

APH 312: ANIMAL HUSBANDRY AND PRODUCTION II (RUMINANT

MANAGEMENT OF BREEDING STOCKS, GROWING AND YOUNG ANIMALS

CATTLE BREEDING STOCK/HERD MANAGEMENT

Animals kept for the purpose of reproduction is called breeding stock/herd. An important objective of any commercial cattle production is the rapid increase in the number of breeding females so that both breeding and fattening stocks can be available for sale to other cattle breeders and butchers, respectively. This involves calving rate, weaning ratio and average weaning weight.

- a. Calving rate: the proportion of cows that dropped a calf at full term to the total number exposed to the bull at breeding season. This is usually 80 – 95 % in high class ranches, 60 – 70 % in viable ranches and <60% in unviable ranches
- b. Weaning ratio: the number of calves weaned as percentage of the number of cows exposed to the bull at breeding season.
 - i. Weaning rate in ordinary sense =
$$\frac{\text{No weaned}}{\text{Number calved}} \times 100$$
 - ii. Weaning rate in economic sense =
$$\frac{\text{No weaned}}{\text{Number of cow calved}} \times 100$$
- c. Average weaning weight: this is the average weight of the weaners at a standard age of 205 days.

IMPORTANT CONSIDERATIONS IN BREEDING HERD/STOCK MANAGEMENT:

i. Establishment of a breeding season

Breeding season is the period of the year when bulls are allowed to mate with cows. This is usually targeted at a period when grazing is at its best. It is done to: reduce stress during pregnancy and lactation; calves are planned to be born when the climate is favourable for providing maximum lactation for the calf's growth and good re-breeding of the cows (It is therefore recommended that the breeding season should be restricted to within 90 days period so that the cows can calf within a comparatively short period for adequate and efficient supervision at calving season); Dehorning, castration and weaning can be streamlined and management of similar age groups of cattle is possible. Breeding season can be adopted by studying the ecology of the area the best time to start the breeding season being when the grasses are very green and attractive. Many young grasses and legumes contain some oestrogenic ingredients that will promote the ovulation rate in the cows.

ii. Compulsory weaning of calves

Weaning is the separation of calves from their dams usually carried out at 7 – 9 months. It is essential to allow the cow to recover from previous calving preparatory to subsequent calving. For this reason, weaning of calves is compulsory. Delayed weaning can affect the hormonal balance of the dam leading to late re-breeding. Also early weaning is a trauma for the calf resulting in mortality or slow growth rate. This can however be circumvented by good management practices and this is perhaps where supplementary feeding for 2 -3 weeks after weaning becomes paramount.

iii. Post-breeding season activities

The major post-breeding activity which should be conducted 8 weeks after the breeding season is pregnancy diagnosis. Pregnancy diagnosis is done by the insertion of the left gloved-arm into the rectum of the cow to feel the uterus and thus detect the enlargement caused by the presence of calf or calves. This should be followed by culling of open cows or heifers. Culling is the removal of unproductive cows and heifers from the breeding herd. Reasons for culling should be for the following reasons:

- a. Non-pregnancy during two consecutive breeding seasons or persistently long calving intervals
- b. Weaning of persistently poor and unthrifty calves
- c. Old age. Cows should not be allowed in the breeding herd when above 10 – 12 years
- d. Injuries or diseases that can impact on reproductive efficiency like loss of teats or mastitis
- e. Reproductive diseases

iv Introduction of replacement heifers

Although weight of heifers is more important than age in determining breeding suitability, it is recommended that the heifers drop their first calf between three and three and half years of age. This could be reduced later by introducing the bulls to the heifers at two, if the management is adequate and progressive. Causes of abortion or abortion storms should be properly investigated by the veterinary personnel of the ranch.

v. Mating plan

A good cattle herd should be closed as early as possible and the selection of male and female replacements should be under one-herd environment. Until the need for registration of pedigree is desired when single-sire breeding is used, multiple sire breeding should be adopted for practical purposes on commercial herds. This is desirable for rapid build-up of the herd and to allow some measure of natural selection pressure on the mating efficiency of imported bulls

vi. Close supervision at calving season

This is done to reduce post natal mortality which is known to be highest immediately at birth or around birth period. This will also allow us to identify and assist heifers or cows with dystocia (difficult parturition)

vii. Reproduction record

Successful reproduction encompasses the ability to mate, the capacity to conceive and to nourish the embryo and deliver the viable young ones at the end of the normal gestation period. Reproduction efficiency is controlled by both genetic and non-genetic factors. The non genetic factors are climate, nutrition and level of management. It is important to note that the best feeding & management practices can't coarse performance beyond the genetic limit of an animal.

