



Community-Based Conservation Group

# Goat training manual

*Genetic Resources: Farm Animal Genetic Resources*



agriculture,  
forestry & fisheries

Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA



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*Genetic Resources: Farm Animal Genetic Resources*

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# 1. CONSERVATION OF FARM ANIMAL GENETIC RESOURCES (FANGR)

Farm animal genetic resources refer to genetic materials from farm animals (e.g. cattle, sheep, goats and poultry, etc.) that are used or maybe used for breeding purposes, for production of food and agriculture. These are materials that contain functional unit of heredity which includes live animals, semen, oocytes, embryos, tissues, somatic cells and DNA. The reason why indigenous farm animal genetic resources are important:

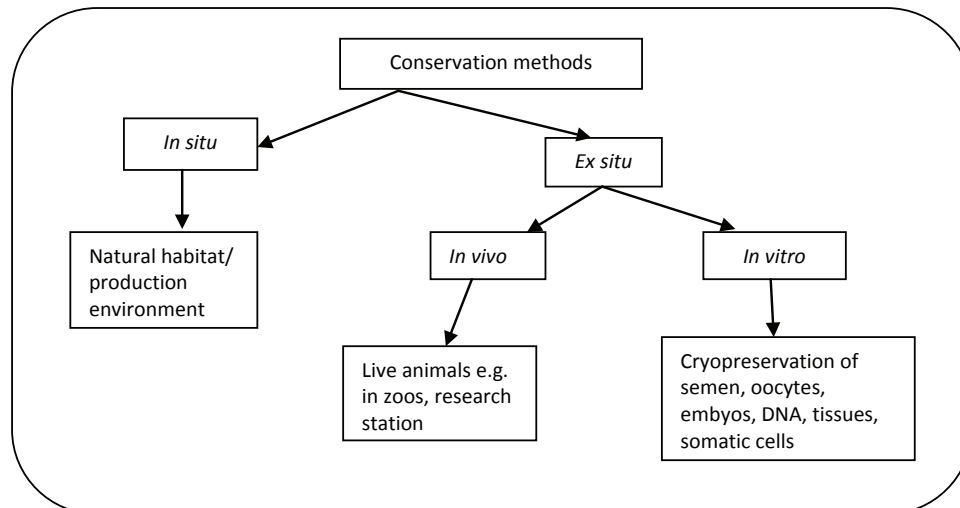
- They carry genes that enable them to adapt/tolerate harsh environments
- Can cope with thorny vegetation in drought-prone areas
- Can walk long distances,
- They are tolerant and/or resilient to diseases and parasites

However, over the years, high output producing exotic breeds have been given more attention than the local and adapted breeds. Due to climate change, the arid and semi-arid regions have been reported to be severely affected by drought and under such conditions; indigenous animals have more competitive advantages over the exotic ones.

## 1.1 What is conservation of AnGR?

It refers to action undertaken to ensure that the diversity of farm animal genetic material is being maintained for contribution to food production, agricultural production and productivity through planning, strategies and policies for future purposes. Effective conservation of genetic resources is possible only if the breeds are identified and documented adequately, and there is a full participation towards conservation efforts of communities keeping the animals. There are basically two methods to conserve AnGR and they are in situ and ex situ conservation methods.

The figure below summarises the two ways of conserving AnGR



## 1.2 Reasons for conserving FAnGR

Reasons for conserving FAnGR as indicated in literature, vary between situations, for example, agro-ecosystems, farming system, species, breeds, as a result, reasons for conservation include, but are not limited to the following:

- To meet present socio-economic demand (FAnGR are a source of income for poor rural communities, losing them will be detrimental to their livelihoods).
- Insurance against future changes in production circumstances.
- For cultural and historical reasons (Cultural and historical values of most communities are reflected by the type of breeds they keep, therefore, conserving them is necessary to maintain their identity.)
- Opportunities to meet future demands.
- Regenerating population after disease outbreaks.
- Rescuing rare or endangered species or breeds.
- Providing a source of genetic material for research purposes.
- Supplying germplasm for the development of new breeds.
- Maintaining indigenous livestock gene pool diversity
- To fulfil the rights of an existing genetic resource to continue to exist.

