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COLLEGE OF AGRICULTURE, MUKTAINAGAR, DIST- JALGAON.

COMPLIED BY

PRACTICAL LABORATORY MANUAL

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LIVESTOCK PRODUCTION AND MANAGEMENT

COURSE NO. : AHDS -111

CREDITS: 1+1=2

DIVISION OF ANIMAL HUSBANDRY AND DAIRY SCIENCE

ACADEMIC YEAR: 2019-20

CERTIFICATE

This is to certify that,

Mr. /Ms_____

Registration No._____ has completed the practical of course no. AHDS-111 (Livestock Production and Management) as per syllabus of B.Sc. (Agri.) First year, I semester in the laboratory of Division of Animal Husbandry and Dairy Science, College of Agriculture, Pune as prescribed by M.C.A.E.R. Pune.

Place: Muktainagar.
Date: / /

Course Teacher

Course No. : ASDS-111
Course title: Livestock Production and Management

Livestock Production and Management

Course No: AHDS - 111 **Semester: I**

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Exercise No. 01.

Title: Study of external body parts of Cow and Buffalo

1. Objectives:

1. To be acquaint and distinguish the species, breed and individual phenotype
2. To find out external abnormalities
3. To know usefulness and functions of each parts

2. 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.

- Be careful and cautious while approaching the animal.
- Do not forget to win its confidence.
- Carefully restrain the animal in Travis or create.
- Do not excite the animal.
- Beware of the vices of the animals.

3. Material required:

- Live specimen cow/buffalo
- Rope
- Travis/crate
- Green or dry fodder, concentrates and ration
- Peg
- Measuring tape
- Photograph/ chart/model cattle/buffalo

4. Procedure: 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 instructor.
- Memories the parts of the animal body.

Table: Body parts of a cow

A. Head	B. Neck	C. Body	D. Limbs/Quarters	
			Fore Quarter	**Hind Quarter**
1. Horn	1. Neck	1. Withers	1. Hump	1.Sacrum
2. Head	2.Neck crest	2. Back	2. Shoulder	2. Rump
Crest/Poll	3. Dewlap	a. Chine	3. Blade	3. Pin bone
3. Face	4. Brisket	b. Loin	4. Arms	4. Thigh
a. Fore head		c. Hollow of flank	5. Fore arms	5.Tail
b. Nostrils		3. Hip bone	6. Knee joints	6. Milk veins
c. Muzzle/muffle		4. Chest	7. Shank	7. Milk Mirror
d. Mouth		5.Abdomen	8. Pastern	8. Udder, Teats
e. Eyes			9.Fetlock	9. Anus
f. Cheeks/chin			10.Coronet	10. Vulva
g. Ears			11.Hoof	11. Scrotum
			12.Dew claws	12. Sheath

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

1. **Horns**: They are in pair and situated on head, functions are
   a. Self defense b. Age estimation c. graceful appearance 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 month has following sub parts.

a. **Fore head**: The portion between the lines of head crests and line of two eyes is called fore head.

b. Nostrils/nose: This includes the central bridge, starting from central 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. Muffle/muzzle: This includes the muzzle, which is black portion with grayish spots above the upper tip. Muzzle indicates the general health condition. During sound health it is moist.

d. Mouth: It is opening for intake of fodder offered/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, lashed and eye lids. Appearance may be defined as bright, dull and sleepy.

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

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

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

B. Neck: This is the portion between head and body.

1. Neck crest: It is line between centers of poll to hump. 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.

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

C. Body: This portion situated between hump and sacrum.

1. Withers: Upper higher part .of shoulder is called wither. it is fleshy portion below the hump and above the shoulder is called as withers.

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. Hallow of flank: Triangular depressions just below the loin on both the sides.

3. Hipbone: The raised bone of hollow of flank is termed as hipbone situated on both sides. The distance between two bones indicates the development of reproductive organs in female.

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

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

D. Limbs/Quarters: It includes two. I. Fore quarter. II. Hind quarter.

I. Fore Quarter: 1be portion of this region has an importance in selecting the animal for draft quality.

1. **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/buffaloes.
2. **Shoulder**: Upper portion of front legs.
3. **Shoulder Blade**: Flat bones of the shoulder is called shoulder blade.
4. **Arms**: This is a portion of leg in between shoulder and point of elbow.
5. **Knee Joint**: This is a joint between fore arm and shank.
6. **Shank**: It is portion between knee and pastern.
7. **Pastern**: Portion between shank and fetlock.
8. **Fetlock**: The portion between pastern and coronet.
9. **Coronet**: Portion covered with hairs just above the hoof.
10. **Hoof**: Lower most hard portion of the leg is called hoof. There are two digits of the hoof. The gap between the digits is termed as "inter digital space". Hardback portion is heel. Front portion is toe and lower most flat portion is called as sole.
11. **Dew claws**: The hind fingerlike projections on back side of the fetlock joint are called as dewclaws.

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

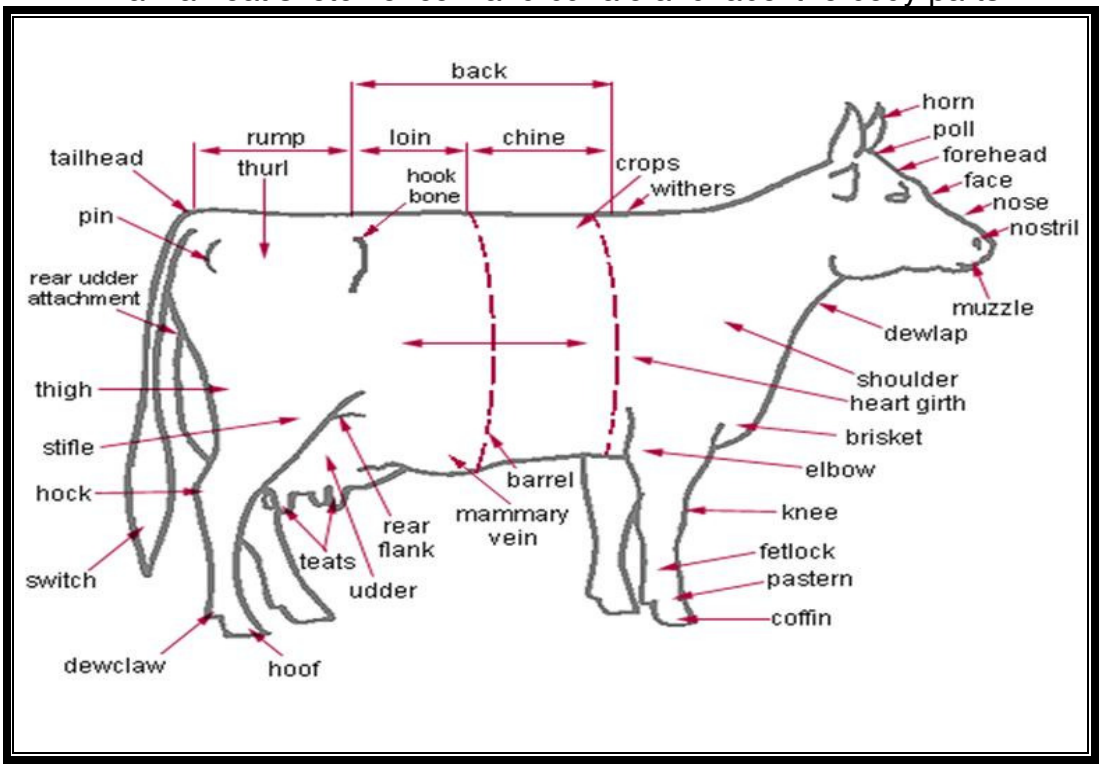
1. **Sacrum**: It is the portion extending from loin to the tail root.
2. **Rump**: It is the sloppy portion located between the sacrum and thigh.
3. **Pin Bone**: The two projections on each side of anus called pin bone.
4. **Thigh**: Thick and fleshy portion of hind legs in between rump and hock. Generally used for putting identification marks in animals by branding method.
5. **Tail**: It is a long whip like structure in continuation of vertebral column.

6. Milk Vein: A prominent Zigzag veins starting from heart to the udder. The veins get curved and bulged to the heart region with the depression is called as milk well.

7. **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.
8. **Udder**: Also known as mammary gland. Complete udder has four quarters; front two of quarters make fore udder while hind two make rear udder. Each quarter extended with tube like structure known as teat.
9. **Anus**: Extreme end of the elementary canal located below the base of the tail.
10. **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.
11. **Scrotum**: A male genital organ, which is a pouch like structure in between two hind legs, which accommodate testicles. It regulates the temperature for sperm production.
12. **Sheath**: It is a skin flap, which covers penis and attached to the body extended to naval flap. It protects the penis from external injuries.

5. Observations:

- Practices locating parts of the cow and buffalo.
- Draw a neat sketch of cow and buffalo and label the body parts.



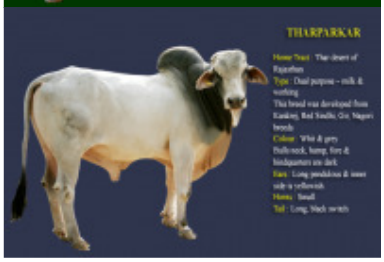
Indian Cow Breeds

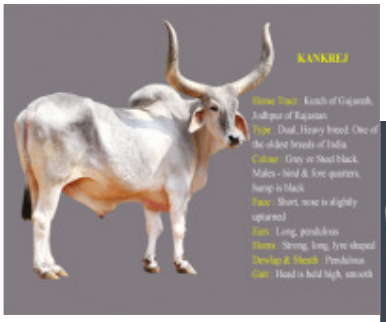
PONWAR NAGORI NIMARI

KENKANTHA MALVI DANGI

KHALLARI AMRITMAHAL KRISHANA


GANGATIRI


THARPARKAR


KANKREJ


DEONI

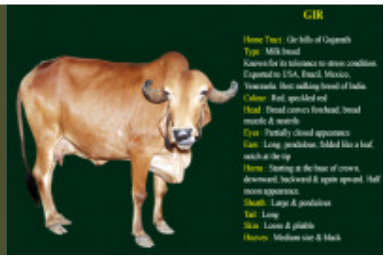

LAL KANDHARI


GAOLAO


SAHIWAL


SINDHI


RATHI


GIR


VECHUR


KERIGHAR

BUFFALO BREEDS

Murrah

Mehasana

Jaffarabadi

Surti

provided by D.V. Ambardekar

Pandharpuri

Nilli Ravi

Lab Work

Exercise No. 2
Routine management practices followed on Livestock farms

1. Objectives:

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

2. Relevant information: The livestock farm is the full time job, which start from morning and evening. The farm manager organizes 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 'person 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 agro climatic condition.