FACTORS AFFECTING BREEDING EFFICIENCY

i. Numbers of ova released during each ovulation

Ovulation is the process of shedding of ovum from ovarian follicle. In the case of cow usually a single ovum is capable of undergoing fertilization for a period of 5 -10 hours. The timing of mating in relation to ovulation is important for effective fertilization.

ii. Percentage of fertilization

Failure of the ova to be fertilized may results from several causes: The spermatozoa may be few or low in vitality or the service may either be too early or too late to ovulation period.

iii. Embryonic Death

After fertilization embryonic mortality may occur. Several factors such as hormone imbalance resulting in failure of implantation of fertilized ova, lethal genes, accident during development, poor nutrition and infection in the uterus are few causes of embryonic death.

iv. Age at first pregnancy

Females' bred at a lower age may appear stunted during the first lactation but their matured size is affected little by their having being bred early.

v. Frequency of pregnancy

Lowering intervals between successive pregnancies can greatly enhance breeding efficiencies. It is better to breed for the first time at an early age and to re-breed at almost the earliest opportunity after each pregnancy. Cows can be re-bred in 9-12 weeks after birth.

vi. Longevity

The length of time and animal remain in breeding plays an important part in determining its breeding efficiency.

The management practices to improve breeding efficiency include:

- a. Keeping accurate breeding records of dates of heats, service and parturition
- b. Breed cows near the end of heat period
- c. Have females with abnormal discharges examined and treated by veterinarian
- d. Call veterinarian to examine female not settled after 3 services
- e. Check the female for pregnancy at the proper time after breeding
- f. Buy replacement only from healthy herds and test them before putting them in your herds
- g. Allow the females to give birth in isolation preferably in partition rooms and clean up and sterilize the area once parturition is over
- h. Follow a program of disease prevention, test and vaccination for the diseases affecting reproduction.
- i. Practice a general sanitation program
- j. Supply adequate nutrition
- k. Provide suitable shelter
- l. Detect silent or mild heat by using a teaser bull

MANAGEMENT OF BREEDING BULLS

Prior to the breeding season, all breeding bulls earmarked for use during the season should be fertility-tested by palpating the testes to ascertain their functionality and examine the sperm for motility and quality under microscope. Firm and consistent testes are the desirable attributes of good breeding bull. Sperm motility and the percentage sperm abnormalities are useful indices for determining the fertility status of breeding bulls. Injured bulls and those with reproductive diseases like brucellosis, vibriosis or trichomoniasis should not be used for breeding. To avoid overuse of the bull, 15 – 25 cows/bull is recommended. The bulls have been reported to contribute 80 % to the improvement of any herd; hence selection pressure is maximum on bulls. Therefore, a bull should not be retained for further breeding after three years, however good. The management of breeding bulls can be broken down into 3 phases

a. Phase 1: Management before the breeding seasons

The bull needs 90 days prior to the beginning of breeding seasons for conditioning. A breeding soundness examination (B.S.E) usually predicts the selection process and helps to ensure the reproductive capacity and physical soundness of the bull. Bulls to be introduced to cow herd should be grouped together to become familiar with each other so as to prevent fighting when turned in. Nutrition prior to the breeding season is important as bulls tend to lose weight during the season. 3 categories of bulls are identified for nutrition purpose

i. Yearling bulls

These animals have not reached their matured weight i.e. the required adequate growth and need to maintain satisfactory body condition without becoming extremely fat. A balanced ration should be given containing 12 – 14 % crude protein should be fed to yearling bulls. This can be supplied through high quality forage and concentrates ration.

ii. 2 years old bulls

These bulls are those that have almost attained their matured size. They should be given high quality forage and moderate energy diets such as grains

iii. Matured bulls

The nutrition program should be based on the physical conditions of the bulls at start of the conditioning period. They required high quality forage and more grains than the 2 years old o build the necessary energy reserve.

Phase 2: During the breeding season

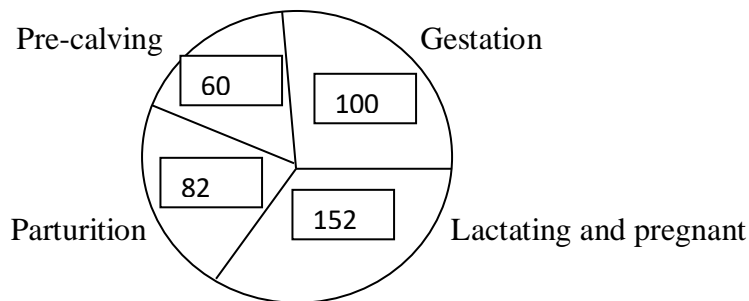
When young bull is being used, one bull may be expected to breed 5 – 12 cows. When using matured bulls the number of cows increased to 35-50 depending on the carry capacity of the pasture and the condition of the bull. During the breeding season the bulls should be observed to make sure they are getting the cows bred and that no injuries have occurred. A bull in service should be given good quality forage with concentrate. Too much forage should be avoided as it makes the bull punch and slow in service. A large supply of concentrate feed may make the bull too much fatty and less virile.

Phase 3: After the breeding season

After the building season, bull should still receive adequate care. They should be evaluated and separated into 2 groups. Young bulls which are still growing and thin matured bulls. The thin matured bulls should receive supplemented feed while those in good condition and matured can exist very well on ordinary roughage diet.

