.5/ kg	6480
d.	Dry fodder for dry period of 95 days @ 2kg/day/animal	760 kg	1.50/kg	1140
	Concentrate for period of 270 days for milking animals @ 4kg/day/animal	4320	7.5/kg	32400
	Concentrate for period of 95 days for animals @ 1 kg/day/animal	380 kg	7.5/kg	2850
B	Equipments @150/animal	4	150	600
C	Cattleinsurance @ 4.5% of the cost of animals	4	1200	6000
D	Veterinary aid (Rs. 500/animal/year	4	500	2000
E	Labour	1/2 labour/day	60/day	10920
F	Miscellaneous expenditure	4	500	2000
.	Total recurring cost			78,780
.	TOTAL (Non recurring + Recurring)			3,04,280

Income - expenditure statement

Year	I	II	III	IV	V
Milk production (14/lit/cow/day)	15120	15120	15120	15120	15120
Sale of milk (Rs. 13/lit)	1,96,560	1,96,560	1,96,560	1,96,560	1,96,560
Sale of manure (Rs. 700/cow)	2800	2800	2800	2800	2800
Gross income	1,99,360	1,99,360	1,99,360	1,99,360	1,99,360

Cash flow statement :

Particulars	I	II	III	IV	V
Cash inflow (A)					
Bank loan	1,69,125	-	-	-	-
Income	1,99,360	1,99,360	1,99,360	1,99,360	1,99,360
Total inflow	3m68,485	1,99,360	1,99,360	1,99,360	1,99,360
Cash outflow (B)					
Capital cost	2,25,500				
Recurring expenditure	78,780	78,780	78,780	78,780	78,780
Repayment of loan	53,274	49,384	45,494	41,604	37,714
Total outflow	3,57,554	1,28,164	1,24,274	1,20,384	1,16,494
Cash balane	10,931	71,196	75,086	78,976	82,866
Average profit / year					63,811

Repayment schedule of loan :

Total loan	:	Rs. 1,69,125
Repayment period	:	5 years
Rate of interest	:	11.5 %
Instalment amount	:	33,825

Year	Principal	Repayment instalment	Interest	Total	Balance
I	1,69,125	33,825	19,449	53,274	1,35,300
II	1,35,300	33,825	15,559	49,384	1,01,475
III	1,01,475	33,825	11,669	45,494	67,650
IV	67,650	33,825	7,779	41,604	33,825
V	33,825	33,825	3,889	37,714	00000
	Sum	1,69,125	58,345	2,27,470	

The Net cash flow in the project is likely to be as above.

The economic viability of project is judged in terms of discounting and un-discounting methods. Discounting method is more reliable than un-discounting. Discounting is the process by which the time the present value of the future income can

be known and it assessed by knowing Benefit Cost Ratio (BCR) and Net Present Value (NPV). However, it needs more time and calculations. Un-discounting method is quite simple and it includes following measures.

1. Pay back period (PBP) : This refers to the time taken by the project to recover initial investment. For viability of project it should be least. It is generally used for ranking the projects. The preference of the project is based on the lesser payback period.

$$PBP = \frac{\text{Initial investment}}{\text{Net income per year}} \text{ i.e. } \frac{2,25,500}{63,811} = 3.53^*$$

* It means that proponent can free from initial investment (fix deposit) in 3.5 years.

2. Average Debt Service Ratio (DSCR) : It is the ratio of net profit to annual repayment of loan. When it is more than 1 it is considered as viable.

DSCR :

Particulars	Year - I	Year - II	Year - III	Year - IV	Year - V
Net profit (A)	10,931	71,196	75,086	78,976	82,866
Repayments of loan (B)	53,274	49,384	45,494	41,604	37,714
DSCR = A/B	0.20	1.44	1.65	1.89	2.19
Average DSCR	**1.47**				

The average is 1.47. The project is economically and technically viable.

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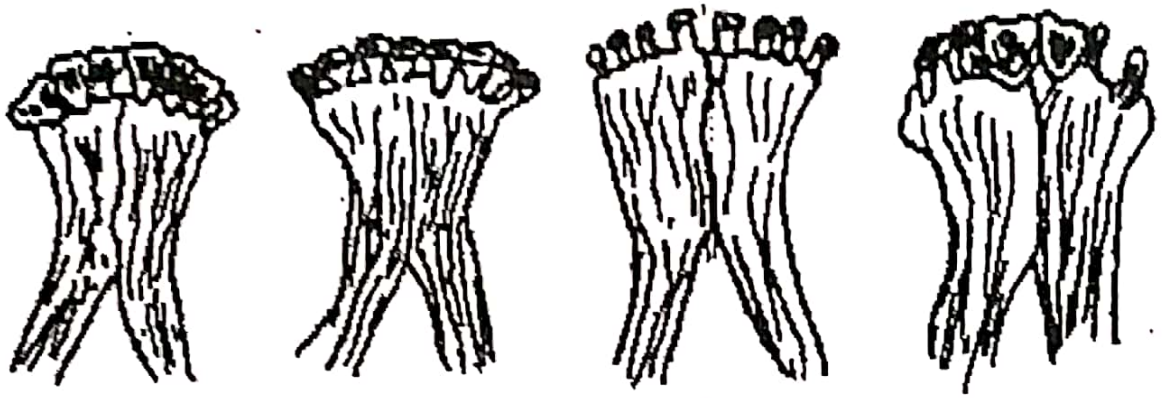
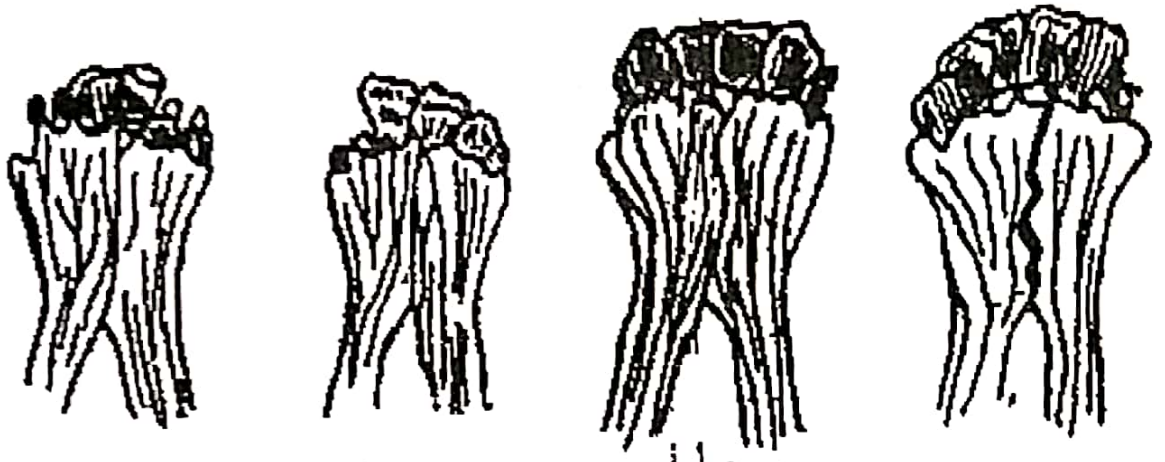
EXERCISE NO. 16 :
TITLE : **VISIT TO DAIRY FARMS**

