Livestock imp for IBPS AFO, NABARD,ICAR AND ALL AGRI COMPETITIVE EXAMS

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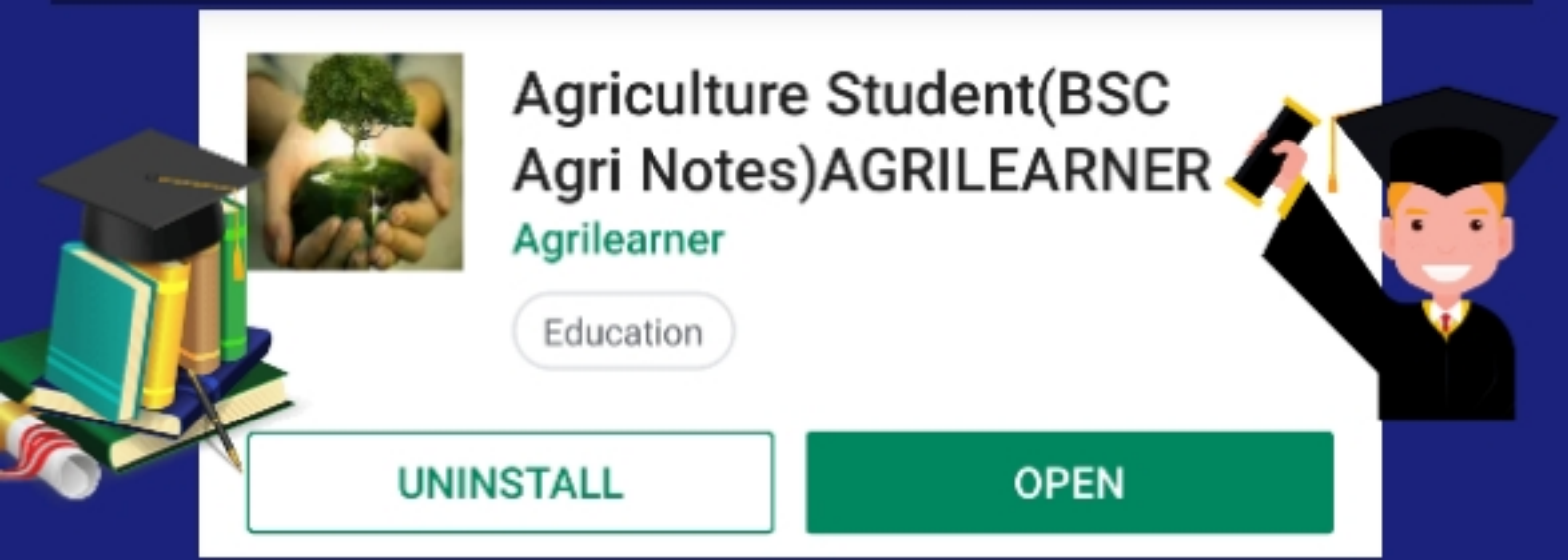

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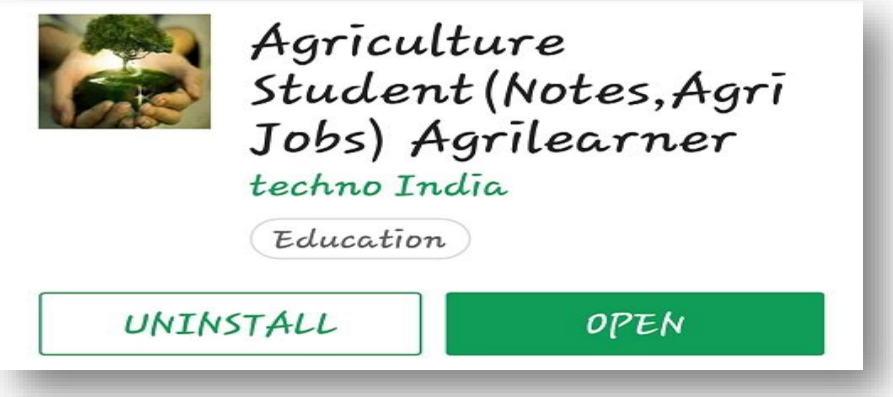

Chapter-I

INTRODUCTION

Livestock production is an important source of income for the rural poor in India where 70% of the livestock is in the hands of small and marginal farmers and landless laborers', who own less than 30% of the land area. A sizeable percentage of livestock owners are below the poverty line. Livestock rearing, is particularly tied' up with milk production and lends itself to small scale enterprises more effectively than the other agricultural enterprises, since this is a labour intensive effort uniformly distributed throughout the year. Animal husbandry has a large potential for providing gainful employment to rural women in their own households; as 70% of the workforce in dairying complies of women.

Government of India, through various schemes has undertaken cattle and buffalo breeding programmes, for genetic upgradation at the national level. However, extension work in the Animal Husbandry sector is not sufficient. There is often a lack of knowledge procedures. Consequently farmers who rear bovines are unable to make optimum use of the improved offspring from national genetic upgradation programmes.

This manual has been prepared by compiling knowledge, information and standard operating procedures to provide information regarding scientific bovine management practices to farmers. The manual also provides details regarding commonly occurring diseases and clean milk production to enable farmers to adopt for optimum productivity. It is hoped that this publication will help and assist farmers and also stimulate further improvement of the efficiency and productivity of livestock, thus leading to higher income for smallholder dairy farmers.

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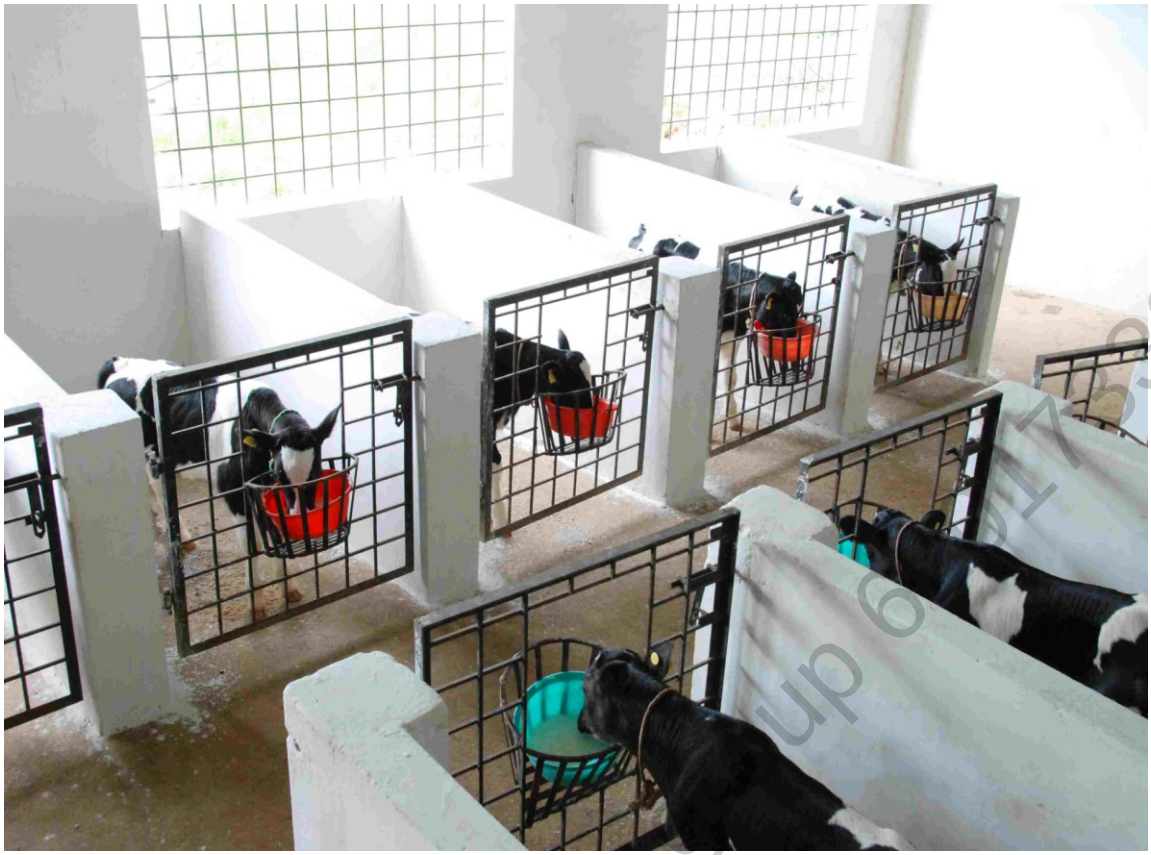

Scientific Management of Calves

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Chapter—II

ANIMAL MANAGEMENTAL PRACTICES

A. DAIRY CALF MANAGEMENT (Weaned calves)

Calf management in a dairy herd is very critical and a vital one because; today's calves are going to be the replacement stock in the future. Any lacunae in the calf management will have serious repercussions in the production of the dairy farm in the long run. Extra care and attention is warranted to the calves especially below 3 months of age as they are vulnerable to many infectious diseases especially the respiratory and enteric infections. As per the standards laid, for any given dairy herd at any given point of time the calf mortality rate should be less than 5%.

Following are certain managemental practices to be followed in the calf management to have calf mortality rates less than 5%.

In the calf management the initial one week of the calf's life period is very critical and utmost care should be given.

Day O :

As soon as the calf is born the colostrum feeding to the new born calf should be done without any delay (with in one hour). Meanwhile, the umbilical cord of the new born calf should be cleaned with tincture iodine and the excess of the umbilical cord hanging out should be cut and the cord is stripped from the body towards the open end to avoid any fluid accumulation in the cord. Open end of the umbilical cord should be tied with a string (Cotton thread) which is dipped in tincture iodine.

The birth weight of the new born calf should be recorded and the colostrum feeding is done accordingly ie., 10% of the calf's body weight. At most care should be given during the colostrum feeding that the milk does not enter the respiratory tract and at the same time making the calf to take the milk by placing the finger in the milk and simultaneously allowing the calf to

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suckle the finger. Colostrum feeding to the calf should be carried out for at least 3 days as it contains high immuno globulins (IGg) which helps the calf to defend themselves from various infectious agents.

Day 1:

The milk feeding to the new born calf should always be done in the morning and evening. Care should be taken that the milk should be fed only according to their body weight and no excess or less milk should be fed to the new born calf. The calf is kept in a neat and clean calf pen which does not have any sharp edges and no newly painted structure should be present, since the new born calves have the habit of licking and the fresh undried paint contains lead which causes lead poisoning when licked by calves. Fresh and clean water is supplied to the calves in a well cleaned bowl.

Day 4,5,6 :

From day 5 onwards the calves may be allowed in the calf paddock. Care should be taken that the calf paddock is kept clean without any debris, sharp structures & stones. Normally the paddock are to kept in an elevated place where there is no water stagnation and should be well aerated with sufficient shades. Preventive doses against "Coccidiosis" is to be done (Neftine/Furazolidone – 2 tablets twice daily).

Day 7:

Deworming of the calves on 7th day & after 21st day should be done based on their body weight. Care should be taken that the same de-wormer is not used repeatedly to avoid creation of resistance to dewormers.

The calves are fed with a good quality calf starter (Conc.feeding) by 1 to1.5 months of age after gradually reducing the quantity of milk fed to the calves from 1/10th to 1/15th & 1/25th of its body weight. Calves are fed with good quality dry fodder during the same period of its age. This will hasten the development of rumen. Milk fgfveeding to calves can be totally withdrawn from 2.1/2 months of age. The calves are to be dehorned (left to the discretion

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of the farm vet.) as a routine managemental practices in order to avoid injury to other animals as well for easy handling of the animals at adulthood stage.

Calves above four months of age are to be vaccinated with FMD vaccine and a booster dose should be given after 21 days without fail. Periodical measurement of body weight and deworming of the calves is most essential. The body weight gain per day should be calculated for the individual calf and the growth curve for the calf should be recorded up to 4 months of the calf's age (Per day body weight gain in calves varies between 300-600 gms from breed to breed).

Precautions to be taken :

1. The calves are kept in the calf pen for minimum of 5 days after their birth. The calf paddock should be kept neat & clean without any debris, sharp objects & stones. The paddock should be located in a elevated area without any water logging, well aerated and with good shade.

2. The calf pen and calf shed are to be cleaned with good quality disinfectant in correct dilution. The calf pen and calf shed are to be dried well before the calves are housed inside them.

3. The calf pen, calf shed and water troughs are to be white washed with lime at regular intervals.

4. The calf pen, calf shed are to sprayed with ectoparasiticide/ organophosporus reagents to avoid tick/lie infestation in calves.

5. Immediately after the birth, clean the nostril and mouth from the mucus.

6. Clean the whole body of the calf massages/ press the chest for the onset of respiration.

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B. Heifer Management

From the age of 10 months onwards the rate of body weight gain is regularly monitored.

The heifer should attain the breed able body weight of 250-300 kgs. in 12-14 months in exotic breed and in 18 months in cross breed.

To achieve this they have to be fed with a good quality concentrate of mineral supplements and fodder (Green & dry) as prescribed in the feeding schedule.

