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INDIGENOUS GOAT PRODUCTION HANDBOOK

REVISED EDITION

MDUKATSHANI
RURAL DEVELOPMENT PROJECT

Goat Agribusiness Project
KWAZULU-NATAL

HPSA
SOUTHERN AFRICA

Goat Production Handbook

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Goat Agribusiness And Community Animal Health Worker Project

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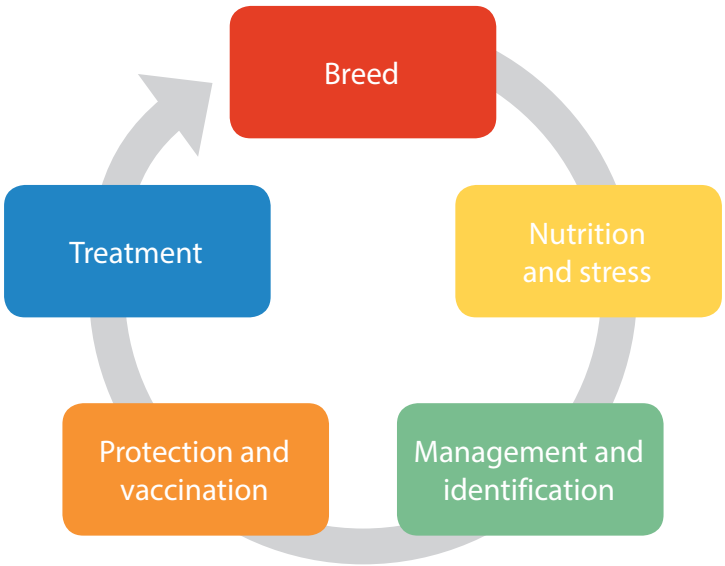
How to use this book

The aim of this book is to assist owners of indigenous goats with extensive farming systems. It looks at ways to improve the productivity of their herds. It is designed to be shared with farmers in a way that allows them to understand how to find their way through the book and how to find the information that they need. It is best if the book is used as part of a capacity building programme being implemented by extension officers and field workers.

There are further training materials to support training farmers with this book. They are available at **www.mdukatshani.com**, **www.hpsa.org.za** or **www.gapkzn.co.za**. These are training modules linked to sections in the book and and can be downloaded as pdfs for printing, or as PowerPoint presentations. These training materials reference this book's sections and pages.

The book is divided into four parts.

Part 1– Basics of keeping goats: This section covers everything a communal goat farmer needs to keep their indigenous herd healthy and productive within its current limits. This part of the book follows these five steps to a healthy goat:



1. **Breed** – breed is the most important part of having a healthy herd.
2. **Nutrition and stress** – nutrition problems often link with stress to make a goat vulnerable to diseases and parasites.
3. **Management and identification** – managing herd health, nutrition and stress give the farmer a cost-effective and efficient way of preventing disease and parasites in their herd.

4. **Protection and vaccination** – giving an animal shelter can prevent disease and stress. Vaccination is only possible for certain diseases.
5. **Treatment** – once an animal is sick, treating the disease quickly is important. Giving the right dose and the correct type of medicine or antibiotic is important.

Part 2 – Increasing productivity: This section is more focused on increasing productivity. It is for goat owners who want to invest more time and resources in managing their goats. This section covers some general management practices (including record keeping), housing and handling facilities, herd identification, nutrition and feeding, reproduction and kid rearing.

Part 3 – Commercialisation: This section is aimed at goat owners whose main aim is to market their goats. It looks at the economics of goat production, opportunities for marketing and value adding, and proper transportation of goats.

Part 4 – Value adding, tools and resources: This section covers the technical aspects of some of the interventions that have been mentioned in the rest of the book. This includes record sheet templates, the information to make your own goat weight belts, and sources of information (books and websites), as well as detailed economic analyses of various herd sizes and building instructions for dips and enclosures.

PART 1

Basics of keeping goats

1. A healthy goat

1.1 What is a healthy goat?

- It eats food in normal quantities and chews its cud
- It moves with the herd or herd of other animals
- It breathes easily and doesn't pant
- It doesn't limp or bend its back while it's standing or walking
- It doesn't have missing hair
- Its nose is slightly dry
- Its eyes and nostrils are not runny or have excessive mucous
- Its eyeballs are shiny and clear
- It has mucous membranes that are pink and not white
- It has dung and urine that are a normal colour and it urinates/defecates normally
- Its stomach is not bloated
- It does not have diarrhoea
- Its hair is smooth and shiny.

A healthy goat

A sick goat

A healthy animal is more able to resist diseases and can recover more easily when it does get sick. A sick animal costs a farmer money and time. A farmer with a sick animal has to buy medicines, syringes and needles. It is therefore better for a farmer if animals stay healthy and do not get sick.

So before we consider how to treat diseases, it is best to think about how to recognize healthy animals and how to keep them healthy.

Treatment is also more successful if it is given early, before the animal is so sick that the medicine cannot help it. This means that a farmer must be able to tell very quickly if he or she has a sick animal, what sickness it has and what he or she can do about it.

1.2 Goat breeds

A local breed has the best chance of resistance and adaptability to the diseases and the diet of the area, selecting a local breed is always the best place to start a healthy goat herd. Goat breeds can be divided into three categories:

1. **Indigenous breeds** which have been naturally selected for adaptability to harsh environments and which are generally used for meat production, but are also important for cultural purposes.

Indigenous goats in Msinga

2. **Meat breeds** which have been specifically bred for meat producing characteristics. Such breeds available in South Africa include Boer Goats, Savanna Goats and Kalahari Red Goats. It is generally accepted that they are more susceptible to disease than non-improved goats.

Boer goat (left) and Kalahari Red goat breeds

3. **Dairy breeds** which are all imported breeds and include mainly Saanen goats and Toggenburg goats. These are breeds which have been selected for milk production and are used for the production of milk and processed milk products such as cheese and yoghurt. It is generally accepted that these breeds are very susceptible to diseases and parasites.

Saanen dairy goats

1.3 Basic information of indigenous goats

Production norms for different goats are fairly variable. This user guide will focus on indigenous goats and provide some information that can guide a goat farmer and allow him or her to assess the herd's performance.

- Length of gestation period (pregnancy): 150 days (approximately 5 months)
- Birth weight: 2.5 kg
- Weaning weight (weight when kid stops suckling): 12-15 kg
- Mature mass of female: 35-40 kg
- Mature mass of rams: 45-50 kg
- Breeding age for young ewes: 1 year
- Main kidding seasons: April–June or September–December
- Ram to ewe ratio: 1 ram to 25 ewes (4 rams for every 100 ewes)
- Lifespan: 10-12 years.

2. Nutrition and stress

Nutrition problems often link with stress to make a goat vulnerable to diseases and parasites. A well-fed animal is generally a healthy animal, especially in winter when there is no or little greenery. See Section 13 for more information.

2.1 Immunity

The immune system keeps the animal healthy. All animals and people have immune systems. The job of the immune system is to fight germs that invade the animal and could cause it to get sick. The immune system is like the animal's own army, ready at all times to fight invaders that put the animal's life at risk.

The immune system is found everywhere in the animal's body. It is made up of millions of little cells that are too small for people to see with their eyes. When germs enter the animal's body, these immune cells come from all over to attack the germs. If the cells win the battle, the animal stays healthy. If they lose the battle, the animal may get sick and need treatment. The cells are produced in the bone marrow and then spread around the body in the blood.

The immune system can recognise diseases if it has fought these diseases before. With some diseases, like contagious abortion (CA), this recognition lasts the animal's whole life. With other diseases, however, the immune system can recognise the disease when it is present often but stops being able to recognise it when the animal hasn't had it for a long time. Common diseases of this kind are those that ticks cause. This is one reason why animals often get sick in early summer when there are a lot of ticks after there have been so few in winter. Once the animal's immune system is used to the ticks again, then the animal can often fight the tick diseases.

Livestock owners who come from areas where the disease heartwater occurs must be very careful about buying animals from other areas, because if they come from areas that do not have heartwater, the animals' immune systems will not recognise the disease and cannot protect them and they will get sick and may even die.

Vaccines give immunity to the animal when used in the correct way. Young animals exposed to viruses while they are suckling colostrum can also have degrees of immunity.

2.2 What causes stress in an animal?

Stress can lower immunity and thus allow diseases and parasites to infect or affect the goat's health. Stress can be caused by many factors:

- Hunger
- Thirst
- Tiredness (walking long distances)

- Cold (exposure to wind and rain or sleeping in a dirty pen)
- Pregnancy
- Change in diet
- Change in environment.

2.3 How to keep your herd healthy

One sick animal can sometimes contaminate other healthy animals and cause them to get sick too. This can also result in the sick animal getting re-infected after it has recovered.

Sometimes when a farmer has many sick animals, or a neighbour has sick animals, it means that the amount of disease in the area is very high. It is very difficult to keep individual animals healthy when there is a lot of disease around. Farmers who are aware of common diseases in their area need to think strategically about how to combat these diseases as a community rather than trying to just keep their own animals healthy.

This is also true of parasites that cause diseases, like ticks and worms. If some animals have a lot of ticks or worms, then it is difficult to stop the ticks and worms spreading to all the animals in a herd.

3. Management and identification

Managing the herd is the next best way to avoid losses. This can include keeping animals away from areas with parasites and keeping their enclosures clean. Managing parasite loads is also very important. Removing all parasites at some times of the year can make the animal more vulnerable to the parasites and death when they do infest. A sick goat in your herd needs to be separated and quarantined otherwise it will infect others.

The single biggest loss farmers report on is stock theft. Identifying the farmers' animals helps prevent stock theft and increases the chance of having an animal returned if it is stolen.

3.1 Handling your goats

The main thing to consider when handling goats is to keep them calm and prevent injuries, both of which will improve the productivity of the goats. Smallish pens and handling facilities allow for easier handling of the goats than trying to work within a camp.

When handling goats, you need to understand their natural behaviour. For example:

- They prefer to move towards light than dark
- They prefer to stay with the herd than be separated, which can distress them
- They like to follow the leader

- They tend to move in a circle in the pen around the handler
- They are easily distracted by noise
- They can become aggressive towards each other when confined and stressed
- They prefer to move in family groups
- They can jump over gates and find escape opportunities
- Standing behind the animal's shoulder will generally encourage it to move forward. If you move quickly down next to the race in the same direction to the goats, they will generally move forwards up the race
- Keep the goat upright when trimming hooves
- Try to get the goats used to being handled so that they are less stressed
- When holding a goat by the horns, hold the base of the horns and not the tips
- Work calmly and quietly with your goats.

Catching a goat correctly (above the hock) so as to not damage the leg (top picture) and holding it securely (below).

4. Protection and vaccination

Giving an animal shelter from cold, wet conditions prevents stress that can lead to disease. Dipping and deworming can help the animal fight off diseases if it is not carrying a large load of parasites. Vaccinating is the only non-natural way of making an animal resistant to disease. This has to be done before the animal is exposed to the disease.

4.1 Health interventions

If your animal is sick it could be caused by a number of things, most commonly one or a combination of the following: a viral infection, a bacterial infection, internal or external parasites or poisoning.

Observation (appearance, history, appetite, temperature, respiration and other clinical symptoms) cannot be used as the only way of identifying a disease. Overuse of antibiotics is a common and growing problem because they are used on conditions that cannot be treated effectively. Correct

antibiotics are the only effective intervention that can be used against certain conditions if used at the right dosage.

Types of agents

1. A **virus** is a small infectious agent that replicates only inside the living cells of other organisms. Viral infections in animals provoke an immune response that usually eliminates the infecting virus. Immune responses can also be produced by vaccines, which confer an artificially acquired immunity to the specific viral infection. Antibiotics have no effect on viruses.
2. **Rickettsia** organisms are small parasites often classified with bacteria that are transmitted by ticks and live in the blood stream. Example: heartwater.
3. **Bacteria** also cause sickness in animals. Bacterial infections are illnesses that occur when harmful forms of bacteria multiply inside the body. They can be treated with various types of antibiotics. These are generally split between sulphur based and cyclidine based antibiotics. Example: pneumonia. Often bacteria and viruses work together in making an animal sick, so one injects antibiotics to combat secondary infections caused by bacteria to help the goat get healthy enough to fight off the virus.
4. **Parasites** are organisms that live on or in a host and get their food from or at the expense of their host. Parasites can cause disease in goats.
5. **Protozoa** are small single celled organisms which are common in soil and dirty water. They can occur as parasites in the gut of animals and cause, for example, coccidiosis.

