

APH 509: BEEF CATTLE PRODUCTION

ANIMAL DISTRIBUTION

No animal species occurs uniformly over the whole world, but each is restricted to a definite RANGE or AREA OF DISTRIBUTION

The entire extent of land or water over which a specie may occur is termed its GEOGRAPHICAL RANGE, and the kind of environment in which it lives is its ECOLOGICAL RANGE.

All the animals living in a particular area, large or small, are collectively, termed the FAUNA (the equivalent term for plant is Flora). The plants and animals together are the BIOTA.

FACTORS REGULATING DISTRIBUTION

Since every species produces offspring in excess of the numbers that can survive within its normal range, there is a population pressure by which individual tend to expand the boundaries of their range. Factors, such as competition, enemies, disease, shortage of food, adverse seasonal weather condition and decrease in available shelter, act to reduce population.

The distribution of all animals, from protozoa to mankind is consequently dynamic rather than static and always subject to changes. This is equally true of plants on which so many animals depend. Most plants, being rooted to the ground, cannot extend their range as individuals but only by dispersal of seeds.

The External Factors that limit Distribution are termed Barriers. These include:-

- a. Physical barriers – such as land for aquatic species and water for most terrestrial forms;
- b. Climatic barriers – such as temperature (average, seasonal or extreme), moisture has rain, snow, air humidity, or soil moisture), amount of sunlight etc.

- c. Biological barriers – such as absence of appropriate food or presence of effective competitors, enemies or disease. Many kinds of animals and insects are limited to particular species of plants for their food, shelter or breeding places, so that their distribution is controlled by factors that regulate these plants.

Every species of animal and plant has a limit of tolerance – maximum or minimum – to each factor in its environment. Changes in a factor beyond the tolerance units result in migration or death, or survival of only those individuals better suited (more tolerant) to the altered conditions.

CATTLE POPULATION AND DISTRIBUTION

There are over 1.1 billion cattle, in the world, many of which are used for work or milk production with beef production only a side issue of their major intended usefulness.

All dairy cattle are beef cattle but not all beef cattle are dairy cattle. Most of the cattle produced strictly for beef are found in North and South America, Australia and New Zealand. The distribution of the world cattle population is such that the leading beef producing countries are not necessarily the highest beef consumers per capital. In fact, 70% of the World cattle population is accounted for by only 20 countries. Cattle population however, appears to be increasing more rapidly in the tropics than elsewhere. The reasons for the tremendous population variation include –

1. Religious and other customary beliefs which prevent the eating of the flesh of cattle e.g. India produces 2 times as many as any other country. It is however illegal to eat any of the cattle and the slaughter of buffalo is restricted. In most parts of Africa, Cattle are slaughtered for ceremonial reasons;
2. Some countries have a large geographical area with a little ratio of number of population with number of cattle e.g. China. In this situation, the per capital beef consumption is low and limited.

3. Some countries have small geographical area with a high ratio of cattle number to number of people e.g. Finland. Thus they export some of the animals.
4. Some countries import considerable amount of beef they eat eg. Switzerland.
5. Apart from geographical and religious factors, climate is an important factor in the distribution and production of cattle as it has direct and indirect effects on the animal. The direct effects are manifested on the animals themselves while the indirect effects are accounted for by climatic effects on their environment.
 - (a) Super humid climatic areas are characterized by dense rain forest with tall trees with dense crowns and interlocking branches. Such areas have high humidity and excessive rainfall and climatic stress on livestock is considerable. Such areas are found in parts of Indonesia, Philippines, Burma and S. E Asia countries, the West Coast of India, part of West Africa, the East Coast of Central America. Parts of Northern South America. Forage is available all year round but it is usually low in protein, minerals and high in fibre content.
 - (b) Humid areas are also forested but have moderately high temperature and lower humidities. Climatic stress is thus not as severe as in the super humid areas. Such areas have more potential for the development of animal husbandry.
 - (c) Sub-humid areas are characterized by high grassland that may be interspersed with trees when it is known as Savanna. Rainfall is usually seasonal. Large areas of Savanna are found North and South of the Equator in Africa particularly in the East. Such areas also occur in India, S. E Asia and North Australia, while smaller areas are found in Central and South America and in many of the Tropical highlands. Such areas are the most suitable for animal production and a large proportion of the tropical domesticated cattle are found there. In these areas the climatic stress on to control than in forest areas.

In the absence of the major disease problems, nutrition, however, still constitutes a major problem of the animal industries since forage production is very seasonal.

(d) The semi-arid areas are characterized by short grasses, low humidities, high temperatures and low rainfall. In these areas nutritional stress and lack of water are greater limiting factors in animal husbandry than the climatic stress. It can however support livestock.

(e) Deserts also supports some livestock. Nomadic tribes follow the rains across deserts and feed flock on plants that spring up soon after the rain. Irrigation helps to support high stocking rates or densities.