The common problem during the period between 10-18 months of animal life is inferior growth rate especially calves raised indoors.

Heifers at 10-16 months of age can become more dependent of Pasture and silages for their forage requirement. However, they must receive an adequate supply of energy, protein, minerals and salt to keep growing, to show heats and to conceive. Feeding 1-2kg of grain ration per head per day will meet these objectives.

The period from 16 months to calving is a “tricky” feeding period because the objective is to keep the heifer in a good growing condition without allowing her to become overly fat.

Excessive fat deposition in heifers is often linked with post calving health problems and a reduction in milk production in first lactation.

Breed heifer in last two months of pregnancy will require roughage, grain and minerals similar to dry cows.

Housing for heifers should have sufficient space and bedding to be comfortable and to be easily seen daily by the attendant.

In large herds, heifers are usually not monitored as carefully as lactating cows, and a regular examination and treatment for lice and Parasites should be part of the routine activities.

Heifers should be vaccinated for economically important diseases & that may occur in the area.

- Heifers with low potential, based on visual appraisal or on their pedigree can be removed at a younger age.

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- Other routine management practices like dehorning (at the age of 4 months) removal of super mammary teats (by 8 month of age) is to be carried out.
- The heifer is the herd should always be having a potential to perform higher than that of the lactating herd “herd improves” as today heifer tomorrow’s cow.

C. Dairy Cow Management

The main objective of the dairy cow management should be to reach peak yield and persistency according to her genetic potential.Adequate management is to be provided to dairy cows in such a way that optimum targets of live-weight changes and body conditions during the lactation cycle includes:

- Minimum loss in early lactation commensurate with maximum yield adequate body condition and live weight change at first service :
- Adequate body condition score at calving: High level grain feeding during dry period and during early lactation leads to occurrence of metabolic and digestive disorder. Thus, the feeding of dairy cows must be consistent and according to needs, which requires dedicated personnel.

Total dry matter intake is a major factor that limits milk production in cows with the genetic potential to be high producers. Dry matter intake may not exceed 1.5% of the body weight immediately after calving but can reach 3.5 to 4% of body weight by 12-15 weeks of lactation in cows fed with good quality forage.

The most critical period for nutrient supply to the high producing cow is from parturition until peak milk production, which usually occurs 4-10 weeks post partum. For cows to survive this critical period without severe metabolic problems and to attain peak yield, it is essential that their diet is balanced in all nutrients.

A balanced concentrate feed, fed to the dairy cows should contain moisture – 11% (Max) crude protein 20% (Max) crude fat 2.5% (Mini) crude fibre 8% (Max) Acid insoluble ash 4% (max) TDN 68% (min) Aflatoxin 0.1 ppm ; salt 1% Mineral mixture 2%, Urea – 1.5% (max).

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There should be an unlimited supply of clean drinking water – with continuous access is recommended.

D. Dry Cow Management

- Animals who have completed 300 days in milk and above 7 months (222 days) of pregnancy are selected for drying
- Drying of animal is done by adopting gradual increase of gap in milking frequency i.e switching over from 2 times milking to one time milking and then once in 2 days, once in 3 days, and so on till the udder shrinks & then teats are plugged by infusing intra – mammary antibiotics.
- During the process of drying the quantity of concentrate is also reduced.
- Separate dry Cows from lactating cows.
- Provide six to eight weeks dry period
- Restrict energy intake to 85 to 90%of requirements during dry period, if the cows are in good condition.
- Keep Calcium intake below 100 gms and phosphorus near 40 gms per day. Provide Vitamin A and D, trace minerals.
- Dewom cows prior to calving or early lactation.
- Selenium supplementation may reduce the incidence of retained placenta
- Provide a clean, well bedded area for calving
- Increase grain intake after calving at a rate of 1 kg per day.]
- Total mixed ration offer greater control of intake and forage to grain rations, do not exceed 60 % of the dry matter intake as concentrate.

Pre – Partum Management

- In preparation for parturition, about 10 days before calving, the diet of pregnant cows should be gradually shifted to free – choice good quality hay, and concentrate. Feeding should begin so that an equivalent to 1% Body per day is being consumed at parturition.

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- This is gradually increased to peak levels about three to four weeks after Calving.
- Each cow should be placed in well –bedded maternity box-stall for at least six days before calving.
- Maternity pens should be measuring 12 feet square :
- A maternity pen containing a cow expected to calve is a constant focal point that will pay dividends by minimizing the incidence and severity of diseases associated with Parturition.

E. CASTRATION

Castration means removal of essential organs of reproduction in males.

CASTRATION OF OX:

Indication: 1) To render the animals docile and manageable
2) For beef production and improve the quality of flesh.

Age of castration: Calves: 6 weeks to 6 months
Adults: when required.

Season: Autumn and spring are recommended. Can be done any time avoiding extremes of weather.

Control:

1) CALVES: Either standing or casting position
Casting : Animal resting on its buttocks and held between a man's knees and men grasping each hind limb by hamstrings.

Standing: It is simply held against a wall.

2) BULL:

1) Burdizzo's Method: A special forceps for crushing of spermatic cord through the skin without open wound.

Procedure: Secure the animal then stand behind the animal draw one of the testicle backwards isolate the cord, and hold it with fingers and thumb of the left hand.

Other person can apply forceps (Burdizzo's) such that cord must fit between the middle parts of the jaws of forceps. Now apply pressure by closing the forceps take care cord does not slip out of the jaws before crushed. Advisable to crush the cord in two places to increase the success of operation. Same procedure is repeated on the other testicle also. See that crush marks on both sides should not coincide.

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Result: By about 2-3 months testicles gradually undergo atrophy completely.

Advantages:
1) No risk of infection
2) No risk to life of animal
3) Does not interfere with animals thriving or condition.

F. CASTING OF ANIMAL

Casting of Cattle

Purpose of casting

Cattle have to be casted for a variety of reasons, such as for surgical operation, special examination, to trim or pare over-grown feet and shoeing of bullocks and sometimes for better control at a difficult calving.

Equipment required

Thirty feet long cotton rope of about one inch diameter.

Procedure

Cows are more easily and safely cast than bulls and bullocks, since they struggle less and are more willing to lie down. Bulls are more vigorous and harder to cast and control. There are many methods adopted for casting cattle, some of them are;

I. Reuff's method.

1) A running noose is made at one end of a thirty feet rope and passed round the base of the horns (in the case of dehorned cattle the noose should be either fixed and placed round the neck or the ends of the long rope should be attached to the poll piece of a stout halter).
2) A half hitch is next made round the chest immediately behind the elbows.
3) A second half hitch round the abdomen in front of the udder or scrotum.
4) The rope is pulled by two assistants and the beast will sink.
5) The man on the head forces the head into the shoulder of the same side as the ropes cross.
6) If the rope is tightened before the assistants pull the animal will certainly fall on the side opposite to that towards which is turned.
7) As soon as the animal falls, one man immediately controls the head and the other pulls the tail under fore foot together to control the animal properly for shoeing or any other operation.

II. Alternate method.

1. Double the thirty feet long rope.

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2. Pass it over the neck in front of hump.
3. Cross both ends and pass it between the fore legs of the animal.
4. Then again cross these separate ends over the loin of the cattle.
5. Finally, take those ends between the hind legs on either side of the udder or scrotum.
6. Each end is then pulled by two assistants.
7. Head is controlled by a separate man.
8. On pulling the ropes the animal will sit down.
9. The direction can be controlled by the man on the head.

Alternate method has following advantages:-

1) It is not necessary in this method to tie the rope around the horns or the neck. It is simply passed around the animal body which takes less time.
2) This restraint does not put pressure over the thorax and thus does not interfere with the action of the heart and lungs.
3) It does not endanger the genital organs of the bull or mammary vessels of the cows.
4) Both hind legs may be tied with ends of the casting ropes.

III. Country method.

To cast cattle on right side by country method, generally adopted by farriers while casting bullocks for shoeing purposes, is as follows:-

Equipment required.

Thirty feet long cotton rope of about one inch diameter.

Procedure

1) A running noose is made at one end of the thirty feet rope, passed round the right pastern and tightened.
2) The spare rope is passed on the left side behind the hump.
3) The animal is forced to move forward and while in motion the rope is pulled on the left side, thereby flexing the right leg at the knee.
4) The other end of the rope is passed round the right hind pastern from inside out and the rope is pulled from left side.
5) The head is controlled by another man and turned towards left shoulder.
6) On pulling the rope on left side, the animal is forced to sink down and fall to the right side.
7) Head and neck is firmly held down.
8) The legs can then be tied according to needs.

Casting of buffaloes

These above methods used for casting cattle are not effective in the case of buffaloes. The following method is useful for such animals:-

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Equipment required

Two ropes about 16 feet long and about one inch thick, with spliced loops at one end.

Procedure
To cast on right side

1) Take one rope and make a slip knot round the right for cannon just above the fetlock.
2) Wrap the same rope round the left for cannon above the fetlock also to form another slip knot.
3) Bring both legs as close as together as possible.
4) The other rope is fastened in the same way to the right hind and then to the left hind cannons just above the fetlocks.
5) The free end of the front rope is then passed back to that part of the hind rope which lies between the hind legs, first under it, then over it and forwarded to the outside of the left fore leg, where it is held by an assistant.
6) In a similar manner the free end of the hind rope is carried forward and under that part of the front rope which lies between the two fore legs, then over it and back to the outside of the left hind leg.
7) A double rope is placed under the left fore arm, over the withers and is held by an assistant standing on the right side.
8) Two end of these ropes are then pulled in opposite direction by two men on each rope, thereby drawing all the feet together.
9) The assistant on the right side pulls the double rope over.
10) The man on the head forces the head backward.
11) When the animal falls down one or two men keep the head and neck down and another man kneels down against the hind quarter of the animal and holding the tail slipped through the hind legs. The legs are fixed by tying or twisting the two ends.

Note

The ropes can also be fixed round the cannon bones in figure of eight fashion or both fore and both hind legs can be tied together instead of individual pair of legs by single rope.

Precautions

1) All precautions mentioned under casting of horses are also required to be observed in cattle.
2) In- calf cows should never be cast except when absolutely necessary.
3) In Reuff's method, the rope may slip backward during casting and injure the penis in the male and mammary gland in the cow.
4) The ropes passed between the hind limbs should be kept well apart to avoid injury to the mammary gland or scrotum in alternate method.
5) One should remember that is not desirable to keep the cattle in cast position for any length of time as they are likely to develop tympany.

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G. DEHORNING

Calf rearing is a foremost criterion for future of any herd. If they are not reared properly they will not achieve the targets set for optimum benefits from cow industry. Dehorning is one of the important calf hood practices. Dehorning can be defined as a process by which horns of an animal are removed by chemical, mechanical, electrical or surgical methods. This procedure is also called as debudding in calves.

Dehorning in yearlings and older animals is painful and causes considerable bleeding. Hence it should be done when calves are around 10 to 15 days old. This operation, like all other operation should preferably be done when the climate is dry or is expected to be dry.

This practice helps to accommodate larger number of animals in smaller space and makes handling easy. It also eliminates danger of injuries to operator as well as to fellow animals. In some breeds like Kankrej hornes serves as important identification mark of the breed and so these animals normally are not dehorned.

METHODS OF DEHORNING

1) CHEMICAL: - a) This is the most widely used method of debudding in calves. In this method caustic potash sticks, which are easily available in market are used. In this method first, hairs around the bud are clipped so as to expose the buds completely. Then the buds are rubbed with coarse sand paper, to remove the crusts and to make it softer. Afterwards petroleum jelly should be liberally applied all round it (3 inch radius) but not on the bud. This is necessary to limit the spread of caustic on tissues other than bud. i.e., skin and eyes. Operator must use double gloves while using the caustic sticks to avoid damage to hand.

Once these preliminaries are finished caustic sticks are rubbed over bud in circular fashion only till it bleeds slightly. In the same manner other horn botton is treated. Topical application of antiseptic cream for 3 days is advisable to avoid rarely occurring secondary complications. In case of damage to skin around horn bud, cleaning of wound with wet cloth and topical antibiotic ointment application should be done.

b) Considering the complications arising out of use of caustic stick, silver nitrate is also used. This procedure has been tried with considerable amount of success. For this 2% solution of silver nitrate is prepared. Depending on size of the bud 3 to 5% of this solution is deposited at 2 or 3 places under the bud with the help of 18 or 20 gauge hypodermic needle and syringe. Due to this procedure complications arising out of ever run of caustic is avoided and risk of damage to operators hand is also overvalued.

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2) ELECTRICAL: Iron rod with tip having co cavity to fit the size of horn botton is electrically heated till it becomes red hot (In some electric dehorner

thermostat regulated at 1000 ^{0}F is attached). Then it is applied to horn bud for around 10 seconds. This is sufficient to destroy horn cells. After operation any antiseptic cream may be applied for a period of 3 days.

Amongst all these procedures, electrical dehorner is most easy and practical procedure but good quality electrical dehorners are not readily available. Keeping this in view indigenously devised mechanically heated iron rods can be prepared. Here 2 cm diameter and 1 feet long iron rod can be fitted with wooden handle at one end. This can be heated in fire till it becomes red hot and be applied on horn bud for ten seconds. This procedure might prove to be costlier as it requires around 15 to 20 minutes for iron rod to become red hot on good fire.