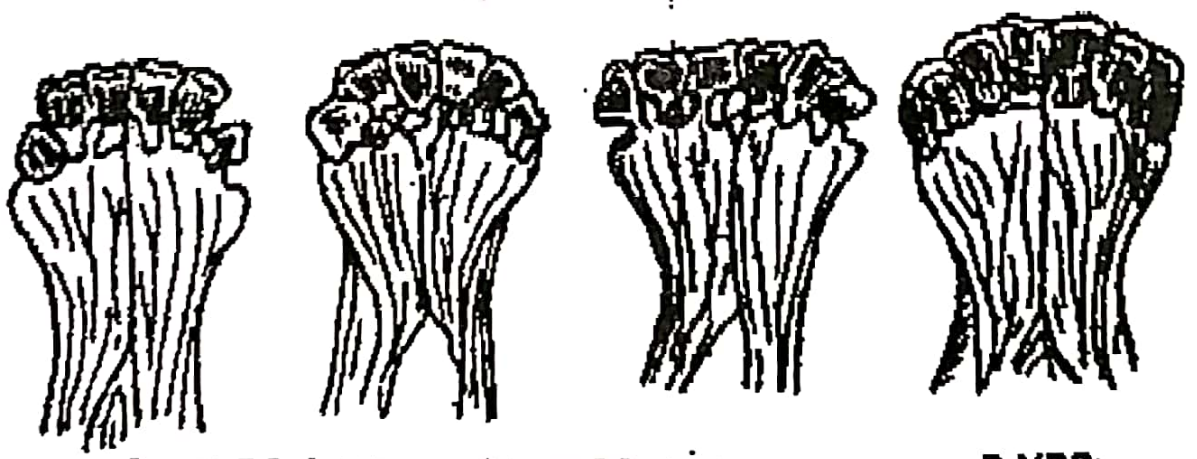
TYPES OF TEETH, THEIR ERUPTION AND WEARING OUT STAGE OF DIFFRENT AGE OF ZEBO CATTLE



3—4 MONTHS | 6—8 MONTHS | 1 YR. 3 MO. | 1 YR 9 MO



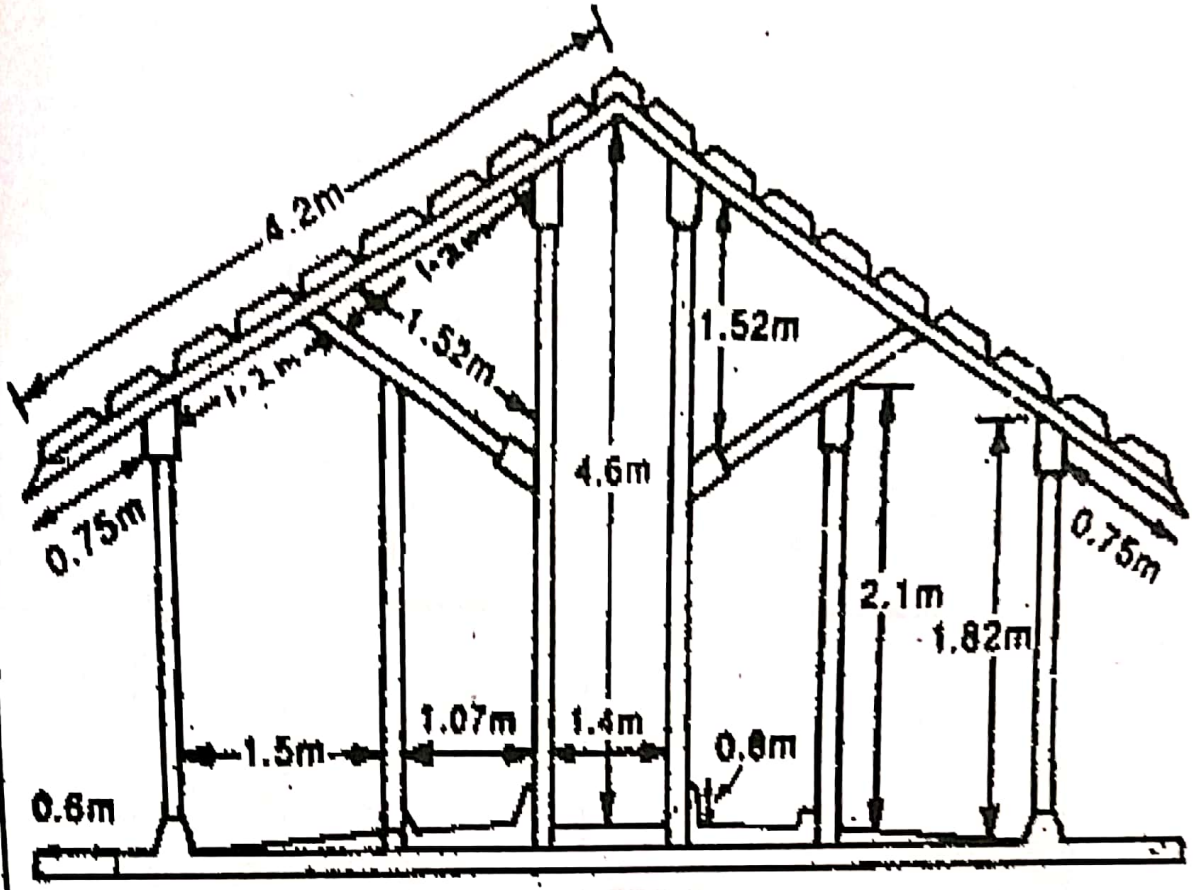
2 YEARS TO 2 YEARS 3 MO.