MANAGEMENT OF BREEDING COWS

For nutritional and most management purposes, the cows production cycle can be divided into 4 phases.



a. Phase 1: Pre-calving

This is a phase immediately before calving and it is the most critical period of the year. Cows must calve in good body condition to have healthy calves and breed back quickly. Fetal growth is rapid, placental is growing and cow needs to gain 450- 560 g per day (weight), while heifers and growing cows need to gain more weight more than the adult cows. Therefore, energy and protein needs increase at this stage. Cows are also preparing for lactation late in the period around 50 days to parturition, feed intake may decrease because the fetus and associated structures take up space normally occupied by the rumen.

b. Phase 2: Post-partum

The 80-90 days period that begins at calving, is the period of greatest nutritional demand as cows must lactate, repair their reproductive tracts, resume heat cycle, and breed. During this period cows must be fed to meet their nutritional demand or else there will be failed or delayed in breeding and weight loss

c. Phase 3: Lactating and pregnancy phase

This is a period of 120-130 days. Nutritional requirements are still high, but energy and protein needs decrease compared to the post partum period. Cows reached their peak lactation and then decrease in milk production during this period. Cows become pregnant but with limited fetal growth which limit its feed requirements

d. Phase 4: Gestation

100-110 days immediately after weaning, nutritional requirement are at their lowest because lactation is ceased. This is the best time to put weight back on these cows and heifers because growth of the developing cow is still slow and activities decreased.

MANAGEMENT DURING CALVING

The main aim of management during calving is to minimize deaths of calves and heifers that may result from a difficult calving. Heifers must be observed frequently, but disturbed as little as possible.

Calving supervision

Heifers should be observed frequently at least twice daily so as to assist the animal early if needed. It is however noteworthy that frequent checking can induce calving difficulty therefore; this must be done with care. To ameliorate the stress of checking, heifers should be kept close to cattle yards during calving, so that early assistance may be given if needed. The labour required for supervision can be kept to a minimum if the heifers are joined to calve over a short period, (6-8 weeks). Keeping the heifers in a small paddock close to the house during calving can also reduce the time required for frequent observation.

For the calf to be born alive, calving must be completed within two hours after the appearance of the water bag. If the calf is not born within three hours of the appearance of the water bag, the heifer should be examined for early assistance to prevent deaths, calving paralysis and uterine prolapse in heifers.

The decision to assist the heifer should be based on the following

- i. Position of the calf:- If a hind leg is visible or if only one foreleg is presented
- ii. Any other evidence of mal-presentation of the calf
- iii. A heifer that has ceased straining and appears weak or exhausted
- iv. If the heifer is straining vigorously, and the birth appears to be progressing normally, the heifer should be left alone for approximately one hour. If there has been no real progress after the hour has elapsed, assistance may be required.

When finally decision is made to assist the heifer as a result of difficult calving, veterinary assistance should be sought particular, a veterinary surgeon may be required to prescribe and administer any drugs required to assist with calf and heifer survival during and after calving.

After a difficult birth, young cows in particular often desert their calves. It is wise to keep the cow and calf confined in a small area after assistance has been given. They can then be watched and should not be allowed back with the main herd until the cow has accepted the calf and will allow it to suck. Sometimes it may be necessary to hold the cow in a crush or race and force her to allow the calf to drink for the first few days.

For good fertility and milk production, first calvers in particular must be well fed after calving by simply providing an abundance of good quality pasture. Some producers draft off freshly calved young cows each week, and drift them into a better paddock. Feeding should begin immediately after calving because cattle may take a while to adjust to the ration.

MILK PRODUCTION

The main factor determining how well calves grow is the amount of milk their dams produce. This in turn depends on such things as the age and breed of the cow, but it is also influenced by feeding management. Young cows produce less milk than matured cows. Consequently the growth rate of calves from two year-old or three-year-old cows is normally 10 – 15 % less than that of calves from cows aged five or six. Nevertheless, young cows can produce good calves if they are well fed after calving. Feed intake before calving has a relatively small influence on milk yield, but after calving the effect is enormous. Once they start to produce milk, cows of any age need at least twice as much food as they did before calving. If they don't get it they will lose weight and their milk production will be depressed.

Fertility

After they calve, cows have only about 80 days in which to become pregnant if they are to calve again within 12 months. Whether they achieve this level of fertility depends on how soon after calving they come on heat again. This is largely determined by the breed of cow, the amount of milk produced, age, and feeding management before and after calving.

Milk production places cows of any age under much greater stress than pregnancy or any other body function. High milk-producing breeds and strains of cattle take longer to start cycling again after calving than lower milk producers. Matured cows usually take about 60 days to come on heat again after calving; young cows may take 90 days or more. The reason is that young cows, particularly those calving at two years of age, are in a very delicate nutritional situation after calving. They require nutrients not only for milk production, but also for their own body growth and development. Nutritional management both before and after calving has a great impact on cow fertility. Cows that are not well fed during pregnancy take longer to start cycling again after calving than cows that are well fed.

MANAGEMENT OF CALVES

Feeding of calves

The calf must receive the first milk i.e. colostrums/ beestings/ bisnings/ first milk which the cow gives the calves for the first three days after calving. The protein of colostrums consists of a much higher proportion of globulin which acts as an anti-body to protect the animal from any infection. Also, the colostrums contain Vitamin A and a greater amount of other vitamins such as riboflavin, thiamine, pantothenic acid, and choline. Better growth and greater resistant to calf ailment result from supplementing milk diet with grain from 7-15 days of the life of the calf. Excessive protein rich grain mixture is not desirable as milk is already rich in protein. A medium grain mixture is most suitable when milk is fed freely.