Hence, under field condition silver nitrate injection at the base of the horn or caustic potash would be commendable practices.

H. HOOF TRIMMING

When cows are kept continuously in the barn for considerably long period and when they pasture on soft soil there is a tendency of the hooves growing too fast resulting in the development of long toes. This may be corrected by chiseling off the fore part of the toe and rasping off the excessive growth underneath.

I. GROOMING DAIRY COWS

Dairy cows should be groomed daily, especially in the winter when they are in the stable for more time. Grooming is necessary for production of clean milk and for the health of the animal. By grooming, dirt and loose hairs are removed which otherwise may fall in milk. Grooming stimulates the skin, making it more pliable. The method should be first to rub the cow vigorously with a stiff brush and then to clean hair off with a cloth or a brush. Grooming should be vigorous, but not so severe as to irritate the skin. The bone points should be gently rubbed. Generally dandy brush or body brush and curry comb are used.

Grooming of cattle should finish at least two hours before milking so as to allow the dust which is raised and disturbed in the atmosphere to settle down before milking commences.

J. AGE & WEIGHT

Details of Teeth Eruption in cattle

Di 1 -Before birth DP3 0-3 week

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Di	2 -Before birth	DP4	0-3week
Di	3 -0-1week	P 1	None
In	1 -2 year	P 2	2-2 1/2 year
In	2 -2.1/2 year	P 3	11/2-21/2year
In	3 - 3 year	P 4	21/2 -3 year

D	C -*0-2 week	M 1	5 -6 month
C	-*31/2-4 year	M 2	1-11/2year
Dp	2 - 0-3week	M 3	2- 21/2 year

* The canine tooth of domestic ruminants has commonly been accounted a fourth incisor

D 1	= Deciduous incisors	C	= Canines
P1, 2, 3	= Premolar1, 2,3	In	= Permanent incisors
Dp	= Deciduous premolar	M1,2,3	= Molar 1,2,3
Dc	= Deciduous canines		

Calculating Body weight of calf

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K. Determination of Pure and Cross – Breed Cattle Weights from Heart Girth

Measurement

Heart girth (inches)	Weight (kgs)	Weight girth (inches)	Weight (kgs)
26	36.36	56	239.09
27	38.18	57	250.90
28	40.45	58	263.18
29	43.18	59	275.90
30	45.90	60	289.54
31	49.09	61	303.63
32	53.63`	62	318.18
33	58.18	63	332.72
34	62.72	64	348.18
35	67.27	65	363.63
36	71.81	66	379.54
37	76.36	67	395.90
38	81.81	68	412.72
39	87.27	69	430.45
40	94.54	70	448.63
41	101.81	71	466.81
42	109.09	72	485.90
43	112.72	73	505.00
44	120.90	74	524.09
45	129.09	75	544.09
46	142.72	76	564.09
47	151.81	77	584.09
48	161.90	78	605.00
49	170.00	79	625.90
50	179.09	80	646.81
51	188.18	81	667.72
52	197.27	82	704.54
53	207.27	83	709.54
54	217.17	84	730.45
55	227.72	85	756.36

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Chapter-III

MANAGEMENTAL PRACTICES

A. LIVESTOCK HOUSING IN RURAL AREAS

The need for livestock housing is important from the point of animal health, welfare and comfort, hygiene, efficient and economical use of labour. A suitable house is essential to make best use of the, efficient environment. Properly designed house contributes not only to comfort the animal but to sanitation as well and enables them to work efficiently. The animals are to be protected from cold winds, sun scorches and rain. Livestock housing helps the animals, conservation of heat in winter and protection from excessive heat in summer. The heat production is associated with decrease in milk production and some increase in feed consumption.

Presently the farmers are keeping the animals either in the same area where they sleep or in a small shed constructed by utilizing wooden poles and indigenously available agricultural by –products. It is not advisable to keep the animal in the same premises from the sanitary point of view. Also, any infectious disease of animals may be hazardous to the health of the members of the family.

Generally, the small farmers use kaccha clay bricks of stones for the construction of walls, which is not stable for longer duration. The floor is muddy which is not suitable for animals to lie down. The floor should not be sloppy which results in the accumulation of water, makes the condition favorable for the growth of organisms and causes several dangerous diseases to animals. The roof is constructed by the skeleton of bamboo and sugarcane leaves. A weak structure sometimes collapses due to high intensity of rain and wind and causes injury to the animals. Each time huge money is invested for purchasing the constructional material as well as in hiring the labour to rebuild the structure. It is estimated that every year approximately half of the initial construction cost is spent on maintenance and repair of the house.

The general location for the housing and climatic region in which it is situated requires several structural details. The constructional materials are selected on the basis of relative cost, availability and characteristics of strength and durability. Protection against wind, rain and extremes of heat and cold are all that are required. The condition of light, air, temperature, humidity, cleanliness and sanitation are significant in design as they affect health comfort, production and quality of the product.

To maximize the work output from the animal, it is essential to construct a suitable house. In order to examine the basic design requirements for the housing, the number of cattle and category of the farmer is taken into consideration. The design of suitable housing, a compact unit, for a small farmer who possesses two cows and a pair of bullocks has been suggested based on the availability of cheap construction materials.

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The house consists of a floor, gutter, feeding trough water, brick wall and roof. An area of 16.2 square meter is sufficient for four animals. A suitable floor is constructed by making the earth surface hard. The floor is constructed of bricks laid in cement mortar to secure cleanliness and permanency of suitable slope of one in 60 is provided towards gutter for removal of manure and for effective drainage. This floor is durable. Non-slippery, impervious to water and urine and easily cleaned. The gutter has to be 30 cm wide and 10 cm deep facilitating proper drainage of water. The manure accumulates in gutter and it is removed once or twice a day. A minimum slope of two percent is provided so that effluent is discharged outside the house and then conveyed to suitable point for disposal.

A feeding trough of 60 cm, width is provided the back of the trough has to be 125 cm above the floor so that animals may not throw the fodder outside. With common water trough of 120 cm length and 60 cm wide has been suggested for cows and bullocks at 75 cm above the floor space. The wall is 30 cm wide and 125 cm high and is constructed by using bricks laid in cement mortar. A structure of this type is quite strong and at the same time economical and essentially will protect the animals form cold wind. The roof is supported on the four wooden poles, which are inserted into the wall. The roof cover is made of bamboo skeleton and arhar stalk and top is covered polythene sheet and sugarcane leaves. The roof is sloppy towards gutter side.

B. FEEDING

Feeding of Local Cattle and Buffalo Calves below 3 Months

Age	Whole milk (Kgs)	Skimmed milk (Kgs)	Calf starter (Gms)	Good Quality hay / green
1- days*	2.0			Offer a bit for training So as to feed on early.
4th day	2.0		Offered	
2nd week	2.5			
3rd week	1.75	0.75	50-75	Ad. Lib
4th week	1.75	0.75	75-100	“
5th week	1.25	0.75	100-150	“
6th week	0.75	0.75	250-300	“
7th week	0.50	0.75	350-450	“
8th week	0.50	0.50	450-500	“
9th week	-	0.50	550-600	“

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Feeding of calves/Heifers

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Calves – 3 to 6 months

Concentrate mixture 1.0 to 1.25 kgs.
Green fodder 5 to 10 kgs.
OR
Concentrate mixture 1.25 to 1.5 kgs.
Green fodder 3 to 5 kgs

Note:- Dry fodder, ad.lib. (Usually 1.5 to 2 kgs.)

Young stock – 6 to 12 months

Concentrate mixture 1.5 to 1.75 kgs.
Green fodder 10 to 15 kgs
OR
Concentrate mixture 2.0 to 2.5 kgs.
Green fodder 3.0 to 5 kgs.
Note:- Dry fodder, ad.lib.(usually 2.5 to 3.5 kgs.)

Adults:
Concentrate mixture 1.5 to 2 kgs.
Green fodder 20 to 30 kgs.
Dry fodder 2 to 3 kgs.

* Colostrum to be fed ad.lib.

Feeding of Exotic and Cross-breed cattle
Calves below 3 months

Age	Whole milk (Kgs)	Skimmed milk (Kgs)	Calf starter (Gms)	Good Quality hay / green
1- 3days*	**2.5**			**Offer a bit for training So as to feed on early.**
4th day	**3.0**		**Offered**	
2nd week	**--**			
3rd week	**3.0**	**0.5**	**50-75**	**Ad. Lib**
4th week	**2.5**	**1.0**	**200-300**	**“**
5th week	**2.5**	**1.0**	**200-300**	**“**
6th week	**2.0**	**1.5**	**350-400**	**“**
7th week	**1.5**	**1.75**	**500-550**	**“**
8th week	**1.0**	**1.5**	**600-700**	**“**
9th week	**-**	**1.0**	**750-850**	**“**

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Calves – 3 to 6 months

Concentrate mixture	1.5 to 1.75 kgs.
Green fodder	10 to 15 kgs.
Dry grass	ad.lib 2-3 kgs

Young stock – 6 to 12 months

Concentrate mixture	1.5 to 2.0 kgs.
Green fodder	15 to 25 kgs
Dry fodder	3 to 4 kgs

Adults:

Concentrate mixture	2 to 2.5 kgs.
Green fodder	25 to 35 kgs.
Dry fodder	4 to 8 kgs.

BREEDING BULLS:

Concentrate mixture	3.5 to 4 kgs
Green fodder	30 to 40 kgs
Dry fodder	2 to 3 kgs

* Colostrums to be fed ad.lib.

ADDITIONAL FEEDING FOR MILCH ANIMALS

MILK YIELD ALLOWANCE

a. 10 kgs or less milk
   1) Cow—10 kgs milk — 1 kg conc. Mix. Per 3 kgs. of Milk yield.
   2)Buffalo—10 kgs.milk — 1 kg. conc. Mix. Per 2 kgs. Of milk yield.

b. 10 to 15 kgs. Milk
   1)Cow — 1 kg. per 2.5 kgs. of milk yield
   2)Buffalo — 1 kg. per 2 kgs. of milk yield

c. 15 to 20 kgs.of milk
   1)Cow — 1 kg conc. Mix. Per 2 kgs.of Milk yield.
   2)Buffalo — 1 kg. conc. Mix. Per 1 kg.of milk yield

d. More than 20 kgs.
   Free choice of conc. Mixture and greens some quality of dry fodder to prevent loose motion (to ensure better consistency of dung).

PREGNANCY ALLOWANCE

Each pregnant animal after 6 months of pregnancy should be fed with 1.5 kgs. of concentrate mixture over and above the ration schedule of adult animal.

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Feed Formulae for Calves
Composition of Milk Replacer (Biologically similar to natural milk)

Ingredient	**Proportion (Kg)**
Wheat	10.0
Fish meal	12.0
Linseed meal	40.0
Milk	13.0
Coconut oil	7.0
Lineseed oil	3.0
Molasses/ Jaggery	10.0
Mineral mixture	3.0
Butyric acid	0.3
Antibiotic mixture	0.3
Rovimix A, B_2, D_3	0.015
Total	100.115

Note: Crude protein around 10%
Crude fibre less than 5%

Feed Formulae for Calf Starter

Ingredients (kgs)	**Model**			
	I	**II**	**III**	**IV**
Maize chuni	35	40	21	46
Dal chuni	30	27	20	30
Wheat bran / Rice bran (ist quality	-	-	-	-
Soyabean meal	10	10	-	11
Groundnut cake	12	10	11	10
Linsced Meal	-	-	10	-
Dried Whey	-	-	10	-
Dehydrated lucerne meal	-	-	5	-
Molasses / Jaggery	10	10	5	-
Calcium and Phosphorus	2	2	2	2
Trace minerals	1	1	1	1
Total	**100**	**100**	**100**	**100**

For these mixtures add 5 lakhs I.U. of vitamin A and 60 thousand I.U. of Vitamin D and 0.15 gram of Aurofac or TM – 5.
Note:-Minimum protein content 16%; total digestible nutrient 75 %.
In addition to milk, calf starter may be fed at the rate of 125 grams per

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day from 5th to 8th week, 250 grams from 9th to 12th week, 650 grams from 13th to 16th week (quantity of milk is reduced from 2.5 lts to 0.5 lts) and 1000 gram from 17th to 24 weeks, at this period, milk is totally withdrawn.