Direct Effects of Climate

- i. **Effect of High Temperature:** Exposure of beef cattle to temperature above 80°F (27°C) results in activation of the thermoregulatory mechanisms of the body, resulting in increased respiration and vaporization rates. At temperature above 95°F (35°C) there is failure of heat regulatory mechanism with consequent rise in rectal temperature, increase in water intake, reduced appetite, reduced growth and milk production and possible losses in body weight.
- ii. **Effect of High Temperature on Grazing Habits:-** High temperature reduces the length of day time grazing of cattle.
- iii. **Effects of High Temperature on Growth:-** This is due to effect on grazing time and feed intake.

- iv. **Effects of High Temperature on Milk Production:-** It depresses milk production and affects milk composition.
- v. **Effects of High Temperature on Reproduction:-** High testicular temperature adversely affect spermatogenesis and hence, the fertility of the bull. There may be seminal degeneration.
- vi. **Effects of High Humidity:** Humidity is the amount of vapour in the atmosphere.
 - (a) High humidities add to the heat load of the animal by reducing evaporative heat loss
 - (b) High humidities also depress the amount of daylight grazing and
 - (c) High humidities have some effect on feed intake (reduce it) and hence reduce productivity.
 - (d) High humidities lower the dry matter content of forages i.e. there would be high moisture content and low DM content.

INDIRECT EFFECTS OF CLIMATE

Effect on Feed supply: Climate affects the quantity and quality of feed available to the animal. This is because plant growth is dependent on temperature, precipitation and the length and intensity of day light while the quality of the feed is affected by precipitation and humidity.

Tropical forage matures quicker so that at the same age as the temperate type. It has a higher crude fibre content and lower digestible nutrients but quicker maturity. Thus tropical stock have to digest more fibrous feed with resulting increase in heat load. In areas with high humidity, there is rapid deterioration in quality of mature forage. This is however less intense in drier area.

In the humid and super-humid zones, forage contains such high water content and become so bulky that the animal is unable to ingest a sufficient quantity containing enough dry matter to satisfy nutrient requirement.

Effects on parasites and Disease

High humidity and temperature zones favour the multiplication of endo and exoparasites. This is because of the effect of vegetation on the incidence of insect vectors of disease. One of such dreaded vectors is the tsetsefly which is a great threat to animal production. Various direct and indirect effects of climate on the animal have great significance in the determination of geographic distribution of world cattle population. The variations in climatic conditions also call for various physiological adaptation in the animal and the need to adjust to environmental pressure and behavioural patterns of the animal.

Assignment: The leading beef producing countries are not necessarily the highest beef consumer per capita. Apart from this, the various direct and indirect effects of climatic on the animal have great significance in the determination of geographical distribution of the animal population. Discuss.

PROSPECTS AND PROBLEMS OF BEEF INDUSTRY IN NIGERIA

The economic significance of beef and beef cattle industry has long been recognized since colonial era when our colonial master opened up a needed source of beef supply for Great Britain. This was as a result of an increasing concern when the world meat supply, especially in Britain, was diminishing, while demand was increasing due to population pressure. Beef industry has been making significant contribution to the National Economy of the country in that:

- The beef industry offers employment opportunity to millions of Nigerians as
 - o Cattle rearers
 - o Cattle traders
 - o Cattle trade middle men and women
 - o Cattle drovers
 - o Cattle transporters
 - o Butchers, etc

Beef production is second to arable farming in respect of Nigerian agriculture.

Prospects

Nigeria has high prospects of increasing her cattle population. This is because, among other factors, the market favours producers because of greater demand as a result of:

- Increased preference for beef
- Good prices brought about by population growth
- Better health and nutritional education
- High economic growth rate
- Better per capita income all leading to higher demand for beef

Besides, per capita consumption of animal protein is grossly below minimum required in this country. Thus there is prospect for marketability of the product – beef.

There is ready market since Nigeria is no where near the FAO recommended requirement for animal protein consumption per day (7g vs 35g).

The cattle breeds are adapted to the environment e.g. N'dama, WASH (West African short horn), Gudali, Kuri, Sanga, etc.

There is vast grassland resources available in the country. Supplementary feeds are also available in the forest areas e.g agro-industrial by-products like DBG, wheat offal, rice bran, crop residues – sorghum, maize and wheat – stovers, groundnut and cowpea vines, etc, fodder trees – Gliricidia, Leucaena, Ficus spp, Gmelina, etc.

There is large water bodies like rivers and lakes for regular and adequate water supplies.

There is animal traction and transport in the Northern sector of the country e.g. bullock ploughing.

There is less building requirement for the beef industry, hence low initial capital outlay.

Beef animal production serves as financial security or collateral in times of need.

There is no tribal, religion or social inhibition or taboo to beef consumption or leather goods.

There is availability of personnel to man the animals e.g. Nutritionists, Breeders, Reproductive Physiologists, Technicians and cheap labour, etc.

Problems

The problems of the Nigeria beef industry can be considered from:

- (a) National economy
- (b) Social and
- (c) Political aspects of the industry

There has never been any accurate means of estimating the level of production and beef consumption in the country. There is no records of private slaughtering. The records on government farms are disjointed or not properly kept. As such, lack of reliable statistics hampers our assessment of achievement or otherwise in beef industry.

