Training Manual



Improved Goat production

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1. **Introduction to improved goat production**

Trends of goat production globally?

Across the globe, there is an increasing demand for food of animal origin, together with increased awareness of importance of goat production. The growing human population and urbanization has placed goat production in spot light due to the following attributes; low initial capital investment per unit area, short gestation period (high reproductive turnover) and easy management.

What is the Uganda's perspective?

In Uganda, goat production is the second most important component of livestock species that contributes to the livestock sector of agriculture. Goats play an important role in the livelihoods of rural communities through provision of meat for food security and incomes. Goats are usually sold or bartered in times of need. In addition goats are widely used for social and cultural functions, nutritional values in terms of milk, meat, cheese, ghee and butter as well as manure for integrated crop production. Thus goats are important to small scale farmers, commonly referred to as "a poor man's cow", and also contribute to national economic development

This manual will assist farmers to:

- identify, prevent , control diseases and conditions on goat farms
- identify and select better goat breeds and breeding options
- design and constructs good goat shelters
- carry out routine management practices in order to increase on profitability of the enterprise
- properly manage the goat enterprise
- (hygiene products)

4. Goat breeds and their characteristics

There are various goat breeds for meat and milk production is Uganda including but not limited to the indigenous (Mubende, Kigezi, Karamoja, Sebei and the Small East African breeds) and the exotics (Boer, Galla from kenya, Saanen, Toggen burg, Alpine). Described based on origin and physical characteristic such as colour, body size, ears shapes and length.

5. How to manage improved goats?

Ensure that you observe the following key management principles:

- ✓ Proper nutrition
- ✓ Proper disease prevention and control
- ✓ Better breed selection and breeding
- ✓ Proper housing
- ✓ Record keeping
- ✓ Proper care of replacement stock

8. Reproduction and management methods to optimize breeding

In this phase you have to be knowledgeable about the reproduction efficiencies like the reproductive efficiency (number of kids born per number of does bred) and kid rearing efficiency (number of kids per number of breeding does).

- **Reproductive cycle and breeding management**
  - Oestrus cycle- period between one heat to the next heat, average 12 days(18-24days)
  - Does – reach puberty between 4-12 months and bred preferably at 10-12 months (60-70% adult BWT of breed and atleast after a pair of permanent teeth).
  - *Why not breed young females?*
  - ✓ Increased chances of abortion
  - ✓ Increased chances of dystokia/difficult birth
  - ✓ Reduced milk production

- ✓ Stunted growth
- However, for exotic breeds does could even reach puberty between 7 to 10 months depending on breed, season of birth, level of feeding/nutrition and overall health status.
- Oestrus –lasts 12-36 hrs(2-3days)
- Bucks –Reach at 4 months but preferably used after attaining 12 months
- Buck power- 1 year- 10 does in a month, 2 years- 25 does in a month and above three years- 30-40 does in a month. In addition the buck power is dependent on sex drive or libido, terrain of the land and the mating methods.
- Two services at interval of 8-12hours practiced, improves conception rate
- 90 % conception rate if allow a buck with a doe or 2-3 does remain together a whole day or whole night
- Prolificacy – desired 2 litter size imply 50% twin
- Gestation period- 148-152 days or Five(5) months (average 150 days)
- Avoid inbreeding by replacement of buck after 2 years
- Does which do not return to oestrus after 2 cycle be separated from the dry non-pregnant flock and keep in group of 15-20 does to avoid in fighting
- Avoid starving of goats especially in early gestation as may cause high percentage of shed embryos to be absorbed

- **Management methods to optimize breeding:**
  - Telescoping-introduce buck in does after keeping it away 2-3months and 70-80% does come on heat in first heat cycle
  - Buck effect-sudden introduction of buck in does after prolonged separation
  - Oestrus synchronization-use hormones
  - Oestrus stimulation using wethers and teasers in does 10 days to 2 weeks before breeding season
  - Flushing of does before breeding season(3-4 weeks)