The most common and problematic internal parasites are worms and flukes. The most common intervention is an oral dewormer. Different dewormers are used to treat different species of worms and flukes. In order to be most effective with these, a farmer needs to be clear what worm he/she is having problems with by taking dung samples. A common problem is worms becoming resistant to many of these actives because of drenching, where a whole herd is dosed regardless of its worm load. There are some injectable solutions that can also treat worms.

The most common and problematic external parasites in goats are ticks, fleas and mange. There are a number of insecticides for these external parasites. These are often called dips. The most common are mixed with water and sprayed on the animal. Others can be poured onto an animal's back and spread through an oil based carrier to cover the whole animal. Injectable remedies are also available.

These insecticides are also classed according to the active ingredients and can be found with different brand names with the same actives. These actives also build up immunity in the target population so where they do not seem effective, farmers should get their ticks tested and change to different actives. The actives work in different ways. Some sterilise ticks. Some paralyse the mouth parts. Some stop the exoskeleton forming. Farmers need to understand tick life cycles so as to understand when they would expect to see ticks on their animals again after dipping. There are some insecticides that control both ticks and mange which are common problems with goats.

The most important step in treating an animal is checking its state.

4.1.1 Visual examination

A visual examination of the goat can recognise problem areas in the goat's health.

17-point check

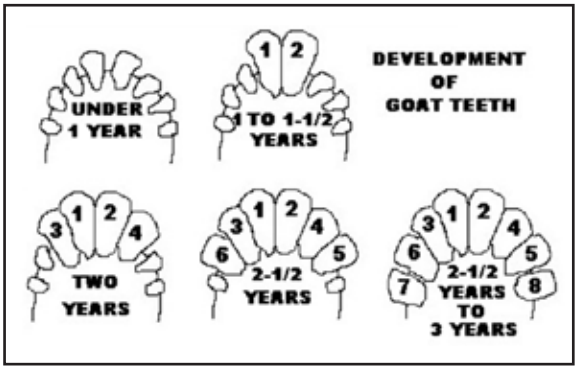
What to inspect		Look at	Looking for what	Reference
Head 	**1**	Eyes	Discharge / anaemia	8.2 & 7.1.1
	2	Nose	Discharge/snot/ moistness	6.2, 7.3.2 & 7.1.1
	3	Horns	Ticks at base of horns	7.3.1
	4	Chin	Bottle jaw	7.1.1
	5	Teeth	Age	4.1.2
	6	Ears	Ticks	7.3.1
Body 	**7**	Body/ back and sides	Lumps/abscesses/ abnormalities	8.1
	8	Look in the hair	Ticks/fleas/mange	7.3.1, 7.3.3 & 7.3.4
	9	Feel the rump	Condition of goat	4.1.3
	10	Take weight	Weight for dosage or treatment	5.2
Rear 	**11**	Look under tail	Diarrhoea/ticks	7.1.1 & 7.3.1
	12	Feel udders	Lumps/heat	8.3
	13	Feel testicles	Lumps/ heat/equal size	11.3
	14	Take temperature	See if it has infection	5.1
Feet 	**15**	Check gait for limping	Sore joint or leg	9.7
	16	Open toes	Look for ticks/ab-scesses/infection	9.7.1
	17	Look at hooves	Overgrown nails	9.7.3

4.1.2 Checking age of goat

The age of goats can be determined by looking at the goat's teeth:

- The first permanent incisors come through at about **15 months** – thus at this age the goat will show **2 teeth**
- The next two incisors come through at **21-24 months of age** – thus the goat will have **4 teeth**
- The next two incisors come through at about **30 months of age** – thus the goat will have **6 teeth**
- The last two teeth come through at about **36 months of age** – thus the goat will have **8 teeth (it is said to be full-mouthed at this stage)**.

A young goat has 'baby teeth' before the permanent incisors emerge (left) while an adult goat shows permanent incisors (right)



Using the teeth to determine the age of the goat

4.1.3 Condition scoring

Farmers should be concerned with the body condition of their breeding animals. The term body condition refers to the body fat content of an animal. Ewes should not be allowed to become too thin or too fat. Failure in reproduction, low twinning rates and low weaning rates will result if ewes are too thin. Overly fat ewes can suffer pregnancy toxemia, but fat ewes are rarely a problem.

Condition scoring a goat

This is a standard way of assessing the condition of individual goats on a scale of 1-5, where 1 is very thin and 5 is obese. It is a way of telling whether your goats are getting too little feed or too much. You assess three different things:

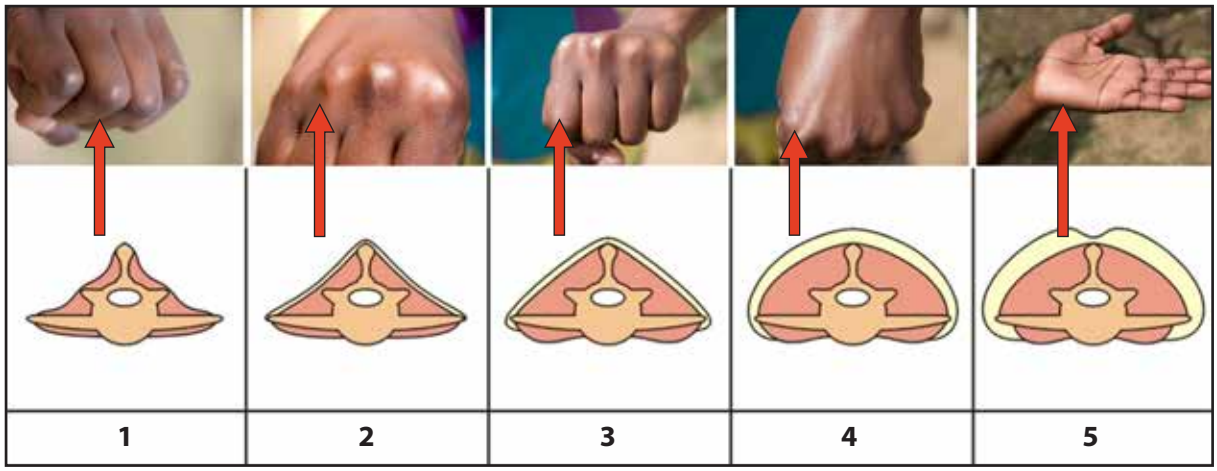
- Backbone
- Rib cage
- Loin eye area (either side of the backbone above the tail).

Condition scoring criteria. *A condition score of 3 for the doe is ideal at weaning, breeding and kidding.*

Score	Condition	Backbone	Rib cage	Loin eye area
1	Very thin	Sticks out sharply (can even see), can feel individual vertebrae	Can feel each rib sharply	No fat covering
2	Thin	Can feel vertebrae but smooth	Smooth, need slight pressure to feel ribs	Smooth even fat cover
3	Good condition	Smooth and rounded	Smooth and well covered	Smooth even fat cover
4	Fat	Can feel with firm pressure	Cannot feel individual ribs, but can feel indent between ribs	Thick fat cover
5	Obese	Cannot feel individual vertebrae	Cannot feel individual ribs or indent between them	Fat accumulated around the tail area

Body condition scores – goats

To condition score a goat hold it firmly and feel the sections mentioned above. Compare what you feel to the diagram. Each condition should feel like the part of your hand as illustrated.



5. Treatment

Once an animal is sick, treating the disease quickly is important. Giving the right dose and the correct type of medicine or antibiotic is important.

5.1 Taking temperature

A thermometer is used to take an animal's temperature to see whether it is sick.

- If you are using a mercury thermometer, shake the thermometer back down to normal before starting
- Insert the thermometer into the goat's rectum and wait for 2 minutes
- Normal temperature for a goat is 38.8-40.2°C
- If the goat has a temperature below or above this range it could be sick. *(Note: Don't give antibiotics if temperature is normal)*
- Wipe the thermometer with antiseptic before storing it again.

A digital thermometer (left) and taking a goat's temperature (right)

5.2 Weighing your goat

The weight of a goat can either be accurately determined using a scale, or it can be estimated using a weight belt. The weight belt is placed around the girth of the goat and the weight is then read off the belt. This is possible because there is a known relationship between the weight of the goat and the circumference of its girth. The belt will only be accurate for the type of goat for which it has been developed. For further information, see 19.7 in the Resources section.

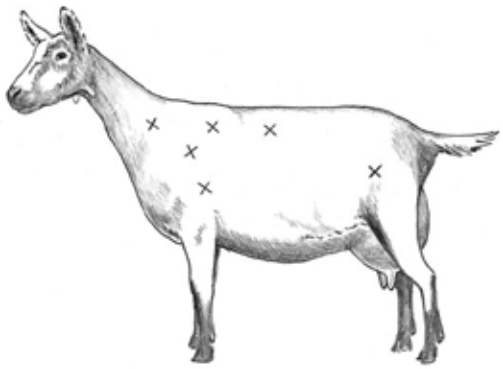
You can use a weight belt for weighing your goat

5.2.1 Correct dosage-to-weight

With most medication, whether it is given orally or injected, it needs to be given at the correct dosage rate, which is normally according to the weight of the animal. The heavier the animal, the greater dose it requires. It is important not to under-dose because firstly it will not work and secondly when you try to use it again, even at the correct dose, it will not work because the organisms that you want to kill will have become resistant to it.

You need to be able to estimate the weight of your animal so that you know how much medication to give. If you are dosing a similar group of animals for worms then you **calculate your dosage based on the heaviest goat in the group**. It might be better to divide your herd into animals of similar size and then calculate the dosage rate for each group separately.

5.2.2 Injecting correctly



In general, use a fresh needle for each animal and boil syringes for at least 10 minutes before use in order to sterilise them.

Subcutaneous injection

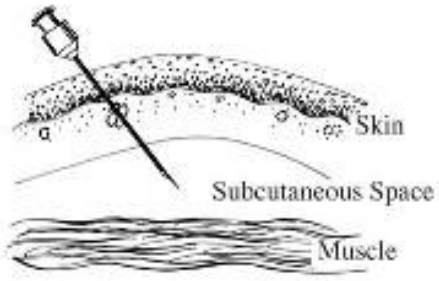
This is an injection that is given under the skin.

- Use a 20 gauge needle (22 gauge for kids) – 16mm or 1 inch length
- Lift loose skin and insert at an angle between skin and flesh – make sure you do not go right through the skin with the needle
- A subcutaneous injection often leaves a small lump under the skin immediately after injecting.

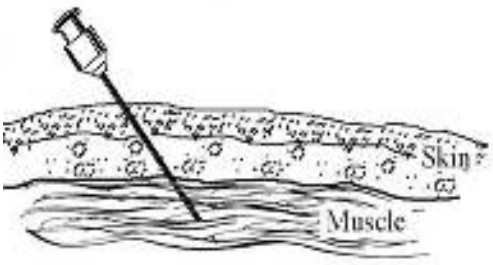
Intramuscular injection

This is an injection that is given into the muscle.

- Use a 20 gauge needle (22 gauge for kids)
- Inject into a heavy part of the neck or thigh
- After inserting the needle, always draw back first and make sure no blood enters the syringe (this will happen if you have hit a vein) – if there is blood, try another site.



Subcutaneous Injection



Intramuscular Injection

Note: *The third type of injection is called an intravenous injection and the drug is injected straight into the vein, but this is a difficult injection to give so this should not be tried by people who do not have experience.*

5.2.3 Dosing correctly

When dosing be careful not to get dewormer in the lungs as this can kill the animal. Insert the tip of the doser in the corner of the mouth as shown here. Using a metal dosing attachment *(pictured below)* helps to reach deeper into the mouth to prevent wastage and helps safe dosing.

5.2.4 Vaccination (preventative health care)

Farmers need to be aware of common diseases that affect goats in their area and then follow an appropriate vaccination programme. Vaccination is only possible for certain diseases. With these diseases, you can give the healthy animal an injection that will stop it contracting a particular disease. This is different from treating an animal once it is sick.