## 2. GENERAL MANAGEMENT OF GOATS

There are different types of goats in South Africa ranging from unimproved indigenous types to well-defined and established improved indigenous breeds types and the recognised exotic goat breeds. Goats in South Africa are found in intensive, semi-intensive and extensive production systems, with large percentages of goats found in the extensive production system, particularly in rural communities under communal production system. Below are some of the goat pictures for differentiation.

### Meat goat breeds



**Indigenous goats** from Mara Research Station, Limpopo province



**Savanna goat**  
boerboksa.co.za



**Boer goats**  
www.boergoats.co.za



**Kalahari Red goat**  
Kalaharired.webmeester.co.za



**Milk breed: Saanen goat**  
Nationalsaanenbreeders.com



**Milk breed: Saanen goat**  
Nationalsaanenbreeders.com



**Mohair breed: Angora goat**  
www.angoragoat.com

### 2.1 Housing

Goats require good housing that will protect them from harsh environmental conditions. The house should also provide adequate ventilation and hygiene, opportunity for better feeding and breeding.



Types of goat houses

Goat housing over ground



www.pinterest.com



www.joygoats.org.uk



www.motherearthnews.com

Goat housing over pole



www.roysfarm.com



www.motherearthnews.com

2.2 Nutrition and feeding

Goats, like other animal species, require nutrients for body maintenance, growth and reproduction. The availability of forage does not always meet the nutrient requirements of the animals due to seasonal availability of feed resources, poor management, inappropriate grazing management, rangelands fires and droughts.

Supplements provide nutrients that are deficient in natural veld or browse. Supplements can be in powder form, often called licks, meal (such as HPC) or blocks. Ready mixed commercial supplements are available.

Kids must receive colostrum soon after birth because the percentages of antibodies and nutrients found in colostrum decreases 48 hours after birth. Colostrum contains high content of energy, vitamins, minerals and antibodies that helps the kids to fight and resist infections/diseases.

**Note: Farmers/producers must consult with animal nutritionist all the time in order to purchase the correct supplements. Animals must be introduced slowly to feed supplements and enough roughage must be provided at all times.**

Use of body condition scoring to guide on nutrition

- Body condition score (BCS) is the reflection of good nutrition and hence adequate body tissue for normal functioning of the body.

Table 1 Body condition scoring

BCS1: Very thin	BCS2: Thin	BCS3: Moderately lean	BCS4: Moderately fat	BCS5: Very fat
				

www.articles.extension.org

- How to prevent loss of condition in animals during the dry season:
  - > Grass can be cut or leaves harvested and stored to give the goats during the winter months when feed is scarce. It must be dry when stored to prevent mould.
  - > Conserved feeds, usually hay are fed in winter
  - > Crop residues are grazed or processed for winter feeding. Feedstuffs such as maize stalks need to be chopped and adding molasses to them so that they are acceptable to goats.

- > Winter fodder crops are established, which can be grazed during winter
- Other options to consider during drought
  - > Selling goats, particularly old and unproductive
  - > Early weaning
  - > Feedlotting

## 2.3 Animal identification and record keeping

### 2.3.1 ANIMAL IDENTIFICATION

According to the Animal Identification Act (Act No. 6 of 2002) all livestock must be marked or identified. Each livestock owner must have their own identification mark with unique identification code. The code will be the one that the producer uses when tattooing. Tattooing is considered to be the safest and lawful way of identifying goats so far especially when your goats are lost or stolen and are found. A disadvantage about this method is that one can cut off the tattooed ears. Other methods of identifying animals such as ear tagging and ear notching can be used together with tattooing.

#### 2.3.1.1 Tattooing

How to tattoo goats:

- Clean the inner part of the ear lobe thoroughly so that the ink can easily fill the holes made by the tattoo pliers.
- Apply or smear the tattoo ink on the area to be tattooed.
- Make sure that the sequence of the tattooing characters is correct according to the certificate of registration.
- Press the tattooing pliers until holes appear on the skin and then release.
- Rub the ink in to the holes.
- The excess ink can be cleaned and the characters should be easily readable as black dots in the ear.