The production is short of the ever increasing national demand. The problems are extremely diverse – breeding, nutrition, production system, socio-economic and financial constraints. This is true even within Nigeria because of various climatic and ecological differences, ranging from hot savannah zone where livestock production is based on pastoral system to humid zones with high rainfall in the south where utilization of the abundant pasture resources and water is highly limited by tsetse flies and social land pressures.

Beef and beef cattle production can be classified into:-

- (i) Socio-cultural
- (ii) Management
- (iii) Finance
- (iv) Marketing

(A) Socio-cultural: Beef cattle production is a traditional occupation of the Fulanis and Shuwas in Nigeria. They are characterized by the love of animals, the dependence on daily milk economy, and annual transhumant system of production possibly forced on them by the agro-climatic constraints, and hence a constant base shifting to meet the nutritional requirements of their animals.

As migrating people, their requirements are limited and because of remote living to satisfy their livestock nutritional demand they are not much concerned with education as an agent of change. Despite all efforts to settle the livestock rearers by different governments, the level of achievement is still negligible.

Overstocking often leads to overgrazing and a shift to new area thereby further encouraging strict adherence to pastoral way of life rather than integration of animals and crop production as required of a settled farmer.

The land tenure systems, which is a necessary pre-requisite for livestock development does not favour the present day livestock/beef cattle rearers in Nigeria. Many of the rearers would have to graze their animals on lands other than their own.

With this and other factors such as finance, education, etc, it becomes very difficult if not impossible to impart new knowledge and technical innovations to the livestock rearers to boost their productive capability.

(B) Management: In its broad definition, management includes nutrition, breeds and breeding, housing, disease control, herd health management and other environmental factors directly or indirectly affecting production.

To get more beef, we need to improve the environment in which beef cattle are raised. Emphasis was placed in the past on developing a high genetic potential for production by introduction of exotic blood. Biological efficiency however, without regard for environment which was to support it is undesirable and often leads to failure. Some of the management constraints are:-

(i) **Nutrition:** This is the most important single factor, apart from endemic diseases control, as a constraint to livestock production in Nigeria.

Wide seasonal variations have an important influence on feed production. Irregular precipitation coupled with high rates of evaporation brings about two seasons:-

(a) 7-8 months wet season

(b) 4 -5 months dry season

Which are important in maintaining uniform feed supplies for grazing.

When there is high variability in feed supplies marked fluctuations arise in the rate of weight gain of grazing animals causing poor quality meat. The major part of the feed supplies thus goes just to satisfy maintenance requirements. The forage have a characteristically high lignin content which influences both digestibility and the amount the animals will eat. Forage availability is seasonal and of low quality. The improvement of pasture is very expensive because it is capital intensive. Pasture establishment needs stumping, procurement of improved variety, which is not easy to come by, irrigation and afforestation while the land gradient, in some cases, does not lend itself to mechanization. Thus there is need for concentrate supplementation.

Lack of improvement in crop yields and the competition between human and animals as well as brewing industries for the available grains makes nutritional requirement at reasonable cost more difficult to achieve since a viable livestock industry is interdependent on agricultural products. Animals are unable to meet both protein and energy requirements and consequently, there is not only a marked weight loss and lower disease resistance and death, but also seasonal anestrus, reduced fertility, slow growth rate of calves and young cattle.

(ii) **Breed Constraints:** The indigenous cattle breeds are not genetically endowed as their temperate counterparts. The interaction between environment and genetic ability of the animals prevents the animals from fully expressing their

genetic potential. The programme for genetic improvement are few and this constitutes an inhibitor to successful livestock production enterprise. There are very few organized system of records keeping and consequently there is little emphasis on selective breeding through progeny test. It has however, been observed that the poor conception rate, delayed age at first calving (40 – 60 months), and the long calving intervals (400 – 600 days) are likely to be as a result of poor nutrition as a single factor affecting reproductive performance of Zebu cattle. In beef cattle breeding, attention is given to the selection of parents based on the choice of desirable beef traits especially those which have high heritability and those with economic value.

Breed per se is not a major constraint and the nation can do better in beef industry development based on the existing highly adapted breeds, though full genetical expression of any breed will depend on environmental factors.

However, attempts must be made to use home breeds for crossbreeding by selecting for an animal that is superior in some economic and genetic traits to others in the same environment, and cross breed with the one to be improved, since the indigenous breeds survive under adverse conditions because they have genes that adopt to such condition.

(iii) **Disease as a constraint:** The beef industry is faced with insidious economic diseases such as mastitis, trypanosomiasis causing anaemia, emaciation, intermittent fever, and poor condition, streptothricosis, endo- and ecto-parasites, and some reproductive diseases leading to breeding inefficiency and infertility. Cattle worms are the causes of severe economic loss to farmers throughout the world, especially young animals. A light helminth infection deprives calves of their vigour while a heavy burden results in marked reduction of weight gains, decreased feed efficiency and consequently poor condition or even death. The trypanosomes and their vectors, the tsetse flies prevent utilization of considerable potential grazing

areas in those zones where adequate rainfall results in luxuriant grass growth.