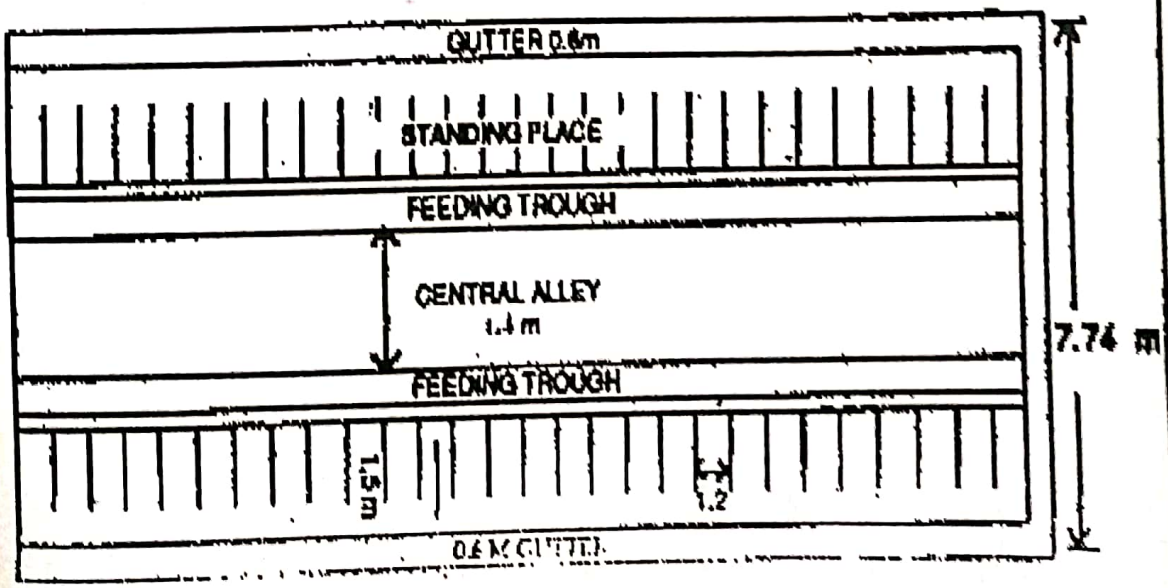
2 YEARS 6 MO.TO 2 YEARS 9 MO | 3 YRS

3 YEARS 3 MONTHS | 9 YEARS

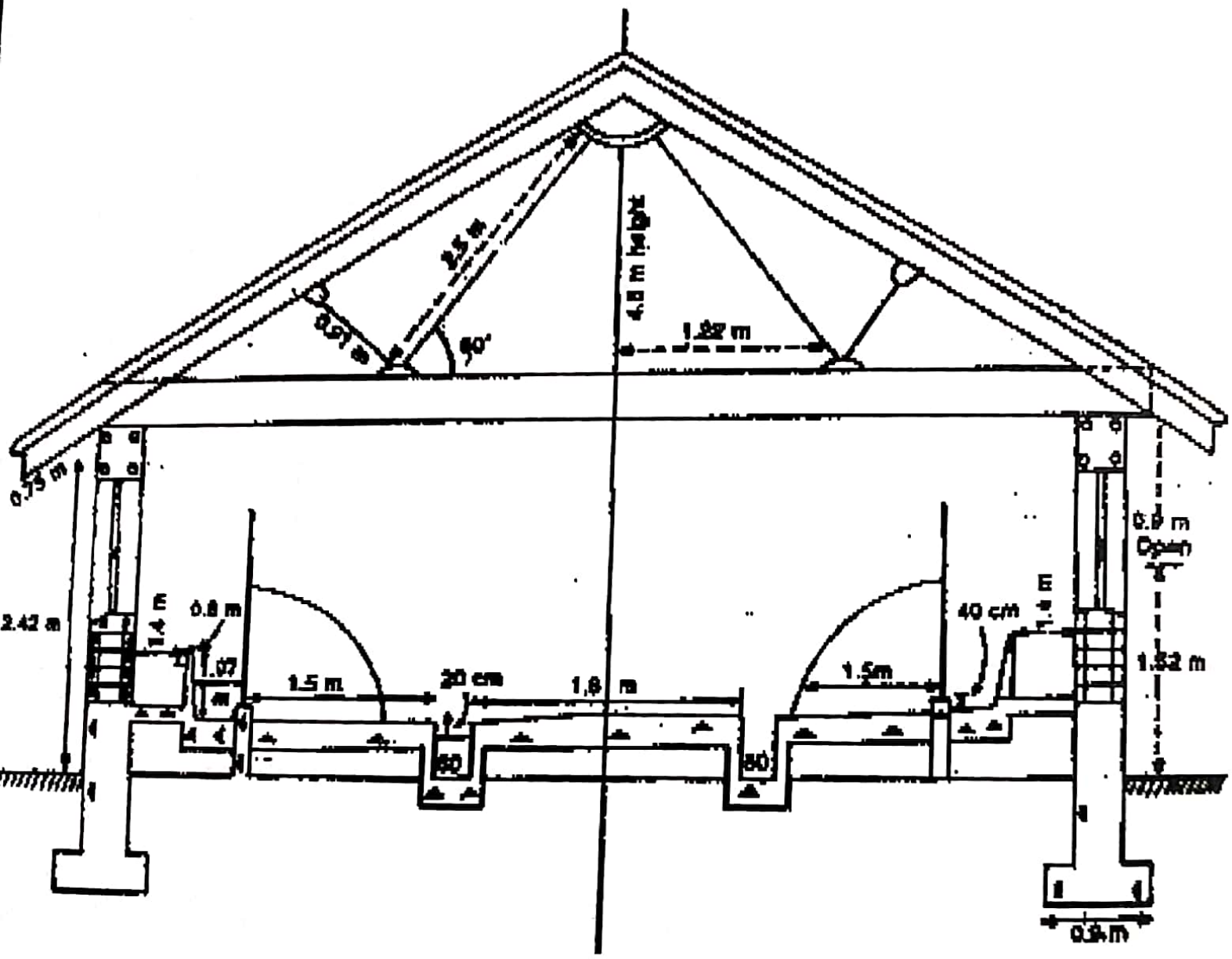
SECTIONAL VIEW OF HEAD TO HEAD BARN