Tattooing tools



Cleaning ear before tattooing



Applying tattoo ink



Tattooing

[www.premier1supplies.com](http://www.premier1supplies.com)

### 2.3.2 RECORD KEEPING

Record keeping helps to identify which animals should be kept as replacements for breeding purpose or should be kept in or culled from the breeding herd, in documenting pedigrees (relationships), in marketing animals for a premium price, to monitor the progress of the project (profit/losses) and generally helps in decision-making. Record keeping begins with individual animal identification.

Below are the examples of records:

Examples of basic records											
<b>Kid record</b>											
Kid ID	sex	Date of birth	Doe ID	Buck ID	Birth type	Birth weight	Date of weaning	Weaning weight	Date of death	Any observed causes/symptoms of disease	
<b>Health record</b>											
Animal ID	Date	Clinical signs	Diagnosis	Treatment plan	Duration of treatment	Dosage/Route of administration		Animal recovered (Yes or No)			
<b>Doe and buck record</b>											
Doe ID		Doe Date of death		Any observed causes/symptoms of disease			Buck ID		Buck Date of death		Any observed causes/symptoms of disease
<b>Cull record</b>											
Animal ID		Date culled		Breed		Age		Sex	Reason for culling		Method of disposal
<b>Animal sale</b>											
Animal ID		Breed		Sex	Value of goat		Sold price	Date of sale		Buyer	

## 2.4 Breeding and selection

Breeding is the purposeful mating of male and female animals to improve certain characteristics in the progeny and it must be goal-driven. Breeding can be done by pure breeding or crossbreeding.

Selection is the process whereby certain individuals are chosen for use as breeding animals for a certain period. Selection is an important decision that a farmer takes, because the effect of selected animals remains in the herd or flock for many years. Animals are selected from the new kid crop for breeding purpose. Selection can be done through:

- Natural selection – adaptation and survival
- Artificial selection – by man
  - > Visual appraisal/appearance
  - > Pedigree recorded information
  - > Performance recorded information
  - > Combination of the above

### 2.4.1 BREEDING OBJECTIVES AND SELECTION CRITERIA

Breeding objectives refers to decisions as to which traits the livestock keeper wants to improve, maintain or introduce in their herds or flocks. The breeding objectives are achieved through selection criteria. The selection criteria refer to the traits actually used in the selection of an animal.

Table 2 Examples of breeding objectives and selection criteria

Breeding objectives	Milk production	Meat production	Fertility
Selection criteria	Milk yield Udder conformation Body capacity	Weaning weight Yearling weight 18 month weight Growth rate	Scrotal Kidding interval Age at first kidding

### 2.4.2 SELECTION OF BREEDING BUCK

Buck contributes more to genetic improvement in a herd as one buck can serve a number of females in a herd. Selection of inferior breeding buck means increase in number of poor quality animals. Buck can be selected at weaning (3 to 4 months of age) using weaning weight, using post-weaning growth evaluation at 6 to 8 months of age. The buck should be replaced in the herd or flock every three years to prevent inbreeding and to make genetic improvements in the breeding stock. The following are examples of structural characteristics that can also be looked at when selecting a buck:

- Masculinity
- Standard buck/ram vocalisation
- Uniform pair of testes and a fine sheath
- Large scrotum circumference

### 2.4.3 SELECTION OF BREEDING DOE

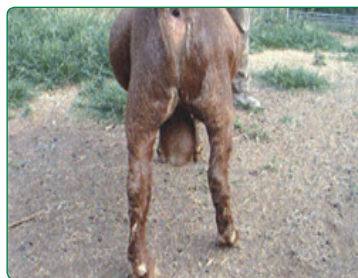
Selection of the replacement females is based on weaning weight and the development of the female (average daily gains). Further selection is done when the female is ready to breed. At this stage she must show signs of oestrus and become pregnant at first mating. The final selection is made after the female has weaned its first kid. The following are examples of structural characteristics to be considered when selecting a doe:

- She must be feminine
- She must be fertile
- Good milk production
- Well structured udder with two functional teats
- Large body capacity and volume (associated with ability to breed, carry and rear kids and good milk production)

Below are pictures of structural characteristics



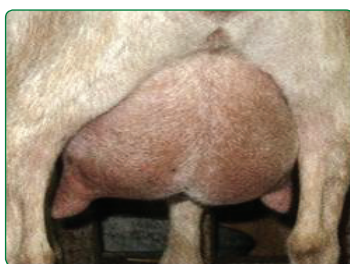
Buck with excessive scrotal split articles.  
articles.extension.org