9. Heat detection in does (Oestrus cycle and behaviours)

- Restless
- Bleating

- Swollen and reddened vulva with slimy mucus discharge
- Tail wagging frequently, rapidly to the sides and upwards
- Frequent bleating
- Mounting of others
- Seeking for males
- sometimes shows frequent urination
- Standing for mating-standing reflex

In addition you need to prepare breeding parents for the breeding season by flushing or extra feeding with concentrate supplementation or using legume hay

- **Management of breeding buck**

First and foremost management of breeding buck is vital to achieve desirable breeding buck with high libido and demonstrated breeding soundness. The buck has greatest genetic impact on the herd and should be well taken care of at all times. It is important to observe proper feeding, good health and freedom from stress. Though proper selection of breeding buck cannot be overemphasized, it favours genetic potential to obtain maximum response and later re-enforce with proper management. In good management we consider the following best practices to quarantee steady and active buck:

- ***Feeding of the breeding buck****:*
  - Feed to body condition-give same nutrient requirement (energy, proteins, vitamins, minerals and water) to buck just enough to keep weight steady but not too fat because a fat buck will not be active. However, proper feeding of buck involves;
    -providing mineral lick at any time
    -Providing good pastures and fresh-clean water needed all time
  - Increase plane of nutrition or more feed two months before and during breeding season. This will make the buck active and improve spermatozoa concentration. As a result, fertility of the buck in enhanced.
  - When the back is being used a lot to serve does, it should be separated from other goats for 2-3 hours per day to allow time to eat as well as serve the does.
  - Avoid excessive weight gains when the buck is inactive
- ***Animal health and animal welfare for breeding buck***

- Manage diseases- ensure the buck is free from infection or disease
- Do regular deworming, vaccinations and testing for veneral diseases or examine for genital abnormalities before breeding
- Make sure the hooves are properly trimmed- avoid overgrown hoof
- Ensure good environmental conditions – no predators, free from stressors like harsh weather condition through proper handling and housing

Note-poor libido may result from inadequate feeding, extreme heat stress and ill-health.

- **How to increase prolificacy/fecundity in does?**

Under-feeding can lower her chances of getting pregnant and having kids and also reduces milk production after having kids. It is important therefore to flush they would be does using concentrates supplementing (increase protein diet of 10 to 14%) about 250g daily or use 500g of good quality legume hay per head per day 3-4 weeks before the breeding season. This will increase fertility, ovulation rate (number of twins or triplets) and subsequent kidding of about 10-20%, help in declining phase of nutritional availability

- **How do pregnancy diagnosis, care for pregnant?**

Pay attention to the management of the pregnant does and lactating doe and the kid through birth to weaning.

How do diagnose pregnancy?

This can be done through different approaches, namely: Non return rate, physical and behavioral change in the animals' body, change in mammary gland and also foetal movements in advanced stages

How to care for pregnant does?

- ✓ Separation of pregnant does from flock in advanced stage
- ✓ Extra feed during the later part of pregnancy 3-4weeks before kidding because inadequate or poor feeding nutrition in pregnant does may result into pregnancy toxaemia, abortion, and premature birth of weak kids
- ✓ Protect the pregnant does for harsh weather conditions
- ✓ Put the expectant doe in kidding shed 4-6days before parturition and provide maximum comfort.

10. Goat housing

In goat production, housing is important to prevent the animals from harsh environmental conditions, theft among others.

- Key considerations to achieve animal welfare, health and productivity include;
  - ✓ Houses should be easy to clean
  - ✓ Give enough space per animal (comfortable) and mitigate injury
  - ✓ Provide good ventilation and give good light to kill germs in shelter and vitamin D
  - ✓ Protect animals from predators and access to provide water and feeds
  - ✓ Keep the animal hygienic-free from dung and urine
  - ✓ Protect from harsh environmental conditions such as rains and hot sun

Generally the site should be chosen to minimise operational and constructional problems. For instance, should be dry area and free from flooding, convenient to feeding among others. The structure should not be located near water source-atleast not less than 50m away from water source.

