

Lecture 3

GOAT PRODUCTION AND HUSBANDRY

Breeds of Goat in Nigeria

There are three main breeds of goats in Nigeria.

The Sahel goat

It is found more abundantly in the Sahel of the country. They have varying coat colour but usually mixed black, white and brown. They possess fine hair coat, short ears and long legs. Mature weight range from 25 – 35kg. Rams have horns. The breed is adapted to nomadic and wide range grazing. They are meat animals although they could be used for milk and skin production.

Red Sokoto or Maradi goat

The breed is found mainly in the north-western Nigeria but has spread to the savannah belt of Nigeria. It is uniformly dark red in colour and weighs 20 – 30kg at maturity. Both sexes are horned. The breed is noted for its valuable skin and it is a meat animal.

West African Dwarf (WAD) goats

They are found mainly in the forest belts of the southern Nigeria. The breed is hardy and trypanotolerant. They have small body sizes and strongly set short legs. The breed is black, brown or white or a combination of black, brown and white. They are prolific giving birth to twins and triplets. Mature weight is 20 – 25kg. The breed is used mainly for meat but also has dairy potentials.

Feeding of Goats

Feeding goat from birth to weaning

It is most important for kids to receive colostrum (the doe's first milk) during the first 24 hours of its life. A healthy newborn kid rarely needs help to suck from its dam. Colostrum, which is produced by the doe during the first 4 or so days after kidding, is thicker and darker than ordinary milk. It contains essential antibodies (immunoglobulins) that protect kids from disease, and is a concentrated source of nutrients. The newborn kid can absorb the essential antibodies in colostrum only during its first 24 hours or so of

life. These antibodies protect the kid for the first 8–10 weeks against many diseases. Excess colostrum can be stored for future use in either fermented form (3 months) or frozen form (12 months).

If the mother dies shortly after giving birth or becomes too ill to care for the kid, or if the mother refuses to accept the kids, bottle feeding of the kid is recommended. Bottle feeding requires a lot of time and a total commitment to the kid. It is best to feed the kid at the same time of day during each feeding. It is best to use a milk replacer designed specifically for goats or goat milk. Goat kids have different needs than other animals. Lamb milk replacer is too high in fat and calf milk replacer is too low in protein for goat kids. In the absence of milk replacer, you can make your own by mixing: 1 gallon of whole milk, 1 can evaporated milk, and 1 cup of buttermilk (Take the gallon of milk, pour out about 1/3 and set aside.) Pour into the gallon container 1 can evaporated milk and 1 cup buttermilk. Then pour the rest of the milk that you set aside in to the gallon container until full. Shake and serve warm. Bottles and nipples must be thoroughly cleaned before each use.

Kids eat solid food from about 1 week of age and are often seen ruminating at about 2 weeks, so it is important to give them good-quality hay and suitable concentrate from 1–2 weeks of age. Usually both hay and concentrates are provided *ad libitum*, although, particularly with concentrates, you should try to match the allowance with the kids' appetites to reduce waste. It is important to make sure that energy and protein supplements are kept fresh, so new feed material should be provided daily.

Wean kids at between 8 and 10 weeks of age, or a little older. Weaning can be abrupt, or it can be gradual with milk being withdrawn by restricting the amount fed and the number of feeds per day. Whichever weaning method is used, kids must be consuming, and have ready access to, high-quality solid food. The ration may include some high-quality roughages to assist rumen development. It is important for clean water to be available at all times.

Management of weaned kids

Weaning kids from their dams is a stress-inducing experience for both mothers and kids. Stress can cause illness and sometimes even death, so it is wise to minimize stress at all times. Intact bucklings should be weaned 8 to 12 weeks of age to avoid the possibility that they might be able to breed their dams, sisters, or other females in the herd. Doelings can stay with their dams for a longer period of time. Depending upon prevailing conditions, the weanlings may be dewormed prior to moving them to a weaned-kids pen/pasture as far away from their dams as possible. Males and females from weaning age and up are kept in pastures separately to avoid indiscriminate breeding. When weaning kids (bucklings

in particular but both sexes in general), never wean one or two kids and place them into a herd of already-weaned kids. They will be harassed to the point of exhaustion. Feed the kids after they are in their new pastures. Eating together is a familiar group activity that will distract them from harassing each other. Kids tend to wander, getting lost from the main group, therefore becoming potential targets for predators. Herding kid goats requires that one animal takes a leadership role. This can be done by introducing one or two older goats of the same sex into the herd.