One of the key vaccines you can give a goat is **Multivax P**

- This will control pasteurella (lung infections), pulpy kidney, tetanus, black quarter
- Young goats: inject at 4-5 months and repeat at 5-6 months
- Adult goats: **Repeat annually in September (and repeat after 4 weeks).**

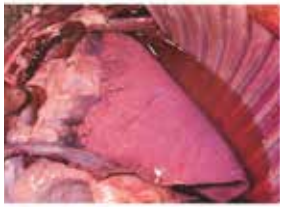
Other vaccinations should only be given if a problem is positively identified by a vet or animal health technician, for example: enzootic abortion, *Brucella melitensis* (also commonly called CA). Check the management calendar in Section 11.5 for timing of basic vaccinations.

5.2.5 Good hygiene practices

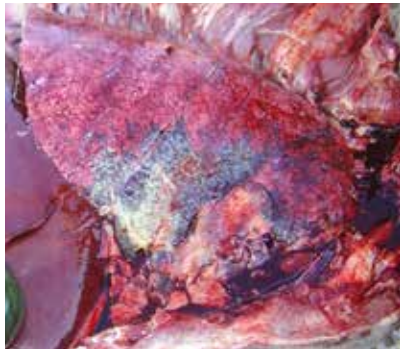
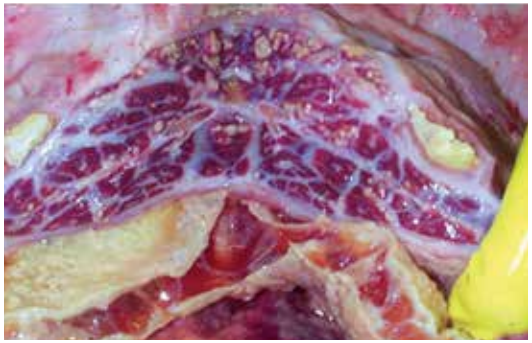
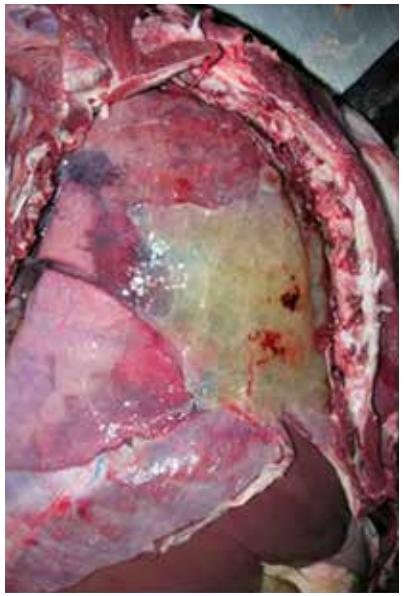
- Always wash your hands with soap and water before and after treating and handling animals. A hand disinfectant can also be used
- Always use fresh sharp needles where you can
- Needles should be sterilised as often as possible with boiling water for steel needles
- Any animal waste e.g. pus, blood, hair or flesh, should be disposed of by burning, burying or at least be thrown in a pit toilet to prevent the spread of infection.

6. Common diseases and conditions

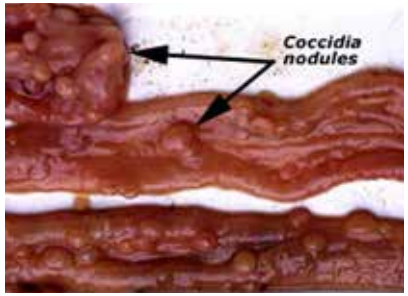
6.1 Heartwater – treat with tetracycline

Symptoms	Prevention	Treatment	Blocking against heartwater
    **The live animal:** The organisms that cause heartwater 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 2 to 5 days. Affected goats have a very high temperature and show nervous signs: 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** will have excessive fluid in the heart sac, lungs, chest cavity and abdominal cavity.	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. Goats that have grown up in a heartwater area are more resistant to the disease If an animal dies of heartwater, dip it to kill the ticks on its body. The ticks are infected with heartwater and will infect other animals if they bite them. Vaccination against heartwater is possible but it is complicated and expensive, speak to your veterinarian about this.	Treat the animal early before nervous symptoms show. Use short-acting Terramycin for three days in a row, or new drug doxycycline. Use an intravenous injection if you can, otherwise intramuscular. **Dosage rates:** Adult goats inject 5cc daily for 3 days (intramuscular injection). For a kid give 2.5cc daily for 3 days. Note: Dosage rates will vary depending on the make of the injection that you buy.	This is a method used to prevent deaths due to heartwater. The disease has an incubation period of 14-28 days, with a mean of 18 days. If you vaccinate goats with heartwater (i.e. infect them), and you are not able to take their temperature daily and treat them when they have a raised temperature, you can block them on day 13 after vaccination, while they are still incubating the disease and not yet showing symptoms. You inject them with a long acting oxytetracycline at the correct dose based on their weight. Alternatively: treat animals that are new to a heartwater area every 7 days for 3 weeks (i.e. day 7, day 14 and day 21 after entry to the area).

6.2 Pneumonia – treat with tetracycline

Symptoms	Prevention	Treatment
    **Live animal:** The symptoms include fever, lack of appetite, rapid breathing, coughing, loss of condition and discharge from the nose. In post mortem, a piece of lung put into water will sink whereas healthy ones float.	A multi-component vaccine such as Multivax P can be used to prevent certain types of lung infections in sheep and goats. Keep goats healthy, unstressed, well fed and under cover at night. Kids should be taken indoors during very cold nights.	Sick animals can be treated with an oxytetracycline antibiotic such as Terramycin or Hi-Tet. **Hi-Tet 200 LA dosage:** Intramuscular injection. 1ml/10kg livemass. Repeat after 3 days if necessary.

6.3 Coccidiosis – treat with sulphamides, not tetracycline

Symptoms	Prevention	Treatment
    Coccidiosis is a disease that mainly affects kids and lambs. It is caused by an organism known as coccidia and is most commonly found in communal drinking water areas and pools of stagnant water. Older animals do become infected; however, due to immunity that they develop over time, clinical signs do not show. Older animals are normally the source of infection for the younger animals as they are carriers of the disease. **The live animal:** This disease normally affects young animals. It attacks and destroys the mucus of the intestine which leads to animals having diarrhoea and an inflamed intestinal lining. This is different from scours. An outbreak is characterised by a short period of diarrhoea and then animals quickly dying. Symptoms include: • 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 dead animal:** Tiny, greyish-white spots are often visible in the mucous membrane of the small intestine. Guts filled with fluid and blood.	Sick animals should be separated from the rest of the flock or herd to prevent spread of the disease. Hygiene is important for preventing outbreaks of coccidiosis. Pens must be clean and dry. Kids should not mix with older goats and should not have access to contaminated feed and water. Coccidiostats such as Rumensin can be fed at times when disease outbreaks are common to prevent the disease.	Give Sulfazine 16% as a drink. **Sulfazine 16% dosage:** Initially give 14ml/10kg livemass Then give 7ml/10kg daily for two days Where there are outbreaks, treat all females and kids with Sulfazine. **Other treatments:** **Immodium** for 3-5 days (0.5 tablets per day) **Vecoxan:** 1ml/2.5kg livemass body weight at about 4-6 weeks of age (treat all kids). The goat should also be given water with electrolytes to prevent dehydration. A good general treatment is a mixture of one spoon salt and 8 spoons sugar in one litre of clean, warm water. For young animals that have not been weaned, feed this mixture twice a day instead of milk (but not for more than three days).

6.4 Orf – virus, management and vaccination only

Symptoms		Prevention	Treatment
	Wart-like sores on the animal's lips and nose and around the mouth of especially young lambs and kids and on the teats of their mothers.	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. **Method of vaccination:** take a thick (18g) needle and insert it into a vaccine ampoule such as Scabivax. Then pierce the skin in the armpit of the animal.	Spray the affected areas with an iodine spray daily. Hard scabs can be softened with Vaseline or glycerine to make it easier for the animals to eat.  **WARNING:** USE GLOVES AS THE DISEASE CAN SPREAD TO THE HANDS OF HUMANS.

6.5 Tetanus

Symptoms		Prevention	Treatment
	Tetanus is a disease that causes stiffness that leads to paralysis and then death. This fatal disease occurs as a result of a wound becoming infected by bacteria commonly found in soil and faeces. Therefore, animals are at high risk when using the elastic band method of castration as this makes a wound. *Left: Stiff legs – symptoms of tetanus in a kid*	The disease is preventable by using the Multivax P Plus vaccine recommended in this book.	No treatment possible.

6.6 Black quarter/quarter evil

Symptoms	Prevention	Treatment
 Black quarter is an acute infectious disease caused by Clostridium bacteria. It causes inflammation of the muscles, toxaemia and high mortality. **Live animal:** Fever, loss of appetite, depressed behaviour, stiff gait and reluctance to move due to lameness, gaseous bubbles in the muscles before death, sometimes nose bleeding and swelling of the head. **Dead animal:** Accumulation of fluid under the skin and in the lungs and body cavities; affected muscle is dark brown, dry and sponge like or moist. A pungent odour is noted. *Left: The spongy appearance of muscle in an animal with black quarter*	It is spread by contaminated soil and organisms are either taken in when the animal is feeding or through wounds. Bury or burn the carcass to prevent the disease from spreading to other animals. The meat can also cause humans to get sick. It will be prevented if goats are vaccinated with Multivax P. They can also be vaccinated with Blanthrax, which also protects against anthrax.	Treatment is not often successful. The farmer can inject the animal with a penicillin injection, which must be obtained from a veterinarian.

6.7 Anthrax

Symptoms	Prevention	Treatment
 This disease is more common in cattle. It can affect goats, but very rarely. It can affect humans and that is why it is important to notify the state vet. **The live animal:** The animal often dies suddenly, with no symptoms having been seen even a few hours before. **The dead animal:** Thick, dark blood is seen coming from the animal's nostrils and anus. This disease can infect people so the carcass must be buried or burnt and not eaten.	Animals should be vaccinated annually with Blanthrax which will protect them from both anthrax and black quarter.	There is not normally enough time to treat the animal so prevention is essential.  **DO NOT OPEN THE CARCASS –** The carcass must not be cut open or it will release germs that affect the surrounding area.

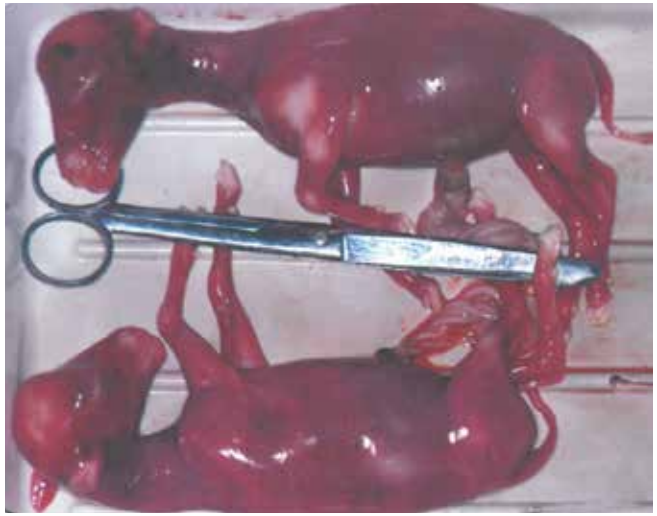
6.8 Peste des petits ruminants (PPR)

Symptoms	Prevention	Treatment
  This disease is a potential threat to the goat sector although it is not yet encountered in South Africa. PPR is a viral disease of goats and sheep characterised by fever, sores in the mouth, diarrhoea, pneumonia, and sometimes death.	The virus is secreted in tears, nasal discharge, secretions from coughing, and in the faeces of infected animals. Water and feed troughs can also be contaminated with secretions and become additional sources of infection.	There are no medications available to treat the disease, but supportive treatment may decrease mortality. There is a PPR vaccine available from countries where it is common.

6.9 Foot-and-mouth disease

Symptoms	Prevention	Treatment
  Lesions (sores) in the mouth and on the feet, salivation and lameness.	Vaccination is only permitted by government under certain circumstances.	No treatment – cases must be reported immediately and affected herds/flocks slaughtered to prevent the spread of the disease.