The design of the structure should also enhance smooth operational, workers safety and friendly environment. There are different types of goat shelters, namely:

- ✓ Ground level housing-common in semi arid areas like Karamoja
- ✓ Slatted housing –the floor is raised to about 1.5m above ground level. Though in some instances 60 cm high slatted floor are constructed provided the ground level is inclined to allow drainage (1 in 60)
- ✓ Lean housing-2-3m high at the front slopping to 1-1.5m at the back. This is common on small farms and at times found attached/annexed to existing structure. However, the houses may be constructed as individual stall, individual pens, cubicles and loose housing (bedded and on slats).

While in determining the spacing due consideration is attached to the different production phases (age and physiological groups) such as weaning, breeding, pregnant, kidding and lactating, and the breeds. Several authors have quoted different specification for various categories of operations, namely: 1. Floor area for adult goats- 1.5-1.8m^2; 2. Kidding pen-2m^2 per goat (one pen for herd of 30 goats); 3. Kid rearing pen (10 kids should be given floor area of 3.24m^2 (1.8x1.8m) or 0.3m^2 per kid); 4. Lactating doe should be 3m^2 per goat (2x1.5m); 5. Open doe 1.8 m^2 per goat (1.2x1.5m); 6. Bucks should be 2.8-3m^2 per goat (1.9x1.5m); 7. Adult individual goat floor is atleast 1.0 x1.0 metres; 8. Isolation pen accommodating 50 goats at floor space of 2.5m^2 per goat. See illustration of loose slatted goat house Fig 1, with different herd units:

I back,

6 kids

2 open does

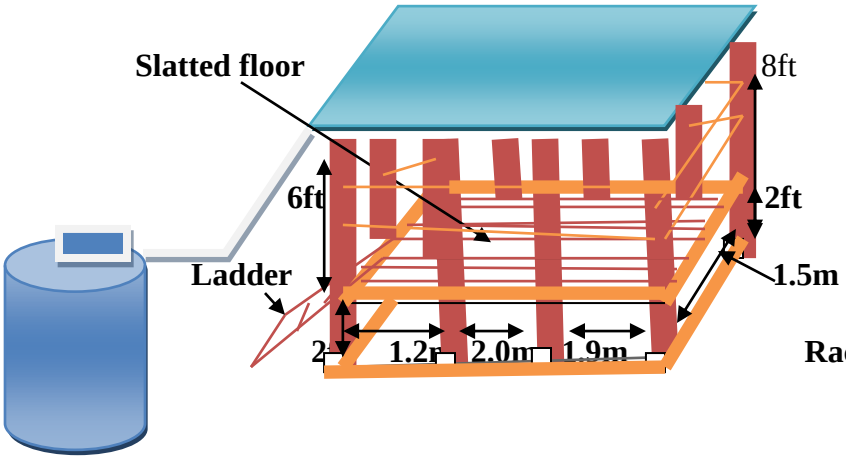


Fig 1: Back View of Shade

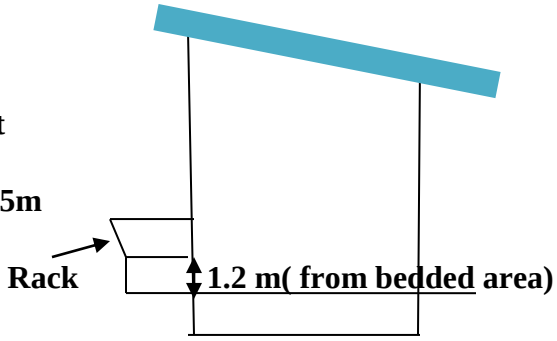
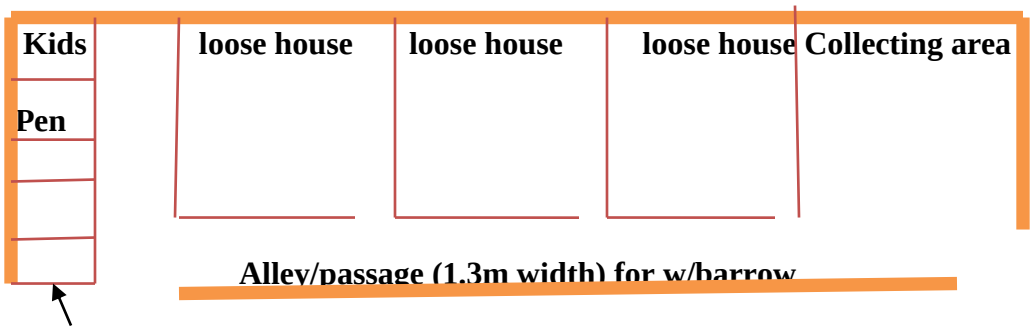