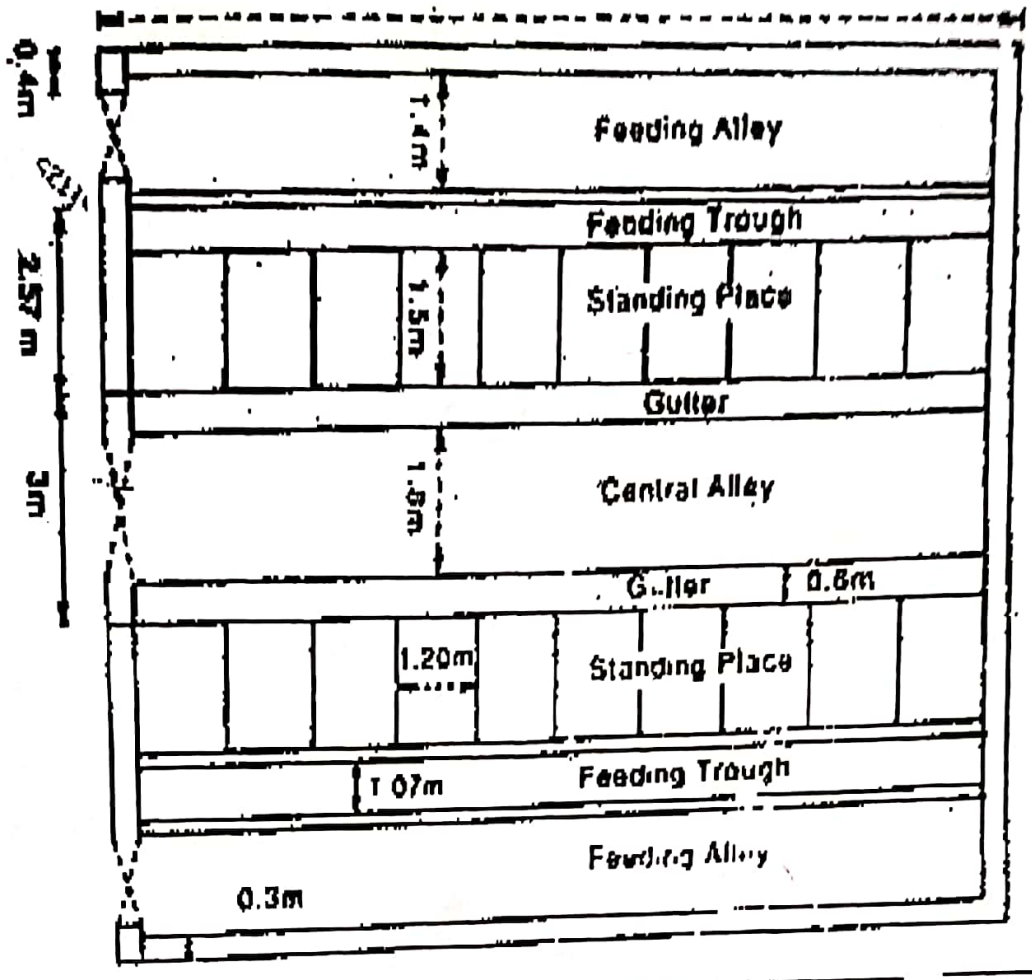
TOP VIEW OF HEAD TO HEAD BARN



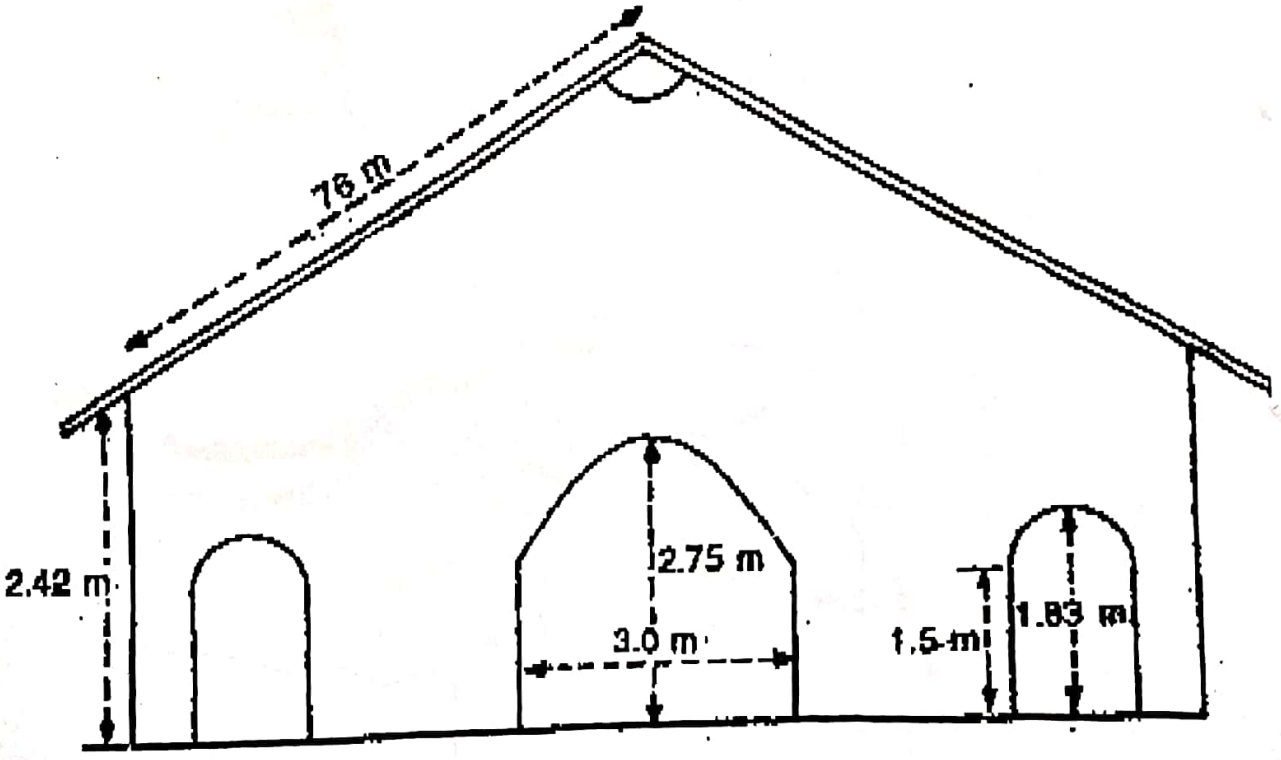
SECTIONAL VIEW OF TAIL TO TAIL BARN