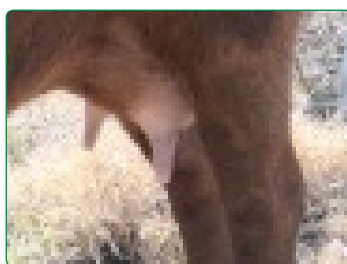
Buck with firm mobile testicles in the scrotal sac  
www.aces.edu/pubs/docs



Buck with firm mobile testicles in the scrotal sac  
www.aces.edu/pubs/docs



Well formed attached udder articles.  
extension.org



Well structured teats  
www.jackmauldin.com.

### 2.4.4 SELECTION THROUGH PEDIGREE AND PERFORMANCE RECORDED INFORMATION

- For basic records refer to record keeping in 2.4.2.

### 2.4.5 CULLING OF ANIMALS

This is the removal of animals from a breeding flock or herd. Organized data collection and record keeping (refer to 2.4.2) are required and individual animals must be identified. Animals can be culled due to several reasons. General reasons for culling include:

- > Low production or reproduction levels

- > Unproductive animals
- > Genetic defects or pre-disposition to disease
- > Physical problems
- > Disease – decrease the amount of sub-clinical diseases and chronically ill animals
- > Age – old, thin animals that no longer eat well

#### 2.4.6 BREEDING SEASON

In general, goat production in communal area is of free ranging goats. Mating occurs throughout the year. Kids are born anytime. However; free ranging results in kids dropping throughout the year, makes management, recording and strategic feeding of doe's impossible or difficult and it also means that the farmer needs to keep the buck in good condition all year round.

#### 2.4.7 CASTRATION OF MALE KIDS

It is the removal or destruction of the testes, epididymis and a portion of each spermatic cord from a buck. Castration should ideally be done at less than three weeks of age.

The importance of castrating male kids:

- To maintain and control the breeding programme
- To successfully carry out breed improvement
- To improve on farm safety for animals and handlers because castrated buck is usually less aggressive and easier to manage.
- To lessen goat smell: meat from castrated male has less smell than tainted odour in the meat from intact bucks.
- For improvement of carcass composition and weight development.

**Note: It is important to let an experienced animal health practitioner show you how to do the castrations correctly before you do it yourself.**

Holding and controlling kid goats for castration



Restraining [www.infovets.com](http://www.infovets.com)



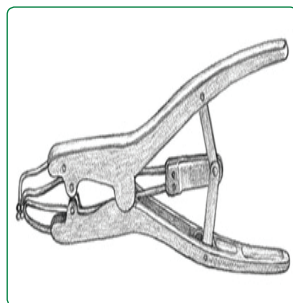
Restraining and positioning the testicles [www.4h.ansci.cornell.edu](http://www.4h.ansci.cornell.edu)

Methods and tools that can be used to castrate male kids

##### Elastrator method



Rubber rings



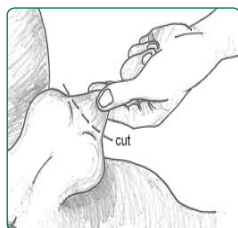
Elastrator



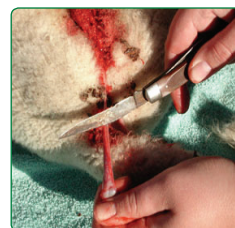
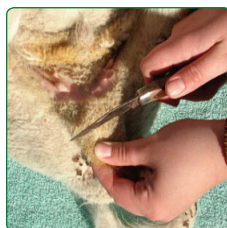
### Knife method



Touching the testicles



Opening the scrotum sac



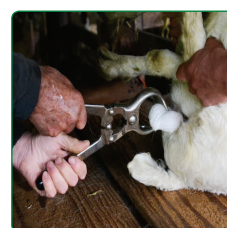
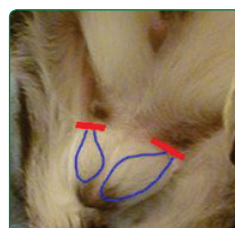
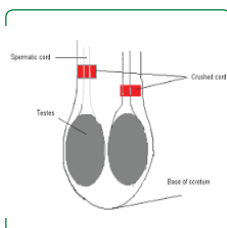
Pushing out the testicles