3. Precautions:

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

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

5. Procedure:

• Daily inspection	• A.I. of animals
• Cleaning of animals /byres /premises	• Cutting/chaffing of fodder
• Feeding of animals	• Trimming of horns
• Milking of animals	• Soaking of concentrates
• Grooming	• Dusting/spraying
• Exercise	• Preparation of concentrate mixture
• Disposal of milk/milk products	• Repair of equipments
• Care of calves	• Clipping of hairs

• Providing water to the animals	• Grazing of animals
• Dehorning.	• Preparation of concentrate mixture
• Castration	• Grazing of animals
• Vaccination/treatment	• Detection of heat
• Deworming	

6. Observation:

1. Kind of farm, specialized/Mixed.
2. Number of animals.
   - A) Male
   - B) Female - a) Milch
     b) Dry
     c) Pregnant
   - C) Young Stock- a) < 6 Months
     b) 6 months to one year.
     c) >1 Year.
   - D) Bulls
   - E) Bullock
   - F) Staff employed - a) Ministerial
     b) Supervisor (Agri.)
     c) L.S.S.
     d) Farm Labourers.
   - G) Routine workers.

7. Question:

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.

Lab Work

Exercise No. 3
Title: Methods of handling and restraining of animals

1. **Objectives**: To control the animal for examination, treatment and operation like castration.
2. **Relevant information**: Farm animals are required to be handled for various purposes e.g. examining their health, milking, and displacement, grooming, judging etc. One has to follow scientific methodology in approaching the animal and win its confidence so that the animal will not get excited. Handling of animal will be without trouble
3. **Precaution**:
   - While approaching the animal follow scrupulously the hints given for the purpose.
   - Do not over confidence with animals.
   - Take care of communicable disease of animal.
4. **Material Required**: Rope, fixed pole, Travis, mouth gags.
5. **Procedure**:
   1. Secure the animal.
   2. Bring it into the Travis. If Travis is not available tie the animal 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 call1ng 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.
6. **Examine**: 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 with easily.

B. Bull holders:

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

C. Nose String:

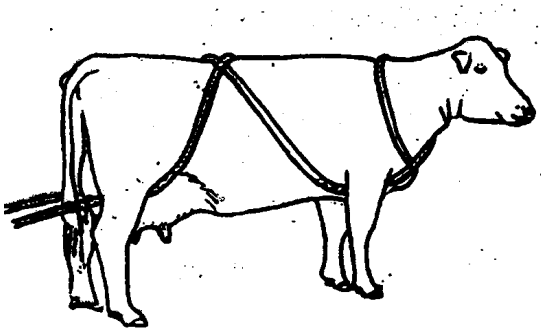
1. It is cotton rope of sufficient thickness and length.
2. A hole is made into anterior part of the nasal septum by sharp and sufficient thick needle or even with a pointed stick.
3. After making a hole, string is passed through it and tied behind the horns at the pole.
4. Apply tincture iodine to the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

D. Nose ring:

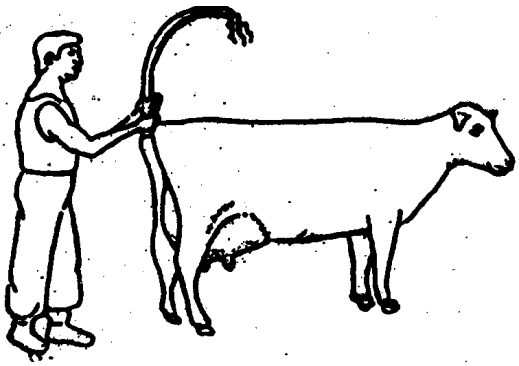
1. It is a copper, brass or stainless steel ring of approximately 8mm in thickness and 6-8 cm in diameter.
2. It is inserted in nasal septum.

Use of cotton rope:

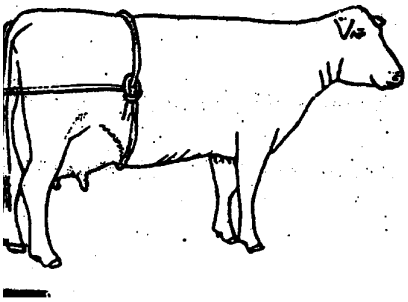
1. Sizable cotton rope (8 knot) is applied above the hock before milking or examination of udder.
2. **For Lifting fore Limb**: A knot is given above the fore limb and pass the rope either front or back side of the hump or withers and pull the rope so that limb is lifted and fixed at the knee. If required tie ,a rope around the canon and fore arm till examination.
3. **For lifting hind limb**: The over fetlock 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.
4. **Casting**: It is the last resort to control the animal by which animal can be controlled perfectly.
5. **Use of hand**: Lower jaw of animal should be caught by keeping thumb in the dental space and other fingers grasping lower side of jaw by left hand and caught the base of horn tightly by right hand. Small animals can also be controlled by this way.
8. **Observations:** Draw the figure of bull ring, nose string, halters and lifting of hind leg.



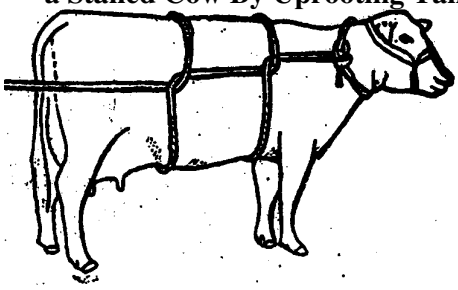
An Alternative Method Of adjus1lng the rope for Castrating Cattle



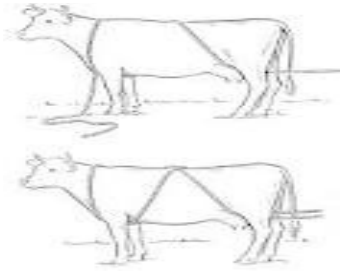
Restraint Of Hind-Limb movement in a Stalled Cow By Uprooting Tail



Udder kinch

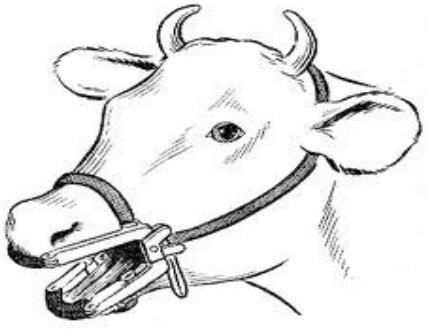


Reuff's Mthod of casting



Burley Method

Bull Holder



Speculum examination

Halter

Halter

Nose ring

Exercise No. 4 a.
Title: Identification of animals

1. **Objective**: To establish the identity to animals.
2. **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:
   - Identifying the animal if lost or stolen
   - Recording the details of animal in respect of breeding, feeding, management and treatment.
   - Pedigree of the animal tracing back to its ancestors becomes easy and accurate.

3. Precautions:

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

4. Material Required :

1. Tattooing ink	2. Travis
3. Tattooing set	4. Cotton
5. Tags and strings.	6. Spirit
7. Branding number (Cold)	8. Iodine
9. Branding ink	10. Zinc oxide in oil
11. Hot branding number	12. Notching punch
13. Rope	14. Cotton
15. Spirit	16. Iodine
17. Zinc oxide in oil	18. Notching punch

5. **Procedure**: There are different methods of identification of. Animals. They are as under,

A. Tattooing:

1. Find out and decide the number to be allotted.
2. Arrange the desired numbers on the tattooing forceps.
3. Check this number on the piece on 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 spirit to remove d1rt and ear-wax.
7. Sterilize the numbers fixed on tattoo set by using spirit.
8. Apply some ink on the numbers.
9. Hold the tattooing forceps with pad out side and tattoo number inside the ear.
10. Press the handle with gentle pressure stopping at click 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 fill up 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 left 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 pore it in a shallow porcelain dish or enamel pot.
4. Dip the number on the thigh till a clean impression of number is made.

5. 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 a.n1lnal 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-piercing 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-piercing tag directly with the help of forceps keeping
5. The number visible outside of the upper edge of the ear.
6. Keep the number neither tight nor swinging loose on the ear.
7. Apply tincture iodine to wound to prevent infection.
8. In case of non-piercing tag, make the hole on upper edge of the ear close to head.

F. Notching of ear:

1. Steri1ize the side ear punch and central ear punch or pair of sharp scissors of pincering.
2. Clean the ear with the he1p of cotton spirit.
3. Side ear notches 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 notches 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.

6. Observations: Following observations are to be recorded:

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

7. Questions:

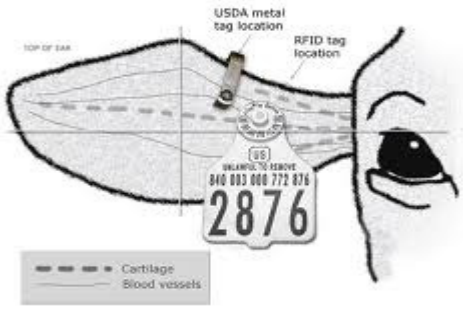
1)Name different methods of identification.
2)Name the system of allotting the numbers at your farm.
3)Why is spirit used for cleaning of ear?
4)Why precautions are necessary in branding notching and tagging.
5)Difference between hot and cold branding.

Tagging

Ear Tags

Ear tags

Ear tag with forceps



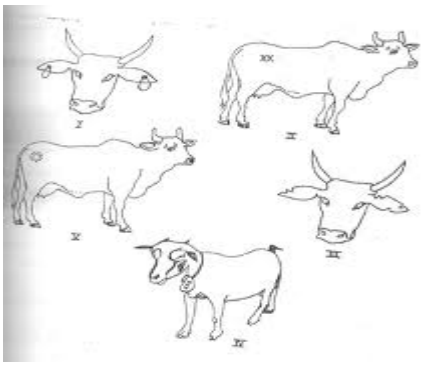
Metal tag & Plastic tags

Tattooing forceps

Tattooing forcep

Tattoo in ear

Branding



Branding

Cold branding

Ear tagging

Freeze branding

Exercise No. 4 b.
Title: Dehorning of animals

1. Objectives :

a. Easy and safe handling of animals.

b. To protect the animals against injury.

2. Relevant Information: Often injuries are caused to self, other animals and owner or handling persons by homed animals. Also horned animals require more space. Hence, animals are dehorned at early age so as to overcome above mentioned demerits. It can be effected by mechanical, chemical, electrical or Rubber band method. However, farmers on account of show and identification of the animals do not prefer dehorned animals.

3. Precautions :

a. Dehorning should be done before 7 days of its age.

b. Choose appropriate method and master it.

c. Handle the young one carefully while dehorning.

d. Avoid injury due to excess dehorning process.