Feed Formulae for Dairy and Working animals

Ingredients (kgs)	**Model**		
	I	**II**	**III**
Maize/Jowar	25	27	27
Groundnut cake	20	20	15
Rice polish/wheat bran (Ist quality)	30	10	20
Soyabean meal	10	10	-
Deoiled rice polish	20	30	15
Maize gluten	-	10	10
Dried Whey	-	-	10
Husks/Groundnnut shell/powder	2	-	20
Mineral mixture	2	2	2
Salt	1	1	1
Anti Biotics	+	-	-
Vitamins	+	+	+
Total	**100**	**100**	**100**

Milk Recording

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Nutritive value of some common feeds & fodders (%)

Sl. No.	Material	DM	DCP	TDN
	Roughages			
1.	Rice straws	90	--	40
2.	Wheat straw	90	--	40
3.	Jowar Straw	90	--	40
4.	Bajra Straw	90	--	40
5.	Sugarcane bagasse	90	-	40
6	Hay	90	1.5	50
	Greens			
7.	Maize	25	5	65
8.	Lucerne	20	12	60
9.	Berseem	20	12	60
10.	Hybrid Napier	20	5	55
11.	Jowar gree	30	4	55
12.	Bajra green	25	5	55
13.	Sugarcane whole	25	3	60
	Concentrates			
14.	Cottonseed cake	90	20	75
15.	Groundnut cake (expeller)	90	45	75
16.	Groundnut cake (deoiled)	90	45	75
17.	Sunflower cake	90	28	75
18.	Linseed cake	90	30	75
19.	Rice bran	90	09	65
20.	Rice bran (deoiled)	90	10	55
21.	Wheat bran	90	08	60
22.	Gram chuni	90	08	65
23.	Tur Chuni	90	07	65

Alternate Feed resources for animals

There is severe shortage of green fodder. Therefore straws and stovers are the basic feeds of the ruminants. However straws and stovers are deficient in fermentable nitrogen, energy and minerals. To overcome the problem there are products in the market, which can be, used daily. They are;

1. Urea molasses mineral block (UMMB)
2. Urea treatment of straws
3. Bypass protein feed
4. Bypass fat

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1. Urea molasses mineral block

Helps in increasing the number of micro-flora in the rumen there by digestibility.

a. The urea molasses mineral block should be kept before the animal in a special dispenser to facilitate it to lick as and when desired.
b. Provision of adequate straw or fodder and water should be made.
c. The concentrate feeding can be reduced when UMMB lick is provided.

2. Urea treatment of straw

Treatment of straw by urea can greatly increase in nutritional value, digestibility palatability and intake.

Urea at the rate of four percent of straw is sprinkled in solution form layer by layer and then well pressed by manual tampling.

Mineral mixture at appropriate level is also sprinkled layer by layer. Treated straw heap is left undisturbed for two to three weeks before it is used as feed. Initially aerate the treated straw for half an hour before feeding. Once the animal is accustomed to the treated straw, feed it without aeration.

If animal does not accept the treated straw initially, sprinkle some concentrate powdered flour over it to induce eating.

eg to treat 1000 Kgs straw, 40 Kg urea is dissolved in 400 Liters of water .Cover the treated straw with plastic sheet.

3. By pass protein feed

a. In bypass protein feed the dietary protein escapes ruminal degradation but degraded in fourth stomach (abdomen)
b. Ideally, compounded by pass protein feed should have a minimum of 28% crude protein.
c. The concentrate is reduced by 40%
d. The efficiency of protein utilization is far superior in BPF formulation as it is based on the principle of dietary protein degradability.

4. By pass fat

By pass fat is also protected from the rumen degradation, it by passes the rumen and gets totally digested in lower gut.

The energy is used with maximum efficiency without any wastage.

By pass fat increases the milk yield and also balance the protein energy ratio to increase the fertility. In the concentrate feed it is incorporated at 2-4% level, where the feed is given as per the milk production and for maintenance so as to get the requisite amount energy.

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AI in Crossbred cow

AI in Buffalo

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C. BREEDING

1. Estrus:

It is period characterized by sexual desire, immobility in the presence of, and the acceptance of male by female domestic animals

Symtoms of Heat in Cows / Buffaloes

1. Animal mixed with other cows in the herd.
2. Animal will be more excited where as in buffalo less excitements.
3. Appetite depressed.
4. Frequent bellowing will be there
5. Sharp rise in body temperature
6. Turbid, opaque and ropy mucus discharge from vulva, this mucus discharge hangs from vulva.
7. Hyperemia of vulvas i.e. Pinkish colour vulva
8. Frequent mounting on other animals
9. Frequent urination
10. Animal will be standing still when other cows or bulls try to mount and
11. This indicates right time for inseminations or, natural service.
12. If observed perfectly uterus will be toxic

Some important points to be remember

1. Animals should be inseminated in the mid heat for better conception rate.
2. When valval mucus discharge will be hanging at hock joint that is the signs of mid heat
3. In the mid heat discharge will be smeared on the back of animal.
4. When mucus discharge completely falls on the ground or sudden fall then it is the indication of an early heat
5. Early heat is not correct time for A.I, conception rate will be less.
6. Licking other animals
7. Peculiar movement of lumbosacral Joint i.e. frequent rising of tail

II. Artificial Insemination in Cattle /Buffalo:-

Artificial Insemination (A. I) is a technique of depositing the semen in to the female reproductive tract artificially

Advantages of A.I

1. Efficient utilization or maximum utilisation of superior sire
   eg-6ml semen is sufficient for 250 cows.
2. Semen can be imported or exported intercontinental
3. Sire evaluation is possible in a short period.
4. It is economic advantage for small farmers.
5. Spreading of defective genes are prevented.

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6. Reduce the spread of reproductive disease.
7. Upgradation of local cattle in a short period there by new breed developed.
8. Utilization of sires who is unable to serve due to an injury or arthritis.
9. Increase the rate of conception. This will stimulate greater interest in livestock breeding & better management.
10. No necessity for a farmer to keep the bull

Disadvantage of AI

1. If low quality of males are used for semen collection then it distributes the poor germ plasm in a short time
2. Reduce fertility due to wrong insemination technique
3. Well-trained inseminator required.
4. Rural part Communication should be good for supply of liquid nitrogen
5. Non availability of good quality extender for all species.
6. High establishment Cost to start a bull station for semen collection.

Some Important points to be remember

1. Heat sign should be observed correctly by the owner
2. Time of heat sign should be noted correctly.
3. Animal should be inseminated in the mid heat i.e, 10-12 hr after the heat sign.
4. Deposit the semen in the mid cervix

Precautions to be taken during A.I

1. properly observe that whether animal is in heat or not
2. Back racking should be done properly i.e Removing of dung from rectum
3. Properly examine the internal genitalia.
4. While putting hand in the rectum, apply the soap on the hand .
5. Wash /clean the vulva properly to prevent from infection.
6. Manipulate internal genitalia gently

III When to examine the cows not seen in heat

Anoestrus or failure to detect signs of heat in cows, is one of the major problems in maintaining reproductive efficiency. Examination of reproduction records shows that the days lost in service period, the time from calving to next conception, a majority can be attributed of failure to detect signs of heat.

Examinations of cows, which are reported as not coming into heat, are normal cows. Part of the problem is due to the fact that cows are more likely to exhibit estrus behavior during the night and early morning hours when no one is looking. Scheduling time of observation for estrus as the first chore in the morning and last chore at night can be helpful in finding cows in heat.

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The herdsman and Veterinarian should decide at what point in the post calving interval anoestrus or “no heat” cows would be examined. Normal cows should be examined after 50 days or more post calving. Therefore if the schedule of examination is monthly the anoestrus cows should be examined sometimes between day 71 and day 102-post calving.

Information regarding ovarian structures obtained during the examination may be helpful in predicting the time of next heat, particularly if this can be combined with whatever information the herdsman has recorded on the cow’s health sheet regarding calving date and heat signs which may have occurred prior to breeding option date. Some cows will found which are not normal. The most common abnormality found during anoestrur examination is uterine infection and cystic ovaries. Both of these conditions can be expected to respond to treatment if it is given early and correctly. One of the most common causes of an anoestrus is Pregnancy. We should not neglect this possibility. If you always remember to record breeding dates, you will not find any pregnant cow at the aneostrus examination.

Heat check-up report card

Heat Report		Breeding Tag
Date		Date
Cow		Cow
Time observed	Am	Sire of cow
Location	Pm	Breed- first service
(Check all the signs that apply)		Breed- Repeat: Last-Breed

- ❑ Stood to be mounted
- ❑ Did not stand when mounted
- ❑ Rode another cow
- ❑ Unusually active
- ❑ Rough tail head
- ❑ Clear mucus discharge
- ❑ Bowling
- ❑ Would not let down milk
- ❑ Bloody mucus discharge
- ❑ Other

Do not Breed –reason

Sire to use

Time of breeding

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CHAPTER IV

Animal Diseases

A. COMMON DISEASES IN CATTLE

1. **TYMPANY** : Also known as bloat.

ETIOLOGY : **Excessive fermentation of succulent feed in rumen.**

SYMPTOMS : Left side of the abdomen is bloated, uneasiness, stamping and peddling of hind legs, Difficulty in respiration.

TREATMENT : Massage the abdomen Carminatives e.g. Ginger, asafetida, turpentine oil mixed with linseed oil followed by Mg SO_4 and $NaSO_4$. In severe condition puncture the rumen by trochor and canula.
Avoid succulent and starchy feeds.

2. <u>ACETONEMIA or KETOSIS</u>:

Metabolic disease and occurs within few days or few weeks after calving.

ETIOLOGY : Disturbance in carbohydrate metabolism.

SYMPTOMS : Sweetish acetone like odour noticed in expired air, milk, urine, loss of appetite, Rapid drop in milk production, rapid loss of body weight, stiffness, nervousness

TREATMENT : 5% glucose 500 ml I/V for 3-4 days. Propylene glycol 225 gms twice daily for 2 days

PREVENTION : Feeding of well balanced diet i.e. CHO, vitamins, minerals and proteins

2. **<u>DIARRHOEA</u>:**

Frequent expulsion of profuse loose watery faeces is called Diarrhoea.

ETIOLOGY: **Constant irritation by faulty diet**
Abrupt change in roughages to grain
Cold, overwork, stress
Bacterial and viral

SYMPTOMS: Anoxia, dull
Hindquarters soiled with faeces
Dehydrated with sunken eyes

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TREATMENT: Depends upon causative agents
Parasitic Diarrhoea – Anthelementhics
Bacterial -- Antibiotics, Sulfanamides

1. **MASTITIS:** Inflammation of mammary glands.

ETIOLOGY: **Bacterial Streptococcus agalactiae, and staphylococcus aureus, coliform organisms**

SYMPTOMS:

a) Peracute – swelling, heat, pain, abnormal secretion in the gland, Fever, depression and anorexia
b) Acute – Fever and depression, changes in the gland similar to above
c) Subacute – No systematic changes, changes in the gland and secretions are less marked
d) Subclinical – In which changes in the gland detected by tests Changes in the secretions – wateriness with flakes, yellowish clots.

TREATMENT:

a) Penicillin is the drug of choice for streptococcal and staphylococcal mastitis
b) Streptomycin for gram negative bacteria.
c) Enrofloxaccin , Gentamycin

CONTROL:

a) Milking machine function and milking procedure check and correct where necessary.
b) Milking hygiene

BACTERIAL DISEASES

1. ANTHRAX: An acute, febrile disease

ETIOLOGY: ***Bacillus anthracis.***

SYMPTOMS:

a) Peracute – highly fatal with tarry blood oozing from, natural orifices & death
b) Acute and subacute – high fever, staggering, convulsions
c) Animal is highly bloated with all the four legs stretched out

TREATMENT: a. Penicillin
b. Tetracycline

PREVENTION:

a) By vaccination

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b) Dead body should not be open for PM examination
c) Dead body should be burried 2 metres below the surface and 15 cm layers of unslaked lime be put around the body

2. BLACK QUARTER:

ETIOLOGY: ***Clostridium chauvoei***

SYMPTOMS: High fever, emphysematous swelling of subcutaneous tissues Producing cripitating sound on applying pressure,lameness,and death within 48 hrs.

TREATMENT: Penicillin

PREVENTION:

a. Carcasses of the animals buried deep and covered within Lime
b. Vaccination

3. BRUCELLOSIS : (Contagious abortion)

Etiology : *Brucella abortus*

Symptoms :

a) Reduced milk yield
b) Abortion occurs in the last 3 months of pregnancy
c) Opaques vaginal discharge before abortion.
d) ROP (Retention of placenta)
e) Arthritis

TREATMENT: No known cure for brucellosis in domestic animals

PREVENTION :

a) Vaccination of female calves upto 10 months of age. Intraocular low dose vaccine in adults
b) Adopt sanitary measure for contagious and infectious diseases

4. TUBER CULOSIS

DEFINITION : It's a Chronic infectious disease of mammals caused by *Mycobacterium tuberculosis* and characterised by the development of tubercles and abscess formation with resulting caseation and calcification.

ETIOLOGY: Mycobacterium tuberculosis

TRANSMISSION: a) Contamination of feed and water b) Aerosol.

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SYMPTOMS: In early stages lesions are localised, general malaise, intermittent fever. Dry husky cough gradual emaciation, persistant diarrhoea hard pain less enlargement of the mammary glands lesions nodular or diffused. Consistency of the milk affected, watery milk.

TREATMENT AND CONTROL:

a) Streptomycin
b) Isonicotinic acid hydrazide

CONTROL :

a) Test and slaughter
b) Test and segregation
c) Chemotherapy

5. JOHNE'S DISEASE or PARATUBERCULOSIS

ETIOLOGY: *Mycobacterium paratuberculosis*

DEFINITION: Chronic infectious disease of ruminants characterized by progressive, wasting and diarrhoea.