- (C) **Financial Constraint:** Despite the Federal Government measures on lending policy to assist livestock farmers through injection of money from financial institutions, the beef cattle industry still suffers untold hardships. Beef production requires high capital outlay. However, slow rate of production, slow returns and slow recovery rate of loans in beef industry have been the major concerns hindering release of loans to the beef farmers by the financial institutions. The socio-cultural attitudes of beef cattle raisers, their inability to provide security guarantee and lack of technical know-how on processing of loan schemes are part of the problems leading to low financing of cattle industry up to the present time.
- (D) **Marketing Constraint:** There is no organized market system nor market information to show the trend of supply, demand and current prices. The economic law of supply and demand does not apply to Fulani and Shuwa cattle rearers/raisers because they have no profit motive, while the Nigerian consumers have not been known to request for a particular type of meat to change the given marketable products. There is no standard weighing or organized auction of live cattle or weighing of meat. The role of middlemen in cattle marketing results in complexities in sales and purchases and often exploitative. Other market functions e.g. transportation, slaughtering and processing are not as efficient as would be desirable and in some parts of the country virtually non-existence.
- (E) **Lack of Commitment:** There is generally lack of personal commitment in government farms. For instance, a shortage of water supply on government farm should attract tankers to supply water which in most cases are not done for some flimsy excuses. Official protocols kill initiatives while the farm is run in civil service manner i.e. 7.30 a.m. to 3.30 p.m. No motivation and no

sense of patriotism on government farms, high-ranking officers are not personally involved in the management of government farm while over-staffing is the order of the day. These make government farms unprofitable ventures.

SOURCES OF BEEF ANIMALS

- (a) Veal Production – calf fed from birth to slaughter weight on high quality feeds
- Veal calves are young animals from 6-8 wk of age weighing approximately 90-100kg or 200-240kg.
 - They are fast growing with very high feed conversion ratio
 - Growth period affects the palatability of the meat
 - Whole milk and milk substitute are used to feed the animal from birth to slaughter.
 - The aim is to create a slightly anaemic condition resulting in the production of white muscle. The meat is of good flavor and commands high price.
 - The use of whole milk makes it very expensive. Thus milk replaces e.g. dried skim milk are normally used to reduce the cost of production and the cost of end product.
 - Replacers are made with particular attention to energy, protein, vitamins and minerals. Antibiotics, such as, aureomycin or terramycin (100 – 200 mg/kg of milk) are given to the calf to stimulate growth.

The programme of feeding generally followed:-

Colostrum - 1st 3 days

Skim milk - 6pts/d to 7th day

Skim milk - ad libitum to slaughter weight

No concentrate or grass is fed and the calves are kept in small pens to reduce movement to the minimum.

(b) Baby beef production

Baby beef comes from 8 – 12 months old calf weighing over 250kg.

- Have dark-red colour in the lean meat which is extremely tender and of very high quality.
- Baby beef calves “never” had a hungry date in their life.
- They are cattle with excellent beef conformation
- They are sold at a relatively young age
- Calves may be allowed to have as much concentrate and forage as they want
- They may be creep-fed on a good grain mixture from 3-5 wks old and marketed at 12-15 months of age.

(c) Pure beef producing herd – specialized and carefully selected herds with desirable beef conformation and all those qualities necessary for a rapid and efficient meat turn over. Calves must be fast growing and capable of attaining mature weight in a shortest possible times.

(d) By-products of Dairy Industry

Animals from surplus dairy calves, heifers, bulk, dairy steers, bulls and vealers that have been fed for meat production as well as from dual purpose breeds or crosses with the ability for milk production and rapid growth.

TYPES OF TROPICAL CATTLE, CHARACTERISTICS AND CONFORMATION

The family of animals that includes all types of domestic cattle are known as Bovidae.

A breed of cattle is defined as a race or variety related by descent and similar in certain distinguishable characteristics.

All cattle are believed to have originated from Western Asia, from where they spread to other parts of Asia, Europe and Africa. The increasing number and breeding of the different types resulted in the breeds we have today.

Present day Africa cattle can be classified into four broad categories:

- a. Humpless - *bos Taurus*
- b. Humped - *Bos indicus* (zebu) all found in Africa
- c. *Bos taurys* x *Bos indicus* - East & South Africa
- d. Sanga x zebu types - Ethiopia and Uganda

The humpless are 2 types:-

- i. Longhorns e.g. N'dama and Kuri
- ii. Shorthorns e.g. West African shorthorn (WASH), Muturu, Keteku

Both are trypanotolerant

INDIGENOUS BREEDS OF BEEF CATTLE

They are mainly humpless e.g. N'dama, Kuri, Muturu, otherwise called West African Shorthorn (WASH) , also called Baoule in Ivory coast and Lagure in Republic of Benin.