6.10 Contagious abortion (Malta Fever)

Symptoms	Prevention	Treatment
 Abortion is the loss of a foetus at some stage in the pregnancy. Abortion can be due to a range of factors including: • Diseases that specifically cause abortion – such as enzootic abortion, brucellosis (Brucella melitensis) • Any disease that causes a high fever (e.g. heartwater) • Poor nutrition, especially during late stages of gestation • Mineral deficiencies • Stress • Certain poisonous plants.	The best prevention is to keep mothers unstressed. Don't transport them unnecessarily. Make sure the mother has adequate nutrition. Dispose of aborted foetuses and placentas in such a way that they do not contaminate the environment and result in other goats also becoming sick (burn them or bury them – at least knee-deep). Some diseases can be vaccinated against (e.g. enzootic abortion), but it is important to find out whether this is the cause of the abortion. Blood can be drawn from goats or samples from aborted foetuses can be analysed to identify the organism responsible. The first step is to keep records of how many goats are aborting (as a percentage of the herd) and when they are aborting in order to try and identify the real cause of the problem (whether food or disease).	Generally no treatment required unless there are complications.  **NOTE:** Some diseases also affect people, although they do not always cause abortions in people. Use gloves when you handle aborted foetuses and placentas to avoid contact and contamination with the disease-causing organisms. For example, infection with Brucella melitensis causes abortion, reduced milk yield and testicular infection in goats, and Malta fever in humans. Infection has been found in goats in Northern KwaZulu-Natal. Ask your local Animal Health Technician to bleed your goats to make sure your goats do not have this serious condition. If any do, contact your local state vet and make sure that you cull these animals immediately!

6.11 Rift Valley fever and Wesselsbron disease

Symptoms	Prevention	Treatment
These are both viral diseases transmitted by mosquitos. OUTBREAKS ARE EXTREMELY RARE! These diseases only occur in situations where there is standing water. **Rift Valley fever symptoms:** young kids unlikely to show symptoms, while adults may develop a fever, vomit and show a nasal discharge, leg weakness, may abort, bloody diarrhoea. 20-30% of infected animals die. **Wesselsbron disease symptoms:** resembles Rift Valley Fever, but mortalities are low amongst adults. Abortions and high kid mortalities are however to be expected.	Vaccination is possible but should only be considered in very wet years.	Not possible.

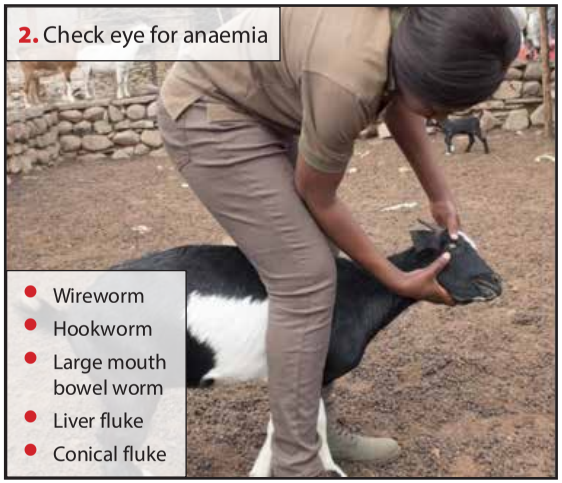
7. Internal and external parasites

7.1 Identifying and treating internal parasites

Internal parasites are commonly called worms, but also include flukes. They are one of the biggest production problems with goats. Most goats have some worms but when there is an imbalance between the parasite and host this can lead to significant loss of condition and eventual death in the goat. It is important to identify the particular worm that is the problem as the dewormers are specific to types and no dewormer can cover all the types of worms. Use the 5-point check on the following page to identify which of these it could be and treat accordingly.

7.1.1 5-point check for internal parasites

The Five-Point Check© is aimed at checking goats that could be affected by one or more major internal parasites. There are five places on the body that need to be checked. Those places are the nose, eyes, jaw, tail and back. The steps below demonstrate how it's done and what each inspection might show.



1. **Nose:** Discharges from the nose may indicate nasal bot fly (*Oestrus ovis*) and may also be a sign of pneumonia.
2. **Eyes:** anaemia may be due to wireworm (*Haemonchus contortus*) and other worm species that cause anaemic conditions such as hookworm. Note: see more detail about checking for anaemia in Section 7.1.2.
3. **Jaw:** A soft subcutaneous swelling below the jaw is known as bottle jaw. This is another symptom of worm species that cause anaemia.
4. **Back:** Body condition scoring is the assessment of overall condition of the animal. If only a few in the flock or herd show poor condition, this may show worms that suppress the animals' appetite such as bankrupt worm, brown stomach worm and conical fluke.
5. **Tail:** Parasites such as conical fluke and roundworms cause mild or severe diarrhoea. Parasites are known to be a major cause of diarrhoea therefore the farmer needs to treat animals with visible diarrhoea.

Other signs such as a pot belly, when combined with poor condition or growth rate, are usually an indication of tapeworm infestation.

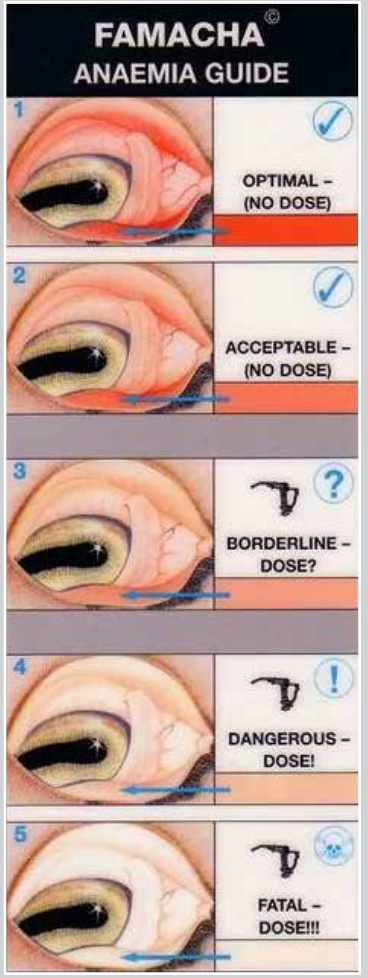
7.1.2 Checking for signs of anaemia

The FAMACHA© method is only suitable for controlling wireworms because it is based on assessing the level of anaemia in the goats (from looking at the inner membranes of their eyes) and then dosing those that are anaemic. If they are pale pink instead of bright pink they are said to be anaemic. The paleness is because the worms have been feeding heavily on the goat's blood.

NOTE: THE FAMACHA© METHOD WILL NOT PICK UP TAPEWORM.

Different levels of anaemia (from highly anaemic to no signs of anaemia).

Checking the goat's eye for signs of anaemia.



A FAMACHA© chart

7.1.3 Use of anthelmintics (dewormers)

Goats can be dosed with a variety of dewormers – some only kill one type of worm, while others kill a range. You should try and dose for what particular worms are affecting your goats. Resistance will build up over time so regularly change your dewormer ensuring different active ingredients.

Unless you have a particular type of worm that you are trying to treat, you should swap dewormers regularly (check that they have different active ingredients) to make sure that over time you control the different types. You also need to make sure that the product you are using is safe for goats.

It is recommended that you use a FAMACHA© chart and the 5-point check system described below to control parasites in your goats. You can use a standard dosing programme based on periods of heavy infestations and dose the whole flock or herd at certain times of year.

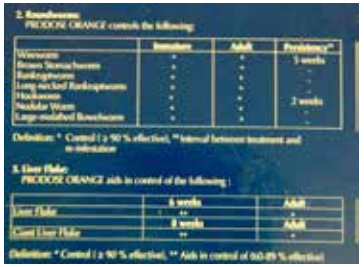
If it is possible, call a technician to send a dung sample to a laboratory to determine what worms are infecting your goats. You should collect a sample directly from some goats and not from the ground. Keep them in a plastic packet in the fridge until you take them to the lab.

If you plan to slaughter the goat to eat you should also check the withdrawal period of the product (this is the recommended time period from when you dose it to when it is safe to eat the goat or drink the milk). Many medicines also have a withdrawal period.

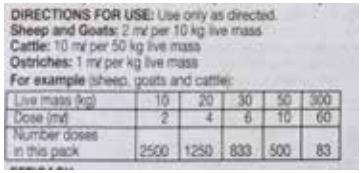
Things to look for on a dewormer label

The label often has pictures or at least a description of which animals it is registered for. It should also describe the active ingredients and the percentage by volume.

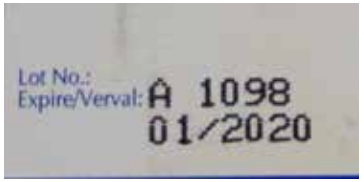
Look for how it must be stored.



Look for the species of worm that are covered by this particular dewormer. More importantly, look for the efficacy of the particular dewormer. A standardised star system is used – 1 star means it will control 90 percent of adult worms, and 2 stars means that it aids in controlling 60-89 percent of these worms. Also look at whether it works with adult or juvenile worms.



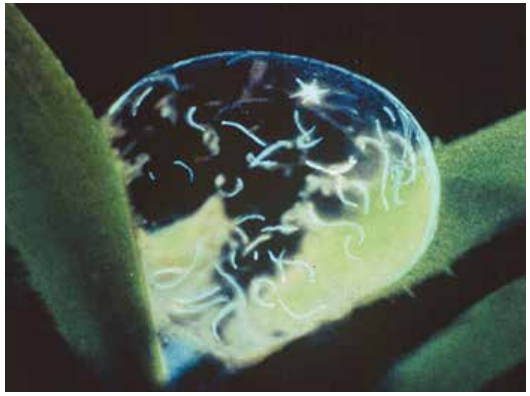
Look at this section for dosage instructions. Often it is weight based, which means farmers should have estimates of the goat's weight.



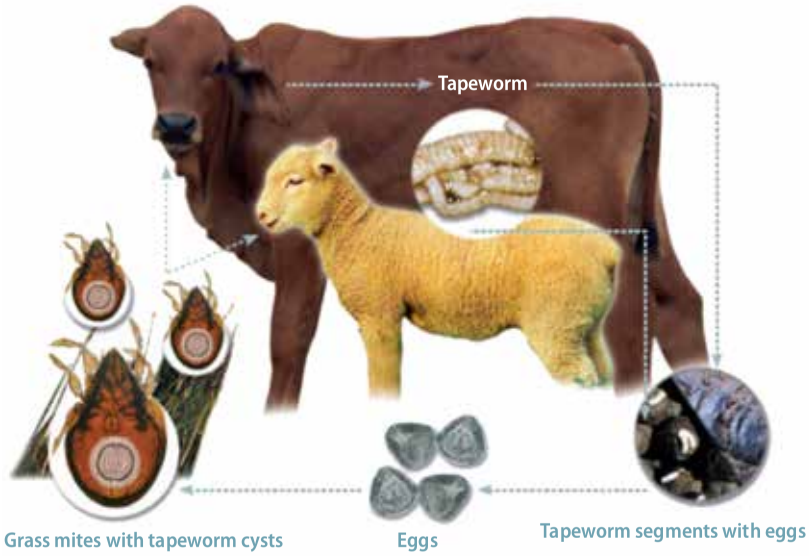
Check expiry date of the dewormer before using it.