Colostrum

Colostrum is a form of milk produced by the mammary glands of mammals in late pregnancy. Most species will produce colostrum pre-birth. Colostrum contains antibodies to protect the newborn against disease; it is lower in fat and higher in protein than ordinary milk. Colostrum is crucial for newborn farm animals.

Calves receive no passive transfer of immunity via the placenta before birth, so any antibodies that they need have to be ingested. This oral transfer of immunity can occur because the newborn's stomach is porous. This means that large proteins (such as antibodies) can pass through the stomach wall. The newborn animal must receive colostrum within 6 hours of being born for maximal transfer of antibodies to occur. Recent studies indicate that colostrum should be fed to bovines within the first thirty minutes to maximize immunoglobulin G (IgG) absorption rates.

Colostrum varies in quality and quantity. In the dairy industry, the quality of colostrum is measured as the amount of IgG per liter. It is recommended that newborn calves receive at least 4 liters of colostrum with each containing at least 50 IgG/liter. Testing of colostrum quality can be done by colostrometer, optical refractometer or digital refractometer.

Livestock breeders commonly bank colostrum from their animals. Colostrum can be stored frozen but it does lose some of its inherent quality. Colostrum produced on a breeder's own premises is considered to be superior to colostrum from other sources, because it is produced by animals already exposed to pathogens occurring on the premises. In most dairy cow herds, the calves are removed from their mothers soon after birth and fed colostrum from a bottle.

Roughages should be introduced gradually because the calf's rumen starts to develop functionally as soon as the roughage is consumed but time is required before it is completely functional. Nursing calves that consume roughage begins ruminating at about 3 months of age however, if only milk and concentrates are consumed, the rumen develops considerably later.

Management of growing cows from 6 months upward

For calves within 1 year of age, it is always desirable to give sufficient concentrates in addition to good quality roughage so that they can make optimum growth. Calves over 1 year of age fed on high quality roughage need reduced concentrates. From 6 months upward, calves can be given the same type of concentrate mixture as used for adult cattle (14-16 % digestible crude protein and about 70% total digestible nutrients).

FEEDING STUFFS

Feedstuffs are all kinds of feeds consumed by Farm Animals. Feedstuffs can be classified into the following:

- a. **Root and Tubers:** Cassava, sweet potato and other tubers are rich sources of carbohydrates in livestock feeds.
- b. **Concentrates:** They are basically of plant origin. A major characteristic of this group of feed is that they are high in protein and most of the time low in fiber. Examples are groundnut cake, coconut cake, palm kernel meal, soya meal. They are used as the main diet source for non-ruminants and as supplementary feed for ruminants.
- c. **Animals Products:** Livestock get quality protein from animals and animals by-products like milk; fish meal, blood meal and meat meal.
- d. **Feed Additives:** Livestock feed are supplemented with other substances known as feed additives. The feed additives essentially supply minerals, vitamins and sometimes amino acids in their concentrated forms. Antibiotic and hormones are also examples of feed additives. The feed additives are added in very small amounts but the action in animal performance is overwhelming.
- e. **Roughages, fresh and Succulents:** Roughages are bulky feeds containing high crude fiber content above 18% and less than 60% total digestible nutrient. They are made up of grasses and legumes or grasses/legumes planted in a pasture for ruminants to graze. If pasture is a natural one it is called natural grassland or if seeded it is called artificial pasture. It may be fenced or otherwise. If grass and legume are planted together they are called mixed pasture and if only one type of pasture is found, it is called sole pasture. Most of the members in this group on which ruminants graze are high in fiber content and forms the main component of their feed.

GRAZING SYSTEMS

Ruminants are often on pasture where there is facility for it especially during the rainy season when the grasses/legumes grow luxuriously. At this stage, it can form the sole diet for beef cattle with little supplementation in form of concentrate in case of dairy. Where fenced the pasture could be partitioned or divided into paddocks to facilitate good grazing management. The grazing systems used include:

i. Continuous grazing system

This is an uninterrupted type of grazing system. It has the disadvantage of the pasture being depleted due to overgrazing and a major advantage of little or no need for fencing thereby lowering cost.

ii. Rotational grazing system

Rotational grazing is the rotation of grazing animals on fenced and paddocked pastures. It is an effective grazing management. It has the advantages that the carrying capacity of the pasture is controlled and the persistency of the pasture is ensured. It is also good for control of parasites and other diseases.

iii. Strip grazing system

This involves restricting the animal to a section of the pasture usually with electric fence. It has an advantage of increased utilization of the pasture.

The most desirable grass species in pasture in Humid Tropics are *Andropogon spp*, *Cynodon spp*, *Panicum maximum* and *Pennisetum spp*. Again forbs and woody plants particularly browses are important they are not as desirable as grass for grazing cattle.

RELEVANT FACTORS IN PASTURE MANAGEMENT FOR PROFITABLE CATTLE PRODUCTION

1. The cattle manager

The efficiency of any operation is dependent largely on the overall efficiency of the manager. He determines the –

- i. Reproductive efficiency of the ranch females through his continuous surveillance, efficient feeding regimes and consistent record keeping system
- ii. The provision of good quality pastures, adequate water supply, and efficient animal husbandry practices

Therefore, the manager must be knowledgeable, dedicated, persistent and free to take all important decisions on the day to day running of the operations and be ready to take full responsibility for his/her decisions. To facilitate this, the Ranch manager, his assistant and all the herdsman should be resident on the Ranch. Adequate facilities in terms of infrastructures and bonuses based on the Ranch productivity in terms of calf crop and total number of calves weaned each year should be provided to all categories of Ranch workers.