1. WASH = MUTURU = LAGOON CATTLE

- Is found in coastal and rain forest areas throughout West Africa from Gambia to the Cameroons. It thrives well in these areas because of its tolerance to trypanosomiasis.
- Is a small sized animal, weighing between 200-250kg
- Humpless

- Very reduced or non-existent home
- Coat colour varies – black, grey, red, pied, with white markings etc.
- Reputed to be resistant or tolerant to trypanosomiasis
- Is a good meat type
- The breed is very few in number and used for crossbreeding with the N'dama for beef because the N'dama is bigger.
- They are never kept by populations with a pastoral tradition.
- They are animals of settlement and they constitute an occasional addition to the revenues of cultivations in the economies of villages
- At adulthood, chest circumference (male) 128.4+1.6cm
(female) = 1404+2.6cm
- Height at wither (male) = 95.7+1.1cm
(female) = 100.0+1.7cm
- Average mature weight 110-140kg
- Well adapted to the humid tropical Savannah
- The breed is reputed for high fecundity which compensates for their poor stature in the trypanosomiasis infested zones

ii. N'dama is a forest zone specie margin with the savannah zones

- It has been introduced from Guinea and Zaire
- The breed can also be found in Senegal and in the South West of Mali
- It is most tolerant to trypanosomiasis and streptothricosis
- Humpless and of small to average stature. The skin has no folds with negligible dewlap.
- Coat colour most frequently fawn (golden brown) uniform and white under the belly.
- The extremities e.g. head, tail and extremes of limbs, are often darkened and sometimes almost black.

- Horns well developed, most often cup-shaped or lyre-shaped
- Body thick set, rather short and well developed, muscular parts with excellent beef conformations.
- Temperament (natural behavior) is alert and quickly adapt to good as well as bad treatment.
- On ranches (large farm where animals e.g. cattle are bred), they often prove to be indisciplined and even aggressive.

The breed has a great potential for use in cross breeding programmes for upgrading other breeds especially because of its tolerance to trypanosomiasis and its good beef characteristics.

	Male	Female
Mature weight (kg)	328.6+20.0	286.7+8.3
Height at wither (cm)	116.4+1.5	113.6+0.8
Chest circumference (cm)	164.1+5.6	156.20+1.8

Its tolerance to trypanosomiasis confers an exceptional advantage upon it. It has a fecundity very much higher than Zebus.

iii. White Fulani (Bunaji or Yakanaji): It is of Egyptian descent. They migrated along the coast of North Africa to West Africa. They are bred by the nomadic Fulanis of Northern part of West Africa. The body is usually white with black spots. They are characterized by fairly large chest and the height at wither is about 130cm. The neck of the bull is muscular and the hump is usually large. The dewlap is fairly large especially the bull. Average bull weight is about 550kg while the cow weighs 340kg. The body is compact and fleshy but the rump is rather small. Dressing percentage of the carcass is between 50-55% of the live weight. The head is small, face straight, horns are of medium to very long and curve upwards and outwards. The skin is thick and pigmented.

Variations in colour exist with all combinations of black and white on a black skin. It has the largest hump in comparison with others. It is a triple-purpose breed in milk and meat and draught.

Characteristics of Beef Breeds

The primary purposes for the existence of beef cattle is to produce beef. The ultimate goal in a beef management programme is to produce large quantities of high quality beef efficiently and profitably. The basic conformation of the beef type animal is short, thick bones, thick muscles, long broad backs and square rumps carrying more of the valued flesh. The ideal beef conformation has been described as a "parallelogram" or a "block" conformation.

Animals with long limbs, narrow flat sided barrels and small rumps are not desirable as beef animals.

While the whole lot of cattle breeds and types can be used for beef production, certain breeds are specialized and possess the desired qualities with resultant maximum returns.

ADAPTATION OF TROPICAL BREEDS TO THEIR ENVIRONMENT

1. Long legs, for walking long distance and to increase height from ground to avoid heat contact of the ground.
2. Loose skin: pendulous dewlap (below necks) and sheath around the penis for increased surface areas against heat accumulation and to dissipate excess heat.
3. Disproportionately bigger extremities to dissipate heat e.g. large ears, etc.
4. Hump in Zebu breeds for storage of fat and perhaps for sweating. The fat could provide energy during the lean feed period.
5. Less subcutaneous fat to enhance sweating
6. Sweat glands – bigger, dense and more voluminous
7. Short hair – to assist heat loss by evaporation
8. Shiny coat – to reflect heat and sun rays

9. Thick skin – against ecto-parasites
10. Long and large tails – to whip flies and provide large surface area for cooling
11. Horns for defense and for heat loss
12. Digestive power – greater to handle fibrous feeds
13. Water requirement – can go without water for 1 or 2 days. Less faecal moisture content and urine output to conserve water e.g. Boran cattle
14. Thyroid gland activity increases the rate of metabolism and released thyroxin when an animal is exposed to cold. In hot weather, thyroxin activity is reduced.
15. Carotid rete is believed to be an area in the neck region where heat exchange occurs between blood to and from the brain. This enables the brain to record temperature lower than the active body temperature.