7.2 Types of internal parasites

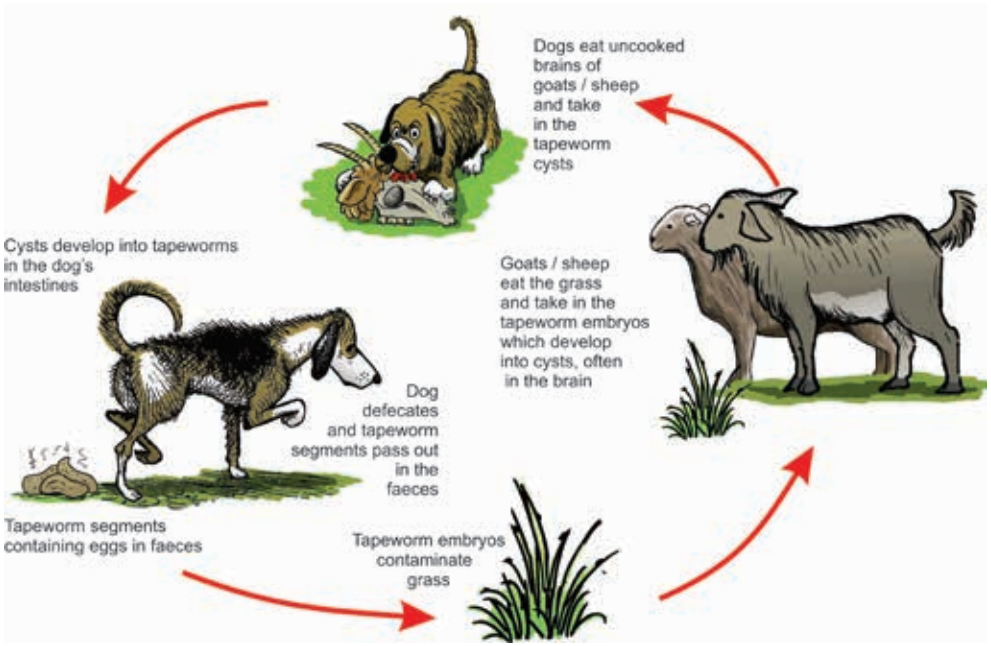
7.2.1 Roundworm

Description	Life cycle	Management	Treatment
  These worms have long cylindrical bodies, are unsegmented and have simple life cycles, which involve free living larval stages. Some are bloodsucking such as the wireworm, while others simply damage the intestine.	After mating, the female worms lay eggs that are passed in the faeces. Depending on conditions they can survive several months. When conditions are favourable they hatch and go through 3 stages, free living in the soil. The third stage crawls up low vegetation – about 5 centimetres – and can survive quite long periods like this. If eaten with the grass, they undergo a final stage inside the goat and become adults.	The worm larvae live in moist spots where water drips or collects, so kill grass around watering points or taps as it is probably infested with worms. Don't build resistance by drenching all the animals – only treat goats that are anaemic according to FAMACHA©.	There are various dewormers on the market. Choose ones with 1 star for best results. Read the label and follow correct dosage procedures.

7.2.2 Tapeworm

Description	Life cycle	Treatment
   They are characterised by long segmented bodies and an indirect life cycle. In some cases, the goat can be the final host (it has the adult tapeworm) but in other cases carnivores such as dogs play this role while the goat is the intermediate host (it has the intermediate bladder or measles in its flesh). **Tapeworm life cycle** 	Where goats are the final host (milk tapeworms *Moniezia*, *Thysanezia*, and *Avitellina* species) the ripe tapeworm segments are passed out in the faeces and release their eggs. These can be eaten by tiny mites that live on grass. They act as intermediate hosts. The mites if eaten by goats, release the infective stage of the tapeworm in the intestine where it attaches and grows to an adult.	There are many dewormers on the market, but the tapeworm-specific ones are better, as broad spectrum ones are usually less effective.

7.2.3 **Tapeworm cyst** (turning disease/draaikop) – Medicines registered for milk tapeworm will not work on this

Description	Life cycle	Treatment
Goats can get a condition that is often called draaikop or malkop or turning disease. The animal starts turning in circles and loses condition as it no longer eats and eventualy dies. It can spread these tapeworms to humans if the meat is not cooked properly and so also poses a zoonic danger.  *Above: A tapeworm cyst in a goat brain* *Below left: Tapeworm Measles in meat* *Below right: A tapeworm cyst*  	When goats are the intermediate host, the adults live in carnivores like dogs. Segments or eggs are passed in dog faeces. These are eaten with grass by the goats. The immature stage migrates to its preferred place for forming a cyst or measle stage. In the case of the brain bladder worm (*coenuris cerebralis*) this is the brain or spinal cord; for the sheep measle (*cysticercus ovis*) it is the heart muscle or skeletal muscle; and in the hydatid cyst (*echinococcus granulosus*) the liver or the lungs. If a dog eats these cysts the adult tapeworms form in its intestine. 	The only effective treatment is to deworm dogs in the area and farmers should not dispose of raw meat, especially brains, to the dogs. Brains must either be thrown into toilets or burnt or cooked before given to dogs. Once a goat exhibits the turning symptom it is often to late for any treatment, but the rest of the flock can be treated with an injectable dewormer.

7.2.4 Flukes

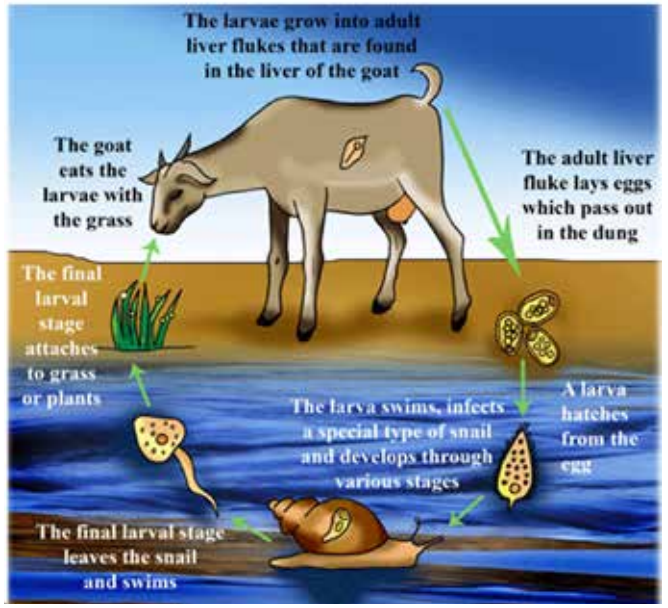
Description

Flukes have shorter bodies and more complex life cycles, which involve a secondary host through which they must pass to complete their life cycle. In goat flukes the intermediate hosts are freshwater snails.

Life cycle

These parasites need an intermediate host to complete their life cycle. Certain freshwater snails are suitable hosts. The adults lay eggs which are passed out with the faeces and can survive for various periods but usually 1 to 3 weeks. In water the *miracidium* stage must find a snail host that it penetrates. They leave the snail after various stages and form a metacercaria which attach to vegetation and can survive for long periods.

If they are eaten they develop into immature flukes. Liver flukes take 2 to 3 months to migrate through the liver and adults develop in the bile ducts. The conical flukes migrate up the small intestine and become adults in the rumen.



Treatment

Fluke specific dewormers are the best solution for the flukes.

In liver flukes a product with the active **Triclabendazole** is best.

In conical flukes, use a product with the active Oxyclosanide.

Management

Watch out for infected water sources.

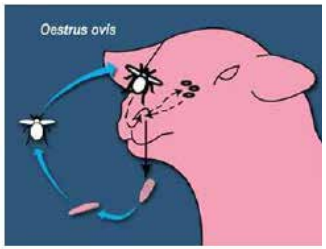
7.3 External parasites

External parasites affecting goats are mainly ticks and mange mites. Other examples would include mosquitos and flies (especially blowflies). Some external parasites cause skin irritation and tissue damage while others also transmit diseases to the goat.

7.3.1 Ticks

Description	Life cycle	Treatment/management
    Besides the physical damage caused by ticks, they also transmit a number of diseases. In goats the most serious tick-borne disease is heartwater. Tick-borne diseases are specific to a certain type of tick. For example, heartwater is only transmitted by bont ticks. Ticks can be controlled by insecticides that can be put on in different ways. Spraying is the most common way, or less common is either dipping the goat (in a plunge dip or with a bucket and sponge), applying a pour-on product onto the animal's back or by injecting it with a registered product (such as an ivermectin). Remember that dips are poisonous so you should make sure that you use gloves and protective clothing to prevent skin contact as you can actually absorb the dip directly through your skin.	Ticks can have 1 or 3 hosts Bont ticks are a particular problem for goats as they carry heartwater and can cause abscesses and lameness. Read more about abscesses in Section 8.1	The most effective control of ticks is a dip either through injecting, wetting, immersing or through an injectable. Other methods are through insecticide mixed with grease on heavily infested areas.

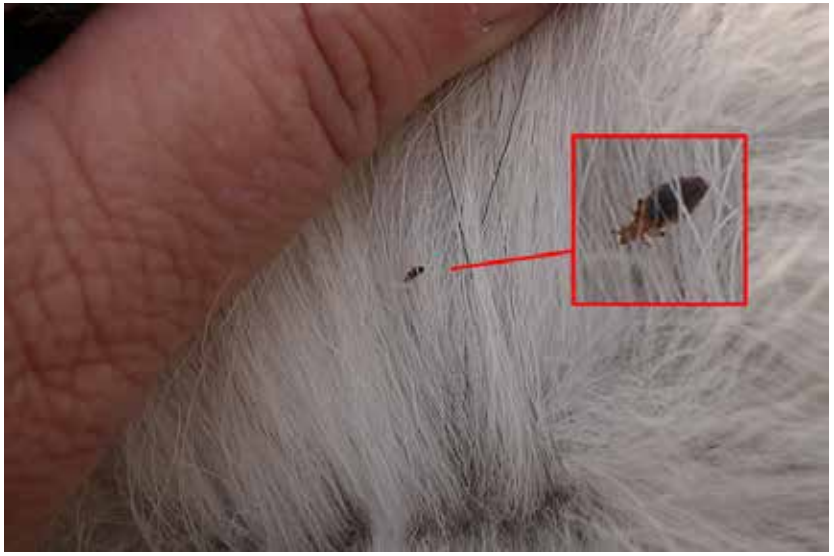
7.3.2 Nasal bot

Description	Life cycle	Treatment/Management
    Nasal worms are not proper worms but actually the larvae or bots of a fly.	The fly lays its eggs around the nose of goats. The eggs hatch into larvae which travel up the nose into the sinuses in the goat's head. Here they cause irritation, inflammation and mucus that runs out of the nose. The goat coughs and sneezes and shakes its head until it eventually gets rid of the bots that then turn into flies.	Fortunately, these nasal worms are easily got rid of. The most effective treatment is to treat with a remedy that contains ivermectin or closantel. Some deworming products can also be used such as **Tramisol** or **Nasalcur**. Sometimes the bots cause secondary infection of the sinuses or even infections that eventually spread into the lungs. These infections must be treated with long-acting oxytetracycline products such as **Terramycin** – at a dosage of 5cc every 3rd day until healed.

7.3.3 Mange

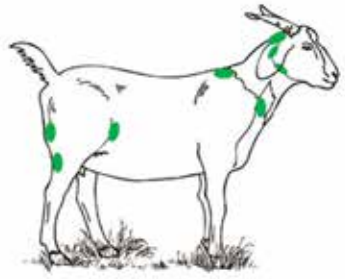
Description	Management	Control/treatment
Mange is caused by an external parasite that burrows deep into the skin causing hair loss and itchiness. This ectoparasite spends its life cycle of 14-21 days entirely on the host it has infected. Overcrowded conditions increase risk for transmission. In rural areas it is often spread between domestic dogs and goats.   	Domestic dogs should be treated for mange as soon as it is identified in the community.	Dipping infected goats either in a plunge dip with **Tritix** or **Taktic**. Injectables such as **Ivermectin** are also effective.

7.3.4 Fleas and lice

Description	Management	Control/treatment
These are small wingless insects that move around different hosts by means of jumping. They have well developed legs that are used for jumping considerable distances. Fleas are normally found on dogs and cats. In that way they are passed on to domestic livestock like goats. Fleas cause rubbing of affected areas, scratching and hair loss. They can be controlled by dipping the goats and treating the affected areas with sprays or powders such as **Karbadust**. There are two recognised types, the biting (red) lice and the sucking (blue) lice. The biting lice feed on dead skin while the sucking lice actually suck blood from the host. Both types cause the animal to itch and in most cases causing the animals to rub against objects. Lice are normally found on the inside of the legs and around the head and neck and may result in scabby or bleeding areas, loss of hair or a dull coat. Severe cases can cause anaemia. 	Dust in areas where goats rest or sleep with products such as carbodust, or these areas should be wetted so as to remove breeding areas.	The goats should be sprayed or dipped with remedies that kill lice (e.g. **Zipdip** or **Deltab Backpack**) and the kraal should be treated with an insecticide (they can also be dusted with **Karbadust**). Infected animals should be separated to prevent the lice spreading to other goats.