Feeding goat for meat production

Feed costs typically account for about 70 percent of the total cost in a meat goat enterprise and feeding program has a large effect on profitability and herd productivity. The nutritional needs of meat goats vary according to weight, age and stage of growth and/or breeding cycle. They can be met by a variety of feedstuffs and feeding programs. There is no perfect feed or feeding program. Ration formulations are usually based upon a combination of the animals' nutritional needs, feedstuff availability and cost. The cost of feeding goats can vary tremendously according to feed formulation and source of feed ingredients.

Meat goats require water, protein, energy, minerals and vitamins in their diets. Water is by far the most important nutrient. Animals can go for a long time without food, but not without water. Energy is usually the most limiting ingredient in goat rations; protein the most expensive. Calcium and phosphorus are the two most important minerals. The ratio of calcium to phosphorus in the diet should be at least 2:1 to prevent urinary calculi, the formation of kidney stones in the bladder of male goats. Goats require vitamins A, D, E and K in their diet, but synthesize the B vitamins in their rumens.

Nutritional Requirements of Meat Goats

	Protein (CP)	Energy (TDN)
Buck	11%	60%
Dry Doe	10%	55%
Late Gestation	11%	60%
Lactating Doe	11%	60%
High Producing Doe	14%	65%
Weaned Kid	14%	68%
Yearling	12%	65%

Pasture should comprise the majority of the diets of meat goats. Goats are ruminant livestock, whose system is designed to utilize forage and other fibrous materials. When fresh forage cannot meet the nutritional needs, supplemental feeding may be necessary. Supplements should only be fed to the point where they support profitable levels of production. The amount of pasture needed to support a meat goat doe and her offspring will vary considerably, depending upon the quality of pasture and management system. Goats will do well on improved pastures, as well as brushy, woody areas. They are natural browsers and if given the opportunity will choose brush and weeds over grass.

Feeding pregnant goats (Does)

The feeding requirements for does changes based on the stage of production. Does should be fed at a maintenance level when they are dry and during the first two thirds of their pregnancy. The doe's requirements increase during the last third of pregnancy. It is critical to provide adequate nutrition to the doe to produce healthy and vigorous kids and to allow her to produce milk to raise those kids.

Early Pregnancy: During early pregnancy does can be fed to maintain their body condition unless they are thin and need to improve their body condition. Pasture or average quality hay is sufficient to meet their nutritional requirements. The does should have access to free choice mineral mixture that has been balanced for goats. This will help to ensure that the does remain healthy throughout their pregnancy. Overfeeding should be avoided. Most animals produce fat externally over their body, however, goats produce fat internally. Overfeeding can cause problems in late pregnancy for very fat does. They will not be able to eat enough to meet their energy requirements and can develop pregnancy toxemia or pregnancy disease. The body fat and the growing kids will take up so much room that nannies become too full to eat enough to meet their nutritional needs.

Late Pregnancy: During the last third of pregnancy, the does need to be monitored more closely. The nutritional requirements during this time increase to provide for the growth of the unborn kids. Doe's diet should be supplemented daily with concentrate in addition to the average quality hay/pasture that they have been eating. As the doe approaches the last few weeks of pregnancy, increase the quality of the hay/pasture to prepare them for lactation. After kidding, the amount of supplement can be adjusted upward. Does nursing twins or triplets will require more supplementation than does nursing a single kid.

Feeding goat for milk production

To get the best milk production from goats, excellent quality forages must be provided. A pasture that contains many kinds of plants, including browse plants, legumes and grasses is ideal. Good mixed-grass hay (cut at an early stage of maturity) is ideal for dry season feeding. Goats will eat a wide variety of plants, including weeds. They are selective eaters that will seek the most nutritious plants while grazing, browsing, or eating hay. They are also wasteful eaters, and therefore it is wise to help them use their feed more efficiently by controlling their grazing and by feeding them only a little more hay than they will require. Goats, if allowed to be very selective, they will waste more feed, but they will produce more milk. On the other hand, If you are too strict with their forage allowance, you will save money on feed but lose income from milk.