Cutting the cord

Source: [www.infovets.com](http://www.infovets.com)

### Burdizzo/emasculator method



Source: [www.infovets.com](http://www.infovets.com)

## 2.6 General health management

### 2.6.1 COMMON PROBLEMS OR DISEASES

There are a number of common problems and diseases that affect goats. Common problems and diseases are listed in Table 3 and 4 but are not limited to those listed in the tables. It means that this section does not cover all diseases and problems affecting goats.

Table 3 Common diseases affecting goats

Common diseases	Symptoms	Prevention/control	Treatment
<p><b>Heartwater:</b></p> <p>This is a tickborne disease. The organisms that cause heartwater are called Ehrlichia ruminantium. The organisms are transmitted by Bont ticks, which are mainly found in hot, dry bush areas. Heartwater can result in death within 24 hours, but some cases survive two to five days</p>	<p>High temperature and nervous signs which include high stepping jerky gait, shivering, walking in circles. Later, jerky, paddling movements with the legs and the head pulled backwards when the animal goes down. The dead animal's post mortem will show excessive fluid in the heart sac, lungs, chest cavity and abdominal cavity</p>	<p>To prevent heartwater, try to maintain the animals' immunity by letting a small number of ticks stay on the animals all the time. However, when there are visibly many ticks on the goats, dipping about once a month may be necessary. For vaccination, animal health practitioners must be consulted</p>	<p>Treat the animal early before nervous symptoms show</p> <p>Use oxytetracyclines products</p>
<p><b>Pulpy kidney: (Enterotoxaemia)</b></p> <p>This disease is caused by bacteria that often exist within the animal's intestine but only causes disease symptoms under certain circumstances such as a change of grazing, exhaustion, sudden dietary changes and dosing with dewormers</p>	<p>Symptoms are sudden and may include exhaustion, paralysis and a loss of consciousness and may have laboured breathing, salivation and diarrhoea or have nervous symptoms with convulsions, accompanied by salivation, grinding of teeth and muscle twitches until death.</p> <p>The carcass decomposes quickly and post mortem shows haemorrhages on the heart and blood under the skin in the neck region, the lungs may contain excessive amounts of blood and the heart sac may contain fluid, the kidneys may appear enlarged, dark red or pale brown and decomposed and may contain large amounts of blood</p>	<p>Effective vaccines are available. It is advisable to vaccinate before deworming animals</p>	<p>Treatment is always too late due to sudden appearance of symptoms and death. Focus on prevention (vaccination)</p>

Common diseases	Symptoms	Prevention/control	Treatment
<p><b>Blue tongue:</b></p> <p>This disease is caused by a virus that is transmitted by midges, which are most found in warm and wet conditions</p>	Fever and/or high temperature, tongue and gum ulcers, blue tongue	Use of midges repellent, Vaccination is available - consult animal health practitioners	Animals with blue tongue disease are susceptible to pneumonia and they must be treated. Use oxytetracyclines products only if indicated Bluetongue is a Notifiable animal disease and must be reported to either an animal health technician or a state veterinarian
<p><b>Infectious pneumonia:</b></p> <p>This disease is caused by bacteria/ viruses and is likely to occur when animals are under stress and in dirty pens or kraals</p>	Fever, lack of appetite, difficulty breathing, coughing, loss of condition and discharge from the nose. The dead animal shows firm and/or red patchy lungs	Keep pens or kraals clean Reduction of stress Vaccination for some agents is possible Consult with animal health practitioners	Use of an appropriate antibiotic if required and anti-inflammatory products. Ideally consult with animal health practitioners before treating to help identify the cause
<p><b>Mastitis:</b></p> <p>It is a bacterial infection of the udder. The udder can be infected through poor hygiene or injuries to the udder/ teats</p> <p><b>Coccidiosis:</b></p> <p>This disease mainly affects young animals (kids). It is caused by an organism known as coccidia. Older animals do become infected. However, due to developed immunity, clinical signs do not show. Older animals are normally the source of infection for the younger animals as they are carriers of the diseases. It attacks and destroys the mucus of the intestine which leads to animals having diarrhoea and an inflamed intestinal lining</p>	<p>The udder is inflated, hard and hot to touch, producing either a brownish watery fluid or watery milk containing white or yellow clots or pus</p> <p>Short period of diarrhoea and then animals quickly dying. Diarrhoea (may be bloody or contain mucus and be brown, yellow or greenish in colour), dehydration, anaemia, lack of appetite, loss of condition, rectal straining (this may lead to prolapse), a rough hair coat. The post mortem of a dead animal may show tiny, greyish white spots in the mucous membrane of the small intestine. Guts filled with fluid and blood</p>	<p>Hygiene is very important. Consult with animal health practitioners</p> <p>Avoid overcrowding, dirty and/or wet pens, kraals and unclean water and contaminated feeds Coccidiostats such as Rumensin can be fed as indicated Consult with animal health practitioners</p>	<p>Use an appropriate antibiotic. Consult with animal health practitioners to help identify the cause.</p> <p>By injection or through intra-mammary directly into the udder via teats</p> <p>Where there are outbreaks, treat all females and kids with remedy for coccidiosis. Keep the animals hydrated. Consult with animal health practitioners. Can be treated with antibiotics or ionophores</p>