Fig 2: Side View of Shade



Isolation unit (different pens)

Fig 3: Layout and floor design of goat housing (large unit)

Note- Large unit subdivide into loose houses each to accommodate 30-40 goats

11. Management practices;

- **Castration:**

This is the removal of testes or crushing of the blood and spermatic cord to the testes using elastrator applicator which results into withering/shrinkage of testicles.

This procedure causes the animal to be sexually sterile or control breeding, removes the male odour and improves quality of meat, less aggressive or docile and improves growth because reduces sex drive and the animal concentrates on feeding. Normally castration is done in early age.

There are basically two approaches to castration in goats namely;

- ✓ Surgical approaches using knife- this can either be open or closed castration.

  Open castration the scrotum and turnica are both incised using surgical scapel and sharp knife to remove the testicles by cutting through the spermatic cord under hygienic conditions. While the closed type, the scrotum is incised and the tunica albugnia is left intact. The testicle is removed by cutting through the spermatic cord under hygienic condition.

- ✓ Elastrator or rubber ring method- sue special applicator to apply a rubber ring around scrotum above the testicles to cause breakage of spermatic cord and cut off blood supply to the testicle. Consequently they atrophy and the rubber drops off in about 1-2weeks. It is used in kids of 3-7days old. The use of burdizzo is also common but preferred for large species like cattle. If you are to use burdizzo, apply at 3 months of age.

- **Oral drenching (strategic deworming):**

This approach to control of internal worms takes advantage of the knowledge and biology (lifecycle) of the parasites and the environment. Basing on the epidemiology and biology a strict strategic plan in the year is developed.

So what is strategic deworming? Simply means giving dewormers to goats at well planned times /seasons of the calendar year. The animals are dewormed especially at the start of the dry period and preferably before the start of prolonged rainy season to remove persisting hypobiotic larvae whose development could pause a future threat. The drenching is done using the drenching gun

and much emphasize is on accurate body weight measurement. Otherwise, you risk overdose which could translate into death. Another care is during dosing avoided pulling the tongue as this predisposes to chocking and death when the oaesopagus is temporary closed and the dewormers is headed to the lungs.

- **Dehorning:**

More often horned animals inflict injuries to others by goring or during fights especially at time of eating. Further, horned animals could also harm the workers especially the aggressive type. Although the presence of horns is advantages during animal restraint; dehorning is a routine practice to many farms. In goats, dehorning can be done at early age (4 days) by removal of buds using a caustic agent. The use of hot iron in disbudding is increasingly discouraged. However, more often dehorning is done in older goats above a month using of saw and cauterization using hot iron. The process of dehorning is painful and can lead to shock or death, however, could use anesthesia.

- **Identification:**

This procedure augments effective recording of animals on the farm. It involves giving animals marks using numbers (ear tag) using tag applicator. However, some people may use suitable collars and bands (neck bands or leg bands). Although the bands are not commonly used because can fall off easily.

- **Weight estimation:**

Weight measurement is a pre-requisite for monitoring nutrition and animal health care. However, it is good practice to know the weights for easy drenching to avoid overdose. Further, for market selection grading based on weight and body conformation is also crucial. Normally girth width measurement approach is preferred for weight estimation for purposes of treatment and drenching. The important weights taken are birth weight for proper feeding, growth weight and slaughter weight.