Good quality hay and a balanced concentrate is the best approach in maintaining high levels of milk production. Fiber in the total ration is needed to maintain a normal milk-fat test. However, too much poor quality fiber will lead to lowered levels of milk production. Rations containing some cottonseed hulls or other fibers may be included in the grain where hay or other roughages are not readily available. Dairy goats are good eaters and can consume from 4 to 7% of their body weight as compared to 3 to 4% consumption for dairy cows. This high level of intake allows the dairy goat to have an abundance of nutrients readily available for the synthesis of milk. Overall, the efficiency of milk production by the dairy goat is quite similar to that of the dairy cow.

Animal Identification Methods

- (1) **Ear tags:** A tag is a piece of numbered metal or plastic that is fixed by means of a hole in the ear using an applicator. Regardless of which type of tag is used, it is inevitable that some tags will be lost. It is therefore necessary that another means of identification be used in addition to ear tags. Reading of tags may be difficult unless the animal is restricted. However, ear tag is a quick and easy method of identification and also relatively inexpensive.
- (2) **Tattooing:** A tattoo is applied by making holes in the skin and forcing a marking dye into the wounds. When the wounds heal the dye is retained under the skin and leaves a permanent record of the wound. Finely ground charcoal can be used in place of special tattoo dye. It is possible to tattoo almost anywhere on the animal. Tattooing however, requires more effort for installation than ear tags and can often be very difficult to read.
- (3) **Branding:** A brand is an indelible mark that is placed on an animal. The aim of hot branding is to cause a wound, which will later form scar tissue upon which hair will not grow. The animal should be cast and restrained on the ground. Young animals are easier to restrain and branded

than adult animal. The hot iron which has been heated in a wood fire to bluish-white colour is then applied to the skin. The iron is then rocked up and down and from side to side to give a uniform brand. The scar tissue formed after branding reduces the value of the skin and it is more painful to the animal.

- (4) **Flesh marks:** This is a cut or hole made in the ear or other part of an animal for owner identification. Ear notching in sheep are normally coded so that each notch in a specific ear or in a specific location on that ear has a set of value e.g. sequential numbering, letter number and individual animal number, year and month of birth. Copies of the numbering system should be made on paper so that everyone working with the sheep has access to a code card. Special tools are used for notching and can be in a variety of shapes including a "V", a crescent or a "T"-shape. Notching should be done as soon as possible after birth to minimize bleeding. The advantage of notching is that no continuing expense is required as in the case of ear tags and tattooing. However, it is slower to read than ear tags and more liable to error than tags or tattoos.

Castration

It involves the destruction of testicular function, the testicles being the two organs that lie together in the ram's scrotum. Method of castration in sheep includes:

- (1) The knife method: The scrotum is cut open and both testicles removed by knife.
- (2) Burdizzo method: The spermatic cord connecting the testicles with the rest of the body is crushed mechanically with a pair of heavy and blunt pincers thereby leading to slow degeneration and eventual complete atrophy (withering) of the two testicles in the un-opened scrotum.
- (3) Elastration method: A strong rubber ring is fitted over the lamb's scrotum and left there until the whole scrotum atrophies and falls off. The male sheep becomes a wether or wedder having lost all sexual power and desire.

Common Diseases of Goats

1. Peste des Petits Ruminants (PPR)

It is a viral disease of goat. Outbreaks are common in West Africa. PPR may be peracute (4-6 days), acute (about 10 days) or subacute (about 2 weeks). Clinical signs include catarrhal discharge from the nose, low-grade fever and intermittent diarrhea. Most animals

recover. Spread of infection occurs through inhalation of discharges in the air, direct contact with sick animals, ingestion of contaminated feed and water. There is no treatment for the disease. Fluid replacement therapy combined with antibiotic and anti-diarrhea drugs may be helpful for symptomatic treatment. The only realistic approach to control is vaccination using live tissue culture rinderpest vaccine.

2. **Foot Rot**

It is a disease of the feet of goat caused by infection with two bacteria, *Fusobacterium necrophorum* and *Bacteroides nodosus*. Clinical signs include lameness of various degrees depending on the severity of the lesions and the number of feet affected. In worst cases, goats are reluctant to walk, tending to lie or crouch and graze in a kneeling position.