TOP VIEW OF TAIL TO TAIL BARN

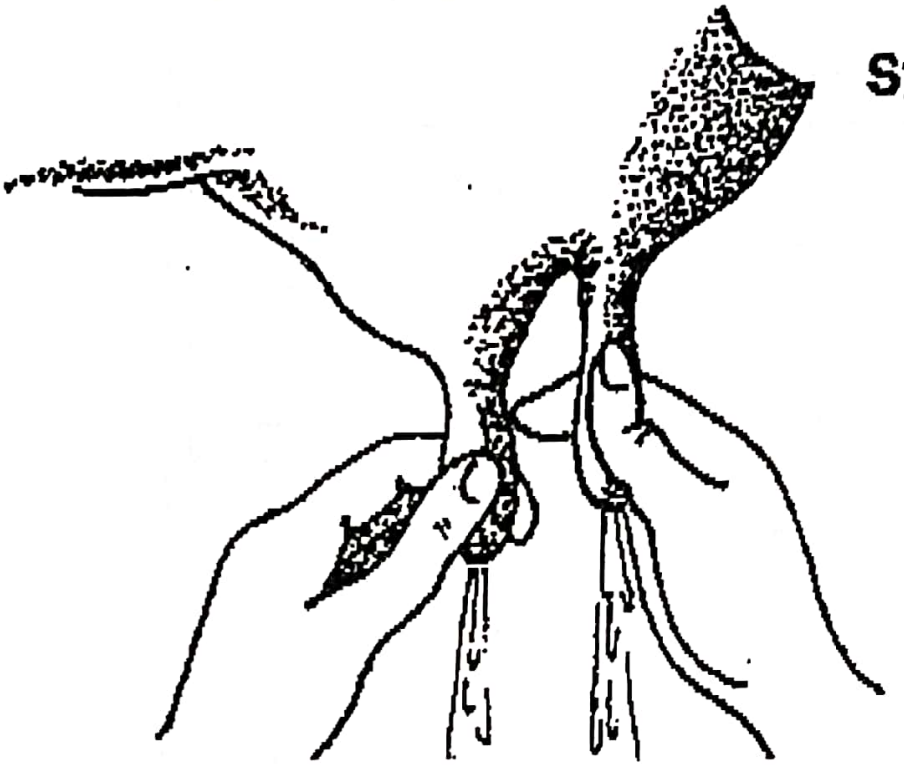


FRONT VIEW OF TAIL TO TAIL BARN

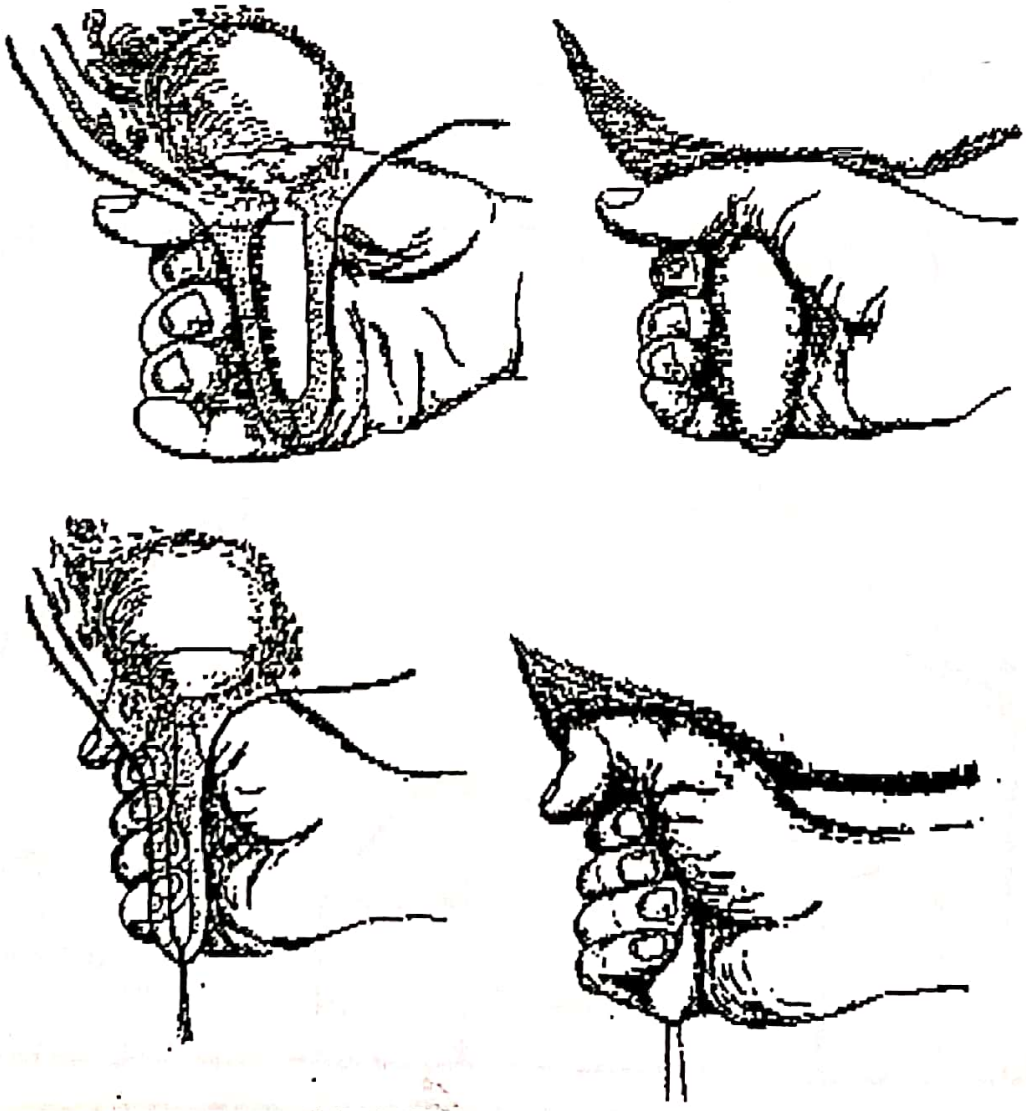


METHOD OF MILKING