**Note: It is important to read the product label for dosage and instructions before administering any medication, wear protective clothing when handling animals (e.g. during treatment or vaccination) and disinfect equipments that are reusable. For prevention and treatment of diseases and conditions always consult animal health technicians and veterinarians.**

Controlled animal diseases in goats:

- Any disease that is not known to occur in South Africa (e.g. Peste de Pestis Ruminants, Contagious Caprine Pleuropneumonia)
- Anthrax (zoonotic)
- Brucellosis (zoonotic)
- Foot and Mouth Disease
- Johne's Disease
- Rabies (zoonotic)
- Rinderpest
- Tuberculosis (zoonotic)
- Bluetongue (notifiable, not controlled)
- Rift Valley Fever (notifiable, not controlled, zoonotic)
- **If any of the above conditions are suspected or confirmed, it must be reported to the local Animal Health Technician or State Veterinarian.**

Table 4 Common problems and /or conditions affecting goats

Common problems/conditions	Symptoms	Prevention	Treatment
<p><b>Abortion:</b> This is the result of a disturbance in the functioning of afterbirth (placenta) or birth of the foetus before the expected normal kidding time. This can most frequently be caused by infections (e.g. enzootic abortion or Chlamydia, brucellosis) or non-infections (e.g. starvation or malnutrition)</p>	<p>Abnormal foetus or normal foetus delivered preterm (dead)</p>	<p><b>Enzootic abortion:</b> Vaccination is possible. Starvation or malnutrition: adequate nutrition is important in avoiding unnecessary stress such as transporting heavily pregnant does. Genetic abnormalities, endocrine disturbances or chronic infection: culling is recommended  <b>NB: if possible, take the aborted foetus and blood samples from goats to veterinary laboratory as soon as possible to identify the organism causing abortion. Clean your hands properly after handling aborted foetus and wear protective clothing all the time</b></p>	<p><b>Enzootic abortion:</b> Treatment is not practical and it is cost prohibitive.  <b>Brucellosis:</b> It is a controlled animal disease and must be reported to either an animal health technician or a state veterinarian. It may infect humans as well (zoonotic disease)</p>
<p><b>Scour or diarrhoea:</b> This is a condition in which the droppings of animals usually become soft, watery and smelly. This condition can be a symptom of a disease. It can be caused by several factors which include but not limited to the following: coccidiosis, colibacillosis, worms, poisonous plants or sudden change of diet (high concentrates or low roughage diet)</p>	<p>The droppings of animals usually become soft, watery and smelly which can be smooth and yellow, smooth and white, whitish with lumps of thin skin in it, red or brown diarrhoea (which may indicate blood in it)</p>	<p><b>Worms:</b> Regular treatment will prevent diarrhoea caused by worms.  <b>Diet:</b> Slow introduction of diet, avoid sudden changes, poor quality or excessive concentrates. Coccidiosis can be treated or prevented with antibiotics or ionophores. Ewes and does can be vaccinated against colibacillosis to protect their lambs/kids. Consult your animal health practitioner to help determine the cause of the diarrhoea</p>	<p>It is important to give sick animals sufficient water and electrolytes to prevent them from dying of dehydration (a mix of one spoon salt, 8 spoons sugar in one litre of clean, luke-warm water). Coccidiosis can be treated with antibiotics or ionophores. Colibacillosis can be treated with antibiotics. Only when there is blood in the diarrhoea, may you consider you inject with a long acting anti-biotic or give a dose of terramycin powder mixed with water. Consult your animal health practitioner regarding treatment</p>