2. Range utilization and improvement

The aim of range utilization should be to manage the range in such a way as to obtain sustainable cattle production activities with no feed supplementation except mineral while feed supplementation is permissible only in drought years. This could be accomplished through proper range management, range improvement through establishment of adapted planted pasture species and legumes like *Stylosanthes spp*, *Centrosema spp* and *Puereria spp* and appropriate stocking rate to the optimum utilization of forage crops. Stocking rate is the number of animals of a specified class per unit area of land over a period of time. This is the key to proper range management. For standardization, stocking rate is expressed as the number of hectares per livestock unit per year. Tropical Livestock Unit (TLU) is defined as the matured weight of a Zebu animal of 300 – 350 kg.

The range should be maintained such that seasonality in feed availability which is characteristics of the Humid Tropic will be averted. To accomplish this, the following should be strictly adhered to:

- a. Incorporation of adapted pasture spp and legume that can carry the cattle through the season of scarcity
- b. Deferred grazing at the end of rains
- c. Prevention of bush fire during dry season
- d. Periodic fertilizer application which will improve herbage digestibility, control of weeds and improvement in the physical structures of the soil.

Although, conservation of excess forage in the form of silage and hay provide forage during periods of feed scarcity, the bio-technical problems associated with them in the wet Humid Tropics may not justify the benefits derivable from them particularly when other simple methods like deferred grazing and standing hay are less cumbersome.

All cattle handling and routine duties should preferably be done in the morning. The management objectives should be aimed at increasing the reproductive performance of the

breeding cows, reducing the mortality rates and increasing the growth rate of all animals in the ranch. To accomplish these, the following management practices should be considered:

- i. Water supply should be available at all times in adequate quality and quantity so that cattle do not have to fight or struggle for water
- ii. Animals should have access to grazing 24 hours a day and overnight kraaling of stock should not be practiced except when handling is anticipated early in the following morning.
- iii. Supplementary bonemeal and salt should be available *ad libitum*
- iv. Routine preventive vaccination and prompt treatment according to prescribed schedule handled by the veterinary officer
- v. Close surveillance on the animals by the ranch manager and other supporting staff
- vi. Prompt removal of sick or injured animals from the herd

3. Mineral supplementation in Tropical cattle production

Native and planted pastures in Tropical Africa are extremely low in Phosphorus and rarely contain less than 0.1 % in dry matter. Therefore, no amount of forage intake even when the pasture are lush, can supply the 15g/day, 16g/day, 18g/day and 20g/day required by heifers, cows, young bull and fattening stock respectively not to talk of when the grasses are lignified. Phosphorus (P) supplementation improves both growth and calving rates. P supplementation can be supplied by offering a mixture of bone meal and salt at a rate of 200g/day/TLU. In the absence of bone meal, di-calcium phosphate should be mixed with 5 % molasses powder in order to enhance acceptability and palatability.

4. Supplementary Feed

This is necessary only during draught years and/or overstocking. Supplementary feeding is not particularly critical for adult animals as compensatory growth in the subsequent growing season will remove any advantage recorded as a result of the exercise. Cases in which supplementary feeding may be justified are: lactating cows suckling a calf and weaners during prolonged dry months. In contingency feed supplementation, agro-industrial by-products such as rice husks (40 %), dried brewer's grains/spent yeast (30%), palm kernel cake/cotton seed cake (15 %), hay and grasses (10%), molasses (2.5 %) and bone meal and salt (2.5 %) could be used. The luxury of offering grains and protein supplements should be restricted. In ranching operations, concentrates feeding to cattle may not be cost effective using the unimproved cattle breeds of Tropical Africa.

PASTURE CONSERVATION

During the rainy season, there is usually abundance in the supply or availability of fodder i.e. grasses and legumes. Therefore, conservation methods in forms of silage, hay and haylage have been developed over the years to feed ruminants during dry season.

Hay

Hay is green grass, legume or any fodder crop of about 80 to 85% dry matter content, harvested, chopped and allowed to dry or cure on the field to 15 to 20% moisture content. The fodder or grass to be used must be harvested in the morning when the weather condition is good i.e. no rain and bright sunshine. The leaves must not be allowed to shatter or rain allowed on it to prevent leaching of the nutrients in the leaves. It must be turned regularly on the field to prevent browning. It is later packed after about two or three days drying on the field, baled using a hay baler and stored for later use. Hay must be stored in a well ventilated store that will prevent the growth of moulds or fungi. Hay infested with fungi or moulds are definitely not good.

Silage

Silage is made from fodder crops (of about 30- 35% dry matter) through controlled fermentation to retain its high moisture. Silage making or ensilage involves the cutting and chopping of forage plants into small pieces and kept in specialized trenches/container called silo (either a pit or trench). The pieces are packed air-tight in the silo. If it is not air-tight, it will grow moulds and fungi. Sometime heavy earth moving machine like a tractor is run over the mass of the chopped fodder if in a trench silo to ensure air-tightness. After this, it is covered with polythene sheets with heavy materials like stones or used tyres are put on it and left to ferment for a period of about 21 to 28 days. Good silage must not grow mould/fungi and must have pH 4.0 to 5.0. The colour must be greenish yellow and have a vinegar odour as a result of organic acids such as formic acid, acetic acid, propionic acid and butyric acid. Silage is very palatable to ruminants.