4.Material required :

A. Chemical method:

a. KOH sticks and holder

b. Scissors

c. Cotton wool

d. Dusting powder.

e. Tray

f. Suitable bedding

g. Surgical spirit.

B. Mechanical method:

a.Mechanical dehorning clippers (horn princer) and saw.

b.Bandage.

c.Cotton wool.

d.Surgical spirit.

e. Pine tar.

f. Sulpha nelamide powder.

C. Mechanical method:

a) Electrical dehorner

b) Scissors

D. Rubber band method:

a.Tight rubber bands.

b.Scalpel.

c.Elastrator.

Of these methods, the convenient and easy method widely adopted is chemical method.

5. Procedure:

A. Chemical method:

a.Secure calf and throw gently on the bedding.

b.Turn the head slightly towards the operator.

c.Locate the horn bud.

d.Clip the hair two cm all around the horn bud.

e.Rub the horn bud with a cotton wool soaked in surgical spirit.

f.Apply Vaseline in a ring shape around horn bud.

g.Hold KOH stick on the holder or with a piece of paper cotton or wet tip.

h.Rub it briskly in clockwise motion on the horn bud.

i.Stop it as soon as entire rubbed surface becomes reddish in appearance.

j. Wipe the surface with cotton.

k. Put some disinfectant powder.

l. Repeat the same procedure for other side horn bud. 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 castrated on ground. The horn Pincer/saw clipper is used to cut the horn. Carefully the horns are spinced. The wound is covered with sulpha nelamide powder mixed with iodophors or it may be treated with pine tar or cotton soaked in pine tar and then bandaged.

7. Precautions:

a.Apply the dehorning instrument near the head of the horn.

b.Dehorning is done in hot and rainy weather must have a follow up to avoid infection.

c.Dehorning should not be done at an early age to avoid scar formation.

d.To minimize or to arrest bleeding the horn artery may be tighten with a silk thread.

e.Sanitary precautions must be observed.

C. Electrical methods:

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℃). The horn is cauterized by applying red-hot tip to the electronic dehorner just for *B*10 see till the golden colour appears at the site of cauterized 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 w1ll set out and fall because tight rubber ring w1ll shut off the blood supply to the horn. It is not a dependable and satisfactory method.

8. Observations:

a. No. of calves.

b. Breed.

c. Date of birth and age.

d. Growth and nature of horn bud or horn.

e. Bleeding if any and treatment given

f. Time taken and dehorning.

g. Time taken to dry off completely.

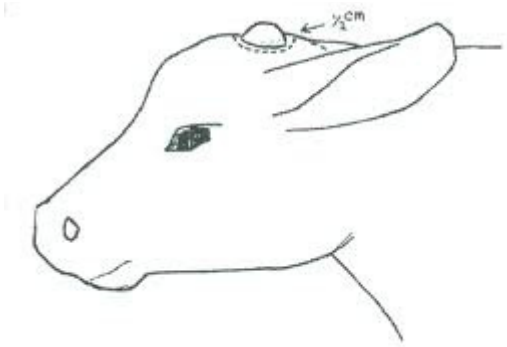
9. Questions:

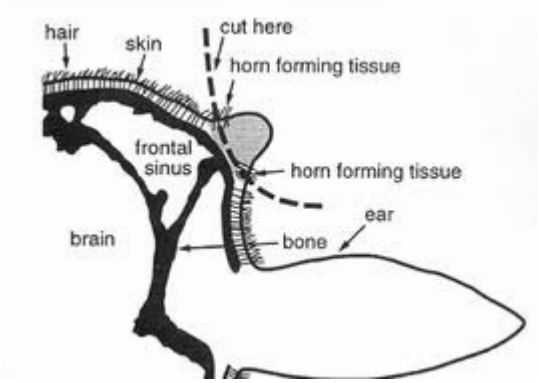
a. Name different methods of dehorning.

b. Why is it advisable to dehorn calves when young?

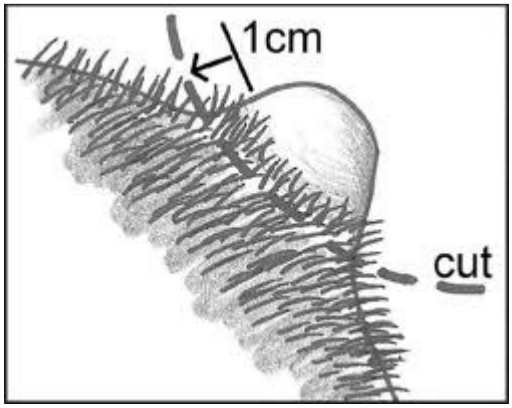
c. Why is Vaseline applied around the bud?

d. List the advantage and disadvantages of dehorning.





Growing horn bud



Exercise No. 5.

Title: Recording of pulse rate, respiration rate and temperature of animal body.

1. **Objectives :**
   - **a.** To know normal health status of animal
   - **b.** To know normal physiological process of animal.
2. **Relevant information:** Amongst the physiological norms to understand the health, recording pulse, respiration and temperature and study them with normal, which gives a quick clue regarding ill health of animal.
3. **Precautions:** While recording pulse, respiration and temperature it should be recorded without disturbing the animal and the man along with instrument.
4. **Material required:** Animal, travis, antiseptic solutions, cotton & Vaseline.
5. **Apparatus**: Clinical thermometers, stethoscope.
6. **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.

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 angles 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, palnfl1.1· condition, severe hemorrhage and after exercise.
8. It is little just in very young and very old age and in hot weather.

Normal pulse rate/min.

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

B. Recording of respiration:

1. Secure the animal and put it into the travis and allow standing for few minutes quietly before recording respiration.
2. Put palm of the hand on the flank region, count how many times flank elevates/minutes, that is respiration rate or keep the hand in front of nostrils and count the expirations per minute-
3. Respiration rate is accelerated during and after exercise, excitement, very cold and very hot weather, 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. Females especially during pregnancy breathe faster than males.

Normal respiration rate / min.

Cattle	12-16
Sheep/Goat	10-20
Buffalo	15-20
Horse	8-16
Dog	20-50
Chicken	5-45

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 finger 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 mucus membrane.
8. Keep it for half 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 clinical and weather change has practically little influence on the temperature of animal.
10. Rise or reduction in normal temperature indicates disease condition.
11. Infectious diseases rise the body temperature.
12. Fluctuating temperature which does not return to normal indicates 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

7. Observations: Record the temperature, pulse and respiration or the animals of different categories.

Exercise No. 6.

Title: Preparation of feeding schedule and feeding of different categories of cattle and buffalo.

1. **Relevant information:** Feeding of animals has been regarded as an important art from old days which was developed with the practical experience of animal owners. Science feeding of livestock came in to practice about 100 years ago. Since then according to the body wt. of animal, maintenance ration, production and work ration were prescribed. In this way in order to meet the nutritive requirement the amount of feed offered to an animal in 24 hrs is called a ration. It may include dry fodder green fodder & concentrate mixture.

   Feeding of livestock for better growth, production & work following general principles has been followed.

   1. The ration of an animal should be balanced and feeding should be done at regular interval, generally 2-3 times in a day.
   2. This food material should contain straw, greens and concentrates so that animal may get all essential nutrients according to his body need.
   3. Ration should be palatable. The coarse fodder like jowar maize, kadbi should be chaffed grains should be crushed, soaked before offering to animals.
   4. The food requirement of animals is calculated on dry matter basis. Cattle consume 2.5 to 3 kg dry matter per 100 kg body wt.
   5. Out of total OM the requirement, 2/3 OM from roughages and 1/3 OM through concentrates.
   6. Individual feeding should be followed for high yielder.
   7. Animal should get additional clean, fresh supply of drinking water.

a) Feeding schedule for calves up to 3 months:

Importance of colostrums feeding: The first milk produced after / calving by a cow is called colostrums. Colostrums is a special formula of nature for starting the young calf. Each calf should be given colostrums as early as possible after its

birth and subsequently 2-3 times in a day for 3-4 days. Colostrums is rich in proteins, vitamins and minerals and other nutrients necessary to meet the need of a calf. Colostrums contain an antibody that helps to protect the calf from disease i.e. Disease resistant power is developed through the feeding of colostrums.

1) Colostrums is a rich source of proteins, (3 to 5 times more than nonnal milk) minerals like copper, iron, Magnesium & Mangnese (Cu,Fe, Mg, & Mn)
2) Rich source of vita A (5 to 15 times more than normal milk)
3) Acts as energy reservoir in the process of drying of birth coat of new born calf.
4) It has got laxative effect thereby the faecal material accurnilated in the alimentary canal is expelled out.
5) Development of antibodies which result in disease resistant power.

Therefore, it is, a nature's gift is calves first priority to calves then for other purpose colostrums should be fed @1/10th of Body weight

20 kg live wt. → 2 kg in 3/4 lots

Milk feeding schedule to calf,

- For first three weeks - 1/10th of body wt.
- For next two weeks - 1/15th of Body wt.
- Thereafter, 1/20th of body wt. up to 3 months after 2-3 wks small qty of calf starter Adlib qty of all good quality hay (Hanging in front of then)

Feeding of animals:

b) Feeding of Various categories of animals

Table 1. Daily Nutrient requirements for maintenance, Pregnancy and Lactation for Indian Cattle and Buffaloes per head per day (Ranjhan, 1991)

Body weight (Kg)	*Dry feed (Kg)*	*DCP (g)*	*TDN (Kg)*	*Ca (g)*	*P (g)*	*Carotene (mg)*	*Vitamin A (1000 IU)*
Maintenance of mature cows/ Buffaloes							
200	3.5	150	1.7	8	7	21	9
250	4.0	170	2.0	10	9	26	11
300	4.5	200	2.4	12	10	32	13
350	5.0	230	2.7	14	11	37	15

400	5.5	250	3.0	17	13	42	17
450	6.0	280	3.4	18	14	48	19
500	6.5	300	3.7	20	15	53	21
550	7.0	330	4.0	21	16	58	23
600	7.5	350	4.2	22	17	64	26
650	8.0	370	4.5	23	18	69	28
Maintenance and Pregnancy (last 2 months of gestation)							
Body weight (Kg)	***Dry feed (Kg)***	***DCP (g)***	***TDN (Kg)***	***Ca (g)***	***P (g)***	***Carotene (mg)***	***Vitamin A (1000 IU)***
250	4.9	270	3.0	14	12	51	21
300	5.6	290	3.4	16	14	56	25
350	6.4	320	3.7	21	16	67	27
400	7.2	350	4.0	23	18	76	30
450	7.9	400	4.4	26	20	86	34
500	8.6	430	4.8	29	22	95	38
550	9.3	465	5.2	31	24	105	42
600	10.0	500	5.6	34	26	114	46
650	10.6	530	6.0	36	28	124	50
Per cent of milk Production (nutrients required per kg of milk) fat							
Body weight (Kg)	***Dry feed (Kg)***	***DCP (g)***	***TDN (Kg)***	***Ca (g)***	***P (g)***	***Carotene (mg)***	***Vitamin A (1000 IU)***
3.0	-	40	0.270	2.5	1.8		
4.0	-	45	0.315	2.7	2.0		
5.0	-	51	0.370	2.9	2.2		
6.0	-	57	0.410	3.1	2.4		
7.0	-	63	0.460	3.3	2.6		
8.0	-	69	0.510	3.5	2.8		
9.0	-	75	0.550	3.7	3.0		

Table 2. Nutrient required for working animals per head per head (Ranjhan,1991)

Live weight (Kg)	***Normal work (4 hrs)***		***Heavy work (8 hrs)***	
	DCP (Kg)	***TDN (Kg)***	***DCP (Kg)***	***TDN (Kg)***
200	0.24	2.0	0.25	2.7
300	0.33	3.1	0.42	4.0
400	0.45	4.0	0.57	4.8
500	0.56	4.9	0.71	6.4

Ex 1. Find out the total requirements of DCP and TDN for a cow weighing 400 kg and yielding 10 liters of milk having 4.5 % fat.