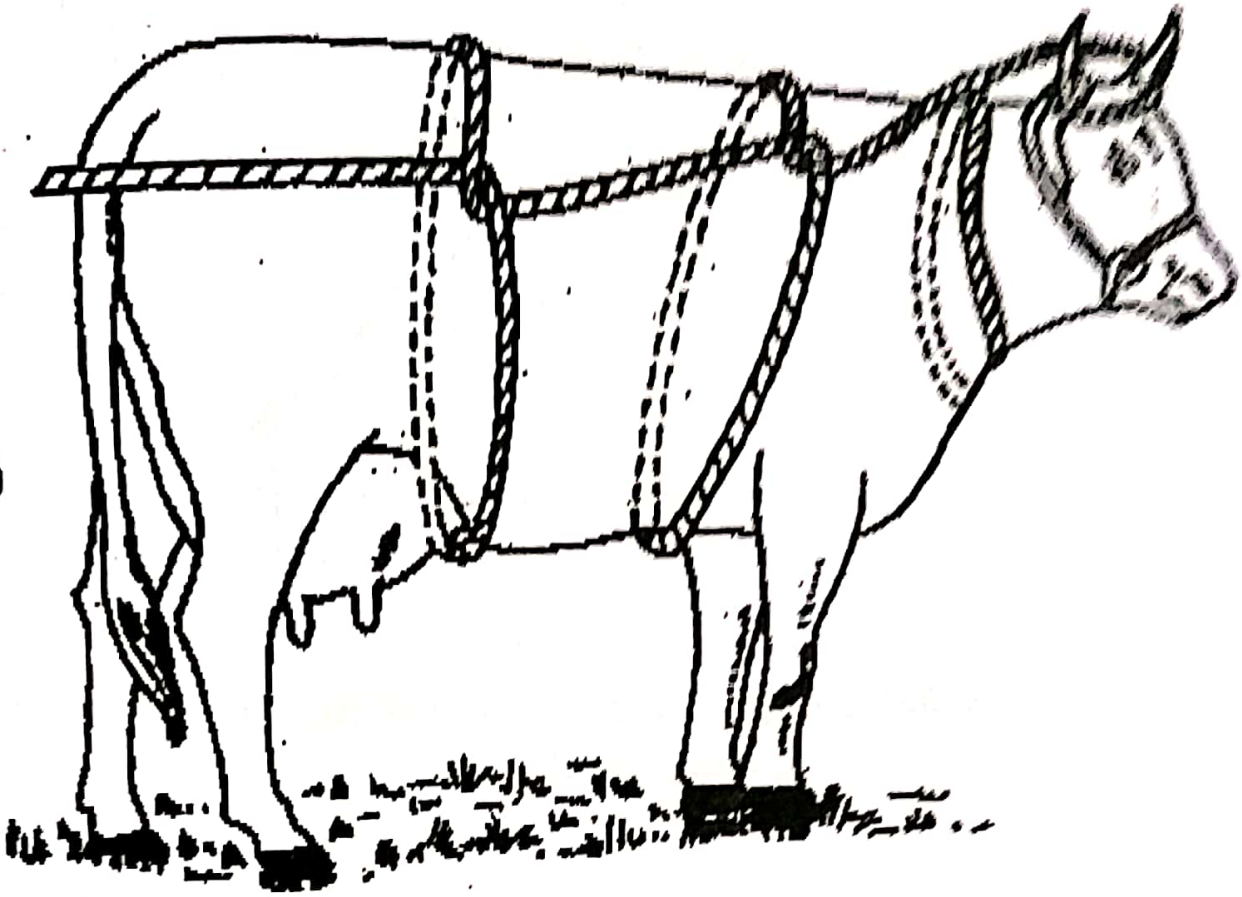
Stripping



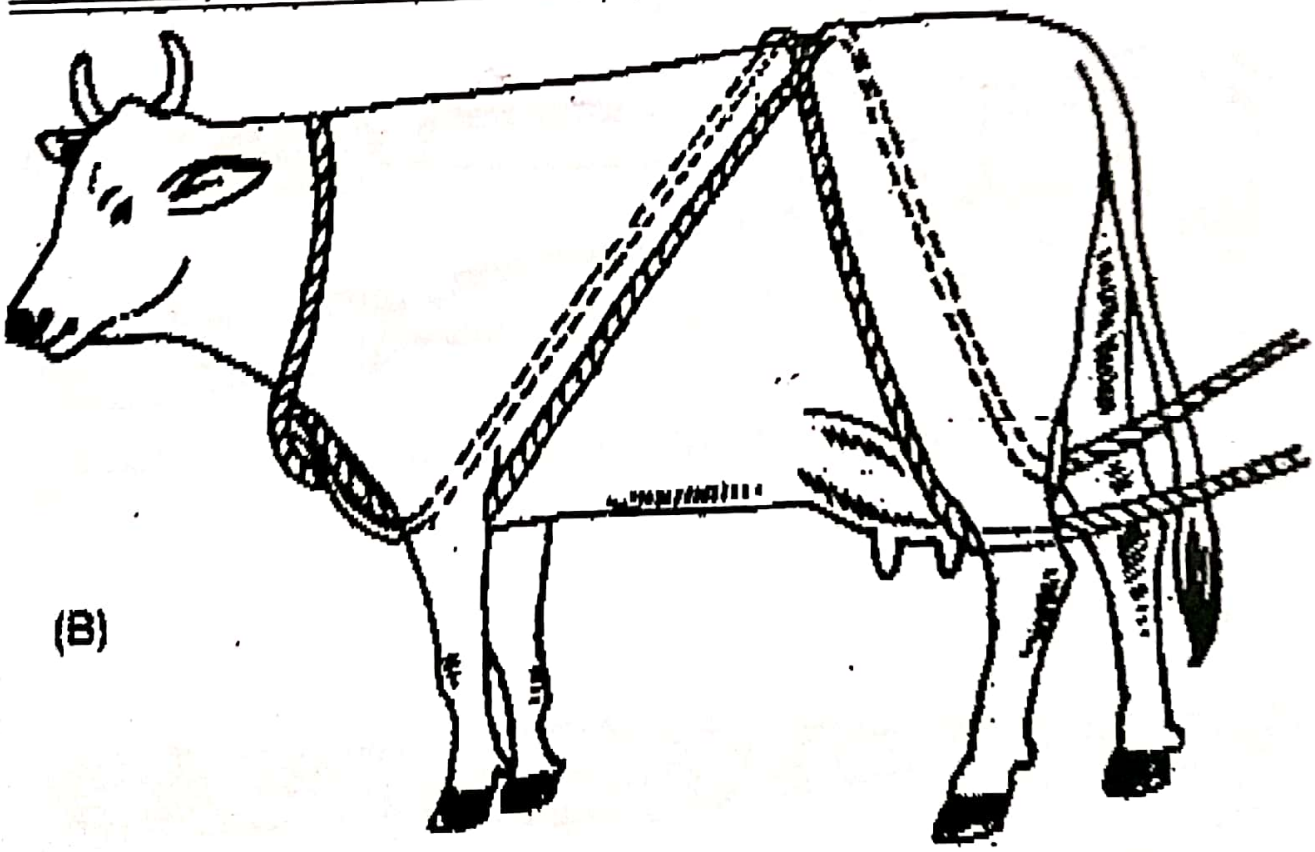
Full - hand Milking



CASTING OF THROWING OF ANIMAL

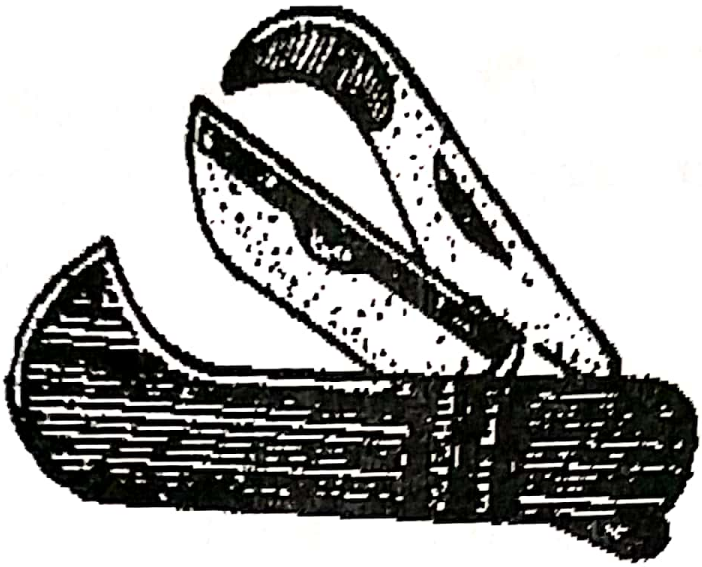


(A)