8. Conditions

8.1 Abscesses

Description	Management	Treatment
      An abscess is a swelling that is the result of a bacterial infection. It is hot, red and painful. It can be caused if a thorn or a tick breaks the skin and the bacteria then enter the wound. **Abscesses on the spine** – Sometimes goats or kids can get 'sitting disease' where their hindquarters become lame. This can be from bont ticks causing lameness or allowing bacteria to enter the goat which causes abscesses on the spine.	Control excess ticks and general hygiene.  **WARNING:** IF AN ANIMAL HAS SEVERAL VERY BAD ABSCESSES OR GETS ABSCESSES OFTEN, IT SHOULD BE CULLED.	Open and drain the abscess when it has a yellow spot on it or when it softens. This can be done by cutting a cross over the soft spot. Use a boiled razor blade to cut the abscess. Then syringe warm (boiled) water with a lot of salt in it (1 tablespoon of salt in a cup of water) or iodine into the wound. Spray daily with a wound aerosol such as **Woundsept Plus**. The wound must be kept opened and it must be flushed daily with warm salt water to remove pus. Use gloves when handling the abscess. Bury or burn the pus and the material used to wipe the pus. This can infect other animals and people. Always boil the razor blade before using it. The goat can also be injected with an antibiotic to aid recovery.

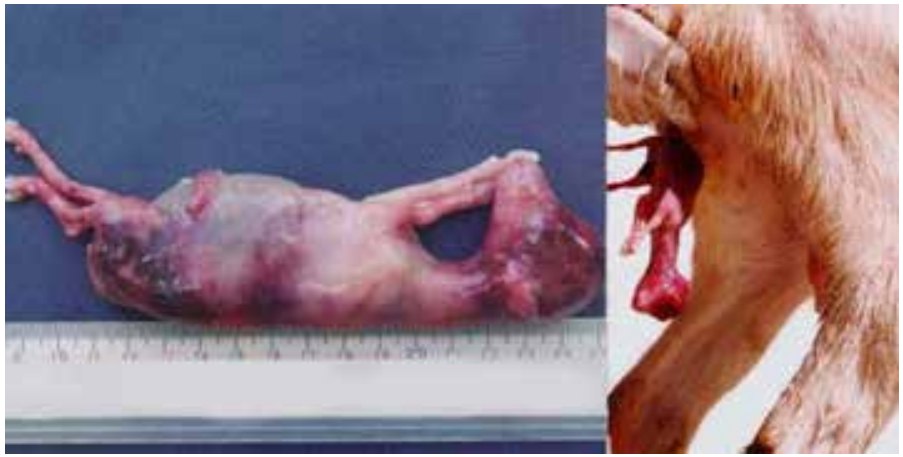
8.2 Contagious ophthalmia (contagious eye infection)

Description	Management	Treatment
  A common problem in flocks in South Africa which at certain times of the year can reach epidemic proportions. It often infects kids and adults. Lowered immunity seems to be a factor in infection. Various organisms contribute to the disease as does dust, sun and vitamin A deficiency. Transmission can be through midges and flies from the increased tear flow. If left untreated the eye becomes red and swollen. Eventually the cornea grows cloudy and the animal becomes blind.	Separate sick animals and avoid stress and hunger – vitamin A injections can also help to avoid an outbreak.	Antibiotic eye powder or antibiotic ointment can be applied until the infection clears up. Mastitis treatments can also be applied to the eye.

8.3 Mastitis

Description	Management	Treatment
  Mastitis is an infection of the udder. The udder produces either a brownish watery fluid or watery milk containing white or yellow clots or pus. The udder will look distended, and feel hard and hot to touch.	Good hygiene is important to prevent the spread of the disease.	Treat any mastitis with long-acting oxytetracycline antibiotics such as **Terramycin** – at a dosage of 5cc every 3rd day until healed. In severe cases combine the injection with a lactating cow intra-mammary antibiotic medicine. Insert the medicine up the teat canals once a day after milking out as much milk as possible. Continue until healed. Milk out at least three times a day.

8.4 Abortion

Symptoms	Prevention	Treatment
  Abortion is the loss of a foetus at some stage in the pregnancy. Abortion can be due to a range of factors including: • Diseases that specifically cause abortion – such as enzootic abortion, brucellosis (Brucella melitensis) • Any disease that causes a high fever (e.g. heartwater) • Poor nutrition, especially during late stages of gestation • Mineral deficiencies • Stress • Certain poisonous plants.	The best prevention is to keep mothers unstressed. Don't transport them unnecessarily. Make sure the mother has adequate nutrition. Dispose of aborted foetuses and placentas in such a way that they do not contaminate the environment and result in other goats also becoming sick (burn them or bury them – at least knee-deep). Some diseases can be vaccinated against (e.g. enzootic abortion), but it is important to find out whether this is the cause of the abortion. Blood can be drawn from goats or samples from aborted foetuses can be analysed to identify the organism responsible. The first step is to keep records of how many goats are aborting (as a percentage of the herd) and when they are aborting in order to try and identify the real cause of the problem (whether food or disease).	Generally no treatment required unless there are complications.  **NOTE:** This disease also affects people, although they do not always cause abortions in people. Use gloves when you handle aborted foetuses and placentas to avoid contact and contamination with the disease-causing organisms. For example, infection with Brucella melitensis causes abortion, reduced milk yield and testicular infection in goats, and Malta fever in humans. Infection has been found in goats in Northern KwaZulu-Natal. Ask your local Animal Health Technician to bleed your goats to make sure your goats do not have this serious condition. If any do, contact your local state vet and make sure that you cull these animals immediately!

9. Eating disorders

9.1 Scours/diarrhoea

Description		Prevention	Treatment
	Diarrhoea can be the symptom of a disease. There are many different causes of scours and each one can cause a different kind of runny stomach. They can include: • Smooth, yellow diarrhoea • Smooth, white diarrhoea • Whitish diarrhoea with lumps of thin skin in it • Red or brown diarrhoea, which may mean blood in it • Scours can be caused by a change in food source or diet • Eating poisonous plants.	Regular treatment for worms will prevent scours caused by worms. Where scours are caused by nutritional changes, feeding some sort of nutritional supplement in winter will help with prevention.	A good general treatment is a mix of one spoon salt, 8 spoons sugar in one litre of clean, warm water. For young animals that have not been weaned, feed this mixture twice a day. Only when there is blood in the diarrhoea should you inject with a sulphamide-based injectable.

9.2 Bloat

Description	Prevention	Treatment
The animal's stomach swells It becomes uncomfortable and may lie down and cannot breathe and will die.  	Do not allow hungry animals to graze green lucerne and clover or other plants that cause them to bloat. They must be introduced VERY slowly to green lucerne and given large quantities of hay before grazing lucerne for a short while. Maize may also cause bloat. Make sure there is no wire or plastic lying around where animals graze.	Make the goat drink cooking oil (50 ml) or bloat guard. Do not let it lie down. If it is down, get it back on its feet and make it walk around until it has burped. In very bad cases stab the bulging area with sharp-pointed knife to let air escape. Treat the wound with antibiotic spray.

9.3 Pulpy kidney (Enterotoxaemia)

Description	Prevention	Treatment
 *Kidney from an infected goat*	Although this disease occurs more often in sheep, it is prevented by using **Multivax P** Plus vaccine, which is recommended in this book. Alternatively vaccinate lambs with enterotoxaemia Vaccine (including a booster injection) and then repeat vaccination annually. Give 1ml per animal as a subcutaneous injection. ***Note:*** *It is advised that animals first be vaccinated against pulpy kidney before deworming.*	Treatment is not possible – rather prevent it through vaccination.

The live animal: This disease is caused by bacteria that often exist within the sheep's intestine but only cause disease symptoms under certain circumstances such as a change of grazing, exhaustion, sudden dietary changes and dosing with dewormers.

The bacteria in the intestine produce a toxin (poison) which results in death.

Symptoms vary – sometimes the goats are found dead, at other times, they either (1) appear exhausted, show paralysis and a loss of consciousness and may have laboured breathing, salivation and diarrhoea or (2) have nervous symptoms with convulsions, accompanied by salivation, grinding of teeth and muscle twitches until death.

The dead animal: The carcass decomposes quickly and there are 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. They may contain large amounts of blood.

9.4 Bluetongue

Description	Prevention	Treatment
 This disease is of little importance to goat farmers as goats are generally more resistant to bluetongue than sheep Difficult, rapid breathing as a result of pneumonia, resulting in a general bluish colour of the mucous membranes of the eye and the mouth and. eventually of the tongue Sore joints, especially the feet and back. This gets so bad that the animal will sometimes walk on its knees and tends to lie down a lot. Animal stops eating and the stomach stops moving. Animal becomes sensitive to sun and the ears become warm and pink.	It is not prevented by using the **Multivax P** vaccine. Bluetongue vaccine is available, but need only be used if farmers experience a problem with the disease. Since the disease is transmitted by midges, move sheep and goats to higher areas where there are fewer insects.	Treat the pneumonia with antibiotics – a long-acting **Terramycin** every 3 days until recovery. Dosage – Adult goats 5ml every 3 days injected into the muscle.

9.5 Deaths due to eating plastic

Description			Prevention
		Goats sometimes eat plastic packets that they find lying around. Sometimes it is because they are craving salt and find it in the packets, sometimes it is just because they are hungry. The plastic is not able to pass through the goat's rumen and in the end the rumen fills up with plastic which limits the amount of food the goat can eat. In the end, it normally leads to the death of the goat.	Providing goats with a mineral lick will reduce the extent to which they eat plastic. Alternatively communities need to try to prevent littering with plastic.

9.6 Poisonous plants

Description	Prevention	Treatment
    Animals will usually try to avoid eating poisonous plants, and will usually only be forced to eat them under certain circumstances. This happens when, for example, the veld is overgrazed, due to drought or overstocking of animals, and when the animals are hungry due to inadequate nutrition. It can also happen when the veld has been burnt, or when animals are introduced into new areas, where they are unfamiliar with which plants are poisonous in that area. Overgrazing of veld, by overstocking, may cause the invasion and dominance of certain toxic plants such as Deadly nightshade (Solanum sp). Some exotic plants that are planted as garden shrubs are poisonous, for example Lantana, seen in the picture at left. Lantana makes animals sensitive to the sun if they eat it (called photosensitivity). Certain plants become poisonous only under certain circumstances. For example prussic acid poisoning happens when certain young, growing plants become dry and wilted. An example of a fodder plant that produces prussic acid when young green foliage wilts is forage sorghum.	It is important to familiarise yourself with the poisonous plants which occur in your area, so as to try to prevent animals eating them. Prevention is better than cure, as there are very few cases where treatment is effective, and treatment is often very expensive. The following steps should be taken as far as possible, to try to minimise plant poisonings: • Prevent overgrazing • Prevent overstocking • Monitor animals in planted pastures during danger periods (eg. hot dry periods where young plants can wilt and become poisonous) • Ensure animals are provided with adequate nutrition so that they do not go hungry, by providing supplementary feeding during times when the veld does not provide enough food • Take special precautions especially at the end of winter, when animals are most hungry and there is the least amount of food available, and the time when many poisonous plants come out • Monitor new animals that are introduced into the area and are unfamiliar with the poisonous plants of that area.	• Dose the animal with activated charcoal, at 2 grams/kg body weight, mixed with water, preferably by stomach tube, or using a 1 or 2 litre plastic Coke bottle. Make sure the charcoal does not go down the wind-pipe as this will cause a dosing pneumonia which is often fatal. • Inject the animal with multi-B vitamin, to support the liver. • Place the animal in a quiet shaded area, and provide plenty of water and feed, and give it time to rest and recover. • If the animal is poisoned with a plant causing photosensitivity, ensure it is in a cool, shaded area, and given plenty of water and soft, green feed. • Keep the animal very quiet and rested (do not chase the animals or stress them out), as exertion can cause death.