Ans. =

Requirements	**DCP (Kg)**	**TDN (Kg)**
For maintenance	0.254	3.03
For 10 ltrs. Of milk	0.480	3.40
(Having 4.5 % fat)	(0.048 x 10)	(0.34 x10)
Total requirements=	**0.734 kg**	**6. 43 kg**

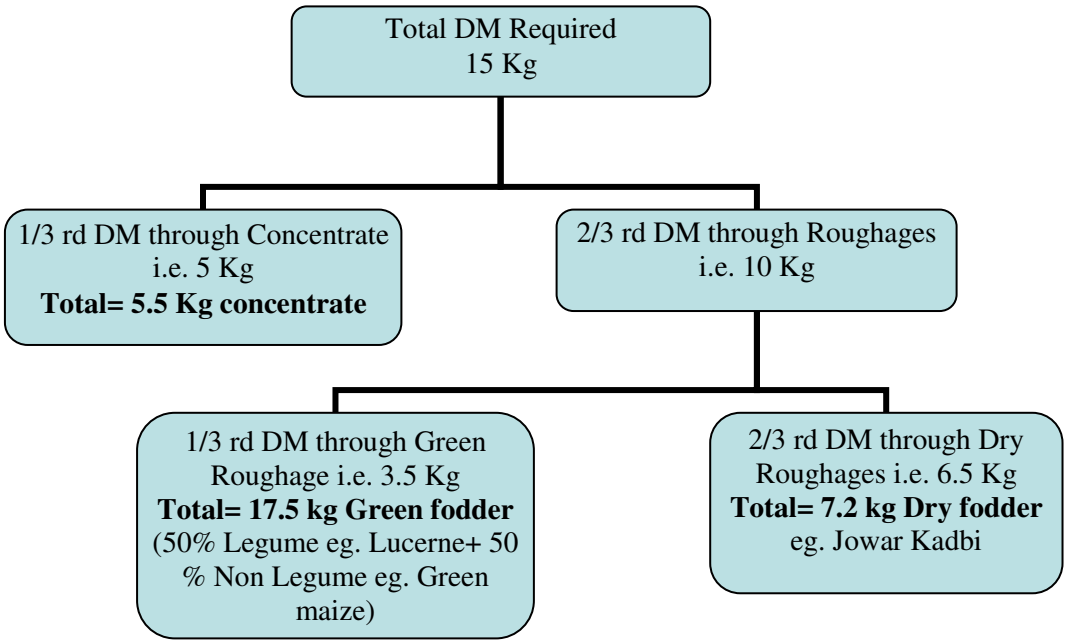
Ex. 2 Find out nutritional requirements of adult cow weighing 250 kg and at an advanced stage of pregnancy

Ans. =

Requirements	**DCP (Kg)**	**TDN (Kg)**
For maintenance	0.170	2.02
For pregnancy	0.14	0.70
Total requirements=	**0.31 kg**	**2.72 kg**

Ex. 3 Calculate feed fodder requirements of lactating crossbred cow weighing 500 kg as per thumb rule.

Ans. = Body weight = 500 kg, DM requirement= 3.0 5 of BW



Lab Work

Exercise No.7.

Title: Estimation of age and body weight of animal

1. **Objective:** To find out the age of different categories of animals.
2. **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 horn rings on horn.
3. Dentition method.

3. **Precautions:**

a. Approach the animals carefully.

b. Handle the animal kindly.

c. Take normal animal for estimation.

4. **Material required**

a. Animals of different age groups

b. Herd register

c. Travis

d. Rope.

5. Procedure:

Secure all animals of different age groups in standing position.

1. **Aging of animals by General Appearance:** Dairymen 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, vigor etc. are some of the characters suggestive of animal age.

a. **Younger/animal**s: Smaller in size, having active disposition smooth and tight skin, soft hair coat, full mouths.

b. **Older animals :** Large in size having normal look, rough hair coat., broken

mouth, loose skin, weak joints, roughened stature etc.,

Limitations:

i) Actual age of the animal can not be determined.

ii) Clever preparation of animal adds to difficulty in determining age by appearance. Based on general appearance of animals are categorized into age groups, such as very young, yearlings, adults, old etc.

2. **Ageing of animals by horn rings:** With the increase in age the horn rings grows in size and rings are formed on it. First ring appears on the horn at three years of age in cattle. There after 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 tough, which 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 of breeds rings are not clear or smaller horns. Also present trend of dehorning the animals renders difficulty limitation in determining age of animal by this method.

3. **Ageing of animal by dentition method:** Open the mouth of animal and count various types of teeth like incisors, canine, premolars and molars. Ruminants do not have canine.

Formula and number of teeth in cattle

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 color and larger in size with deposition of tartar with age. There are four pairs of incisors.

Viz, 1. Central incisors 2. Middle pair 3. Lateral pair 4. Corner pair

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

Type	Pair position	Total Number		Temporary		Permanent	
		UJ	LJ	Eruption weeks	Wearing months	Eruption years	Wearing years
Incisors	**1.Central**	-	2	At Birth	10	2	7-8
	2.Middle	-	2	2nd	15	3	8-9
	3. Lateral	-	2	3rd	18	4	9-10
	4. Corner	-	2	4th	21	5	10-11
	Total	**8**					
			Months			Months	
Premolars	**1.Lateral**	2	2	2	6	18	-
	2.Cheek	2	2	4	10	20	-
	3. Teeth	2	2	6	15	24	-
	Total	**12**					
Molars	**1.Lateral**	2	-	-	-	6	-
	2.Cheek	2	-	-	-	12	-
	3. Teeth	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 (Pairs)				Cheek teeth					
					Premolars			Molars		
	1	2	3	4	Pairs	1	2	3	4	Pairs
Birth to one month	T	T	T	T	T	T	T	-	-	-
6 Month	T	T	T	T	T	T	T	P	-	-
1 year 3 Months	T	T	T	T	T	T	T	P	P	-
1 Year 9 months	P	T	T	T	T	T	T	P	P	P
2 Years	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 months	P	P	P	T	P	P	P	P	P	P
3 years 3 months	P	P	P	P	P	P	P	P	P	P

6. **Observations:** The student will estimate the age of about five animals of different age groups and record it in the tale.
7. **Questions:**
    a. What are the methods of determining the age of animals? Give merits and demerits of each.
    b. What are the differences between temporary and permanent incisors?
    c. Draw the diagram of jaws showing position of different teeth.
    d. At what stage the first pair of permanent incisors appears in Zebu and Taurus cattle?
    e. Give the identification formula of different age groups of animals.

Lab Work

Exercise No.7b

Title: Estimation body weight of animal

Relevant information: Farm animals are weighed now and then for different purpose. Scientific feeding of farm animals is based on their body weight. Body weight is also required in studies of growth and development of animals. Medication is also has its association with body weight, for weighting, special plat farm scales are required. However when the facility is not available, the rough estimation of body weight is possible by using a following formula.

Schaffer's formula: This is the most common formula which can be used for cattle & buffaloes. This formula tends to under estimate weights of very young and very heavy animals.

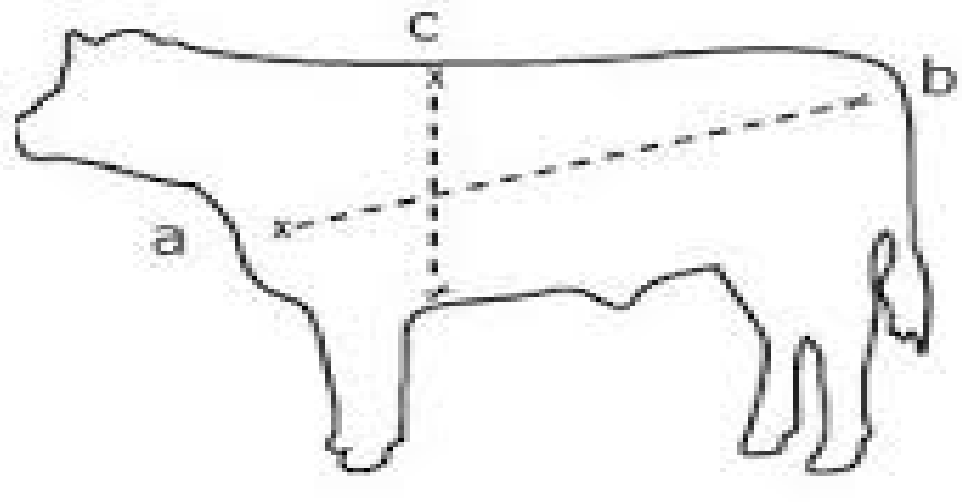
$$\textbf{Body Wt.(lbs)} = \frac{\text{Length X Girth}^2}{300}$$

Note= 2.2 lbs= 1kg

Where,

Body length = Body length is measured is inches (Shoulder point to point of pin bones)

Chest Girth= measuring the circumference of chest just behind in elbows (in inches)



Measuring beef cattle.