Spread of the disease occurs through contamination of the pasture. Chances of spread increases in warm weather with wet conditions. These conditions favour the survival of the organisms in the environment, cause softening of the skin of the feet and increase the chances of infection with bacteria. Treatments involve cutting away the under-run hoof to expose the diseased tissues to the air, which improves healing. Cutting knives and shears should be disinfected with 10% solution of zinc sulphate, 5% formalin and 5% copper Sulphate or sprayed with antibiotic aerosol. The easiest but most expensive method is injection with penicillin in combination with streptomycin in high doses for sufficient drug to reach the diseased tissue. Control of the disease could be achieved by quarantine, culling of animals that do not respond to treatment and routine vaccination.

3. **Orf/Contagious Ecthyma/Sore Mouth**

It caused by a virus and is seen as scabby lesions on the lip and spread to the muzzle, nostrils, adjacent skin and round the eyes. Lesions are also found, in some cases, on udders of lactating goats resulting in mastitis. Clinical signs lead to reduced feed intake and loss of condition. Treatment is not very successful. Most cases of Orf are resolved within 4-6 weeks on their own. Isolation of infected animals and vaccination with live vaccine containing live Orf virus are the two most important methods of control.

4. **Pneumonia:**

This is used to refer to the inflammation of the lungs arising from bacterial or viral infections, mechanical factors or a combination of these. *Pasteurella multocida* or *Pasteurella haemolytica* causes enzootic pneumonia or haemorrhagic septicemia. Clinical signs are high fever, heavy breathing and death in some 90% of cases. In healthy animals *P. haemolytica* may not cause

disease when present unless the animals are exposed to stress and under nutrition. Antibiotics can be used to treat infected animals and vaccination used as a means of control.

5. **Internal Parasites:**

The major internal parasites of goats are Nematodes (Roundworms) e.g. *Haemonchus spp.*, *Oesophagostomum spp* and *Trichostrongylus spp*; Cestodes (Tapeworms) e.g. *Coenurus cerebralis* and Trematodes (Flukes) *Fasciola gigantica* and *Fasciola hepatica*. The ill effects of helminth infection in goats are as follows:

- Loss of condition due to competition for nutrients.
- Diarrhea due to gastro-enteritis
- Anaemia due to blood loss
- Tissue damage from migrating larvae
- Reaction to helminth in tissues

Control of internal parasites can only be effective when goats are well managed and well nourished. Rotational grazing can effectively reduce the level of infection. Drenching with anthelmintic drugs is usually necessary whatever managerial system is practiced.

6. **External parasites:**

These parasites are usually arthropods classified as insects (flies, lice and fleas) and Acarids (ticks and mites) which parasitises the skin of goat. They cause loss of productivity in many ways including serious irritation leading to interference of feeding; skin damage and wounds predisposing the animal to secondary infections by bacteria; and acts as disease vectors. These parasites are much more serious problems in extensive and large-scale intensive units. Control of external parasites could be achieved using a combination of the following methods:

- Grazing management
- Washing and disinfection of livestock premises
- Treatment of infected animals through the application of insecticides and acaricides as sprays, dip baths, manual application, impregnation into ear tags and neck or tail bands and in pour-on or spot-on preparations and injections.
- Good hygiene on farm premises to destroy or disrupt arthropod breeding cycles.

DISEASE CONTROL

(1) **Breeding animals for the environment:**

Some diseases are peculiar to certain environment. Within the same environment some animal breeds may be resistant to the disease. Genetic selection of such animal should be an important

part of integrated approach to animal health. This involves selection for disease resistance in livestock breeding programmes.

(2) **Health maintenance through surgical procedure:**

Disbudding/dehorning of young animals prevent injury in housed animals. Castration of male animals has significant implication on health as it reduces fighting in the sexually matured animals. Removal of supernumerary teat is a wise precaution as such teat is disposed to develop mastitis.

(3) **Modification of the environment:**

This may be achieved through provision of adequate nutrition and supplementary feeding of free range animals, grazing management (rotational grazing to prevent build up of infective micro-organisms and to break the life-cycles of parasitic worms), housing of animals, disinfection and general hygiene.