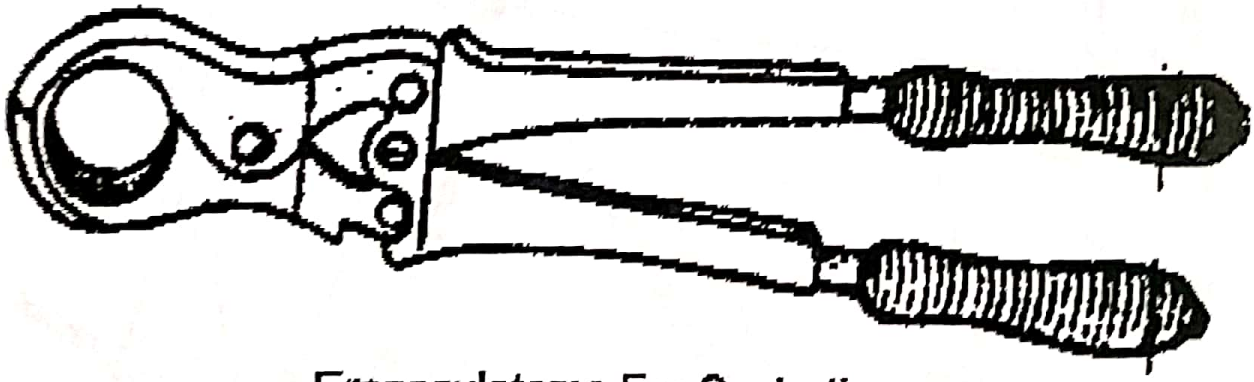


(B)

TOOLS FOR CASTRATION



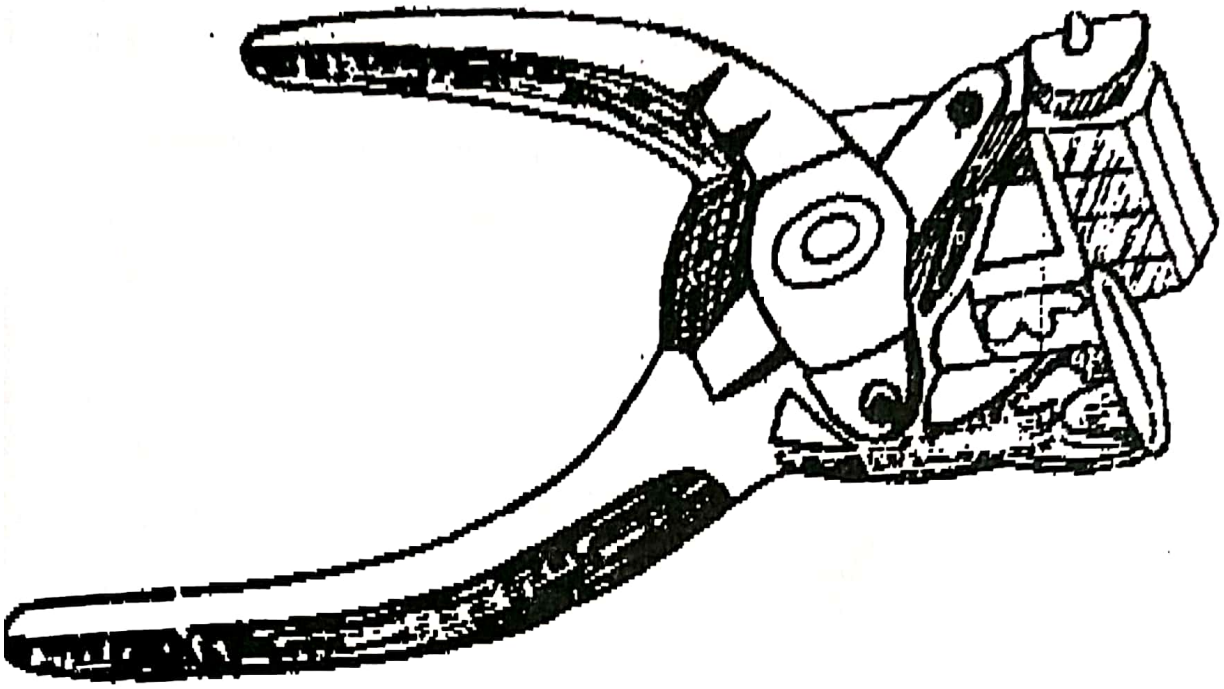
Castrating Knife with Doumle Blade
Scalpel And Hook