Exercise No.8

Title: Clean & hygienic milk production and milking method

1. **Objective:**
   a. To obtain high quality milk with no damage to the udder.
   b.To work out the economics of dairy farm by recording the milk production.
   c. To detect the abnormality if any.
2. **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 min. Otherwise chances of udder damages increase due to retention of residual milk.~ Clean and healthy (disease free) animals, hygiene conditions, clean utensils, milkman with clean habits and free from communicable diseases are some of the primary requirements for clean milk production.
3. **Precautions:**
   a. Ensure good health of animal.
   b.Ensure hygienic conditions of milking shed.
   c. Adopt dry hand milking.
   d. Ensure complete milking to avoid damage to udder due to residual milk.
   e. Adopt full hand milking or avoid milking by knuckling.
   f. Ensure that animal is not disturbed or excited during and before milking.
4. **Material required**:
   1. Clean byres
   2. Clean water
   3. Cotton ropes if necessary
   4. White apron
   5. Herd recorder
   6. Milk recording register
   7. Strip-cup
   8. Milking pail
   9. Towel
   10. KMn04 solution
   11. Concentrate mixture
   12. Petroleum Jelly
   13. Healthy cow

5. Procedure:

a. Secure cow/buffalo.

b. Brush the hind legs.

c. Wash, Wipe the udder.

d. Tie legs along with tail with tight slipknot.

e. Wipe the udder and surrounding body with towel soaked in the disinfectant. (Chlorine and KMn04).

f. Wash and clean the hands.

g. Apply the petroleum jelly to soften the teats. Massage the udder for let down of milk.

h. Drew off few strips of fore milk from each teat in the strip cup and observe the abnormality if any.

i. Milk quickly, silently and completely with dry hand within 5 to 7 min.

j. Incase of small teat animals use stripping method.

k. When milking is over pick-up the milking pail and untie the legs.

l. Record the quantity of milk in milk produce register.

m. Transfer the milk in the milk can through strainer or muslin cloth.

n. Keep cow and buffalo milk separately.

Methods of Milking:

a. Machine milking
b. Hand milking :-
    i. Full hand or fisting
    ii. Stripping
    iii. Knuckling

A. Machine milking:

Generally it is used on the large and Govt. dairy farms ha hiving high yielding animals.

Principle: The milking machine uses the basic principle of applying suction and massage alternatively to the teats of the animal in the simplest possible form to give you a fast and hygienic method of milking. In this method teats are inserted in the chamber under the continuous vacuum and to create a pressure differential across the streak canal, which forces milk form teat cistern into teat chamber of teat cup.

Advantages:

i. Simple and gentle action relaxes both cow and owner.
ii. Sealed milk path and pots ensure hygienic milking.
iii. It will provide comfort to the cow.
iv. Uniform rhythmic action stimulates complete release of milk.
v. Hand milking strains teat and milker, this will be avoided.
vi. Milk path is transparent, so you know when milking is over.
vii. Operating cost is very low.
viii. Quick milking. (4-5 min)
ix. Low maintenance cost.

Limitations:

a) Machine milking does not milk low yielder and animals having uneven teats.
b) Skilled person is required to operate.
c) Initial cost is higher
d) Failure in power supply limits the operation of milking.

B. Hand milking:

i. In this method full hand milking is one of the best and safe method in which teats are held in fist and squeeze the teat from top to bottom to make the milk come out of teat.
ii. Stripping method is used to the animals with small teats and at the end of every milking to remove the residual milk. In this method teats are held in between the thumb and index finger at the base of the teat and strip to downward. This method is useful in goat and sheep.
iii. The knuckling is one of the milking methods in which the teat is hold in your fingers and folded thumb. Milking is completed with the pressure of thumb and downward puU1ng. This method is defective which crushes the internal tissues of teat and form the lumps.

6. Observations:

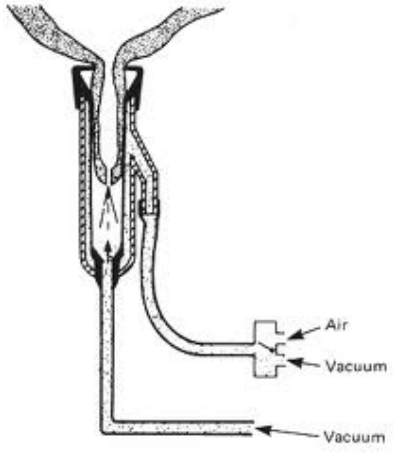
Record the milk yield of individual animal in yield book.

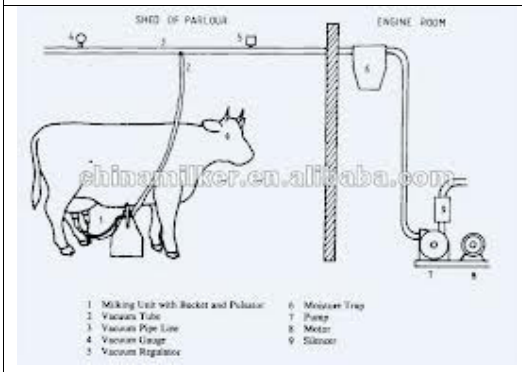
a. Date
b. Date of calving.
c. Current lactation number.

d. Quantity of milk drawn.
e. Time taken for milking.
f. Any abnormality.
g. Size and texture of teat.
h. Sediment test.

7. Calculation:

a. Compare the milking of different methods.
b. Calculate the efficiency of milker.





 Always wash your hands and arms before milking.	
	
	 AMBIC
	

Exercise no. 9

Title: Judging of animals for dairy and draft purpose

1. **Objectives:**

   a. Selection of animals on body confirmations.

   b. Keep the animals in order of merit for different purposes

2. **Relevant information:** Judging of animals is an act of examining the phenotype of animal on the background of its breed characters and its Placement. It needs experience. It promotes healthy competition among the livestock owners to raise ideal specimens and contribute to the refinement of breed and breed characteristics. Two methods of judging the animals widely used are,

   a) Scorecard method

   b) Study of performance record.

   In countries where the organizations do not exist, 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 and are likely to go wrong.

3. **Qualities of good judge**:-

   i) The judge should be livestock minded.

   ii) He should posses thorough knowledge of each body parts of animals and should be able to sort out, desirable, undesirable points in the animals.

   iii) Quick and accurate power of conformation.

   iv) Ability to form a mental image of many individuals animal to rank them by making comparison. Ability to reach at definite decision.

   v) Extreme honesty and sincerity in order to avoid bias prejudice.

   vi) Sound knowledge acquired through practice and experience in order to give effective reason for decisions.

vii) A pleasant and even temperament. Good judges however do not fraternize with exhibitors or friends along the ringside.

4. Precautions:

Observe the animals carefully from a safe distance.

5. Materials required:

Different kinds of animal like cows, buffaloes, heifers etc., score card, show ring, etc.

6. Procedure: Study the score cards and marks fixed for each parLMark animals as A, B, C, D or 1, 2, 3,4. Allow the animals to stabilize in the ring in arrow. 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 animal in the perfect score card.

7. Judging of Dairy Animal:

1. **General appearance:** A good dairy temperament, docility, attractive quality, feminine look, proportionate head and neck, pole parts a graceful carriage, broad forehead, possessive vitality and vigor, thin skin.
2. **Dairy type:** Dairy type as expressed by the milking ability, general appearance and freedom from coarseness.
3. **Body capacity:** As exhibited by the chest, girth, length and depth of barrel with an ample strength and vigor.
4. **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 should be high. Teats of convenient size and squarely placed. It should be with numerous folds of skin when viewed between the thighs. Milk vein prominent with numerous curves.
5. **Other features:** Hip and pin bones wide a part. Thigh widely with well apart hind legs. Ask the attendants to take animals one behind the other for short walk of five minutes, watch the animals from 3 to 4 mt. distance

to find out defects while walking. Bring the animal again and arrange by making close inspection for age by dentition, quality of skin and udder. Make total of the marks allotted and arrange the animals according to the order of merits, based on total marks obtained by the animals i.e. 1, 2, 3 or 4 and support placing with brief but sound reasons.

8. Judging of Draft animal :

1. **Draft Animal Power** (DAP) contributes 57% of total farm energy requirement. 84 million draft animals estimated to generate 30,000 MW electric power equivalents to half of present generation capacity of India. Bullocks are used in various Agril. Operations, Transportation, etc. Knowledge of physical characteristics and utility of different breeds is useful in judging and selection of correct type of animal for draft purpose Character

2. **Head Region:** Alertness, general health condition and fitness of bullock can be decided by using head region of which I. Muzzle:- Frequently mottled in colour, 2 Eyes:- Set in elongated fashion and small, though prominent and little bulged, a thick wavy skin fold around eyes. 3 Ears- Smal1, pointed and always held sideways. 4. Horns: - Long and pointed, placed close together at the root, grow backward curve for half the length and then turn upward in smooth bow shaped. hey are thick at the base and taper to the fine point. 5. Forehead:- Long and narrow.

3. **Neck Region:** l. Neck crest: - should be broad and thick. 2 Dewlap - light with very few thick fold. Body Region: 1. Back:- should be leveled, strong and thick. 2. Chest or Heart girth:- indicate the body capacity of and size of the animals. 3. Skin: - smooth, tight and soft hair coat. 4. Limbs:- Limbs should be strong, It consist of fore quarter and hind quarter.

4. **Fore Quarter:** It consists of foremost two legs, dorsal parts are covered with heavy muscles and it helps in working of bullocks for various Agricultural operations. I. The hump should be light, firm, fleshy and well developed. 2. Shoulder point:- Help in forward and backward movement of the limbs should covered with heavy muscle. 3. Shank:- Helps in extension and flexion of limbs while walking, sitting and various

agricultural operation and should be straight, strong, round bone of legs covered by extensor & flexor muscles and tendons. 4. Hoof:- Hard, black and waxy, Two halves of hoof should be even.

5. **Hind Quarter:** I.Thigh:- Should be longest and strongest. Because it gives strength and helps in the movement of hind limbs for various purposes. 2. Naval flap and Sheath: - Should be tight., 3. Tail:- Just touches the hock point.