<p><b>Abscess:</b> This is a swelling due to accumulated pus inside the thick wall capsule. This is caused by bacteria entering the wound or injury caused by ticks, grass seeds or thorns</p>	<p>Hot, red swelling and painful to touch. Middle soft spot and falling hair when swelling is at the bursting point</p>	<p><b>Tick control:</b> If an animal is affected badly and gets affected more often, culling is recommended Corynebacterium may be vaccinated for. Note that this organism is very contagious and may cause abscesses to spread (through equipment and facilities) within a herd</p>	<p>Cut, open and drain the abscess when it softens. Then syringe warm (boiled and cooled) water with a lot of salt init (1 tablespoon of salt in a cup of water) or iodine into the wound. Spray daily with a wound aerosol. The wound must be kept opened and it must be flushed daily with warm (boiled and cooled) salt water to remove pus. Clean and disinfect the syringe after each use. The goat can also be injected with an antibiotic if it shows other signs of illness. Consult with your animal health practitioner  <b>NB: Bury or burn the material used to wipe the pus to prevent the spread of infection to other animals and people</b></p>
<p><b>Orf:</b> This is a painful skin condition caused by a virus which only grows in the surface layers of the skin, but the virus will only cause an infection if the skin is already damaged. This condition can affect humans if they handle infected animals without protecting themselves</p>	<p>Wart-like sores on the animal's lips and nose and, especially around the mouth of kids and on the teats of their mothers</p>	<p>Affected goats should be kept separate to prevent the spread of the disease. Vaccination of all lambs and kids when the females have stopped lambing for the season</p>	<p>Most orf infections clear up on their own. Lubricants such as petroleum oil and glycerine or paraffin oil can be used to soften the hard scabs to make it easier for the animals to eat and use of topical antibiotic paints, powders or aerosols can help reduce the possibility of secondary bacterial infections</p>



Common problems/conditions	Symptoms	Prevention	Treatment
<p><b>Bloat:</b></p> <p>It is the condition in which gas becomes trapped in the rumen due to interference of gas release following fermentation in the rumen (or occurs when rumen gas production is higher than the rate of gas elimination). Bloat may occur when an animal grazes wet lush young pastures containing legumes or if grains (concentrates) are consumed or due to blockage of the oesophagus</p>	<p>The animal's stomach swells. It becomes uncomfortable and may lie down and cannot breathe and may die</p>	<p>Do not allow animals to graze green lucerne and clover or other plants that cause them to bloat Make sure that the lucerne is dried well and without mould before being given to animals. Animals must be introduced very slowly to wet pastures containing legumes and grains and must be given large quantities of hay. Beware of wire or plastic lying around where animals graze. Consult you animal health practitioner</p>	<p>If it is the blockage of oesophagus by feed, massage the neck, keep the animal in standing position and agitate the ruminal contents mildly.</p> <p><b>Drench:</b></p> <p>Make the goat drink cooking oil (50 ml) or bloat guard. Be careful that the animal doesn't choke – dose small amounts slowly. Do not let it lie down. If it is down, get it back on its feet and make it walk around until it has belched. If the condition does not improve, pass a small diameter rubber tube down the throat (oesophagus) and into the stomach or In severe cases stab the bulging area with sharp pointed knife to let air escape</p>

**Note: It is important to read the label for dosage and instructions before administering any medication, wear protective clothing when handling animals (e.g. During treatment or vaccination) and disinfect reusable equipments. For prevention and treatment of diseases and conditions always consult animal health technicians and veterinarians.**

### 2.6.2 INTERNAL PARASITES


Internal parasites affect goats mostly in warm, moist climates. The most common internal parasites in goats are stomach worms/roundworms (*Haemonchus contortus*, commonly called barber pole worm); liver flukes (*Fasciola hepatica*) tape worms, and intestinal parasites, the most common of which are coccidia (*Eimeria* or *Isospora*).