SYSTEMS OF BEEF PRODUCTION

Organized animal production has for many years been of minor Agricultural importance. Much of the inhabited areas is therefore characterized by the nomadic herding of cattle. This is because most of the tropical areas are either forested with high incidence of disease and parasite detrimental to profitable animal production, or dry zone which called for tremendous physical exertion on the animal in order to obtain feed and water.

In Africa, North of Sahara, Cattle are used primarily for draft (work) and milk with beef coming primarily from unproductive animals. In the South of Sahara cattle are more of religious and social significance than of economic value. Where cattle are raised, they are to many of the people a sign of wealth and a status symbol. Preference therefore is given to keeping the cattle in large number than to exchanging them for money. But with subsequent settlement, organized cattle production assumed greater significance.

In recent years several system of beef production have been introduced from the Temperate. Such system are broadly classified as:-

1. Extensive
2. Intensive
3. Semi-intensive

Various modifications and extensions of these systems also exist in different environments and locations. Profitability is however a common objective for all.

1. Extensive System or Range Feeding

This is the easiest and most unspecialized form of beef production. It is the traditional system in most of the tropics. Beef production in the Tropics is therefore based almost entirely on this system.

The animals are produced solely on ranges using grass and herbage usually in areas where land is cheap and forage can be had for little or nothing or where

the land, for one reason or the other, is not used for any other form of profitable agricultural production.

The young calves are left with their dams to suckle and they are there after maintained to slaughtered weight on pasture. All they are permitted to use from cultivated land are the residues of crops. The seasonality of rainfall and forage production invariably results in considerable nutritional stress on the animal. These restricted periods of forage growth result in abundance of feed during the rainy season, followed by period of relatively rapid deterioration and long period of stagnation. In some areas, the climate is so unfavourable that the land is infertile and there is practical starvation. In both cases the period of plenty is too short to allow young stock to complete sufficient growth to carry them to the condition where they may be profitably sold for meat.

During the unfavourable period the animals subsist on diets that are barely sufficient for the maintenance of essential, metabolic processes and have to draw on their body reserve for much needed energy. This not only results in a check on their growth but in an appreciable loss in body weight. Consequently, the appreciable gain made during the rainy season is lost in the dry season. This makes it impossible for the animal to reach slaughter weight until they are 4-6 years old, i.e. there is fluctuating growth of pasture and body weight in extensive system of management.



In such circumstances not only is the production low, the carcass is also of low quality. Since grazing is uncontrolled, the tendency is for the animal to consume

the available feed around low lying land and around water holes and wells first, they then have to go farther and farther in search of feed and water.

In the process, a tremendous amount of valuable energy is thus expended. The type of animals best suitable for the condition are not the early maturing breeds. Most tropical cattle breeds are thus generally slow maturing and have tremendous capacity to handle large quantity of coarse herbage and are sufficiently heat tolerant to enable weight gains as quickly as feed supply permit at any season of the year.

Meat quality is inferior due to protracted period of fluctuating growing before reaching the attainment of mature weight.

The breeds of cattle found in Nigeria and other West African countries can thus be divided into two categories:

1. **The Southern breeds**:- which have more of the desirable beef characteristics e.g. N'dama, Muturu (West African Short Horn: WASH), and Keteku. These can convert large quantities of easily obtained forage (fodder) into fair quality meat.
2. **The Northern breeds**:- White Fulani, Red Bororo, Sokoto Gudali etc, which are capable of utilizing sparsely growing and coarse, low quality fodder. They are adapted to covering long distance in search of feed and water. Most of the beef comes from this group of cattle. They are managed by the Fulanis on purely extensive system.

ADVANTAGES OF EXTENSIVE SYSTEM

1. It is the cheapest form of livestock husbandry as it does not involve such cattle investments like buildings, feeds and other sophisticated management practices.
2. The chances of disease infection are reduced because the animals are not permanent in any place and are constantly on the move.

DISADVANTAGES

- a. It is considered wasteful in terms of land and can only be successful and economical where land does not find alternative agric use. Such lands are invariably removed from urban centres and accessibility of the market sometimes constitutes a problem.
- b. The dependence of the animals on seasonal forage and water supply results in such fluctuations and irregularly in the growth pattern that the genetic potential of the animal is never fully expressed.
- c. Period from birth to slaughter is unnecessarily prolonged due to slow growth rate.
- d. It is practically impossible to have a meaningful appraisal of the enterprise since no records are kept of vital cost factors such as feed consumption, growth and efficiency of feed utilization.
- e. The animals are exposed on the range to the danger of wild animals, poisonous snakes, accident, thieves etc.
- f. Breeding is also unorganized and calving is irregular and sometimes attended by high mortality.

INTENSIVE SYSTEM

This is a system involving complete confinement of the animal and movement is restricted. All feed is carried to the animal. In situations where population growth and living standard result in increasing encroachment on land hitherto given to natural grassland, greater intensification is forced on all branches of Beef industry. The intensive system thus becomes imperative.

In all cases, it is aimed at producing high quality beef by allowing the calf to express its full growth potential. Adequate nutrients are provided to satisfy requirement for efficient feed conversion and growth.