Haylage

Grasses and legumes that are cut for hay making with dry matter range of about 30 to 45% could be ensiled. The product obtained is called haylage.

CATTLE HANDLING FACILITIES

i. Dam, bore hole or pumped water from river

Sources of water in a ranch could be from dam construction or pumped water from river or bore holes into overhead tanks. In constructing dams, it must be properly constructed to avert dam collapse and properly fenced to avoid silting and parasite build-up. Reticulation network must be spread to cover adjacent paddocks with plastic or PVC pipes properly buried so as to prevent damage during ploughing or fire traces maintenance.

Water troughs

Water troughs should be provided at the Ranch centre where the handling facilities will be constructed and in each paddock. One large water trough is recommended between two adjacent paddocks so that at each side 300 TLU can be served. The level of water in the trough should be maintained automatically by the installation of a **ball cock** which should be protected with iron grille in order to prevent damage by cattle.

Fencing

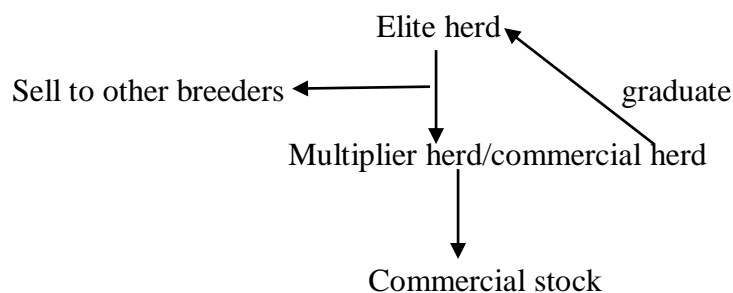
Perimeter and internal sub-division fences which should be constructed using simple and locally available materials are important to:

- i. Enclose grazing area for better pasture management
- ii. Separate different classes of stock for efficient animal management
- iii. Conserve grazing area for dry season
- iv. Protect the cattle from predators and diseases and the ranch from trespassers

An adjacent firebreak of about 6m and ranch roads should be features of all boundary and selected internal fences in order to reduce the risk of fire entering from outside the ranch and to allow some degree of internal fire control if fire does occur.

Herd size

A minimum of 100 cows and 5 bulls and a maximum of 200 cows and 10 bulls is recommended for a herd. When the carrying capacity of any Ranch is reached, the formation of an 'elite herd' based on the same principle of herd size is entrenched. It is envisaged that the 'elite herd' will be the source of breeding bulls and detailed performance recording concentrated on this selected herd. Elite herd means the top cow and bull are culled and kept in the elite herd for identification of individual more efficiently.



Poor handling facilities make cattle handling drudgery; increases labour cost, causes loss of weight, unnecessary injuries, bruises and damage to man and animals. Therefore, a well

planned, centrally located major handling facility is part of good management strategies and a good investment. The most important considerations are convenience, service ability tailored to 'cow psychology' and also safe.

The need for a central facility include branding, dehorning, surgery and other veterinary needs, loading and unloading, cutting out, weighing, dipping and holding. Some principles to adopt are that the fence must be high enough (1.85m) to prevent jumping, tight enough to prevent climbing and strong enough to withstand crowding.

Scales must be provided with **gates and walking chute** (these are narrow alleys lined with planks and poles in which animals are led through for any operation. It may be narrow enough for the animal to make a U-turn or not). The distance of 3.5 to 5.0m of chute between the end of the squeeze/hold pen (pens in which animals are kept for one reason or the other) and the scale speeds the operation of having two or more animals ready in the chute for weighing. It may sometimes be desirable to put the scale between the cutting gate and head gate.

Crowding pen: this is an area where the space occupied by animals are crowded for one reason or the other like getting them ready to be moved from one place to the other. **Spray race/Dip:** Space provided for animals for dip like in case of delousing

Gates: there are different types of gates: **Head gate:** A contraction made of wood or metal use to restrain animals for handling during a particular operation. **Cutting gate:** gates made to separate different species of animals put together like cattle and sheep or goat. **Blocking gate:** gate erected at the end of a walking chute or may lead to a loading ramp.

Ramp: an elevated cart walk constructed at the end of a chute in which the elevation is equivalent to the height of the truck being loaded. It is used for loading animals and usually made of concrete.

Other important points to note in constructing cattle handling facilities are:

- i. For strongly built facilities, gates and corner posts must be buried in concrete with a preservation for the planks/timber (50 % solignum and 50 % spent engine oil)
- ii. Holding pens must be erected on a well drained site.
- iii. Gates should not sag
- iv. Fencing materials should be placed on the inside of posts to prevent cattle knocking down the fence
- v. The walking chute should be close from the ground to about 0.75m
- vi. Attach elevated 'cat walk' for handling convenience on the side of the chute
- vii. Nail tops of posts together on the chute particularly if sides are slanted.