Symptoms: In females strain of parturition and lactation leads to clinical disease, there is no fever, normal appetite but consumes more water. Anemia, emaciation and diarrhoea and dehydration.

TREATMENT AND PREVENTION : No Treatment is known to be effective. It can be controlled by detection of disease, segregation of affected animals. Disinfection, weaning of calves at birth.

6. HAEMORRHAGIC SEPTI CEMIA / PASTEURELLOSIS

DEFINITION: Highly infectious disease, acute in nature

ETIOLOGY: *Pasteurella multocida*

TRANSMISSION: Contamination of food and water.

SYMPTOMS:

a) acute oedematous form – hot painful, subcutaneous swelling appears on the throat and neck region. Respiratory distress, Rise in temperature 40^0c, asphyxiation and causes death.
b) Pulmonary form: Pneumonia, respiratory distress and death
c) Sub-acute enteric form: Enteritis, diarrhoea, emaciation and no death.

TREATMENT: Broad spectrum antibiotics 20 mg/kg body weight

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CONTROL: Yearly prophylactic vaccination with oil adjuvant vaccine annually

VIRAL DISEASES

1. FOOT & MOUTH DISEASE (FMD)

ETIOLOGY: Apthovirus – O, A, C, and Asia-1

TRANSMISSION: Direct contact with affected animal. Indirectly through contaminated water, pastures utensils, straw and feed.

SYMPTOMS: Initially high fever, sluggishness, and anorexia. Profuse stringy salivation. Smacking of the lips and formation of Vesicles on mucous membrane of mouth and foot. Lameness, decrease in the milk yield and abortion.

TREATMENT: No Treatment. Ulcers in the mouth and foot can be treated with application of antiseptics like $Kmno_4$ solution and Boroglycerine is applied.

PREVENTION: six monthly vaccination

2. INFECTIOUS BOVINE RHINOTRACHEITIS : (IBR)

ETIOLOGY: Bovine herpes virus – 1

DEFINITION: Acute disease caused by a virus and secondary bacterial infection characterised by inflammation of respiratory tract, genital tract and conjunctiva.

SYMPTOMS:

I. **Respiratory form**:

a) Elevation of temperature, hyperemia of nasal mucous membrane and nasal discharge
b) Necrotic areas covered with fibrinous exudate.
c) Nasal exudate becomes copious mucoid, mucopurrulant.
d) Respiratory distress
e) Decreased milk yield
f) Conjunctivitis
g) Nostrils and nose pad becomes hyperemic and edematous – Red nose.
h) Bronchitis with cough.
i) Intestinal involvement diarrhoea with blood streaked faeces.

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II Genital form

In males – infectious pustular balanoposthitis.
In females – Infectious Pustular Vulvovaginitis

Abortion occurs after 3 months of infection.

TREATMENT: Treat for secondary bacterial infection.
CONTROL: Vaccination modified live or killed vaccine. Vaccine to control IBR is not used in India

C. PARASITIC DISEASES

HAEMOPROTOZOAN DISEASES

1) BABESIOSIS :

ETIOLOGY: *Babesia bigemina* transmitted by ticks

SYMPTOMS: Sudden high fever ranging from 40^0c to 41.6^0c Dullness loss of appetite, constipation, coffee colored urine and decrease in milk yield

TREATMENT: Diminizine aceturate (Berenil ®)

PREVENTION: Control of the ticks

2) THEILERIOSIS :

ETIOLOGY: *Theileria annulata* transmitted by ticks

SYMPTOMS: high fever, weakness, swelling of superficial lymphnode, lack of appetite.

TREATMENT: Buparvoquone (Butalex ®); Tetracyclines

PREVENTION: Control of the ticks, vaccination

ENDOPARASITES

1. FASCIOLIASIS

ETIOLOGY: *Fasciola gigantica*, *Fasciola hepatica*

TRANSMISSION: Snail

SYMPTOMS: Irritation, atrophy of liver Hemorrhages in the liver, causes sudden death. Oedema under the jaw, anaemia, emaciation, diarrhoea, ascitis and Jaundice.

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TREATMENT: Oxyclozanide –15-mg/kg oral; Albendazole –10 mg/kg; Triclabendazole –10 mg/kg oral; CCl_4 - 1-2.5 ml/sheep, 5-10 ml/cattle.

CONTROL: Reduce the snail population.

2. AMPHISTOMIASIS:

ETIOLOGY: Amphistomes.

SYMPTOMS: Immature flukes cause irritation and damage to the mucous membrane of rumen and reticulum. Diarrhoea, wasting oedema and anemia and death.

TREATMENT: Oxyclozanide

ECTOPARASITES

1) **MANGE :** Mites

ETIOLOGY: *Sarcoptes scabei* var bovis

LESIONS: First appear on head, neck and perennial region, skin eruption, crusted appearance of lesions.

TREATMENT: Ivermectin; Ectoparasiticide; Coumaphos; Toxaphene

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Vaccination Schedule:

Disease	Disease Vaccine	Dose/ Route	vaccination schedule Primary	Re-vaccination	Immunity
1. Anthrax	Spore	1ml SC	6th month	Annual	1year
2. Blackquarter	Bacterin	5-10 ml SC	-do -	2 weeks after Primary& then annual	1year
3. Brucellosis	live attenuated strain 19 This strain is Pathogenic to man ,excercise great care while handling	5 ml SC	calfhood vaccination vaccinate Sero-negative female Calves- of 3-6m age. Adult sero-negative dry cows can be vaccinated in heavily infected herd. Bulls SHOULD NOT BE VACCINATED		protection from abortions for 2-3 lactation
4. Haemorhagic Septicaemia	Alum precipitateed Bactrein	5-10ml SC	6th month	Annual	6months
5.Foot & mouth*[1]	Oil adjuvant (female)	2.Ml I/M	4-6month	9month after primary & then annual	9month
	Al.gel Vaccine (male)	5ml SC	4-6month	3weeks after primary &then 4 months	6months
6.Theileriosis *[2]	live shizonts	3ml SC	2months & above	Once in life time No other Vaccine for 8weeks after administration	life time .In tick infested area once in three years

*[1] Cold chain to be maintained
*[2] To be stored in LN2

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CHAPTER V

Clean milk production

Purpose of clean milk production

- To Produce Safe milk
- Pathogens free
- Milk with low bacterial count an somatic cell score

Clean milk production

(1) Package of hygienic practices at farm level.
(2) Educative propaganda
(3) Incentive payment plan
(4) Miscellaneous

Packages of hygienic practices at farm level

a) Animal Hygiene
b) Milkers hygiene.
c) Utensil- equipment hygiene
d) Hygiene during milking process.
e) Environmental hygiene.

a) **Animal hygiene**

i) Animal health

- Periodical examination of milch animal for udder and other disease
- Treatment of infected animals
- Isolation of infected ones.
- Adoption of sanitary precautions.
- Milk of infected animal should not be mixed with the bulk supply until the animal is fully recovered.

ii) Cleanness of udder and body

- The body and udder of the animal should be cleaned before milking by washing and wiping with a clean cloth.
- While washing & wiping care should be taken not to damage the teat orifice & cleft between the quarters of the udder Clean water should be used.
- Preliminary washing with ordinary water secondary washing with clean & Luke warm Water (temperature <50 degree c)
- Sodium hydrochloride solution or chlorinated water should be used.
- Use of soap for udder may help in cleaning but not on microbes
- Drying with a clean cloth is essential.

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b) **Milkers hygiene**

- Persons milking the animals should take care of following points for them to avoid contamination of milk.
- To be free from infectious disease
- Avoid coughing & sneezing over the milk pales
- Hands to be cleaned with water & soap before milking.
- Nails to be cut regularly since may harbour some infectious organism
- Nails may also cause injury to the teats.

c) **Utensils or equipment hygiene**

Pails or the other containers used for milking and storage of milk under farm condition play a significant role in determining the microbiological quality of milk.

Following measures need to be adopted

- Milk producer should be advised to use clean and tinned utensils having smooth surface, Free from dent & cervices for milking and storing of milk.

- Milk pails: buckets or other utensils should be cleaned with "Detergent sanitiser" and properly rinsed with water immediately after use Rinsing with boiling water or use of detergent & sanitizers like 'Io Iodophors' may be practiced.

- In case of milking machines regular washing of metallic parts & rubber parts should be done. For rubber parts –0.4 to 0.5% lye solution should be used.

Lye solution – NaoH (0.4- 0.5%) CIP: - This is preferred for cleaning of the pipelines of the milking equipments.

(d) **Hygiene during milking process**

- Complete milking i.e., no milk should be left inside the udder after milking elimination of poor quality milk because this is high in bacterial count which get mixed with subsequent milk lot and raised over all bacterial number in milk.

- Dry milking – It is preferable over wet milking, wet milking increases the bacterial number in the milk by dripping by washing down of foreign matter of teats and dirt's on milkers hands in to the milk.

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- Milking by full hand method is good and not by knuckling method.

(e) Environmental hygiene:-

- Place where housing, feeding, and milking of animal is done should be clean and hygienic with respect to aeration, humidity, lighting, floors, wall ceiling, insect's etc.

(1) Following points to be kept in mind: -

- Separate premises located far away from the human living quarters, sewage, manure pits and stagnant water pools are advisable for housing and milking of animals.

- Proper ventilation

- Avoiding direct air currents and dust in the cow shed & milking byre.

- Ample sunlight

- Dry bedding of animals.

- Tick free bedding

(2) Education propaganda

- Through personal advice
- Film show
- Demonstration
-

(3) Incentive payment plan: -

- Incentive to produce good quality milk
- Payment on quality basic.

Helpful measure in quality milk production:

- Consumer education programme utilising mass media & other measures.

- Protection of consumers rights to better quality milk through legislations

- License to all the milk producer & venders.

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Chapter VI

INSURANCE

1. Animal Driven Cart Insurance

INSURANCE FOR:

a) Cart /Tango /Coach
b) Animal pulling the cart
c) Third party liability including passengers
d) Drivers

STANDARD PERILS COVERED

1. For animals:

Death or permanent total disablement due to accident.

2. For driver :

Gramin accident cover, while driving cart.

3. For cart or Tango:

a) Accidental damage to the cart/tango and its accessories by fire, lighting, flood, cyclones etc.

b) Whilst in transit by road, rail and or inland waterways.

4. Third part liability:

Upto Rs. 5000 per accident & maximum Rs. 10000 for all accidents in a policy year.

No	Particulars	Premium
a)	Slow moving animals (Bulls, Bullocks, Camels, Donkey)	Rs.25/- plus 1% of the estimated value of both the animal and the cart.
b)	Fast moving animals (Horses, Mules)	Rs.30/- plus 1% of the estimated value of both the animal and the cart.
c)	Cart alone	Rs.25/- plus 1% of the estimated value of both the animal and the cart.
d)	Third party liability	Rs.5/-
e)	Driver's accident cover	Rs.3/-
f)	Diseases cover for animals	2% extra on the value of the animal

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2. Cattle Insurance

Applicability:

Applicable to indigenous, cross breed and exotic cattle owned by/ belonging to private owners various financial institution i.e. Bank-financed, Military dairy farms, Co-operative/Corporate dairies etc.

Cattle means and Include

a) Milch cows and Buffaloes
b) Calves/Heifers
c) Stud Bulls
d) Bullocks/He buffaloes
e) Mithuns

Age Group

a) Milch cows	2 years or age at first calving to 10 years
b) Milch Buffaloes	3 years or age at first calving to 12 years
c) Stud bulls	3 years or earlier age at sexual maturity to 8 years
d) Bullocks/He buffaloes	3 years to 12 years
e) Calves/Heifers	4 months upto date of 1st calving (No relaxation in upper age-limits is allowed)

Valuation

Valuation based on market value as on date and place and to be decided on the basis of recommendations of the local veterinary surgeon.

Sum Insured: Not exceeding market value.

Scope of Cover

The policy shall give indemnity only for death of cattle due to:

1) Due to accident (inclusive of fir lighting, flood/inundation, cyclones, tornado, tempest, storm, hurricane, famine) or any other fortuitous circumstances (Fortuitous means accidental in origin).

2) Diseases (Inclusive of Rinderpest, Black Quarter Haemorrhegic Septicemia, Foot and mouth disease subject to vaccination against these diseases.

3) Surgical operations.

4) Strike, Riot and Civil Commotion risk & Terrorism

5) Earthquake

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Exclusion

1) Theft or clandestine sale, missing of insured animal.

2) Malicious or wilful injury or neglect/ intentional slaughter.

3) Transport by air or sea or beyond 80 km by rail or road.

4) Partial disablement of any type, whether permanent or temporary.

5) Accident happened/Diseases contracted prior to commencement of risk.

6) War & allied perils.

Premium Rates

1) a) 4% gross p.a.
   b) 1% gross p.a. for PTD cover.

2) 2.25% net p.a. for IRDP (Integrated Rural Development Programme) (Any government sponsored scheme) animals. Addl. 0.85% net p.a. for PTD cover.