Intensive beef production can be broadly classified into 2: (a) Veal Production (b) Baby Beef Production.

Veal Production is from calf fed from birth to slaughter weight on high quality feed, while Baby beef production involves usually the use of pure beef breeds.

ADVANTAGES OF INTENSIVE SYSTEM

1. It is not wasteful in term of land
2. Growth is controlled and uniform. Maturity is rapid
3. Mechanization of farm operations is possible e.g. feeding, drinking etc.
4. Dangers from wild animals eliminated
5. Proper records can be kept and economic evaluation of the enterprise is possible.

DISADVANTAGES

- a. Needs high capital investment e.g feeds, labour and building
- b. The chances of disease spread are great
- c. There is need for large quantities of grain, milk, etc which are also demanded by man.

SEMI INTENSIVE SYSTEM

Between the two extremes (extensive and intensive) lies a bridge which is known as semi-intensive system of beef production. The system consists essentially of partial rearing on pasture and supplemental feeds. The management practices adopted largely depend on the time of the year in which the calves are born i.e. whether wet or dry season.

In situation where the economics of production and the scale of development of beef industry does not justify intensive production, a semi-intensive system finds a ready acceptance.

Since the demand is mainly for quantity rather than quality, meat for the whole market must be chilled so that the low income group who incidentally forms the greater proportion of the population can afford it.

In the semi-intensive beef production system, slaughter age varies from 2½ - 4 years depending on the breed. On the average:- N'dama reached slaughter weight (320kg) in 3 – 3½ years, Muturu – 200 – 220kg in about 3½ years, Zebu – 450kg in 3½ - 4 years.

The semi-intensive system is mainly used on the Government and some private or corporation farms or ranches. On these ranches the cattle are either reared from birth or bought as “store cattle” and then fattened to slaughter weight.

FACTORS TO CONSIDER IN ESTABLISHING A BEEF HERD/INDUSTRY

The aim of a beef producer is to best utilize the feed production capability of the farm or ranch. The choice of the best or the most suitable beef cattle programme is therefore of great importance. Some of the points that should be carefully considered in making a choice are:-

1. The kind and amount of pasture to be utilized i.e. fibrous and succulent
2. Relative amount of grain and roughage produced on the farm or ranch
3. Season during which labour is unoccupied with other work.

4. Seasonal market demand for slaughtered cattle in the area
5. Proximity to market outlets and surplus feed supply
6. Climate and its effects e.g. heat load, grazing habit, rectal temperature, etc
7. Available equipment and shelter
8. Available financial resources
9. Training skills and experience of the operator
10. Personal likes and dislikes of the operators. It should, however, be borne in mind that no one programme is best suitable to all conditions as each has its advantages and disadvantages. Most farmers and ranches raise stock for profit. Therefore after it has been ascertained that the farm, feeds and available labour are adaptable to animal production and that suitable potential market exists, the next step is that of establishment of a herd that is efficient from the stand point of production and that meets market demand.

SELECTION OF BREED TO BE USED

No one breed of cattle can be said to excel all others in all points of beef production under all conditions. An attempt should be made to select a breed suitable for beef and where no definite personal preference exists, the breed most popular in the community appears the best choice. This is because it is often possible to arrange an exchange of animals especially bulls. The location of the farm or ranch has a great influence on the breed of cattle that can be used as a foundation stock.

SIZE OF THE HERD

No minimum or maximum figures can be given as the best size of the herd. It is, in fact a matter for individual consideration. It is however note worthy that there is very little difference in labour cost whether, for example, the cattle numbers 10 or 80, he

cost of purchasing and maintaining the herd bull also becomes high when there are two few females in the herd.

Another factor which determines the size of the herd in any particular circumstances is the amount of pasture, hay and other roughage produced as well as the handling facilities. The system of selling the young stock is also an important factor. For example, if the calves are disposed off at weaning time or fattened as baby beef, practically no cattle other than the breeding herd are maintained. A lot will also depend on whether the enterprise should be a major or minor operation.

GENERAL MANAGEMENT PRACTICES AND FARM FACILITIES

1. **Control of ectoparasites** e.g. lice, mange, ticks, fleas, maggots etc

Spray or dip against ectoparasites using spray race, dipping vat, spraying machines. It is always better to alternate acaricides or chemical to prevent immunity against the drugs. Studying the life cycle of common ectoparasites e.g. tick, could assist in quick control since the knowledge of the life cycle will determine the extent and rate of dipping/spraying. Always use the manufacturer's instructions.

2. **Dehorning or Disbudding**

Horns are objectionable on animals in the commercial herd because of possibility of inflicting injuries on one another and the farm attendant. The presence of horns also necessitates the provision of extra shed, watering and feeding spaces and make the animals more difficult to handle. It is therefore desirable and it is general practice that calves should be dehorned when they are 2 – 4 weeks old. Nutrients that could have gone to other areas are used to sustain the horns. It is used for self defense where predators exist.