9.7 Hoof problems

9.7.1 Limping associated with abscesses

Description	Prevention	Treatment
  These are often caused by ticks or wounds from thorns between the claws of the hoof. Swelling in the foot is hot, red and painful. Sometimes abscesses burst open and ooze pus.	Do not leave goats standing in water or mud for a long time. Dip the feet to kill ticks. Regularly check your goats' feet for ticks, especially ones that are limping. Clean overnight kraals/ facilities monthly.	Open and drain the abscess when it has a yellow spot on it or when it softens. Apply dip to kill the ticks. Use a boiled razor blade to cut the abscess. Then syringe/ pour warm boiled water with a lot of salt in it (1 tablespoon of salt in a cup of water) or iodine into the wound. Spray daily with a wound aerosol such as **Woundsept Plus** or iodine. Keep the wound open to allow it to drain. Bury or burn the material used to wipe the pus. This can infect other animals and people. Always boil the razor blade before using it. Treat with a long-acting oxytetracycline such as **Terramycin** (1ml/10kg) in bad cases.

9.7.2 Footrot

Description	Prevention	Treatment
 This is a bacterial infection that normally affects goats kept on pastures or under intensive conditions. It spreads easily between goats.	Prevent footrot by keeping sheds clean and by using a monthly footbath containing 10% zinc sulphate solution. The goats must be made to stand in the footbath for a period of 5 minutes. Keep affected goats separate from the rest of the flock to prevent spread of infection. Clip hooves.	If an animal has footrot, inject it with an antibiotic such as **Terramycin** to treat the footrot and apply an iodine spray to the hoofs (between the claws).

9.7.3 Excessive hoof growth

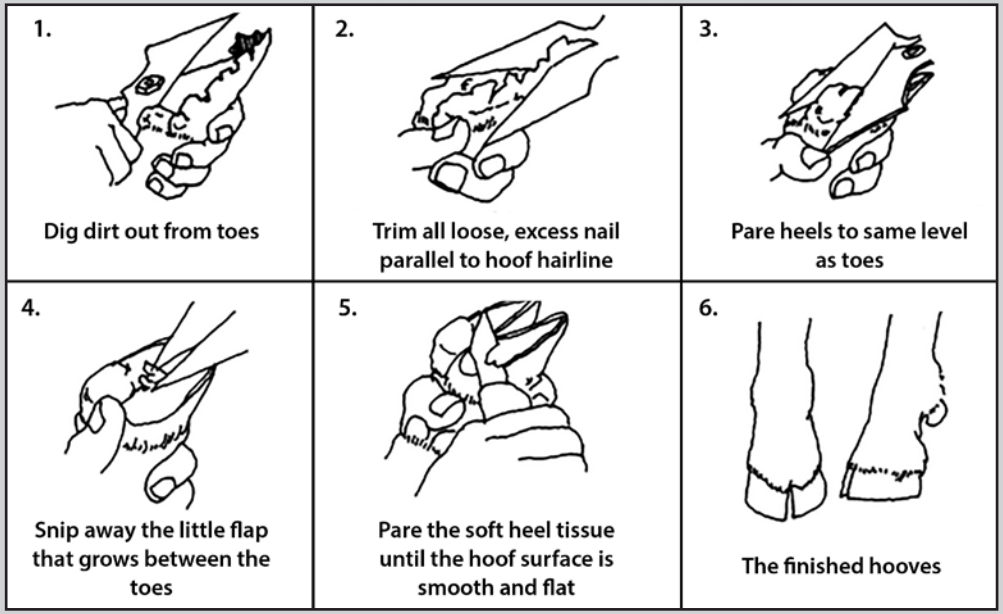
Description	Prevention	Treatment
 If goats are on pastures or in sandy areas where there are few rocks, their hooves may become overgrown.	Overgrown hooves need trimming.	If hooves are overgrown they affect the goat's ability to walk and look for food so they should be trimmed. *See section on hoof trimming below.*

Trimming hooves

In areas where there are not a lot of rocks, goats' hooves often get overgrown and need to be trimmed. This ensures that they can walk properly when they go looking for feed.

Lay the goat down so you can trim the hooves properly. Do not lie heavily pregnant goats down. Pick their feet up one by one while they are standing.

Use hoof shears to trim off excessive hoof growth.



10. Equipment

10.1 Basic vet kit and medicines

Key equipment:

- Cooler box
- Goat book
- Burdizzo
- Hoof trimmers
- Knapsack sprayer
- Tattoo applicator, ink and alphabet
- Weight belt
- Mask
- Gloves
- Blades
- Digital thermometer
- Antiseptic handwash
- Gauze swabs

Basic medicines:

- Wound spray
- Wound oil
- Antibiotic powder
- Broad spectrum dewormer for wire-worms and flukes
- Dewormer for tapeworms
- Dip (one to be mixed with water such as **Tactic**)
- Tick grease
- Long-acting antibiotic
- Short-acting antibiotic
- Sulphur-based antibiotic
- Injectable solution for mange and lice
- Vitamins

10.2 Storage

Storage of medication, expiry dates and withdrawal periods

Read the instructions that come with the product you buy, because they contain important information about using it such as dosing rates, whether it is safe for pregnant animals as well as how it should be stored.

Storage

Check storage instructions on medicine:

- Does it need to be refrigerated?
- Does it need to be kept in a cool, dark place?
- Most vaccines need to be kept refrigerated – do not keep them in a freezer where there is ice as it will kill the vaccine which will then not work.

Expiry dates

- An expiry date is the date when the product has become too old to work properly.
- When you buy a medicine or dewormer or dip – check the expiry date!
- Do not keep drugs beyond their expiry date as they will stop working properly.
- Either share products with other farmers or buy smaller quantities.

Withdrawal periods

With many drugs, you must wait for a given number of days or weeks after administering the medicine, before you slaughter the goat for meat or drink milk from the goat – this is known as the withdrawal period and is always given on the instruction pamphlet. If you eat the meat or drink the milk before this time, you will absorb the medicine.

10.3 Cold chains

A cold chain is a temperature-controlled supply chain. Where vaccines are concerned it is important to keep the medicines in the correct temperature range till they are used. All medicines need to be kept at appropriate temperatures.

	A cooler bag can keep medicines cool for up to an hour without an ice pack. If using a cooler bag, it is advisable to use an ice pack in order to keep medicines cool for about two hours.
	Ice packs should be used with cooler bags and when transporting medicines.
	A flask can keep medicines cool for up to four hours.
	The bottom part of a fridge maintains a temperature of +3 to +8 degrees centigrade. The freezer part (depends on configuration) is -5 to -10. Vaccines and medicines can be kept in the bottom part of the fridge but not in the top part of the fridge.
	This is not a fridge it is a freezer. No medicines should be kept in this.

PART 2

Increasing productivity

11. General management

11.1 Ear tagging

Herd identification

Obtaining an identification mark (KZN diptank mark or personal mark)

According to the Animal Identification Act, Act No.6 of 2002, all livestock must be marked or identified. While cattle are generally branded, goats are tattooed in the ear with the owner's identification mark.

Each livestock owner must have their own identification mark. This is obtained by applying to the National Department of Agriculture in Pretoria. An identification mark certificate is then issued and it carries a unique identification code for each livestock owner. This is the same mark that will also be used when tattooing your goats.

Diptanks can have an identification mark registered by the Department of Agriculture which can be used by all members belonging to the particular diptank, however problems of confirming ownership of livestock cannot be excluded. Therefore, the safest and legal way of identifying livestock is for each farmer to have their own identification mark.

11.2 Tattooing

Tattooing is a way of identifying goats. Tattooing equipment includes tattoo pliers, tattoo characters (letters and numbers) for the pliers and tattoo ink. These can be ordered and purchased through the local farmer co-operative.

Method of tattooing:

Clean the inside of the ear (ears that have dirt and oil on them will prevent the ink from filling the holes made by the tattoo pliers). Ensure that the sequence of the tattooing characters is correct according to the certificate of registration. Apply the tattoo ink on the area to be tattooed. Press the tattooing pliers until holes appear on the skin and then release. Apply ink to the pliers, hold for a few seconds and then rub more ink into the holes. The excess ink can be cleaned. The characters should be easily readable as black dots in the ear.

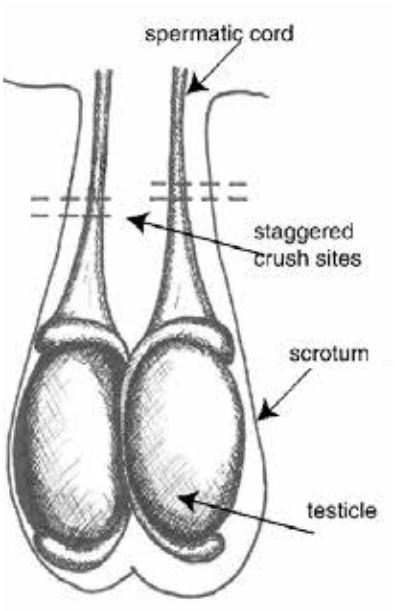
11.3 Castration

Castrate male kids at 3 months of age, using a Burdizzo.

WARNING:
If you are using rubber rings to castrate, the kid must be less than 7 days of age. Using rubber rings on older goats can lead to death.

When using a Burdizzo: feel for the cord, hold it and apply the Burdizzo, close the Burdizzo and hold it in place for a few seconds. Crush the cords from the two testicles separately and do them at slightly different distances from the body to ensure that there is continued blood flow to the testicles. Do not crush the 'false' teats when castrating the ram. After a month the testicles will shrink; if they do not, or if only one shrinks, then redo.

It is advised that the ewe is vaccinated 4 weeks before kidding with **Multivax P**, which helps prevent infections from the castration.



11.4 Record keeping

To be able to manage your goats, you need some basic system of record keeping. Your system should be able to give you the following information:

- The exact number of goats that you have (broken down into different age categories)
- The dates when your ewes give birth and the number of kids born

- The number of goats that die (and the age when they die and cause of death)
- The exact goats that have been treated (for what and with what)
- Who the mother of any particular kid is
- When a particular ram was brought into the herd
- The age of any particular goat (the year it was born)
- The number of goats sold, time when they were sold and prices obtained.

See examples of record sheets in the Resources section (19.11).

11.5 Treatment calendar (including vaccination)

This programme needs to be tried and adapted where necessary because of the unique conditions of any particular site.

1. General animal health programme according to age

AGE	TREATMENT	COMMENTS
I day	Iodine	On tongue
3 months	Castrate	Burdizzo method
4-5 months	**Multivax P**	
5-6 months	**Multivax P**	Booster

2. General animal health programme according to season

SEASON	TREATMENT	COMMENTS
Spring (September)	**Multivax P**	All goats and repeat after 4 weeks
Spring (before mating)	Enzootic abortion vaccine	All females (do as maidens)
All year	Foot bath (copper sulphate)	Monthly
All year	Check hooves	Monthly
Summer	Control ticks	Monthly in summer
All year	Do 5-point check for worms	Monthly

Source: Cedara Goats Vet Programme Document

11.6 Goat dip

Although farmers can use handheld sprays, injectables or tick grease for reducing tick loads on goats, a much more efficient system is a goat specific plunge dip. These can be built by individuals or groups and need a pool section that is at least 2 metres deep, a runway for goats to drip dry so that the dip goes back into the pool and doesn't get wasted after the goats have been dipped and an apron around the pool so that when the farmer stands there to submerge the goat, he doesn't put mud into the pool. The runway needs to run all the way to the bottom of the pool so that goats can easily walk out of the pool. The whole dip needs to be fenced off so as to restrain the goats while they are waiting to be dipped. The runway needs to be fenced and have a gate at the end for goats to be released once they have dried. A section between the runway and the pool needs to be made to allow the farmer to submerge the goat with a cleft stick and also use the cleft stick to assist goats out of the pool. For more on this, go to Section 19.5 in the back of this book or to www.gapkzn.co.za for a video on goat dipping.

Once the dip is built, the farmer needs to fill it with water using a 20 litre container or a 200 litre container so as to count how many of these containers are used and thus get a measure of the capacity of the dip. This water level should be marked off and this volume used as a measure for the mixing ratio of dip medicine to water.

A dip containing the active Amitraz has worked well for farmers who have problems with ticks and mange. A regime of monthly dipping throughout the year except for mid-winter months when there are no ticks on the goats has proven effective.