3) 2% gross p.a. for exotic animals.

Additional Benefits Available

Long term policies of 3 & 5 are years available

No of years	Discount rate
3	15% on basic rate
4	25% on basic rate

Special Features

PTD arising out of accident animal and or unable to conceive or yield milk or unable to be used for breeding can be covered by payment of additional premium.

Points to be Noted:

1) 15 days waiting period

The company is not liable to pay the claim in the event of death of insured animal due to diseases occurring within 15 days from the commencement or risk.

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2) No tag no Claim

In the event of death of animals covered under the policy, claims shall not be entertained unless the ear tags are surrendered to the company. In the event of loss of ear tags, it is the responsibility of the insured to give immediate notice to the company and get the animal retagged.

3) Service tax: Exempted for IRDP Scheme policies.

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Rural Dairy Farming

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CHAPTER VII

Rural Dairy Farming

Economics of a two-animal dairy unit, having buffaloes/crossbred cows, is given. The costs shown below are average and may not be valid for any particular place and so local prices of various inputs should be ascertained.

Farmers, who keep dairy animals, generally belong to the category of small/marginal farmers and landless labourers. They normally keep one/two milch animals as a subsidiary occupation to supplement their income. But to establish dairy farming as a viable economic unit as a full time occupation, a minimum of 8 to 10 high-yielding milch animals are necessary and preferably one hectare of cultivable land to grow fodder crops for feeding the animals. Studies carried out at the National Dairy Research Institute, indicates that a dairy animal to be economical must have a lactation yield between 1,800-2,000 kg. Further, a capital expenditure of about Rs. 50,000 to Rs, 60,000 is needed for purchase of an animal, construction of shed and initial capital for turnover and the like. It does not, however, include the cost of land.

Income from dairy farming depends upon various factors:

For increasing productivity and profitability in dairy farming, attention needs to be paid to the following:

- **Capital investment :** It varies with the quality of animals purchased, type of construction, etc
- **Location**: Nearness of the farm to the market and approach through pucca road.
- **Managerial skill**: of farmer/his family members.
- **Veterinary aid and breeding facilities:** Adequate and timely availability of these facilities.
- **Choice of dairy animal** is crucial both in terms of milk production and reproductive efficiency, especially the calving interval. It should have high daily milk production. Short dry-period and optimal lactation length.
- **Replacement of livestock** is more economical by raising heifers on the farm than purchasing adult animal in milk.
- **AI facilities** in the neighborhood to ensure timely breeding; in their absence, the arrangement of superior bull for natural service.
- **Feeding** of balanced rations.

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- **Cultivation** of green fodder on own farm.
- **Mode of marketing** will influence the net profit, and so proper arrangements need to be made in advance. Attention needs to be paid to the following norms to be observed in the planning of a dairy farm project.

- **Floor space of cattle shed:** About 3 sq meters per animal with 4.5 sq metres as loafing area.

Shed construction cost: For small units located in rural areas Rs 5000 per animal.

Land requirement: One hectare of cultivable land for fodder requirement of 8-10 animals.

Price of milch animals: Rs 50,000 to Rs 60,000; high yielders may cost more, upto Rs 80,000. Preferred dairy animal is buffalo (Murrah/graded Murrah/Nili-Ravi), indigenous cows (Sahiwal, Red Sindhi, Gir, Rahti, Deoni, Tharparkar, Kankrej etc) or crossbred cow.

The milch animals : In second lactation and in the first month of lactation, having a female calf at its foot.

Replacement of milch animals: After 6-7 lactations.

Mortality: 2-3 per cent for adult animals; calf mortality 10 per cent.

Cost of dry fodder (straw): From Rs 500 per quintal.

Cost of concentrate: Rs 2500 per quintal.

Cost of veterinary aid: Rs 500 per animal per year.

Lactation period: Varies from 280 to 305 days, depending upon the dairy animal (crossbred cow/buffalo), followed by dry period of 90-to140 days.

Milk yield per day: 7 to10 kg

Milk Price: About Rs 35 per kg depending on fat percentage and season in rural areas. In urban areas, it can go upto Rs 40 or more.

Value manure: Rs 500 per animal per year.

Depreciation of shed: 10 per cent of the cost of constructions. It is not taken into account during the loan period, serving towards loan repayment instalments.

Insurance charges: 5 per cent on the purchase price of the animal.

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Interest rate: Keeps on changing but for the purpose this statement an average interest rate has been taken at 12%.

Financial Statement: Two –Animal Unit

A two-animal dairy unit could be taken up by weaker sections in rural areas as a subsidiary occupation to supplement their income. Weaker sections are entitled to subsidy, ranging between 25 to 33.3 per cent depending upon eligibility under various Government-sponsored programmes like Dairy Entrepreneurship Development Scheme (DEDS). The economics of such a unit has been worked out on following assumptions:

- For the purpose of calculations, a year has been taken as of 360 days duration.
- The cost of milch buffalo has been taken at Rs 60000 and of crossbred cow at Rs 60000 including the cost of transportation, if any.
- The second animal will be purchased 6 months after the purchase of first animal.
- Average lactation period has been taken as 280 days in case of buffaloes and 300 days for crossbred cows followed by a dry period of 140 days in buffaloes and 100 days in crossbred cows.
- The lactation period of the milch animals during the 1st year of their purchase will be about one month short of the stipulated length as they would be purchased in the 1st month of lactation.
- The average milk yield per day has been taken as 10 litres (buffaloes) and 12 litres (crossbred cows).
- The average price of milk per litre has been taken as Rs 35 for buffalo milk and Rs 30 for cow milk.
- The milch animals will be fed with green fodder, dry fodder and concentrates during lactation and dry periods. The amount of concentrate could be reduced during the dry period.
- The cost perquintal of green fodder, dry fodder and concentrates has been taken at Rs 200, Rs 1000 and Rs 2500 respectively.
- No labour cost has been taken into account as no wages are paid. The farmer and his family members maintain the small unit.
- Income from sale of calves has not been taken into account as it compensates their rearing cost.
- A concessional rate of interest is being charged from those borrowers who are below poverty line and eligible under the integrated Rural Development Programmes (IRDP) and other special programmes.

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CAPITAL INVESTMENT (Rs)

	Buffalo Unit	Crossbred Unit/indigenous cow
Cost of two milch animals	1,20,000	1,00,000
Cost of shed	2,000	2,000
Cost of equipment	1000	1000
Total	123000	122000

Note: For small units which are set up generally to supplement the family income, provision for construction of shed and equipment may not be essential as most of the farmers have adequate arrangements for maintaining the milch animals.

On the basis of the assumptions given earlier, year wise costs and benefits are worked out as follows:

FEED AND FODDER REQUIREMENTS PER DAY

		In Milk				Dry			
	Rate in Rs	Buffalo		CBC		Buffalo		CBC#	
		in Kg	Cost Rs	Kg	Cost Rs	Kg	Cost Rs	Kg	Cost Rs
	Per kg								
Green Fodder	2	20	40	25	50.00	10	20.00	15	30.00
Dry fodder	10	6	60	3	30.00	8	80.00	5	50.00
Concent rates	25	4	100	4	100.00	1	25.00	1	25.00
Total (Rs)			200		180		125.00		105.00

#CBC= Crossbred Cow

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Year wise Profit from small holder dairy system

Days when milk	1st Year		2nd Year		3rd Year		4th Year		5th Year	
	Buff	Cow	Buff	Cow	Buff	Cow	Buff	Cow	Buff	Cow
1 st Animal	250	270	280	290	270	290	220	270	220	260
2nd Animal	180	180	220	260	220	260	220	260	240	260
TOTAL	430	450	500	550	490	550	440	530	460	520
Days when dry										
1 st Animal	110	90	80	70	90	80	140	90	140	100
2nd Animal			140	100	140	100	140	100	100	110
Total	110	90	220	170	230	180	280	190	240	210
Operational /Recurring Exp										
Lactation Period	86000	81000	100000	90000	97800	99000	88000	95400	92000	93600
Dry Period	13750	9450	27500	17850	28750	18900	35000	19950	30000	22050
Insurance	1000	1000					1000	1000		
Veterinary Aid	500	500	1000	1000	1000	1000	1000	1000	1000	1000
Total	101250	91950	128500	108850	127550	118900	125000	117350	123000	116650
Income Sale Proceeds										
Sale of Milk	150500	135000	175000	165000	171500	165000	154000	159000	161000	156000
Sale of Manure	750	750	1500	1500	1500	1500	1500	1500	1500	1500
Sale of Breeding stock					50000	50000	50000	50000	50000	50000
Total	151250	135750	176500	166500	223000	216500	205500	210500	212500	207500
Profit										
Income	151250	135750	176500	166500	273000	266500	255500	260500	262500	257500
Expenditure	101250	91950	128500	108850	127550	118900	125000	117350	123000	116650
Total Profit	50000	43800	48000	57650	145450	147600	130500	143150	139500	140850

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Jersey Cow

Clean Milk production

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Annexure-I

Where to source the good quality animals and their availability

The Ministry of Agriculture , under fourth five year plan have decided to set up six large Cattle Breeding Farms to implement the progeny testing programmes in selected cattle and buffalo breeds and also make available exotic bulls for crossbreeding. Accordingly the following farms were set up.

Name of the Farm and Location	Breed	Year of Establishment
1. Central Cattle Breeding Farm, Suratgarh	Tharparkar	1967
2. Central Cattle Breeding Farm, Chiplpma	Red Sindhi	1968
3. Central Cattle Breeding Farm, Dhamrod	Surti	1968
4. Central Cattle Breeding Farm, Semiliguda	Jersey	1972
5. Central Cattle Breeding Farm, Alamadhi	Murrah	1973
6. Central Cattle Breeding Farm, Andeshnagar	Friesian	1976

Central Cattle Breeding Farm Hessarghata:

A farm was set up in 1962 at Hessarghatta under the aegis of the Indian Council of Agricultural Research with the objective of rearing and distribution of exotic Jersey bulls. In 1975, the Jersey animals were transferred to Semilinguda and Holstein animals were imported from Denmark for production of superior or proven bulls. This then constituted the seventh farm in chain of the centrally administered cattle and buffalo-breeding farms.

The objectives of the Central Cattle Breeding Farms:

a) Progressive genetic improvement of some important cattle and buffalo breeds for improvement in the milk production following scientific methods.
b) Production and distribution of superior pedigreed bulls, for using them in production of frozen semen doses and natural services in the state cattle and buffalo breeding programme/projects in the country

Today all these seven farms are disease free high genetic merit bulls for use by the States and other stake holders for use in their genetic upgradtaion programmes.

The bulls from these farms are sold, at the price fixed by the Central Governments, to Government, NGOs and public regularly.

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Red Sindhi Cow with ET born Calves

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(A) BREEDS MAINTAINED THE CENTRAL CATTLE BREEDING FARM

Indigenous Cattle

RED SINDHI

A Medium sized, well proportioned, compact animal with heavy hump, dewlap and sheath, horns thick at the base, emerge laterally and curve upwards, ears are medium sized , drooping and udder capacious
Red, shades varying from dark red to dim yellow

Body measurements

	MALE	FEMALE
Height (meters)	1.3	1.2
Length (meters)	1.4	1.4
Girth (meters)	1.8	1.4
Weight (kgs)	454	317

THARPARKAR

Deep, strongly built medium sized, well proportioned body, short limbs, straight and strong, firm joints, face moderately long with comparatively broad poll, medium size head, broad forehead and flat or slightly convex above the eyes, full and bright, ears somewhat long, broad and semi-pendulous, medium sized horns, fore and hind quarters somewhat drooping, tail fine with black switch reaching to fetlocks, good and capacious udder, white or grey in colour

Body measurements

	MALE	FEMALE
Height (meters)	1.7	1.3
Length (meters)	1.5	1.4
Girth (meters)	1.9	1.7
Weight (Kgs)	544	408

Buffalo

SURTI

Well shaped medium sized body with wedge shaped barrel, long and broad head, rounded between horns, back straight, eyes prominent, horns sickle shaped, moderately long and flat, tail fairly long, ending in white tuft, colour black or brown, two white collars, one round the jaw and the other at brisket present

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Tharparkar Cow

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Body measurements

	MALE	FEMALE
Height (meters)	1.3	1.3
Length (meters)	1.4	1.4
Girth (meters)	2.9	2.8
Weight (Kgs)	499	408(Kg)

MURRAH

Body massive, head comparatively light, horns short and tightly curved, well developed udder, hips broad, fore and hind quarters drooping, tail long reaching till fe locks, colour jet black with white marking on tail, face and extremities.

Body measurements

	MALE	FEMALE
Height (meters)	1.5	1.4
Length(meters)	1.5	1.5
Girth (meters)	2.3	2.2
Weight (Kgs)	567	431

Exotic

HOLSTEIN-FRESIAN (H.F.)

Roughly built, large feed intake capacity, well developed udder, head is long narrow slightly, rounded withers, colour white and black

Body weight (Kg)	MALE	1000
	FEMALE	67
	Milk Yield	8125

JERSEY

Has straight top lines, level rumps, sharp withers, heads have a double dish, colour is fawn with or without markings.