It is pertinent to note that needless injuries and damages are caused by inadequate facilities, improper constructions and disrepairs. Therefore, all these should be avoided.

MANAGEMENT OPERATIONS

These management operations are sometimes classified into two major groups namely:

- i. Daily routines: Routines carried out on a daily basis
- ii. Occasional routines. Routines carried out periodically or once in the life span of the animal.

Description of Daily and Occasional Farm Operations

A. Daily Farm Operations.

The daily farm operations carried out on any farm will to a great extent depend on the management system and type of livestock kept by the farms. However some of these daily operations irrespective of the animals kept are:

- 1. Cleaning:** Cleaning is the first daily operation on farms and it is done to prevent spread of diseases and unnecessary odour. Dirty feeding and drinking troughs are potential sources of transmission of disease- causing pathogens and therefore should be kept clean.
- 2. Feeding:** Animals are fed and watered daily. Cattle, sheep and goats (ruminants) are regular feeders except when ruminating.
- 3. Exercising:** Farm animals kept in confinement need to be exercised daily particularly for breeding male.

Benefits

- i. For normal body metabolic processes
 - ii. It ensures good health.
 - iii. Out-door exercise with exposure to sunlight provides vitamins D to the farm animals.
 - iv. Pregnant animals that are allowed regular exercise also tend to have less delivery problems.
- 5. Grooming:** This is the brushing of the hair coat of animal.

Benefits

- i. It is performed for cleanliness and appearances.
- ii. It also helps in stimulating blood and lymph circulation, to remove waste product like skin secretion, scurf and loose hair and to remove lice and other skin parasites from hair coat.
- iii. Sick animals may also be detected during grooming.

B. Occasional Routines

Occasional routines are those operations that are done periodically or once in the lifespan of the animal. They include the following:

1. Castration

This is removal of testicles, the glands that produce male cells. Castration is done basically to prevent the animals from indiscriminate mating in the ranch. Best males should be sorted out through their pre-weaning performance records before castration of the rest at weaning. It is suggested that 50 – 75 % of the bull calf be castrated at weaning and excess bulls that will not be used in the herd sold to other breeders or castrated for slaughter stock. Different methods are employed in castration among them are:

- i. **Burdizzo Castrator Method:** An instrument called Burdizzo castrator is used to crush the spermatic cords. The crushed spermatic cords make testicles functionless since they become starved of nutrients. This method of castration is bloodless and often used for younger animals.
- ii. **Elastrator or Rubber Ring Method:** A special pair of pliers is used to place a rubber band tightly over the upper portion of the scrotum into which the testicles have carefully and safely manipulated. Over some time the scrotum shrinks and falls off this method of castration is suitable for calves, kids or lambs that are less than one or two weeks old.
- iii. **Open Incision or Bloody Method:** A sharp sterilized knife is used to cut off the lower part of the scrotal sac and the testes remove one after the other. The site of surgery is then disinfected. This method is bloody and more painful compared to the bloodless castrator method. However, it is more effective and reliable and mainly used on older animals.
- iv. **Use of Hormones:** This method involves the use of hormones to suppress the male sex hormones. In especially castration, it is achieved by implanting hormones in the back of the neck of the male chicken.

Disadvantage

Hormonally castrated cockerels in tropical countries are more susceptible to heat stress.

Benefits of Castration

- i. It reduces fighting among sexually matured animals as such castrates are less aggressive.
- ii. It removes characteristics male odour found in the uncastrated small ruminants carcasses.
- iii. Castrated animals are controversially more amenable to fattening.

2. Dehorning and Disbudding

These two terms are closely related while **dehorning** is the removal of horns of animals **disbudding** means arrest of horn root in the form of a 'bud' or 'button'. Dehorning is therefore carried out in older animals while disbudding is done in young animals of about four days old.

Advantages

- i. It reduces the risk of injury to other animal and even the handler.
 - ii. Dehorned animals are easier to handle during activities like medication etc.
 - iii. It reduces space occupied by animals during transportation
- There are several methods of dehorning and they include the use of chemicals, saws, clippers, hot irons and elastrator.

Precaution

Dehorning should be done with disinfected instruments to lessen spread of infections

i. Chemical Method

Vaseline or heavy grease is rubbed around the horn buds to protect the eyes against the

chemical intending for use. Chemicals such as caustic potash (KOH) or caustic soda (NaOH) are rubbed on the bud (soft growing horn) until it is almost drop off.

ii. Hot- Iron Method

This method involved the application of specially designed hot iron to the horn buds of young animals. The irons are heated in a portable forge or electrically. This method of disbudding is bloodless and can be used on young calves only.

iii. Use of Dehorning Saw and Clippers

Clippers are good for removal of the horn of younger animals but the hard and brittle horns of mature cattle can best be removed by sawing them off. Any handy woodcutting saw can be used in this respect. However, this operation is bloody and the animals need to be specially restraint while the operation lasts.

iv. Use of Elastrator

A specially made rubber ring is placed over the horn well down into the hairline. This rubber ring is so tight-fitted that smaller horns drop off in three to six weeks while larger horns may take two months to drop.

v. Breeding Method

When animals that are naturally polled (with horns) are crossed (mated) with those with horns some of their offspring would then be naturally polled. This method requires specialists called breeders.