(4) **Immunity:**

Young animals when exposed to colostrum from the does greatly facilitate the acquisition of passive immunity because colostrum is rich in antibodies. Vaccination of animals involves the exposure of the animal to infective agent or its products in such a way that the immune system is stimulated and protection against subsequent exposure to the agent results, without the occurrence of clinical disease.

(5) **Prophylaxis:**

The measures taken in prophylaxis fall into two classes: one tends to protect the animal from the action of pathogenic organisms/agents and the other has the objective of rendering the animals able to resist them. Sanitary prophylactic measures involve subjection of individual animal to a health inspection and isolation in quarantine before being introduced into the herd. Sick animals should be isolated and kept within the area where it was when the disease was diagnosed. For certain diseases, the statutory health regulations require slaughter of sick and contaminated animals.

Chemical medical prophylaxis is used for the protection of vulnerable animals by injection of synthesized chemical products. This method is mainly used in the prophylaxis of diseases due to protozoan parasites of the digestive tract and blood system.

The products are scattered on food at intervals of time from one day to a week, or injected under the skin or muscles. Their slow diffusion allows spacing of protective injections over several months and gaining of chemoprevention over a long period.

(6) **Vector Control:**

Many major diseases of livestock in the tropics are transmitted by and develop in the arthropods, such as flies, lice, fleas, ticks and mites. The control of these vectors reduces disease transmission, loss of blood, skin irritation and damage. Vector control could be through the use of chemical agents as sprays, dip baths, injections, pour-on or spot-on.

RECORD KEEPING

Record keeping is preserving or reserving in a certain state, a formal writing of any fact or information. It applies to all classes of livestock production. Record keeping is important for the following reasons:

1. A farmer will know whether he is operating at a loss or profit.
2. He will know the nutritional status of the animals under various management regimes.
3. Through an efficient and adequate breeding record a farmer will know which male serves a female animal and be able to avoid inbreeding problems.
4. A farmer will know which disease is prevalent in his flock and plan for its control.
5. Record keeping is vital in making management decisions, and detecting and correcting management errors.
6. Through good record keeping, government can plan national livestock projects.

Types of records

A **Ancillary records:**

These records are kept in hard cover notebooks at the farm. These are

2. Mating record – record of date, method of mating, male and female mated.
3. Lambing/kidding and weaning records – record of date of birth, type of birth, sex, birth weight, mortality, weaning date and weaning weight.
4. Health record – record of history of any disease diagnosed in any animal or flock, prognosis, treatment administered, control measures taken, response of animal(s) to treatment or measures and other relevant remarks.
5. Feed and drug acquisition record – record of detail inputs acquired for farm use.
6. Sales record – record of the revenue realized from the farm operations.

7. Monthly record – record of monthly stock taking of the operations of the farm. That is, current and previous months' summaries of total and class of stock (female, male, weaned lambs/kids, mortality, lambings/kiddings, culling, sales, purchases, transfer and revenue).
- B. **Core records:** These records are entered in specially designed hard books and are intended for computerization.
1. Pedigree record – contain animal tag number, flock, date of birth, sex, dam, sire, date of disposal, and reasons for disposal (coded).
 2. Breeding record – contain breeding date, lambing/kidding date, parity, litter size, sex, birth weight, survival (coded), weaning weight, weaning date.
 3. Live weight record – usually taken monthly but could be more frequent to follow experimental protocol. It contain information on month, tag number, date and live weight.
 4. Fattening record – contain information on the date the animal enters or leave the feedlot, initial and final weight, the regular weighing date and the amount of feed offered.
 5. Milking record – contain dates, tag number, daily milk yield, total milk yield and lactation length.

PRODUCTS FROM GOATS

A list of the main products from sheep and goats is listed below.

Products from milk

- Fresh milk: only from goats.
- Ultra High Temperature (UHT) processed milk: only from goats.
- Fresh cheese (from raw or pasteurized milk): sheep and goats.
- Seasoned cheese (from raw or pasteurized milk): sheep and goats

Products from meat

- Meat from sheep and goats of different ages for consumption in different seasons.
- Meat from adult animal can be made into some traditional dishes in certain regions.
- The adults meat can be transformed (e.g. goat ham).