Body weight (Kg)	MALE	675
	FEMALE	450
	Milk Yield	4000

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Reproduction and Production Parameters

Breed	Age at first calving (months)	Calving Intervals (months)	Lactation yield (kg)	Lactation Length (Days)
Red Sindhi	41.7 ± 0.5	14.7 ± 0.3	1605 ± 24.7	284.0 ± 2.4
Tharparkar	49.4 ± 0.4	14.8 ± 0.8	1697 ± 53.3	280 ± 6.0
Murrahas	42.4 ± 0.1	15.9 ± 2.4	1597.3 ± 8.0	295.9 ± 1.0
Surti	44.5 ± 2.0	15.3 ± 5.3	1772 ± 10.3	350 ± 5.4
RSXJ	29.0 ± 0.9	13.6 ± 0.5	1501.7 ± 82.3	305.8 ± 7.2
Thar x HF	33.6 ± 0.6	13.2 ± 0.4	2600.0 ± 49.5	311.1 ± 17.8

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Annexure-II

OTHER IMPORTANT BREEDS OF CATTLE

1) Sahiwal

Long, deep, fleshy, symmetrical body with short legs, loose skin, broad foreheads, horns stumpy, medium sized ears, dewlap heavy and large hump straight, hip bones high and wide apart, tail long and whip like, udder capacious.
Usually reddish brown in colour with or without white splashes.

Body measurements

	MALE	FEMALE
Height (meters)	1.7	1.3
Length (meters)	1.5	1.4
Girth (meters)	1.9	1.7
Weight (kg)	544.0	408.3
Milk Yield (kg)	-	2200

2) Ongole

Large medium sized animal with loosely knit frame, long body, limbs long and muscular forehead broad between eyes, ears long, horn stumpy, dewlap large and fleshy, hump in males well developed and erect, white, dark grey markings on head

Body measurements

	MALE	FEMALE
Height (meters)	1.5	1.3
Length (meters)	1.6	1.1
Girth (meters)	2.0	1.8
Weight (kg)	567.6	431.0
Milk Yield (kg)	-	700

3) Gir

Well developed body, prominent and broad forehead, curved turning back at the tip, long and pendulous, ears long and whip like tail, hip bones prominent. Varies from shades of red and white to almost black and white or entire red.

Body measurements

	MALE	FEMALE
Height (meters)	1.4	1.3
Length (meters)	1.5	1.7
Girth (meters)	1.8	1.7

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Weight (kg)	544.0	385.5
Milk Yield (kg)	-	2000

4) Hariana

Body proportionate, moderately long, compact in appearance, head carried high, horns short, curving upwards and inwards, eyes large and bright, ears small and slightly pendolous, dewlap small large hump in males, short, thin, and tapering tail, well developed udder in cows.White or light grey in colour

Body measurements

	MALE	FEMALE
Height (meters)	1.4	1.3
Length (meters)	1.5	1.4
Girth (meters)	2.0	1.7
Weight (kg)	499.0	353.8
Milk Yield (kg)	-	800

5) Deoni

Medium sized, forehead less pronounced well developed dewlap and sheath, horns take characteristic outward and backward curve, ears pendulous but short without the notch near the tip.
Black and white or red in colour and white with irregular patches and spots.

Body measurements

	MALE	FEMALE
Height (meters)	1.5	1.3
Length (meters)	1.7	1.5
Girth (meters)	2.0	1.7
Weight (kg)	589.7	340.2
Milk Yield (kg)	-	900

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ANNEXURE-III

OTHER BREEDS OF BUFFALOES

1) Mehsana

Body longer than Murrah, lighter limbs, longer and heavier head, horns usually less curved at the end, longer well shaped udder Black or fawn grey in colour with white markings on face, legs and tail tip.

Body measurements

	MALE	FEMALE
Height (meters)	1.5	1.4
Length (meters)	1.8	1.6
Girth (meters)	2.1	2.1
Weight (kg)	569.0	431.0
Milk Yield(kg)	-	1800

2) Nili-Ravi

Head elongated, bulging at the top, depressed between eyes, muzzle fine, frame medium sized, horns small coiled lightly, neck long, thin and fine, udder well developed, tail long almost touching the ground

Body measurements

	MALE	FEMALE
Height (meters)	1.4	1.4
Length (meters)	1.6	1.5
Girth (meters)	2.3	2.3
Weight (kg)	567.0	454.0
Milk Yield (kg)	-	1800

3) Nagpuri

Long horns, flat and curved, face long and thin, neck somewhat long, limbs lighter, tail comparatively short, reaching below hooks. Usually black in colour sometimes white, white patches on face, legs and tail tip.

Body measurements

	MALE	FEMALE
Height (meters)	1.4	1.3
Length (meters)	1.8	1.5
Girth (meters)	2.1	2.0
Weight (kg)	522.0	408.0
Milk Yield(kg)	-	1200

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Jaffarabadi

Long body but not compact, dewlap in female somewhat loose, head and neck massive, forehead very prominent, horns heavy, incline to droop on each side of neck, less tightly curved than in Murrah, udder well developed. Usually black in colour.

Body measurements

	MALE	FEMALE
Height (meters)	1.5	1.4
Length (meters)	1.7	1.7
Girth (meters)	1.7	1.9
Weight (kg)	590.0	454.0
Milk Yield (kg)	-	2000

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Annexure-IV

TIPS FOR BETTER MANAGEMENT OF DAIRY CALVES

- Calves may die due to under feeding/over feeding and diseases, such as pneumonia, calf scours, navel infections and worm infestations (Ascariasis). Proper management can minimize calf mortality to less than 10% due to these ailments.

CARE OF THE NEW BORN CALVES

- When the calf is born, the mucous and phlegm should be cleaned from the nose and mouth.

- If calf does not breathe, it should be held from the rear legs and lifted from the floor with the head down or alternate compression and relaxation of the chest will often start the calf breathing.

- Navel should be dipped in tincture iodine

- Wipe the calf with clean coarse cloth to hasten drying.

- Remove all the wet bedding from the cow pen and wash cow udder with clean water and dilute potassium permanganate solution.

- A normal it will stand on its leg and suck within 30 minutes. If fails assistance should be given in getting first feeding.

- Normally muconium (dark material that have collected in the intestine of unborn calf) passes within 2 hours after the first feed. If this does not pass in due time enema consisting of one and a half tea spoonful of sodium bicarbonate in a litre of warm water should be given.

HOUSING CALVES

- Calf pens should be well ventilated, well lighted, clean, dry, adequately bedded using soft material.

- It is better to rear calves in individual calf pens. If room for individual pens is not available calves must be tied properly for 15 to 20 minutes after feeding..

Feeding Calves

- Continue feeding colostrum to the newborn calves through the first 3 days if colostrum is available.
- Feed milk to the calves for first 3 to 4 weeks of life. After that, they can digest vegetable starches and sugars. All liquids should be fed at room or body temperature.

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- Thoroughly clean any utensils used to feed calves. Store equipment in a clean and dry place.

Water

- Make clean, fresh water available at all times.

Deworming of calves

- First dose of dewormer should be given within 5 to 6 days of birth and repeat at 45 days intervals.

Calf Growth

- Birth weight of calf in generally 20-35 kg depending upon the breed of the animal.
- Proper feeding of calf along with regular deworming will achieve a growth rate of 10-15 kg/month.

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Annexure-V

TIPS FOR BETTER MANAGEMENT OF REPRODUCTIVE EFFICIENCY IN BOVINES

Infertility in cattle accounts for major economic losses in dairy farming and dairy industry in India. Maintaining an infertile animal is an economic burden and in most countries. If dry period is increased by one month the total milk production in the country will be declined by 11.25 Million Tonnes (As 79 million animals are in milk)

In cattle, nearly 10-30 per cent of lactations may be affected by infertility and reproductive disorders. Ideal level of days open (60-90 days), days dry (60 days) and calving interval (400 days) must be maintained. To attain good fertility or high calving rate both the male and female animals should be well fed and free from diseases.

Reasons for infertility

The causes of infertility are many and can be complex. Infertility or failure to conceive and give birth to a young one can be due to malnutrition, infections, congenital defects, management errors and ovulatory or hormonal imbalances in the female. Poor heat detection and AI not conducted at the right time of heat may also lead to infertility among animals.

Sexual cycle

Both cows and buffaloes have the sexual cycle (oestrus) once in 18-21 days for 18-24 hours. But in buffaloes, the cycle is silent posing a big problem to the farmers. The farmers should closely monitor the animals 4-5 times from early morning to late night. Poor heat deduction can cause increased levels of infertility. Considerable skill is needed to deduct the animals in heat for visible signs. Farmers who maintain good records and spend more time watching the animals obtain better results.

Tips to avoid infertility

- Breeding should be done during the heat period at the right time of heat. If animal comes into heat in the morning it should be inseminated in the evening and if animal comes into heat in night it should be inseminated in the morning.
- Animals that do not show sign of heat should be checked and treated.
- Deworming once in 6 months should be done for worm infestations to maintain the health status of the animals. A small investment in periodic deworming can bring greater gains in dairying.

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- Cattle should be fed with a well balanced diet with energy, protein, minerals and vitamin supplements. This helps in increased conception rate, healthy pregnancy, safe parturition, low incidence of infections and a healthy calf.

- Care of young female calves with good nutrition helps them to attain puberty in time with an optimum body weight of 230-250 kgs, suitable for breeding and thereby better conception.

- Feeding adequate quantity of green fodder during pregnancy will avoid blindness in newborn calves and retention of placenta (after birth).

- In natural service, breeding history of the bull is very important to avoid congenital defects and infections.

- Infections of the uterus can be largely avoided by having cows calved under hygienic conditions and provided with proper bedding during calving.

- After 60-90 days of insemination, the animals should be checked for confirmed pregnancy by qualified veterinarians.

- Unwarranted stress and transportation should be avoided during the all stages of pregnancy.

- The pregnant animal should be housed away from the general herd for better feeding management and parturition care.

- Pregnant animals should be drained of their milk two months before delivery and given adequate nutrition and exercise. This helps in improving the health of the mother, delivery of a healthy calf with average birth weight, low incidence of diseases and early return of sexual cycle.

- Post partum breeding can be started within 2 months or 60 days after calving to achieve the goal of one calf per year for economic and profitable dairy farming, according to them.

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Annexure-VI

STEPS TO REDUCE IMPACT OF DROUGHT ON DDAIRY CATTLE

Short Term measures:

- Conduct fertility camps in the drought-affected areas; identify problems and make interventions.
- Ensure availability of sufficient quantity of cattle feed and fodder.
- Enrichment of straws using urea- molasses treatment in order to meet protein and energy requirements of the animals
- Adopt chaffing of fodder and making silage to improve quality of fodder and to reduce its wastage.
- DADF advisory on availability of feed and fodder. Is available at: www.dahd.nic.in. Funds available under the existing schemes of DADF may be utilized efficiently to increase availability of feed and fodder.
- Adopt ration balancing as per the advice of local veterinarian/university etc.
- Use area specific mineral mixture as per technical advice.

Medium and long term measures:

- Establish fodder bank in the areas which frequently suffer from draught/draught like conditions.

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TIPS FOR BETTER HOUSING MANAGEMENT OF BOVINES

- Alleviating heat or cold waves can help to decrease or even eliminate these losses. Providing proper shade is one of the cheapest ways to modify an animal's microenvironment during the hot or cold weather.

- High producing livestock are more vulnerable to heat stress requires greater care and protection than other adapted or low producing animals.

- In summer and hot humid conditions well ventilated sheds is a necessary for reducing heat stress particularly in feed barns, loafing areas and in holding areas.
- The aim of the animal shelter is to provide a congenial microenvironment for better growth, reproduction and production performance of animals.

- In planning and designing of suitable animals shelter particularly for high producing cattle or buffaloes a prime consideration should be given to the animal comfort and health of the animals.

Points to be considered for construction of shelter of the animals:

1. **Selection of site for construction of animal shelter:**
   - Land should be even and should not be on a slope or undulating ground or topography.

   - High relatively leveled area should be preferred for animal shelter.

   - The plot for construction should be adequate in size depending upon the number of the animals proposed to be kept.

   - The vicinity of road on one side of the animals shelter may be necessary for transport purposes.

2. Orientation of shelter:
   - Animal shelter should be constructed in east west orientation so as to avoid maximum solar radiation during summer.
   - In the coastal areas the shed shall be oriented across the prevailing wind direction in order to protect the shelter roof from being blown off

3. **Space requirement:-**
   - Each adult dairy animal should be provided with 3.5 to 4 meter square area (1.5 to 1.7 meter width and 1.7 to 2.2 meter length). Minimum of two times open area for animal comfort in paddock.

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- The cows that are in advanced stage of pregnancy and in parturition, adult bulls require more open and standing space.
- The minimum space requirement may vary as per the animal size, location and environmental conditions.