- **Hoof trimming**:

Hoof growth is a common which results into poor health associated with laminitis. Laminitis causes pain and difficult movement reducing the animal performance. Therefore, trimming of overgrown hooves using hoof trimmer and hoof knife to remove surplus wall horn is commonly practiced. This practice keeps the hooves short to the same height and in good condition.

- **Physical dressing and treatment**:

This approach applies to dressing of wounds and dislocations. Normally feedlots are encountered with physical injuries which lead to wound and dislocations. Besides, the routine practices like castration and dehorning could cause wounds that require dressing and treatment. The wound are dressed using topical and injectable antibiotics, hydrogen peroxides and antiseptics. After you can dress wound with bandage and gauze. However, cases of dislocation and incomplete fractures plaster of parice (POP) may be used to immobilize the affected site.

- **Ageing:**

This is a common practice to ascertain the age of animals especially incoming or procured for stocking at the farm. Various methods can be used, namely; dentition, use of records. Let us focus on dentition approach. The dental formula and structure estimates the age of animals premised on the fact that temporary teeth (delicious teeth) are replaced by permanent type after certain period. However, wearing is also common as age advances. Goat's age is determined using the four pair of incisor teeth on the lower. Ageing is assessed based on the following criterion:

- ✓ Less than a year-No permanent teeth
- ✓ Yearling to 2 years old- a pair of permanent teeth
- ✓ 2-3years- two pairs of permanent teeth
- ✓ 3-4years-Three pair of permanent teeth
- ✓ 4-5years- All permanent
- ✓ 5-above-permanent teeth wearing out

- **Vaccinations:**

The control of economically important diseases such as Foot and mouth disease, Caprine Contagious Pleuropneumonia, Rift Valley Fever, Anthrax, Black quarter name it requires regular vaccinations. This is normally done annually and in cases where a booster dose ie required during incursion.

- **Dipping and spraying of animals:**

Prevention and control of vector borne disease on ranches is achievable through regular dipping or spraying of animals with acaricides. Most of the diseases namely vector borne diseases such as Heart water, Rift valley fever and Trypanosomosis strike especially when there is laxicity in the vector control.

- **Biosecurity measures:**

It is equally important that effective proactive biosecurity measures are in place to control entry and spread of pathogens on the farm-non specific pro-biosecurity to counter multiple sources of pathogens. This is done through establishment of bath containing disinfectants at the entrance into the farm to cleanse the vehicle tires, veterinary personels and other visitor before allowed in. A disease like Foot and mouth disease strict bio-security is recommended.

12. COMMON DISEASES AND PARASITES OF GOATS

To assess level of awareness and knowledge about diseases signs and ground leveling or determine how to pitch the session, the question was asked

- ***What signs are noticed in sick goats?***

Participants listed the following clinical signs:

- ✓ Animal become dull, weak and lags behind the rest in the flock
- ✓ Unthrifty
- ✓ Fever
- ✓ Failing to eat or loss of appetite
- ✓ Diarrhoea
- ✓ Swollen udder and no milk
- ✓ Discharge from eyes, nose, mouth, vulva
- ✓ Anaemic-paleness of membranes
- ✓ Loss of body condition
- ✓ Swollen stomach
- ✓ Standing hair and rough coat
- ✓ Swelling of the body
- ✓ Hair dropping off
- ✓ Reduced milk production
- ✓ Lameness
- ✓ Pot bellied
- ✓ Lumps/nodules lesions on skin
- ✓ Drooping ears and nasal discharge
- ✓ Wound around the muzzle
- ✓ Abortion

- ***What are the signs of healthy goat?***
  - ✓ Coat is shiny and smooth
  - ✓ Eyes are bright
  - ✓ Very alert and active
  - ✓ Moves with ease
  - ✓ Chew curd
  - ✓ Pass normal feaces and urine
  - ✓ Breathes normally
  - ✓ No fever (temperature)

This implies that participants could easily detect the abnormality and report to veterinarians for health evaluation.