9. Score card:

Physical parameter		Perfect score	Animal code			
			A	B	C	D
A)	**General appearance**	18				
1.	Size: according to breed and age	3				
2.	Form: stylish, symmetrical	2				
3.	Dairy characters, lean angular	5				
4.	Quality ,thin hide, pliable free from excess fat, hair, smooth fine	4				
5.	Temperament, active, vigours disposition and docile.	4				
B)	**Head and neck**	9				
6.	Muzzle, wide, nostril large	2				
7.	Face clean cut, facial veins prominent	I				
8.	Forehead wide, tine at poll	I				
9.	Horns fine typical breed	I				
10.	Neck: slander, medium length	I				
11.	Eyes: large bright prominent	1				
12.	Ears: typical of breed size well set.	1				
13.	Dewlap: thin light, graceful folds, free from musculature.	1				
C)	**Fore Quarters**	7				
14.	Withers; clean refined free from fleshiness	3				
15.	Shoulders: light , oblique , well attached, free from	2				
16.	Legs: straight well apart shank fine and smooth	2				
D)	**Body 20 points**	20				
17.	Chest: wide, deep, for flank full	6				
18.	Back: straight strong vertebra well define	4				
19.	Loin: broad, strong, leveled, from flesh	3				
20.	Ribs: wide apart and well sprung	6				
21.	Flanks: thin deep & refined	I				
E)	**Hind quarters 12 points**	12				
22.	Hip: bonus prominent wide apart	2				
23.	Hump: long wide level	3				
24.	Pin bone: high wide apart	2				
25.	Tail: Setting long, thin tapering	1				
26.	Thigh: thin widely separated and incurving	2				
27.	Hide legs: straight carried well apart fine shank	2				

F)	**Mammary deployment 34 points**	34				
28.	Udder Shape 1) Fore udder full attached 2) Rear udder full	13				
	Capacity large texture pliable free from fat and	12				
29.	Teats medium sized squarely placed	4				
30.	Milk vein long tortuous zig- zag branching	3				
31.	Milk wells large numerous	2				
	Total	100				
	Grand Total					

10. Grading:

Grade	Score points
Excellent	90 and above
Very good	85-90
Good	80-85
Acceptable	70-80
Fair	60-70
Poor	Below 60

11. Observations:

Date _____ ___ Ring No. _____ _____ _

Animal's class _____ ___ Breed _____ _____

Placing _____

Estimated age _____ ___ _____ _

Estimated value _____

Exercise No.10

Title: Study of Computerized database on Dairy Farm

1. **Objectives:**

   i) To know the computerized database management

   ii) To monitor, analyze and retrieve data records.

   iii) To assess the animal production, reproduction and health status

2. **Relevant information:** A database is like electronic file cabinet. Data Base Management System (DBMS) is a programme that set up or structure, a database. It provides tools to enter, edit and retrieve data from database. On dairy farm this system can be used for maintaining the data of various operations on dairy unit, livestock unit, cultivation unit, store unit, etc. This aids to monitor the farm activity, management system, performance of animal and staff. In the era of computer, the computerized DBSM saves labour, time and capital with enchased accuracy and authenticity. This database/ records are indicatives of business status, accurate studying of farm, information bank and guiding instrument to take decisions for further planning. Generally these records are technical, business, disposal, accounts, dead stock

3. **Materials required:** Different register/ records of dairy farm, computer software like MS-EXEL, MS-ACESS, Herdman software, etc.

4. **Precautions:** Records the information regularly and correctly. Records should be kept in safe custody and

5. **Procedure:** Here one example of Herdman software is given which is Window-based and icon/menu driven hence even a moderately literate para-veterinarian can operate the software without any difficulty. The software maintains life-time records of animals, records of cows and buffaloes can be maintained simultaneously but the data is automatically analyzed separately. The records of all categories of animals can be maintained. The records of culled, sold or died animals

maintained in archive files that can be retrieved easily to analyze the data.

6. Observations: Observe and study of different software and register.

6.1 Core Animal Registration Module: The animals can be registered after creating herds and lots. This makes the animal data access easy and the animals can also be maintained in groups of interest. The Master Parameter menu provides creation of master entries which can be accessed each time when an animal is registered. The animal, parent, other details, such as, previous and current parity breeding, production and health records can be entered without any hassle. The missing parity or lactation data does not hamper analysis of the data.

6.2 Data entry at multi-level: Multi-level data entry is possible, For example in case .there are distinct, staff carrying out a particular activity, the data entry is possible from a single form. The animal farm can be accessed from many levels.

6.3 Action List: Once the animal database is created the program generates 'Action' list to enable farm activity scheduling. For example it will generate list of animals that are expected to be in estrus, animals eligible for pregnancy examination, animals for drying off, animals due for calving, milk recording etc. his streamlines the farm management practices and is no more dependent on observation of the farm staff.

6.4 Alarm List: This list provides the details of animals that are not performing as per the preset standards of production and reproduction. For example, it will generate list of heifers that have not shown first heat, animals with fertility problems, animals with estrus interval problems, animals with low 100-day milk yield etc. This enables the Farm Manager immediate attention and investigation. Thus, the Farm Manager can not miss animals that are not performing up to standard. This leads to detection of problems at sub-clinical stage.

6.5 Reports: All types of 'Reports' can be generated, which include om the combo box. The program also indicates the dose rates for different drugs and the milk withdrawal alarm is also given. The old treatment

records can be retrieved with a click. This also enables calculation of true disease rates in the farm. When antibiotics are used, the software also warns the farmers about the residues within the withdrawal period. Many software currently available do not have this facility.

6.6 Semen Straw Inventory Management: The software also automatically maintains the semen straw or bull records. Very time a straw from a bull is used, the records for straw and the bulls are updated and once the animal is confirmed pregnant, the pregnancy is added in the record of the bull. Software may also produces the bull performance report for the farm. Consolidation of such report from all the farms/village enables calculation of bull indices. Thus, the Farm Manager can analyze fertility data and take decision on use of different bulls in the farm.

6.7 Custom Designing of Report: This is the unique feature of the software. The manager can sort farm data by selecting from among 170 different parameters. The manager can also design the administrative and technical report that can be solved as template. Full data sorting capability enables the Manager to screen the data through various filters. For example he can sort the data generate list of crossbreed animals that have average milk yield more than 25 kg and have calving to conception less than 120 days. Such selection of combinations of the parameters makes this software very powerful.

6.8 Treatment: 'software' maintains lifetime records of all the treatment carried out in individual animals. The database for different symptoms, systems, and the diseases are in-built so the user has o just select from the combo box. The programme also indicates the dose rates for different drugs and the milk withdrawal alarm is also given. The old treatment record can be retrieved with a click. This also enable calculation of true disease rates in the farm. When antibiotics are used, the software currently available do not have this facility.

6.9 Herd Performance Indices: The ultimate objective of the animal data management is to analyze the data to calculate production, breeding and herd indices to indicate how the herd is performing. The software calculates production and reproduction-based herd indices

(as mean +*Standard deviation) for* each lot or herd. This is the unique feature of this software. Herd indices, such as, average milk yield per lactation day, average yield per lactating animal, peak yield, days to peak yield, average lactation length, etc., can be calculated. The reproduction-related indices that can be calculated are: mean age for first heat in heifers, mean age of calving in heifers, mean days after calving to first heat, mean conception rate, mean A.I. per conception, etc.

6.10 Metabolic profiling: Metabolic profiling of animals is an important activity that enables identification of nutrition, management and hygiene related problems in the herd. Software provides a module that assists in determining the sample size. Random selection of the animals from different physiological groups and analysis of the data as mean + stand, deviation. The on-line help enables the veterinarian to compare and interpret the indices.

6.11 Feed Formulation and Scheduling: Software provides a module that can be used to prepare a balanced concentrate feed. Based on the rates of feeding of different categories of animals (Lactating dry, pregnant etc.) Software generates a feeding schedule. This ensures that the animals get right quantity of feed. Most of the software also calculates cost of feed prepared and cost of feeding individual animal in the farm. Software also provides the data prepared and cost of feeding individual animal in the farm software also provides the data on proximate analysis of commonly used feed ingredients and fodder. The software is thus also an information source for the farm managers.

7. Questions:

a) What are the different types of records?

b) What is the importance of records?

c) Which records are maintained under dairy/livestock/cultivation /store unit?

d) Which kind of information you will get from register, software?

Lab Work

EXERCISE NO. 11

Title: Vaccination and Control of Ecto and Endo Parasites in Cattle and Buffalo

A: Vaccination in cattle and buffalo

1. Objectives:

1. To know the various vaccines against particular diseases of livestock.
2. To know the general health cover measures and vaccination programme.
3. To keep proper health of livestock.
4. To obtain better production and efficient progeny from livestock.

2. Relevant information:

The practice of artificially building up immunity against specific infectious diseases by injecting biological agents I veterinary medicines called vaccination. Livestock suffer from number of diseases. High mortality and high morbidity results into heavy losses. To minimize the risk of infectious diseases in livestock it is necessary to vaccinate the animals regularly along with maintaining the proper hygienic condition in livestock barns.

3. Material required: Cotton wool, bandages, rubber tubing, forceps, sprits, clinical thermometers, disinfectants. phenol, turpentine, pocket knife, tray, different medicines! vaccines, distilled water, injection syringes.

4. Precautions:

- Keep hygienic conditions at the time of vaccination.
- Give proper dose of vaccines.
- Use adequate materials and instruments at the time of vaccination.
- Handle animals properly.
- Do not vaccinate clinically ill patients.
- Consider when last dose of vaccine is administered.

5. Vaccination schedule for cattle and buffaloes:

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
1. Hemorrhagic Septicemia	4th week of April	a) Alum precipitate	5 ml s/c
		b) Oil adjuvant	5 ml s/c
2. Anthrax	Pre monsoon season (Only in affected area)	Spore vaccine	1 ml s/c
3. Rinder pest	2nd Week of May	a) Freezed dried goat tissue vaccine	1 ml s/c
		b) Tissue culture	1 ml s/c
4. Foot and mouth disease	October /November	Vaccines manufactured by Hoechst, BAIF,IVRI etc, are available in market	10 ml s/c (Booster dose given to calves)
II) **Sheep and goats:**			
1. Enterotoxaemia	Half dose in first Week and half dose second week of April	E.T. Vaccine	5 ml S/C
2.Haemorrhagic septicemia	2nd or 4th week o April	1) Alum precipitation 2) Oil adjuvant	3 ml S/C
3. Rinder pest	2nd week of May (in the endemic area)	Tissue culture	1 ml S/C
4. Sheep pox	April (in endemic area)	Scab vaccine	Applied in skin under trail by lancet.

(**Source:** Livestock adviser vol. XXI & textbook of animal husbandry by G C. Banergee, Animal production management by Shastri, Thomas.)

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 are 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.

3. 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

4. External Parasites:

The important external parasites (Insects) are Lice, Mange, Ticks, Biting flies, etc. They harm the animal directly by biting, blood slicking, itching, etc as well as indirectly by transmitting infectious diseases. Damp and dark comers, stagnant water, manures, etc are the favorable 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.

5. Control measure of ecto-parasites:

- Periodical dipping or spraying of animals with suitable insecticides like Malathion parathion, neuvon.
- 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.

6. Precaution 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 wound/cuts should be treated after covering the wounds.
- Immediately after dipping or spraying provide green fodder to avoid licking.
- Always keep the antidote ready.

7. Internal Parasites:

Various kinds of the internal parasites such as tape worms, 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 manifested with one or many of the symptoms such as low appetite, stunted growth in days. Frequent illness, diarrhea, 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 to 27 % of feed consumed by the host animal.

8. 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 dewormer (Deworming agent)
- All the animals 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 hr. before giving the anthelmentic, young animals should be de wormed every months using a suitable anthelmentic, older stock can be dewormed at 4-6 month intervals.