3. Tail Amputation (Docking)

Lambs of wool breeds have their tails amputated at the time they are castrated, i.e. one to two weeks of age. The process of amputating the tail is called Docking. Lambs not docked accumulated a great deal of filth and faeces around the tails which may often get infested by maggot flies. Hot iron and docking knife or shears are common instruments used for docking.

4. Removal of Supernumery Teats

This is the removal of extra teats on udder. If the extra teats are not removed it predisposes the animal to mastitis. The extra teats are removed with a pair of sharp surgical scissors.

MANAGEMENT STRATEGIES TO REDUCE STRESS AT WEANING AND IMPROVE CALF PERFORMANCE

Stress is the number one issue that impacts calf performance at weaning. Calves are being removed from their dams and a herd social structure in which they were comfortable and moved into different environment with new feed and water sources. To reduce stress at weaning, the following are pertinent:

i. Precondition calves prior to weaning

Strategic mineral supplementation when the calves are with their dams prior to weaning may be beneficial for getting good immune response. Minerals such as copper, zinc, cobalt and manganese are important to immune system function. A lack of these minerals in feed sources or high levels of other minerals such as sulfur which can inhibit absorption of minerals can impact immune response.

ii. Health program for the herd

A good herd health program plan can help to reduce sickness at weaning, improve the treatment response of those calves that do get sick and increase the overall performance of calves during weaning. To accomplish this, the herder needs to work with his/her veterinarian to plan vaccination strategies and treatment protocols.

iii. Introduce new feeds

Introducing new feeds to calves while they are with their dams prior to weaning can help calves start on feed more quickly when they are weaned. Feedstuffs should be palatable with minimal fines and dust. Feeds should be evaluated to determine if they have adequate levels of protein and energy to meet desired performance goals.

iv. Consider a two-step weaning process

This method involves fence-lining weaning calves or placing nose weaners into calves 4-7 days before removal from their dams. Both methods prevent the calves from nursing while still giving the calf social contact with its dam. This gradual process appears to help the calves forget about nursing and begin the transition to being on their own and part of a new herd.

In fence-lining for weaning, the following should be ensured:

- i. Allow both cows and calves to spread out along the fence
- ii. Presence of minimal dust
- iii. Provide feed and water for the calves that are familiar and close to the fence
- iv. Provide supplemental feeds for the calves two weeks before fence-line
- v. Leave calves in the pasture they are used to being in and move cows to the adjacent pasture.

FEEDING PRINCIPLES OF CATTLE, SHEEP AND GOATS

The kind of feed the animal eats is largely dependent on the animal's digestive system. The principal organs of digestion include; mouth, esophagus, stomach, small intestine and large intestine. The mouth and its components (teeth, tongue, cheeks, and salivary glands) vary with species of farm animals. In most farm animals, the functions of mouth are to bring in feed mechanically, break it down and mix it with saliva, which acts as a lubricant to facilitate swallowing. There also exist variations among farm animals in the extent to which they masticate the food. This is determined by the kind of food they eat and the physical structures of the mouth and teeth. Ruminants for example grind thoroughly the grass or other forage they consume, although much of this occurs during rumination when the boluses are regurgitated and re-masticated rather than at the time the forage is consumed. Cattle swallow grains with very little effective chewing. For this reason, their grains should be ground or cracked. Goats and sheep on the other hand are generally more efficient in chewing the grains.

Ruminants, characterized by the possession of rumen where microorganism breaks down complex plant nutrients by cellulolytic enzymes, regurgitate their food by a process called rumination. When the rumen is filled, the animal lies quietly for regurgitation. Generally speaking the age of an animal will also determine the type of feed consumed for example young animals when not weaned depend on milk for sustenance until the young animal is weaned.

Factors influencing Feed Intake in Farm Animals

1. Feed and feed presentation

Feed can be given in forage, meal, mash or pellet forms. Animals except man tend to eat to meet their energy requirements and once this is met the animal stops eating. However, animals also tend to avoid consumption of toxic feeds. The ruminants are particularly noted for this even though they can also detoxify some presumably toxic feeds. Ruminants prefer long hay, rabbits prefer succulent or pelleted feeds. Poultry on the other hand prefers mash, pellets or crumbs while pigs swallow their food in large chunks.

2. Management Practices

The management practices employed affects the eating behaviour of farm animals. Animals tend to eat faster when kept together than when individually caged. The weaker animals are therefore last to feed if any feed is left. Such weaker animals tend to grow slowly and may therefore have stunted growth because they do not take in the required amount of nutrients. Appropriate stocking density should be maintained when animals are kept together and sufficient feeding and drinking troughs supplied. Poor management may lead to increase food intake. Example, an animal that has high level of worm infestation will always be hungry and will become unthrifty.

3. Climatic Factors

Climate has a direct and indirect influence on the feeding habits of farm animals. The tropical environment is characterized by high average daily temperature the year round. All domesticated animals are homeotherms i.e. they have the ability to maintain their body temperatures within a wide range most suitable for optimal biological performance. Thus they do this to reduce heat generated in order to maintain thermal balance. It is therefore common to find farm animals seeking for shade during the hot afternoons. Ruminant grazed during the night instead of hot afternoon. Generally animals eat less and drink more when the ambient temperature is high.