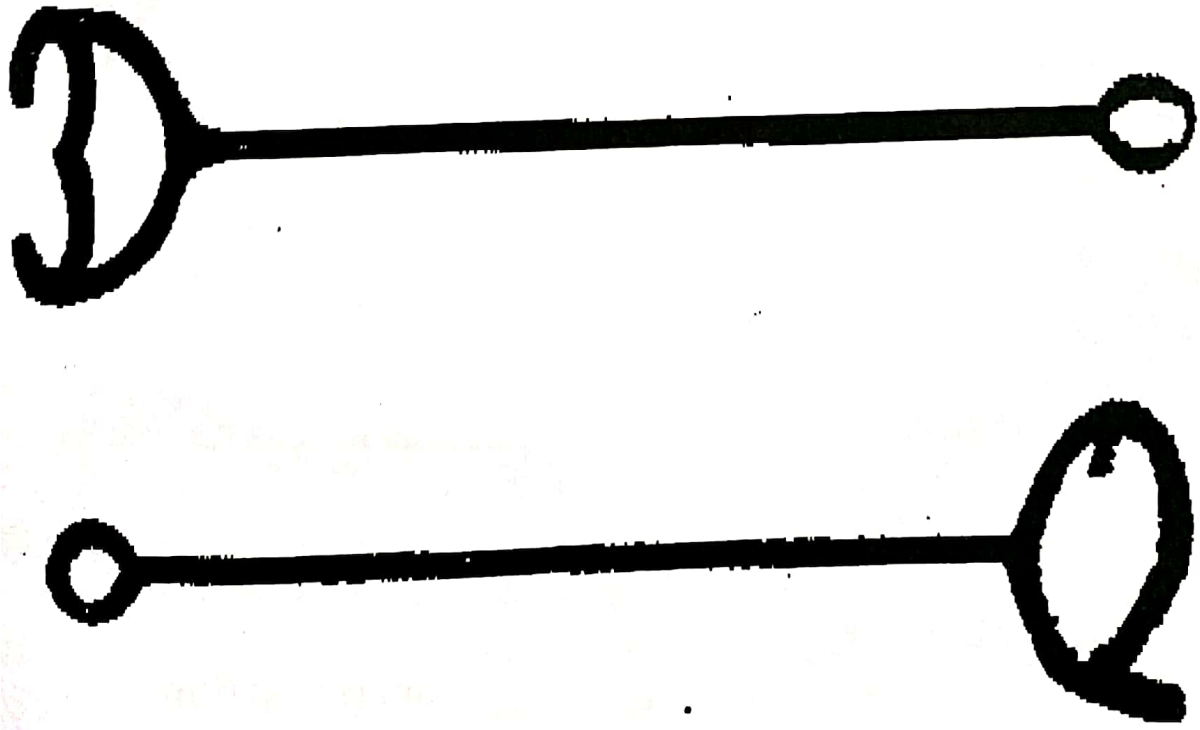
Emasculatome For Castration

Scalpel

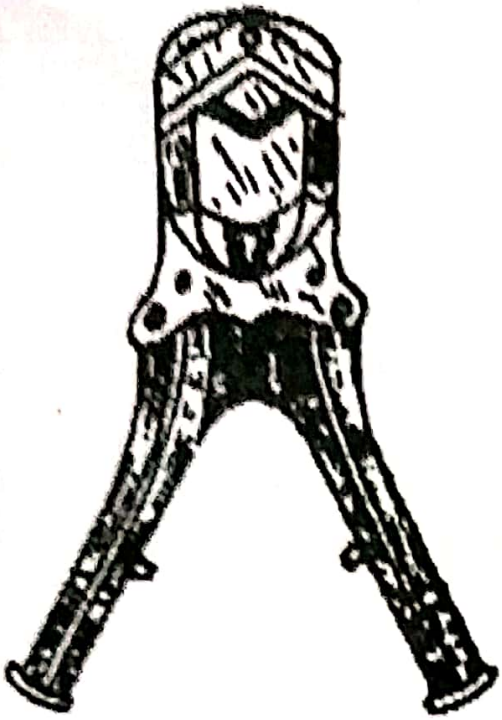
TATOOING SET



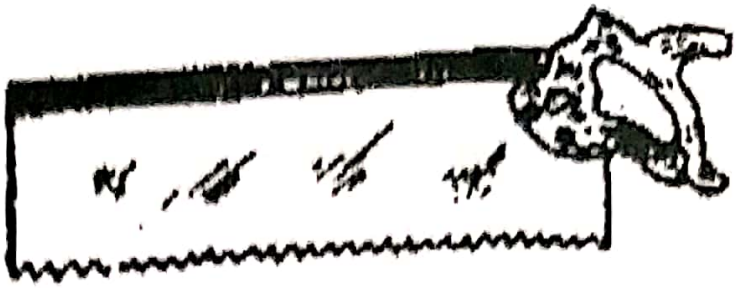
BRANDING IRON



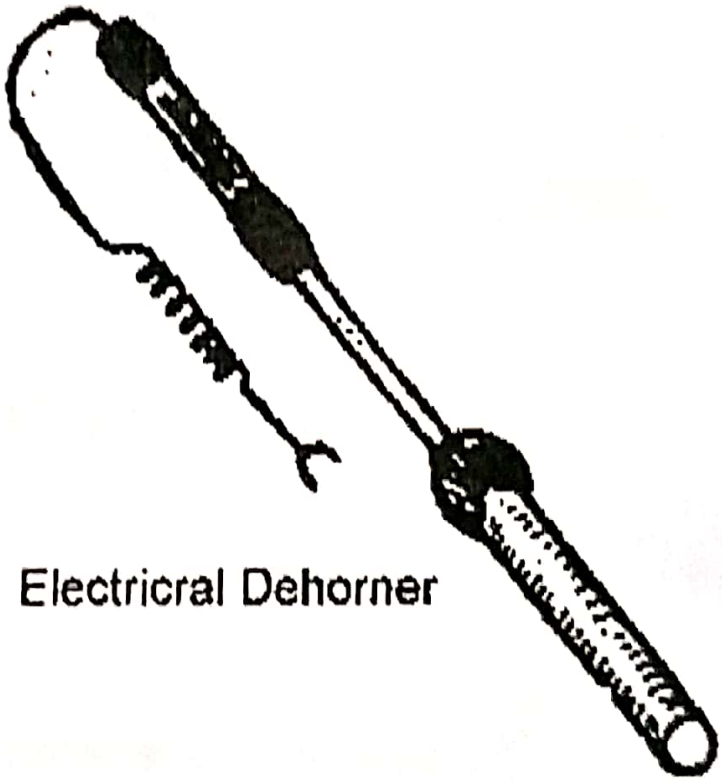
INSTRUMENT FOR DEHORNING



Simple Dehorner



Dehorning Saw



Electricral Dehorner

Mechanical Dehorner

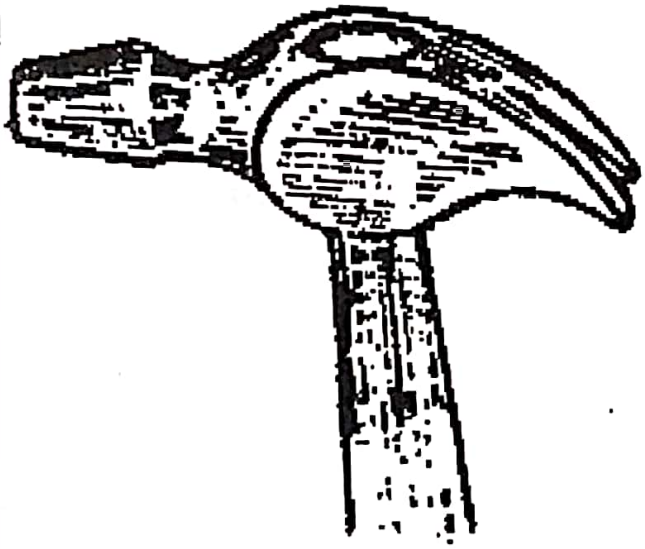
Dehorning Saw

TOOLS FOR TRIMMING HOOVES

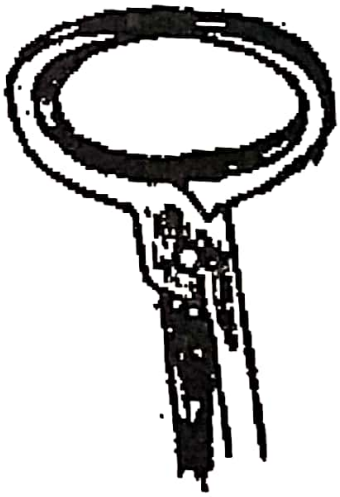
(A)
Hoof Knife

(B)
Toeing Knife

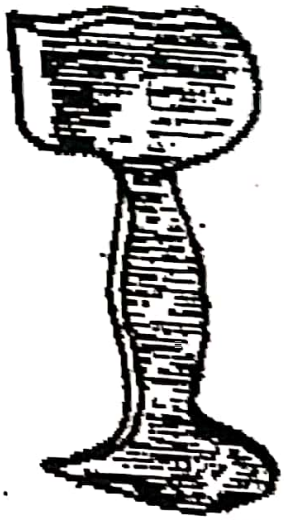
(C)
Hoof Trimmer



(D)
Driving
Hammer



(E)
Fincers



(F)
Buffer

(G)
Front Quarter