9. Deworming schedule for cattle and buffaloes:

Type of worm	Deworming schedules	Anthelmentic drug
Round worms	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	Albendazozole, Fenbendazole, Mebendazole (5-10 mg/kg BW)
Liver flukes	Twice a year in endemic area (before & after monsoon)	Oxyclozanide (10-15 mg/kg BW)
Tapeworms	Twice a year(Jan & June) in calves in problem herds	Niclozamide, (50-100 mg/kg BW) -

EXERCISE NO. 12

Title: Study of Various Dairy Structures

1. Objectives:

- To study different housing systems.
- Better care and management of animals.
- Better efficiency of herd and labour
- To economics the production.

2. Relevant Information: The farm animals require housing or shelter to have protection against natural vagaries. Also it is necessary for safety point of animals to provide them the shelter. While planning for housing following considerations should be considered.

2.1 Elevation: Should be at higher place to facilitate the drainage effectively. Well drained land should be selected.

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

2.3 Direction and layout: As far as possible long axis of the building should be set north south directions to have the maximum exposure of sun.

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

2.5 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 an important criteria in dairy structure.

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

2.7 Surroundings: Areas infested with wild animals and unwanted social elements should be avoided. Narrow gates, higher manager curbs, loose protruding nails, smooth finished floor in and surrounding areas should be eliminated.

2.8 Labour: Honest, economic and regular supply of labour in available. 2.9 Electricity: Should be adequate, regular and proper voltage supply. 2.10 Marketing facility: Marketing facility should be at a short distance.

3) Types of housing: It is impossible to design an ideal set of building, which would be equally suitable fit for livestock farming all over the country, because of variation in climatic, geographical, economic and other consideration. However there are two types of housing system viz. Conventional barn or loose housing.

A. Conventional dairy barn: This is also called stanchion bam. These refer to the housing in which the cows are confined together on a platform and secured at the neck by stanchion or neck chain. The cows are fed as well as milked in this barn. The barns are completely roofed and the walls are also complete with windows and ventilation. It is comparatively costly and becoming less popular day by day. However, animals are more protected in conventional houses.

The following barns are the general need for proper housing of different classes of dairy stot" on the farm.

a) Cow shed, b) Calving box c) Isolation box

d) Sheds for young stock e) Bull or bullock shed.

B. Cow shed: Cow shed should be arranged in a single row if number of cows are small (less than 10). In double row if number of large one. 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.

Advantages of face out (Tail to Tail) system:

1) On an average 125-150 man hour of labour are required per year per cow.
2) Study of time: Motion studies, in dairy showed that 15% of the expanded time is spent in front of the cow and 25% is in other parts of the bam and milk house and· 600k 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
4) Less danger of spread of diseases.
5) Cow can get always more fresh air from out side.

6) The supervision 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 where needed more.
4) Feeding of cow is easier: Both rows can be fed Without back tracking.
5) It is better for narrow barns.
6) Best for dairy stock/bullocks.
7) Economical.

Floor space requirement under conventional system:

1. The flour space required in a bam is 6.5 to 7.0 m^2 per adult animal.
2. Feed passage (feed alley) = Width 120-180 cm
3. Manger length for cow = 90 cm Width-70 cm
4. Height - Towards stall 30 cm.
5. Towards passage - 60 cm.
6. Stall standing places for cow - 150 x 90 cm.
7. Gutter- 30-40 cm wide and 12 cm deep.
8. Manure alley- 180-240 cm
9. Cross alley enlarge barns: 120-150 cm wide.

Note: Gutter should have a 1% gradient.

C. Loose housing system:

1. Loose housing can be defined as 'systems 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 many 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 table. Following specifications are, suggested for covered area in the loose soiling system.

Height of roof - 3 Mts.

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: Floor Space requirements for different livestock

Animal species	Floor space (M^2)		Max. No. of animal house
	Covered area per animal	Paddock area per animal	
Cows	3.5	7.0	60
Buffalo	4.0	8.0	60
Down calves	12.0	12.0	1
Young calves	1.0	2.0	30
Growing stock	2.0	4.0	30
Bulls	12.0	120	1

Table: Dimensions of manger

Sr. No.	Particular	Dimensions (cm)
1	Height of manger wall	75
2	Max. height of fore curve (for adult)	50
3	Max. height of fore curve (for calves)	30
4	Thickness of fore curve (min)	6
5	Inner width of manger (Adult)	60
6	Inner width of manger (Calves)	40
7	Depth of manger (Adult)	40
8	Depth of manger (Calves)	15

D. Free range: Free ranges of the recalled ranches indicate a type of stock management rather than a type of housing. This compares living stock free in a large estate. Sometimes extending the thousands of square meters. The farm head quarter is generally situated at the center 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 beet cattle, sheep and goats.

4. Material required:

- Facilities to visit a dairy farm measuring tape, pencils.
- Drawing sheet, drawing boards.

5. Precautions:

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

6. Procedure:

- Visit a dairy farm based on prior information and study the arrangements of various structures.
- Note down the various types of structure and building.
- Prepare your own plan for a required number of animals and draw linear diagrams of floor for different structures along with details.
- Draw a linear sketch of the bam showing its minor details.

7. Observations:

- Note the number of animals kept in the bam.
- Calculate floor area provided for animal.
- The type of material used for construction of building.
- Note down tieing arrangement of animals

8. Questions:

- Draw a ketch of face out and face in barn for housing 3o animals
- Give a sectional and top view of measurements

Lab Work

EXERCISE NO. 13

Title: Artificial insemination and pregnancy diagnosis in farm animals

a) Artificial Insemination (AI)

1. Objectives:

i. To know the importance of A.I

ii. To acquaint with different steps and the instruments used in A.I

2) Relevant Information: A.I means the deposition of neat or diluted semen in female reproductive tract by the mechanical means for impregnating it. The importance of A.I is as follows,

i) Few outstanding males can be utilized for breeding large number of cows for long period of time

ii) Expenditure on maintenance of bulls in herd is less

iii) No limitation of distance

iv) Avoiding genital contagious diseases and overcome natural mating obstacles

v) Not need to maintain herd sire

vi) Progeny testing of bulls and thereby selection of proven sire is possible

vii) Rate of conception increases

viii) Endorses many type of research activities

3) Precautions:

1. The equipments and instruments used for A.I. should be cleaned and sterilized.

2. Observe the temperature of instrument

3. Proper diluents should be used. Also evaluate the semen carefully.

4. Inseminate the cattle at proper stage of estrus to avoid problems of repeat breeding

5. The person doing AI should have sound knowledge of female genital tract.

4. Material required:

1)	Artificial vagina (A.V)	11)	Freezer
2)	Electro ejaculator	12)	Dry ice
3)	Microscope	13)	Petroleum jelly
4)	Slides	14)	Full hand globes
5)	Counter	15)	Thermos

6)	Chemicals	16)	Travis
7)	Diluents	17)	Trough
8)	Liquid nitrogen	18)	Trays
9)	Container	19)	Insemination set
10)	Straw filler	20)	Hot air oven

5) Important steps in AI

Collection of semen, examination of semen, processing / extension of semen, packaging / preservation and insemination or deposition of semen

5.1 Collection of semen

Sponge, breeder bag, vaginal spoon, electro – ejaculator and artificial vagina are the some of important methods of semen collection. Artificial vagina (A.V.) is the modern method of semen collection and accepted throughout world,

5.1.1 A.V. Method: An A.V. providing the feel of natural vagina. it consist of hard rubber tube with dual valve, inner sleeve to filled with warm water (40 to 45^{o}C) and air, rubber cone with semen collection tube

At the time of semen collection a female or dummy is placed in service crate and male is allowed to mount it on the moment of service the fully erected penis is directed by hand in the A.V. the male getting the feel of natural vagina, ejaculates the semen in AI . Collect the ejaculate in semen collection tube.

5.2 Evaluation of semen:

To decide the rate of dilution and ensure the pregnancy, semen needs to be evaluated by following test

1. Physical test: Volume, colour, consistency, specific gravity etc.
2. Microscopic test: counting of sperms, motility, morphological abnormalities etc.
3. Chemical test: pH, MBR, fructolysis

5.3 Dilution of semen:

Semen contains quite a large number of sperms, however, actual requirement of sperms is lesser and hence semen needs to dilute to keep only required sperm concentration.

Dilutors are added in semen because it increase the life of semen, prevent bacteria growth, provides nutrition, protect against harmful effect of

rapid cooling, maintain pH, osmotic pressure and to increase the volume of semen. The most common dilutors are yolk citrate, egg yolk phosphate illini variable temperature (IVT), Glucose, sodium carbonate, skim milk, antibiose and glycerol

1. Procedure :

1) Collect all the instruments and equipments.
2) Clean and sterilize all the instruments / equipments.
3) Keep the instruments / equipments in thermostatic conditions after sterilization.

1. Observations:

i) See all the instruments are in sound condition**.**

ii) Observe the temperature of equipments / instruments.

iii) Assembling of all parts of A.V

B) Pregnancy diagnosis (P.D.)

Pregnancy or gestation period 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 animals delay in P.D. leads to loss of milk, loss of calf and farmer has to unnecessary pay for the feed consumed by the animal during non- productive period.

1) **Methods of PD**: If estrus signs are not observed around 3 weeks of service or insemination, the cow is generally assumed as pregnant. However, the number of animal shows estrus though pregnant. Conversely, in some pathological conditions, 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 examination, abdominal palpation, ultrasonogrpahy, laparoscopy, radiology, vaginal biopsy, detection of hormonal changes etc. rectal palpation is the most commonly used method of PD in large animals.

2) Procedure:

1. Restrain the animal in convenient place
2. Insert the gloved and lubricated hand through the rectum and remove the dung present in it(Back racking) without taking out hand
3. Examine the genital organs (cervix, uterus, ovary, corpus luteum) and fetus by gentle palpation and feel the changes of developing uterus

4. From 6th week, onwards uterus will be enlarged and feeling fluid filled.
5. At 8th week, the gravid horn is approximately 6 times larger than the non gravid horn
6. From 8th week to 12th week, the gravid horn enlarges by 50 % more than non gravid horn.
7. The uterus starts descending in abdominal cavity. This is the most ideal period for rectal palpation
8. From 12 weeks onwards the uterus enlarged very rapidly and descending into abdomen. but it can be felt up to 16th week.
9. There after palpation of the uterus become progressively difficult at it sinks deeper and deeper into abdomen.
10. Depending upon the experience of palpation, the accuracy may be achieved up to 50 %

Questions:

a) What is A.I.? Why it is more use in cow than buffalo

b) Draw the figure of A.I.

c) What is importance of P.D. and what are the external signs of pregnancy in the farm animal.