Control and treatment of internal parasites:


- Use of Famacha chart

The FAMACHA chart system can be used very effectively to select individual animals for treatment of haemonchosis. It is based on assessing the level of anaemia.

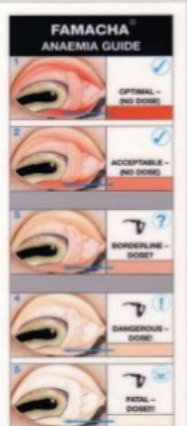
## FAMACHA© System



Look inside bottom eyelid




**FAMACHA**  
Anaemia guide  
Guide sur l'anémie  
Guide de anemia  
مخطط فقر الدم  
贫血症检查卡



**FAMACHA**  
ANAEMIA GUIDE

Clinical Category	Eye Lid Color	Packed Cell Volume/PCV	Treatment recommendation
1	Red	≥ 28	No
2	Red-Pink	23-27	No
3	Pink	18-22	?
4	Pink-White	13-17	Yes
5	White	≤ 12	Yes



Source: [www.sheepandgoat.com](http://www.sheepandgoat.com)

- Use of five-point check system

It is for targeted selective treatment of internal parasites and for expanding the utility of the FAMACHA© system.

Check Point	Observation	Possibilities
<b>1. EYE</b>	Anemia 1-5 (FAMACHA® card)	<b>Barber pole worm (<i>Haemonchus</i>)</b> Liver fluke Hook worms Other worms and causes
<b>2. BACK</b>	Body condition score 1-5 (BCS card)	<b>Brown stomach worm (<i>Teladorsagia</i>)</b> <b>Bankrupt worm (<i>Trichostrongylus</i>)</b> Nodular worm Other worms and causes
<b>3. TAIL</b>	Fecal soiling (1-5) Dag score card	<b>Brown stomach worm (<i>Teladorsagia</i>)</b> <b>Coccidia (<i>Eimeria</i>)</b> Nodular worm ( <i>Oesophagostomum</i> ) Other worms and causes
<b>4. JAW</b>	Soft swelling "Bottle jaw" 1-5	<b>Barber pole worm (<i>Haemonchus</i>)</b> <b>Coccidia (<i>Eimeria</i>)</b> Liver fluke Hook worms Other worms and causes
<b>5. NOSE</b>	Discharge 1-5	Nasal botfly Lungworms Pneumonia Other causes
<b>5. COAT</b>	Coat condition 1-3	<b>Barber pole worm (<i>Haemonchus</i>)</b> <b>Brown stomach worm (<i>Teladorsagia</i>)</b> <b>Bankrupt worm (<i>Trichostrongylus</i>)</b> <b>Coccidia (<i>Eimeria</i>)</b> External parasites Other causes

Source: [www.sheepandgoat.com](http://www.sheepandgoat.com)

- Use of worm remedies
  - > There are several remedies available for treatment of internal parasites.
  - > It is advisable to use worm remedies that treat more than one type of internal parasites to save money.
  - > Animal health technicians and veterinarians must be consulted all the time.
- Good management
  - > Keep your animals in good condition by giving them good quality feeds.
  - > Genetic selection of goats that are resistant or resilient to internal parasites is very important.
  - > Animals that are persistently affected by parasites should be culled.
  - > Contaminated feeds should be avoided and good goats housing can prevent that.
  - > Avoid grazing/pasturing in damp areas and during early morning and evening hours, when there is dew on the pasture.

### 2.6.3 EXTERNAL PARASITES

The warm and/or hot, moist climates favour the propagation of external parasites that affect goats. The most common external parasites affecting goats are ticks and mange. Other external parasites include fleas, lice and nasal bot. For control of ticks, mange, lice and fleas, dip, injectable and power products are available commercially. Lice infected animals should be separated to prevent the spreading to other goats. For nasal bot, the secondary infections must be treated with long-acting antibiotics products. The products approved for use to treat nose bots and kill all larval stages should be used. Animal health technicians and veterinarians must be consulted all the time.

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