3. **Methods of dehorning**

(a) **Use of chemical:** This involves the use of either KOH or NaOH. These chemicals come in form of sticks. Pastes or liquids. The hair around the horn buds are clipped closely. A ring of heavy grease or petroleum jelly e.g. jelly, Vaseline is smeared on the surrounding skin. These prevent skin burns and keep the caustic from running into the calves eyes especially when the liquid is used. If a stick is used, then slightly moisten one end of the stick with water and rub it firmly over the horn bud with a rotary motion until blood appears. The effect of the caustic is to deaden the horn root. In a few days a scab appears over each horn bud which soon drops off leaving a smooth spot of skin devoid of hair. Calves treated with caustic should be protected from rain for a day following the application since chemical may wash down and injure the side of the face and the eyes of calf. It is also best not to turn calves back to their dams for a few hours after the application of the caustic.

b. **Use of Saw and Clippers**

Saws of various forms of shears and clippers are used for de-horning. This is however a less desirable method which applies only to older calves. Whatever the instrument used, it is necessary to remove the horn with about ½ to 1cm of the skin around its base to be certain that the horn-forming cells are destroyed.

c. **The eclectic dehorner or hot iron method**

The method consists of the application of a specially designed electrically heated hot iron to the horn buds of the young calf. The cup like end of the hot iron is firmly pressed on the horn bud. While the method is bloodless it is much more painful than the use of chemicals. It can only be used on calves under 5 months of age.

d. **The elastrator**

This is an instrument for use in stretching a specially made rubber ring over the horn well down into the hair line. This is aimed at cutting off the blood circulation to the bud.

The system may be used on cattle with horns from 6 – 15cm long. Small horns drop off in 3 – 6 weeks, large horns stay up to 2 months.

e. **Dehorning by Breeding**

The use of a polled bull is the most natural method of securing cattle without horns, since it results in a majority of hornless calves. If such a bull is “pure” polled, carrying in its blood no tendency to produce horns, practically all of its calves will be polled, even though their dams may have horns. If however, the bull is an impure polled (product of polled bull x horned cow), only half of its calves from horned cows will be polled. Dehorning by breeding saves labour and avoids pain and possible set-back to the calves.

Treatment After Dehorning

It is essential that a good fly repellent e.g. antibiotic be applied to the wound to remove the danger of flies. The danger of infection is generally reduced if there is extreme care and cleanliness. The instruments used should always be disinfected.

3. **CASTRATION OF BULL CALVES**

This is performed purely for economic reasons. It results in a more symmetrical development of the body, in particular, a better balance between the fore- and hind-quarters. It is generally believed that castration improves the texture, tenderness and flavor of beef but recent tests with beef carcasses do not support this belief, castration, however, makes animal more quiet and easier to handle,

not prone to sexual excitation but have decreased libido. Castrates deposit fat more rapidly than non-castrates. Castration prevents such undesirable secondary sex characteristics, aggressive temperament and sexual activity. Thus steers can be housed with heifer and are generally easily managed than the entire males. But meat from bull is leaner, growth rates and feed conversion ratios are better with bulls than steers.

Bull calves can be castrated any time from a few weeks to 8 months. It is however best done when the calves are from 4 – 10 weeks age, and in any case before they are 4 months old. The older the animal at the time of operation the greater the shock and risk but the more masculine and steer develops in appearance.

METHODS

i. The Bloodless castrator/Burdizzo Pincers

The spermatic cords and associated blood vessels are crushed or severed so completely that the testicles waste away from lack of blood circulation. Young calves can be castrated by this means while standing but those over 3 months are best castrated lying down. The operator's assistant should sit on the calf's head and keep the upper most hind leg of the calf pulled well forward. Two independent closures about ½cm apart should be made for each cord. If done properly, it is a satisfactory means of castration as there is no external bleeding and the chances of infection are reduced.

ii. Open Incision

An incision is made on the scrotal sac and the testes are removed by pulling them away from the spermatic cord. It is not advisable to cut the spermatic cord since excessive bleeding may result. The cord is gradually scraped with a sharp knife until snaps off.

iii. **The Rubber Ring Or Elastrator**

This consists of stretching a specially made rubber ring over the scrotum. It is a useful method for castrating young calves less than 2 months of age. The rings cut off the scrotal and the testicular blood circulation so that they finally drop off.

As a rule the hands of the operator and instrument should be kept clean and as nearly sterile as possible by dipping in disinfectant solution between operations. The wounds should also be disinfected.

4. **BRANDING OR MARKING**

It is highly desirable that all animals in the herd bear some mark or tag whereby each can be positively identified. This is necessary for the establishment of pedigree or ancestry as it is especially the case in purebred herd. The method of marking employed will depend primarily on the objective. When the objective is to establish ownership as it is the case on open range and in poorly fenced pastures, branding with a hot iron is possibly the best method. Although much has been said against branding by hot iron because of the pain inflicted and the damage to the hide. The hot iron is still the most common. In advanced countries before cattle can be legally branded, the brand being used must be properly registered with the livestock identification office to avoid duplication especially at state boundaries.

Other method of marking include ear marking, horn brands, ear tags, neck chains or straps and tattoo.