Lab Work

EXERCISE NO.: 14

Title: Utilization of dairy farm waste

1. **Objectives:**

I) Efficient utilizing of byre waste and convert into good manure.

II) To maintain hygienic environment in the animal houses.

III) To keep the housing clean, dry and prevent the breeding of parasites.

IV) To increase agricultural production.

3. Relevant Information: The dairy farm waste includes dung, urine, bedding material, byre washing, left over of managers, trash from dairy premises. The dung contains on 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 voids 16 to 30 kg. of dung per day. The leftover from the managers 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 crops grow luxuriantly. It saves expenditure on fertilizers. Proper use of dung produces cooking gas, an important source of energy for domestic use and also important that, sanitation and cleanliness are key to good health of farm animal and also of human. Unsatisfactory condition provides scope for development of pathogen, which cause diseases.

4. 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 of rain or drained water into manure pit or gas plant.
5. Follow the steps while preparing the manure and gas correctly.
6. Avoid over-flow of the pit or gas tank.
7. Do not choose the site for manure pits near the well or the milking parlor.

8. Use of appropriate proportion of water and dung for preparing the slurry for gas production.

5. Material required:

1. Shovel,	ii) Iron basket,	iii) Wheel harrow
iv) Pick-axe,	v) Spade,	vi) Crow bar,
vii) Agitator,	viii) Manure pit,	ix) Soaking pit,
x) Liquid storage tank	xi) Gobar gas Unit	

6. Procedure:

A) **Solid waste utilization for manure** :

I) Dig a manure pit of appropriate length and breadth with 1 meter depth.

II) Gather, collect and transfer dung and fresh waste material to the manure pit.

III) Deposit the waste material in 5 to 7 cm. layers and sprinkle the dung slurry over each layer till the pit is completely filled.

IV) Cover the surface of the pit with soil and paste and plaster it with dung and mud.

V) Leave the pit in cover position for about four months.

VI) Note that 1 cubic meter space can hold 900 to 1000 kg. of organic matter.

A) **Solid waste utilization for gas production** :

I) Check the gober gas plant for proper functioning.

II) Collect and transfer the required quantity of dung to the slurry tank.

III) Remove all trash material from the dung.

IV) Add water to the dung at the rate of 5 to 6 lit. per kg. Of dung.

V) Prepare slurry desired consistency with the help of agitator.

VI) After thorough mixing let out the slurry through coarse sieve to inlet chamber of gas tank.

VII) Close the inlet properly.

A) Utilization of liquid waste :

I) Flush the urine; liquid-dung along with floor washing with jet of water into the pit.

II) Drain the liquid waste into a liquid storage tank.

III) Lead the liquid washing into a dilution tank.

IV) 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.

V) Check the leakage of the dilution tank for avoiding the wastage of liquid manure or urine.

Availability of excreta 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 (tonns)	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

Calculation

Estimation of excreta by formula:

1) Wet dung excretion per animal per day –

(0.525 x kg intake of green fodder) + (2.25x kg intake of dry fodder) + (1.5 x kg intake of concentrate)

2) Urine excretion per animal per day (Lit)

$$a = \frac{0.7 \text{ (Wet dung excreted in kg)}}{1.03} \qquad b = \frac{1.5 \text{ (dry matter intake in kg)}}{1.03}$$

Observation

1) Quantity of dung obtained from per animal per day.

2) Quantity of liquid waste obtained from per animal per day.

Questions:

a) Name the various types of farm waste?

b) Describe the various methods of disposal of farm waste and draw the figure of Gobar gas unit

Lab Work

EXERCISE NO. 15:

Title: Preparation of viable bank proposals for cattle and buffalo

1. Objective:

i) To know how to prepare bank proposal

ii) To know the requirement of bank proposal

2. Relevant information:

Dairying has been recognized as an instrument of Scio- economic changes for rural masses in the country. However most of the farmers are not in 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 proposal is analyzed by different methods viz. Payback period (PBP), net present value (NPV), benefit cost ratio(BCR) or by Debt 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 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 dairy activity on commercial basis by purchasing 4 crossbreed cows. However he has insufficient capital to invest in dairy enterprise and he decided to take term loan for a period of 5 years for purchase of 4 cross breed cows and construction of cattle shed for diary unit. It is assumed that:

1) All the recurring expanses are made by farmer from his own capital.

2) The milk production capacities of cow on an average will be 18 lit/day with a location period of 270 days

3) Rate of milk is Rs.12/lit.

4) 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.

5) Animal in 1st or 2nd location with calf at foot preferably female calf will be purchased

6) Banks will sanction 75% loan of total proposed expenditure (for purchase of cattle and construction of shed) with a interest rate11.5%

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

Sr. no.	Items of Investment	Total	Rate Rs.	Total Cost(Rs.)
	I)Non-recurring			
1	Purchase of crossbred cows including transportation of animals	**4**	**35000**/ cow	**140000**
2	Cattle shed for 4 adult animals@60 sq. ft/cow	**240 sq. ft.**	**250 sq. ft.**	**60000**
3	Calf cum heifer shed for 2 animals @25sq ft/ cow	**50 sq. ft.**	**150 sq. ft.**	**7500**
4	Water tank construction (200lit /day/animal)	**1**	**----**	**10000**
5	Chaff Cutter	**1**	**----**	**8000**
	Total non-recurring cost			**225500**
	II) Recurring items and its cost			
	a) Green fodder for period of 270 days for milking animals@25kg/day/animal	**27000kg**	**0.50/kg**	**13500**
	b) Green fodder for dry period of 95 days@ 15 kg/day/animal	**5700kg**	**0.50/kg**	**2850**
	c) Dry fodder period of270 days for milking animals@ 4 kg/day/animal	**4320kg**	**1.5/kg**	**6480**
	d)Dry fodder for period of 95 days@ 2 kg/ day/animal	**760kg**	**1.5/kg**	**1140**
	e) Concentrate for period of270 days for milking animals@4 kg/day/animal	**4320kg**	**7.5/kg**	**32400**
	f) Concentrate for period of 95 days for animals @ 1kg/day/animals	**380kg**	**7.5/kg**	**2850**
B	Equipments@ Rs.150/animal	**4**	**150**	**600**
C	Cattle Insurance@4.2%of the cost of animals	**4**	**1260**	**5040**
D	Veterinary aid (Rs.500/animal/year	**4**	**500**	**2000**
E	Labour		**60**	**10920**

F	Miscellaneous expenditure		**250**	**1000**
	Total recurring cost			**78,780**
			Total	**3,04,280**

Income – expenditure statement

Year	**I**	**II**	**III**	**IV**	**V**
Milk production (14lit/ cow/ day)	15,120	15,120	15,120	15,120	15,120
Sale of milk(@ Rs 13 / lit)	1,96,560	1,96560	1,99,560	1,99,560	1,99,560
Sale of manure (rs.700 / cow)	2,800	2800	2800	2800	2800
Gross income	1,99,360	1,99,360	1,99,360	1,99,360	1,99,360

Cash flow statement: It is the summery of each inflows and cash out flows of business organization in a particular period. Say one year or one season. It is usually prepared for future

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	3,68,485	1,99,360	1,99,360	1,99,360	1,99,360
CASH OUTFLOW					
Capital cost	2,25,500	---	----	----	--
Recurring cost	78,780	78,780	78,780	78,780	78,780
Repayment of loan	53,274	49,384	49494	41,604	37,714
TOTAL OUT FOW	3,57,554	1,28,164	1,24,274	1,20,384	1,16,494
CASH BALANCE	10,931	71,196	75,086	78,976	82,866
Average profit / year					**63,811**

Repayment schedule:
Total loan Rs.1, 69,125 Repayment period: 5 years
Rate of interest: rs 11.5 % Installment amount: Rs. 33825

Year	Principal	Installment	Interest	Total	Balance
I	1,69,125	33,825	19,449	53,274	1,35,300
II	1,33,300	33,825	15,559	49,384	1,01,475
III	1,01,475	33,825	11,669	45,494	67,650
IV	67,650		7,779	41,604	33,825
V	33,825	33,825	3,889	37,714	0000
SUM		1,69,125	58,345	2,27, 470	

The net cash flow in the project will be as above.

The economic viability of project is judged in terms of discounting and undiscounting methods. Discounting method is more reliable than undiscounting. 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 Worth (NPV). However it needs more time and calculations. Undiscounting method is quite simple and includes following measures

1. Payback period (PBP)

This refers to the time taken by the project to recover initial investment for viability of project it should be lead. It is generally used for ranking the projects. The preference of the project is based on the lesser payback period.

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

* It means that proponent can be 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 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
Repayment of the 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**				

EXERCISE NO.16
Title: Visit to dairy farm.

1. Objective:

i) To get acquainted with the working of dairy farm.

2. Relevant information:-

Commercial dairy farming has more economical advantages over traditional dairy farming. On the commercial dairy farm number of operations is performed routinely so as to maximize the production by reducing the cost. Therefore it is essential to learn about the modern dairy farm, particularly the management practices viz, breeding, feeding, balanced diet, preventing disease primary care and modern farming methods to get better production by visiting various dairy farm. Farm management is one type of strategy through which farm resources, changes and time can be adjusted. After visiting the dairy farm one has to get the idea of dairy farm management and may benefited through.

- Cost-cutter of asset.
- Profit within a short time.
- More production within short period.
- Prevent the wastage of energy and labour.
- Profit in dairy farming production.

3. Precaution:-

- Take prior permission of concern before visiting the dairy farm.
- Observe schedule and time of visit and maintain the discipline.
- Do not touch or handle anything i.e. machinery, animals, feed and fodder in the farm.
- Do not pass any remarks or loose comments during the visit.

4. Material Required:-

- Vehicle if available

5. Procedure:-

- Contact the In-charge of Dairy farm and brief the purpose of visit and inform the strength of students.
- Follow the guide line given by Dairy farm In-charge.

- See critically and observe the workshop of Dairy farm.
- Get your doubts cleared at the spot of visit and note down the information for preparation of exercise.
- Give vote thanks to Dairy farm In-charge and guide before leaving.

6. Observation:-

- Name of Dairy farm:……...
- Address of Dairy farm:……
  ……
- Name of Owner:…….....
- Strength of animals

Sr. No.	Species of animal	Breed of animal	Class animal	Number
1	Cow			
2	Buffalo			

- Breed : HF Cross/Jersey Cross/Gir/Sahiwal/Deoni/Dangi/Gaolao etc.
- Class of animal : Calf/Heifer/Pregnant animal/Milking animal/Dry animal ect.

- Machinery/equipments available

Sr. No.	Name of Machinery/equipments	Purpose

- List operation carried at Dairy farm form morning to night.
- Problems of Dairy farm.

Lab Work