4. **Slope in animal shed/paddock:**

- Slope of 3-7% is very important in maintaining sheds clean and dry.
- The proper slope in the open paddock effective drainage of rain water and livestock wastes.
- The slope of standing space/paddock may be kept about 2.5to 3%.
- The slope of the drain should be 4 to 7% for smooth running of water.
- The U shaped drains should be provided at the end of the covered area. The slope of drain shall lead to two settling chambers to the septic tank.
- Septic tank constructed with a size of 2X 2 X 3 meter respectively. Separate drain for rain water in paddock for proper rain water harvesting.
- Open drain in animal shed should be avoided.

5. **Construction of animal shelter:**

- Floor under the covered area may be made of bricks, RCC (reinforced Cement Concrete) or paved with cement concrete tiles.
- The surfaces of RCC floor should be checkered , rough non slippery with shallow grooves.
- The floor of the animal house should have a gradient of 1 in 40 towards the drains.
- About one half to one third of the open area towards the other end of the animal sheds (milking cows & buffaloes paddocks, calf paddock, heifers paddock and dry cows and buffaloes) should preferably send bedded (katcha) and other remaining one half to two thirds area should be brick paved.
- The floor of the of the straw store, chaff cutter shed and implement room may be brick paved whereas the floors of the milk storage and feed storage room should be of RCC.
- The roof height of the animal shed should be atleast 2 meter at the eaves of the shed.
- The covered and open area of the shed should be enclosed by 2 meter high cemented strong brick wall,
- The walls along with which mangers are to be constructed may be kept 0.5 to 1 meter.
- Animal paddock gate should be 3 meter wide and centrally placed and should open towards the road.
- The roof of the animal shed should be a double layered Poly urethane foam (PUF) insulated structure in large sheds. The

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central area or middle passage area or gallery should be separate. Animal standing space should have a separate roof with a gap of about 0.3 to 0.4 meter.

- The roof height of 5 to 5.5 meter at midrib and 3.5 to 4.5 meter at eaves and covered area of 3 to 4 meter on either side meets the requirement of an adult animal.
- The shelter structure may be erected on pillars, built of cement mortar, cast iron pipes, hard wooden or bamboo. The eaves of the roof should project out at 0.5 meter from the walls or the pillars.
- Manure pit and other waste disposal site s should be far away from the animal house as possible
- The cost of construction of shed varies from Rs 200-600/sqft.

6. Heat stress alleviation:

- Shades, fans, fog misters and sprinklers are used to alleviate heat stress of high producing cows.
- High velocity blast fans mounted on side walls can also help in reducing heat stress during July to September.
- Sprinkling water with air draft or wind from fan on heat stress vulnerable animals helps to decrease their body temperature and respiratory activity.
- Reduce dietary fiber intake to the level where rumen functions properly during summer.
- Increasing level of grains, feeding dietary fat is a common strategy to provide extra energy during negative energy balance. High producing animal may fed 6-7% of diet dry matter.
- Supplementation buffer sodium bicarbonate and magnesium oxide help to maintain rumen PH in summer.
- Feeding of antioxidants (vitamin A, & E Zinc etc) reduce heat stress and prevent mastitis.

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Annexure-VIII

INDIGENOUS BREEDS OF CATTLE & BUFFALO BREEDS AND THEIR BREEDING TRACTS

S. No	Breed	Breeding Tract	Productivity	Population as per 2007 Livestock Census	Population as per 2012 Livestock Census
Breeds of Cattle					
Dairy Breeds					
1	Gir	Gujarat (Junagarh, Bhavnagar, Amreli District)	Milk Yield: 2100 kg (800-4000) Milk Fat 4.6%	21,03,307	5113013
2	Rathi	Rajasthan (Bikaner, Jaiselmer & Ganganagar District)	Milk Yield: 1560 kg (1062-2810) Milk Fat 3.7%	9,24,087	1237509
3	Red Sindhi	Pakistan (Karachi and Hyderabad District); Uttarakhand, Tamil Nadu, Odisha; Bihar	Milk Yield: 1840 kg (1,100 - 2600) Milk Fat 4.5%	5,49,432	557402
4	Sahiwal	Pakistan (Sahiwal District), Ferozpur and Amritsar District of Punjab	Milk Yield: 2326 kg (1600-3500) Milk Fat 4.8-5.1%	4,57,405	4882294
Dual Purpose Breeds					
5	Deoni	Maharashtra (Latur, Parbani, Nanded and OsmanabadDistrict), Karnataka (Bidar)	Milk Yield: 1135-3000 kg Milk Fat 4.3% SNF 9.69%	1,66,025	351600
6	Gaolao	Maharashtra (WardhaDistrict), MP (Balaghat, ChindwaraDistrict) Chhattisgarh (Durg, Rajnandgoan)	Milk Yield: 600-1500 kg Milk Fat 4.3-5.5%	2,22,663	322683
7	Hariana	Haryana (Rohtak, Hissar	Milk Yield:	26,00,122	6279966

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		, JindDistrict), Rajasthan (Alwar, Bharatpur)	1567 kg (1067-2500) Milk Fat 4.5% SNF 9.10		
8	Kankrej	Gujarat (Kutch, Mehsana, Ahmedabad, Kaira, Sabarkantha District), Rajasthan(Barmer & Jodhpur)	Milk Yield: 1746 kg (1097-3194) Milk Fat 4.8%	38,87,152	3028249
9	Krishna Valley	Karnataka (Belgam, Raichur, BijapurDistrict) Maharashtra (Satara, Sangli, Solapur)	Milk Yield: 1135-3000 kg Milk Fat 4.3%	2,314	14399
10	Mewati	Rajasthan (Alwar, Bharatpur), Uttar Pradesh (Kosi, Mathura District)	Milk Yield: 900-1500 kg kg Milk Fat 4.7-5%	75,427	32940
11	Ongole	Andhra Pradesh(Chittoor, Kurnool)	Milk Yield: 688 kg (475-1000) Fat 4.2%	2,58,240	634526
12	Tharparkar	Rajasthan (Jodhpur, Barmer, Jaiselmer)	Milk Yield: 1749 kg (913-2147) Milk Fat 4.88% SNF 9.2%	5,57,679	732479
		Draught Breeds			
13	Amrit Mahal	Karnataka (Hassan, ChikmaglurChiteradurga)	Milk Yield: 572-650 kg Milk Fat 4.3-5%	98,169	230142
14	Bargur	Tamil Nadu (Erode District)	Milk Yield: 250-1300 Milk fat: 4.5 to 5.5%	21,312	16307
15	Bachaur	Bihar (Sitamari, Madhubani, DarbhangaDistrict)	Milk Yield: 495-605 kg Milk Fat 4.5%-5%	4,51,659	1546488
16	Binjharpuri	Orissa (Jajpur subdivision Cuttack District)	Milk Yield: 400-450 Kg Fat 4.94% SNF 7.8%	43,680	110553
17	Dangi	Maharashtra (Nasik, Ahmednagar District.)	530 Milk Fat	3,04,238	193780

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			4.3%		
18	Ghumsuri	Orissa (Cuttack District)	Milk Yield: 450-650 kg Milk Fat 4.8 to 4.9%	82,815	83988
19	Hallikar	Karnataka	Milk Yield: 540 kg (227-1134) Milk Fat 5.7%	21,96,698	1807932
20	Kangayam	Tamil Nadu (Erode District)	Milk Yield: 540 kg (600-800) Milk Fat 3.88% SNF 6.96	3,16,114	193445
21	Kenkatha	Uttar Pradesh (Lalitpur, Hamirpur, Banda District), Madhya Pradesh (TikamgarhDistrict)	Milk Yield: 500-800 kg Milk Fat 4.7 to 6.7%	1,85,886	670402
22	Kherigarh	Uttar Pradesh (Lakhimpur KheriDistrict)	Milk Yield: 300-500 kg Fat 4-6%	1,71,414	199251
23	Kheriar	Orissa			383824
24	Khillari	Maharashtra (Solapur, SangliSataraDistrict)	Milk Yield: 384 kg (240-515) Milk Fat 4.5 to 5.5%	14,23,742	2014352
25	Malvi	Madhya Pradeash(Dewas, Ujjain, SajapurDistrict), Rajasthan (JhalawarDistrict)	Milk Yield: 1047 kg (627-1227) Milk fat 4.28%	15,18,452	1710465
26	Nagori	Rajasthan (NagaurDistrict)	Milk Yield: 603 kg (479-905) Milk Fat Av 5.8%	8,37,344	508703
27	Nimari	Madhya Pradesh (Khandwa, Khargoan and BarwaniDistrict)	Milk Yield: 360 kg (310-495) Milk Fat 4.9%	3,09,859	453633
28	Motu	Orissa (KoraputDistrict)	Milk Yield: 100-140 kg Milk Fat: Av 4.86%-5.3%	7,02,347	536758
29	Ponwar	Uttar Pradesh	Milk Yield:	24,072	27967

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		(PilibhitDistrict)	500-1000 kg kg Milk Fat: 4-5%		
30	Red Kandhari	Maharashtra (NandedDistrict)	Milk Yield: 598 kg Milk Fat 4.6% SNF 8.62	1,78,758	458040
31	Siri	West Bengal (Darjeeling) and Sikkim	Milk Yield: 2-6 Kg/day Milk Fat 2.8-5.5% SNF 7.56-9.37	61,764	17749
32	Umblachyery	Tamil Nadu (Thanjavur, NagapattinamDistrict)	Milk Yield: 500 kg Milk Fat 4.5 to 5.5%	2,18,315	72510
33	Vechur	Kerala (Vaikam, Kottayam District)	Milk Yield 550 kg Milk Fat 4.7-5.8%	3,170	2499
34	Punganur	Andhra Pradesh (ChitoorDistrict)	Milk Yield 546 kg (194-1099) Fat 5% SNF 9.5%	771	2828
New Breeds					
35	Malnad Gidda	Karnataka (Chikmaglur, Dakshina Kannada, Uttar Kannada, Hassan, Kodagu, Shimoga, Uddupi)	Milk Yield 200 kg Milk Fat 4.5 to 5.5%	1281000	1049543
36	Kosali	Chhattisgarh (Raipur Durg Bilaspur Janjgir)	Milk Yield 200-250 kg Milk Fat 3.5%	1500000	2432236
37	Pulikulam	Tamil Nadu (Madurai)	Milk Yield 500 kg Milk Fat: 4.5 to 5.5%	45000	10085
38	Gangatiri	Uttar Pradesh (Varanasi, Gorakhpur, Ghazipur, Ballia, Mau, Mirzapur)	Milk Yield 900-1200 kg Milk Fat Av 4.9% (4.1 to 5.2%)		364806
39	Belahi	Foot hills of Shivaliks in Haryana	Milk Yield 182-2092 kg		30,000 (NBAGR)

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			Milk Fat Av 5.25 (2.37-7.89)		
Breeds of Buffaloes					
1	Murrah	Haryana (Rohtak, Hissar District)	Milk Yield 1500-4000kg Milk Fat 6 to 9% (Av (7.3%)	2,04,88,438	48251640
2	Nili Ravi	Punjab (Ferozepur District)	Milk Yield 1500-4000kg Milk Fat: 5 to 8% (Av 7)	5,91,659	677264
3	Bhadawari	Uttar Pradesh (Agra, Etawah District), Madhya Pradesh (Bhind, Gwalior District)	Milk Yield 540-1400 kg Milk Fat: 6 to 13% (Av 9)	7,29,013	1753814
4	Jaffarabadi	Gujarat (Amreli, Junagarh, Bhavnagar District)	Milk Yield 2000 to 4000 kg Milk Fat: 7 to 8.5% (Av 8)	18,43,848	1771498
5	Marathwada	Maharashtra (Marathwada region)	Milk Yield 1000-1500 kg Milk Fat: 6 to 10.5% (Av 9)	1,83,238	376599
6	Mehsana	Gujarat (Mehsana, Ahmedabad)	Milk Yield 600-3600kg Milk Fat: 5 to 9.5% (Av 6.8)	33,76,196	1216125
7	Nagpuri	Mharashtra (Vidhharbha region)	Milk Yield 800-1500 Milk Fat: 7 to 9% (Av 8)	1,42,765	190958
8	Phandharpuri	Maharashtra (Kohlapur, Sangli, Solapur District)	Milk Yield 1500-2500kg (1790 kg) Milk Fat: Av 8.01%	2,72,802	483738
9	Surti	Gujarat (Kheda, Vadodara, Bharuch District)	Milk Yield 1000-2000 Milk Fat: 3.8 to 8.7% (Av 7.02%)	29,88,245	3892927
10	Toda	Tamil; Nadu (Nilgiris, Udamanglam, Coonoor District)	Milk Yield 500 kg Milk Fat: 8.2	54,755	5536
11	Banni	Gujarat (Kutch District)	Milk Yield 1100-6000	5,27,576	382122

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			kg Milk Fat: 4 to 12.1% (Av 6.5%)		
12	Chilika	Odisha (Cuttack Ganjam, Puri District)	Milk Yield 450-500kg Milk Fat: 8.5 to 8.8% (Av 8.7%)	29000	7570
13	Kalahandi	Odisha (Kalahandi, Rayagada District)	Milk Yield 680-912 kg Milk Fat: 7.8 to 8.2%	80,000	142021

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