The important diseases/ conditions and parasites in goat production are as illustrated in table 1 below:

Table 1 Common diseases/conditions, causative agents/vectors and signs

Name of disease	**Causative agent/vector**	**Signs**	**Prevention and control**
Peste Des Petits Ruminants(PPR)	Virus	Fouls smelling haemorrhagic diarrhoea, discharge around mouth, open mouthed breathing, crusting around mouth and eyes, fever, dullness, cough	Treatment with antibiotics, vaccinations, restrict animal movement, biosecurity, disinfection of all materials in contact and vaccination
Orf	Virus	Wounds on muzzle/lips and rushes around the nose, inability to eat, fever	Use antiseptics, treatment with antibiotics, restrict animal movement and vaccination
Goat pox	Virus	Pox lesions on lips, mouth, udder, teats	Vaccinations, treatment with antibiotics, restrict animal movements, use antiseptics
Heart water	Parasite (*Cowdria ruminatium)*Sp	Moves in circles, rapid breathing, loss of appetite, fever, trembling muscle, nervous	Regular tick control by spraying, Treatment with antibiotics

	otted tick	twitching of limbs and head, circling movement and stiff neck	
Foot and mouth disease	Virus	Lameness, wounds on muzzle and hooves/coronate, fever, inappetance	Regular vaccination, Biosecurity, restrict animal movements, treatment with antibiotics
Sudden death	Poisonous plants Bacteria like clostridial organisms Eating to much grains	Waterly diarrhoea Sudden death Swollen abdomen	Use proper feed stuff, Avoid use of much concentrates/grains, proper pasture management
Abortion	Bacteria/infectious diseases that cause fever Poison Trauma Stress/disturbance Poor nutrition	Hanging placenta Death foetus comes out Virginal discharge	Use proper feedstuff, Control vectors by spraying, balanced diets, regular vaccinations against infectious diseases
Brucellosis	Bacteria	Abortion	Vaccination and Biosecurity, culled
Mange	Skin parasites	Loss of hair Scratching Swellings on the skin	Parasite control by spraying, treatment with arvemectins, disinfection of premises
Tetanus/Lockjaw	Bacteria (spore forming bacteria in soil) which grow in wounds to	Nervous signs, muscle stiffening, dull and loss of appetite	Regular vaccinations, treatment with antibiotics, withdraw from the contaminated pastures

	produce toxins absorbed by nerves and cause disease		
Foot rot	Foreign bodies Bacteria Dirty shelter	Lameness Foul smell Loss of body condition	Good hygiene conditions, treatment with antibiotics, use antiseptics
Pneumonia	Bacteria Mycoplasma Viruses	High respiratory rate or rapid breathing, fever, Coughing Diarrhoea	Treatment with antibiotics, balanced diet, mitigate stress factors
Worms	Worms	Pot belly Standing hair Diarrhoea	Regular deworming, proper pasture management, matching age groups
Mastitis	Bacteria and fungi	Swollen udder, hot and painful, westerly and clotted milk	Good milking hygiene, treatment with antibiotics
Brucellosis	Bacteria	Abortion	Vaccinations, culled
Trypanosomosis	Trypanosoma	Loss of body weight Abortion Unthrifty	Prophylactic treatment with trypanocidal drugs, vector control
Contagious Caprine Pleuropneumonia	Mycoplasma	Difficulty breathing, high temperature, loss of appetite, cough, nasal discharge	Vaccinations , treatment with antibiotics, restrict animal movements, biosecurity
Enterotoxaemia	Bacterial toxins (clostridia), excessive energy diets, sudden change in diets, too fresh grass,	Diarrhoea Death	Provide good quality fodder, restrict use of concentrates, gradual change of diet, protein and energy balanced, treatment with antibiotics and giving enough water

	excessive nitrogenous content, low dietary fibres		
Abscess or caseous lymphadenitis	Bacteria which survive in environment(water, soil, grooming equipments, and feeders) which invade through skin and cuts in mouth	Abscess of the lympnodes which are filled with whitish caseous necroses on incision	Treatment with antibiotics after incising the abscess vertically, Isolate sick animals
Pick eye/ eye infection	Bacteria, mycoplasma, fungal Precipited by wet conditions, poor management of dung, mixing of species and overcrowding	Eyes become red and swollen, eyes become cloudy/eye opacity with discharge	Good hygiene, treatment with antibiotics and eye ointments
Plant poisoning	Poisonous plants	Diarrhoea, staggering gait respiratory problem, nervousness and excess salivation	Good pasture management, proper stocking rate
Coccidiosis	Protozoa through contaminated	Bloody diarrhea, loss of appetite	Good hygiene, proper stocking rate, treatment with anticoccidal drugs

	feeds, common in kids 3-6weeks of age		
Diarrhoea	-Worms -Coccidiosis - Enterotoxaemia -Nutritional imbalance and sudden change in diet. For all age groups	diarrhoea, loss of appetite, loss of body weight	Regular deworming, nutritional balance and treatment with anti-coccidial drugs
Lameness	FMD, Foot rot, overgrown hooves, mineral deficiency, physical injury, foot rot and novel ill, ticks	Abnormal gait, limping	Vaccination against causal diseases, treatment with antibiotics, balanced diets
Neonatal diarrhoea	Bacteria(E.coli, rotavirus, corona viruses, cryptosporidium, septiceamia due to bacteria infection) in kids from day one upto 6weeks than 2 weeks	- Smelly watery/bloody diarrhoea, weak and inappetent and sudden death of kids	Good hygiene Balanced diet Treatment with antibiotics, sulfadimidine drugs, rehydrate the animal by physiological saline, limit milk drinking
Rabies	Warm blooded	Nervous signs	Vaccinations and no treatment

	animal(infected)		
Rift valley fever	Virus vectored by mosquitoes	Yellow tinge of skin and eye mucosa, abortion and bloody diarrhoea	Vaccinations, control vectors, restrict animal movement
Dermatophytosis	*D. congolense*-bacterial spores present in environment. Precipted by dirty and wet conditions	Small papules with raised hair, hair sticking together, weeping dermatitis, crusted lesions	Avoid dumpness and treatment with antibiotics

The facilitator should be able to ask farmers to identify diseases of concern so as to help them identify risks on their farm. Thus come up with risk management strategies!

11. Disease prevention and control measure:

Some of the strategies to be adopted by farmers include:

- ✓ Strategic deworming
- ✓ Vaccinations to booster herd immunity
- ✓ Spraying to control tick borne and trypanosomosis
- ✓ Biosecurity measures (cleaning, isolation and disinfection)
- ✓ Prophylactic and curative treatments- for control of trypanosomiasis
- ✓ Vector control –use of traps
- ✓ Culling out of unproductive and chronic case ie mastitis cases
- ✓ Control of animal movement especially for infectious diseases ie FMD
- ✓ Gradual change of diets
- ✓ Routine management practices like hoof trimming to avoid overgrown hooves

11. NUTRITION

It is acknowledged that the adult size of a particular goat is a product of its breed (genetic potential) and its diet while growing (nutritional potential). Thus nutrition is a very crucial aspect of proper management of improved goat and it involves balanced feeding

- ***Why balanced feeding?***

Good nutrition is a pre-requisite for good health, reproduction/fertility, production (milk/meat) and faster growth rate. The profitability of the goat enterprise is a function of production cost and animal performance. Thus, knowledge of low cost nutrition/feeding using the natural feed stuff is key for profitable goat production.

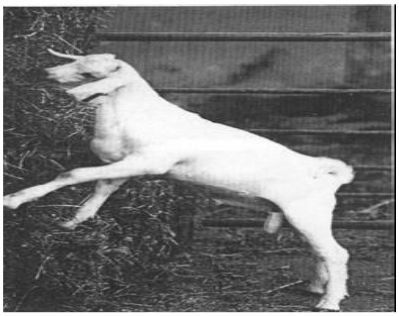
- **What are the basic nutrients for goats?**
  - ✓ Carbohydrates- energy giving food
  - ✓ Proteins-body building foods
  - ✓ Fats-concentrated forms of energy giving foods
  - ✓ Vitamins-protects body from infections
  - ✓ Minerals-builds body health and strengthens body structure
  - ✓ Water-the medium in which all body function takes place
- **Why provide these nutrients?**
  - ✓ Growth and production of milk and meat
  - ✓ Maintenance of the body
  - ✓ Reproduction

12. What are the sources of nutrients for goats (classification of feeds)?

- ✓ Natural pastures and forage legumes
- ✓ Residues (kitchen residue, field left over or crop residues)
- ✓ Concentrates valued for energy and proteins
- ✓ Succulent fodder ie root crops like sweet potato, banana peelings
- ✓ Agro-industrial by-products (cotton seedcake, brewer's grain, cereal milling by-products ie maize bran and rice bran, molasses)
- ✓ Conserved forage(hay and silage)

13. Feeding behaviour of goats and feed requirement

Generally goats eat almost everything. However, they are herbivores and efficient browsers not grazers like cattle and sheep, selective and prefer eating tips of brushy plants along with some other woody shrubs and weedy plants found on the ranges not normally eaten by other domestic livestock. They are curious in nature, thus chew on and taste just about anything remotely resembling plant matters to decide whether it is good to eat.



Galla goat browsing

Thus it is important to feed goats on mixed feeds such as legumes, grasses, shrubs, tree leaves, weeds and crop residues. Goats eat nothing that is dirty (soiled feed and contaminated water) or foul smelling and dislike wet, stale or trampled fodder unless facing starvation. Thus feed them in hay-racks or hang the feeds in bundle from a peg in the wall or from a branch of a tree.

They are ruminants and are able to digest a large variety of fibre and roughage. The nutrient requirements of goats are determined by age, sex, breed, production system (dairy or meat), body size, climate and physiological stage.

Feeding strategies should be able to meet energy, protein, mineral, and vitamin needs depending on the condition of the goats.

The daily feed intake for goats is between 2-4% of body weight as expressed (dry matter/head/day); Indigenous breed 2-3%DM and the Exotic 3-4% DM. They have preference for leguminous forage. The daily feed intake is influenced by body weight, % of dry matter in the feeds eaten (12-35% in forages, 86-92% in hays and concentrates), palatability, and physiological stage of the goats (growth, pregnancy, and lactation).

It is important to note that digestive physiology of young kids is essentially the same as monogastric animals. Milk digestion begins in abomasum, milk having bypassed the rumen via

closure of reticulo-oesophangeal groove during suckling. Thus you need to gradually let the kids nibble solid feed/roughage after 3weeks on wards to stimulate rumen development.

- **Emerging smart feeding technologies for goats (ruminants)**

A technology has been developed for making "densified total mixed ration blocks" that combine straw, oil seed meals and nutrients. For instance NaLIRI-Tororo provides a *Multi-nutrient block* for balanced ration in ruminants. This technology can also be effective in rural communities without access to commercial supplements. This results in higher animal productivity and is also expected to decrease emission of environment pollutants per unit of animal product formation

- **Alternative feed sources**

The quest for alternative/additional food and feed ingredients is of paramount importance, mainly because of the global demand for grains, which has exceeded the production and the stiff competition between man and the livestock industry with the existing food and feeds. There are several promising new feed resources, including cassava residue, sweet sorghum residue, seed meals from palm kernel meal.

14. Pasture establishment

- **Establishment of pasture**

  In addition to food-crop-based feed systems common is many rural communities in Uganda, establishment of locally adapted forage plants, preferably legumes; and disease tolerant and nutritious pasture cultivars with proper management of grazing land, for example rotation grazing need particular attention. However, fodder trees could also be used for cut and carry feeding system which is handy in communities with limited land.