12. Housing and handling facilities

12.1 Shelter

Goats need to be confined at night for a number of reasons:

- To provide shelter from bad weather
- To prevent theft
- To prevent predation.

If animals are kraaled but are not provided with a shelter they will be exposed to the weather and will not be able to choose a place that is more protected from rain or wind. For this reason, it is important that the kraal owner provides the necessary shelter and protection. In building such a structure it is important to consider the following aspects:

- A roof to protect from rain
- Walls/sides to protect from wind
- Drainage or cement floor to prevent the ground from being too muddy after rain
- Provision of raised areas (preferably slatted to allow droppings to fall through) where goats can escape from wet, muddy conditions
- It is also important that it is possible to clean the kraal in order to prevent the build up of disease-causing bacteria and parasites in the dung and dust.

Example of goat shelter (above) and goat shed (below)

Managing the overnight shed

The following recommendations are made regarding management of the shed:

- Make sure that the goats are not crowded (keep to minimum density of 1m^2/goat)
- Remove manure on a monthly basis and spray the house to kill fleas
- Provide feed in feeders or in hay racks to prevent trampling
- Ensure that goats have access to clean water
- Separate rams from ewes to prevent injuries and bullying
- Separate ewes with kids from other goats to prevent trampling
- Goats must not be kept in longer than necessary as it reduces the number of hours available for feeding.

12.2 Equipment for feed and water provision

If goats are to be supplement fed, they should be provided with some form of feeders and water troughs. The feeders should keep food off the ground so that it is not trampled and soiled by the goats. Suitable containers also need to be provided for licks. Make sure the kids can reach the water without a danger of drowning.

12.3 Handling facilities

If you have a group of goats, it is much better to have proper handling facilities that allow for efficient handling of them without causing stress to either goat or person.

Handling facilities should consist of:

- A crush to catch goats where you can dose and vaccinate
- A gathering pen that feeds into the crush
- Sorting pens in case you want to separate males, females and kids as the males will hurt kids and females if they are handled together
- A loading ramp to load goats into transportation.

13. Nutrition and feeding

13.1 Why is food important?

No matter how good your animal's immune system, if it is constantly hungry and malnourished, it will eventually become sick. This is because a malnourished animal's immune system cannot successfully fight all the different diseases trying to attack it. One or more of these diseases will eventually defeat the immune system of the hungry animal, making it weaker and more susceptible to all the other diseases waiting to attack.

It is better to have a well-fed animal so that it is generally in good condition. If it gets sick, such an animal is more likely to recover from illness than a hungry, thin one. A well-fed animal that gets sick can sometimes recover by itself without treatment.

It is therefore important that animals have enough good quality food so that they are able to maintain their immune system and to fight disease. A well-fed animal is usually a healthy animal with a strong immune system. In winter when there is not enough good quality food, animals can get sick very easily. Animals that are fed properly are also generally more productive, producing more milk, growing faster and having a shorter period between subsequent kids (preferably giving birth three times in a two year period). This is especially important to consider where there are no bushes or trees and in sourveld areas. See more about feeding goats in Section 13.4.

13.2 Basics of nutrition and feeding

Goats are mainly browsers (eat leaves off trees and bushes) although they will also graze (eat grass). They are *ruminants*. This means that they regurgitate feed and ruminate or 'chew the cud'.

In order for goats to grow well, it is necessary to develop a year round forage programme allowing for enough feed throughout the year.

Feed requirement

Maintenance requirement is the minimum feed required by an animal that is to not growing, pregnant or lactating, to keep warm, and to maintain its body weight. A mature, dry ewe (i.e. not pregnant or feeding a kid) or a mature castrate are examples of animals having maintenance requirements only.

All other physiological functions increase the feed requirement of the goat. Additional requirements above those needed for maintenance are required for growth, pregnancy, lactation and hair production. Ewes feeding twins or triplets have greater nutritional requirements than ewes feeding a single kid. Goats grazing very hilly pastures will have higher nutritional requirements than goats on level pastures of the same quality because they will use more energy while out browsing.

The feed requirements are also linked to the weight of the goat and the weather conditions (i.e. they need more feed during cold periods).

Feed components

Goats need water, protein, energy, and a range of vitamins and minerals.

Water

Access to water is essential for healthy, productive goats. One goat will drink 3 to 10 litres per day, depending on stage of lactation and environmental temperatures. Ewes that are feeding kids have very high water requirements. During hot weather all goats will have high water requirements. It is also important that the water is clean – this is especially important for kids.

Protein

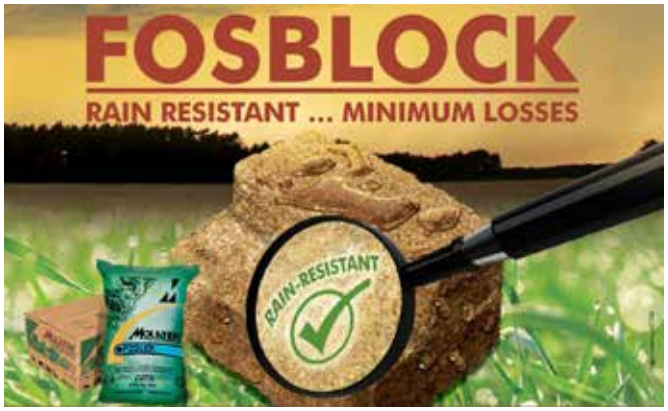
Protein is required for maintenance, growth, reproduction, lactation, and hair production. Protein forms a major component of blood, anti-bodies, muscle and milk and it is therefore required to produce these. Protein deficiencies in the diet can lead to goats becoming sick and even dying. Examples of protein feeds are: acacia pods, beans, cowpeas, lucerne, soybean meal, green pastures and high protein concentrates (PROCON 33).

Energy

Goats also need sufficient energy in their diet to allow them to grow, reproduce and make milk. Body condition scoring (discussed in Section 4.1.3) can be used to see whether the goats are getting enough energy – or too much. Examples of energy rich feeds are: maize grain, oats, sorghum and molasses.

Minerals (calcium, phosphorus, salt)

Goats also need to be given access to minerals if they are deficient in their diet. The addition of specific minerals (phosphorus for dry winter forages, selenium in deficient areas, etc) and salt (sodium chloride), preferably in granular form and offered free choice, helps prevent most mineral deficiencies and improves performance.



Various mineral supplements are available for goats

Critical feeding times

Critical periods when you need to ensure your goats are properly fed are:

- Before mating (ewes and rams)
- Late pregnancy (last 6-8 weeks) to avoid aborting and having small, weak kids – but do not overfeed or there will be kidding difficulties from large kids
- Early lactation (to make sure the ewe has enough milk for her kids)
- Feeding kids.

13.3 Supplementary feeding of goats

Making use of supplements

Supplements are available in various forms. These can be in powder form, often called licks, meal (such as PROCON 33) or blocks. It is often necessary to supplement natural veld with one of these. Supplements provide the nutrients that are deficient in (missing from) the natural vegetation. When you feed a supplement you need to make sure that the goat has access to sufficient grass, browse or hay or it will be ineffective and may even cause harm to the goat.

Make sure that you protect supplements from rain – especially if they contain urea – as this dissolves in water and can be lost or can poison the goat if it drinks the water. It is recommended not to use supplements with added urea with goats, or in areas of uncontrolled animals.

Prevent excessive intake by putting out small amounts daily or by increasing the salt content.

WARNING: Many of the recommended supplementary feeds contain urea which can be toxic in large amounts but is especially poisonous even in small amounts to horses, donkeys, chickens and goat kids. Take precautions as per labels on the bags.

Summer mineral supplement

In summer, supply a mineral supplement to goats grazing on veld as South African veld is typically phosphate (P) deficient. For example:

- Mix 50kg of P12 (phosphate lick concentrate) with 50 kg salt and feed 50g/goat/day,
- or P6 which includes salt at 100 g/goat/day,
- or a phosphate summer block.

Protein-energy-mineral supplement

In sourveld areas, the quality of the veld declines in winter and it is necessary to supply a protein and energy rich mineral supplement. The energy is required to supply the rumen microbes with sufficient energy to utilise non-protein nitrogen (urea) sources and to digest poor quality feed.

Examples of a supplement to use when there is not abundance of grass, or in the dry season when the nutritive value of veld is low, are:

- Commercial protein (winter) blocks (25kg each). Supply one block per 25 goats and at a consumption of 100 to 140 g/goat/day a block should last for 8 days.
- Molasses meals enriched with minerals and protein, e.g, **Voermol Super 18**, **Voermol Supermol**, **Molatec Master 20** or **Molatec Background 18** at approximately 200 to 300 g/day. Therefore a 40 kg bag is sufficient for approximately 160 goats for a day.
- LS 33 (molasses liquid supplement) is a protein, energy and mineral supplement spread onto roughage diluted with equal quantities of water to aid in consumption and digestion. Recommended intakes are 60 to 100 g/goat/day. ***Note: this is urea based – use with extreme caution.***

How to make an energy and protein block for supplementary feeding of goats

This section explains how to make your own block to supplement your goats' nutritional requirements. Please see Section 19.6 for complete information. These blocks are for supplemental feeding of goats. This means they must be fed to goats with other food, or to goats that are allowed to roam out in the veld for most of the day.

The goats also need to have a good supply of clean water to drink as the salt in this supplement will make them thirsty. The goats should not eat more than 4 tablespoons a day of the block, so the block must not be left with the goats as they will finish it. This block is recommended for mothers and for kids from two weeks of age.

Ingredients

These 5 ingredients will be available from your local farmers' supply shop. The brand names will change and are not important.
Please always use a 2 litre jug with measurements marked on the side, like the one in the picture.

Ingredients	Number of 2 litre jugs
Coarse salt	2
Procon 33	16
Maize meal	7
Molasses (liquid)	8
Whitewash	4
Number of blocks per mix	42

Mixing instructions

Find a cement slab or piece of ground-sheet. Mix dry ingredients together. Add molasses and mix with a spade, then break up any lumps by hand until the mix is consistent.

Using the block maker

Oil surfaces with cooking oil so the block doesn't stick to these surfaces. Add mixture to block maker to level shown. Stamp down the mixture with the rounded handles. Pull out block separator. Lift whole block maker off. The four blocks will need a day to dry before you move them or feed them to goats.

This block maker has been specially adapted to make goat blocks and is available from any hardware shop. (2017 price approx. R1800). Just ask for the HAKA Goat Block maker. If this maker is not available these blocks can be pressed by hand into plastic containers of appropriate size.

Home mixes

There are some feeds that you can mix at home using local materials. For example you can chop up maize stover and add **Voermol LS33**, which is a liquid supplement that contains molasses and urea, but this should not be fed to kids. Alternatively you can feed milled bean residue. If you are feeding goat kids or lactating ewes, you can add lucerne to improve the protein content.

Growing green feed for goats

You can grow green feed for your goats. Examples of perennial pastures are Napier grass planted in rows within fields or pastures, Lespedeza, lucerne or Desmodium. Annual pastures include oats. cowpeas, lucerne, soya or peanuts can be grown in summer and the leaves and stalks used as a protein supplement for winter consumption.

Root crops such as chicory, turnip, radish or fodder beet grown at the end of summer are an early winter feeding option, supplying both protein and energy. These can be harvested and fed to the goats as they come in at night, not in the kraal as they may pick up worms unless the feed is in secure feed troughs.

Stover processing

A farmer should always conserve left over crop residues or stover that may be palatable for animals so that they can be properly dried and processed to be fed to the livestock in the dry winter months. These can include maize and sorghum stalks, bean plants after threshing, sweet potato leaves, dry grass, leaves of nutritious trees, etc. These should be processed to be small enough to swallow without too much chewing and a farmer should add a supplement to them to make them sufficiently nutritious. Use a small electric or petrol hammermill to grind up the stover, or chop it by hand, and add either molasses or **Voermol LS 33** (fortified molasses) or lucerne.




Feeding problems

Certain feedstuffs can cause problems:

- Allow goats to adapt slowly to concentrates (start with 50g/day/goat and increase gradually over a week)
- Take care with legume pastures as they can cause bloat

- Sometimes goats eat poisonous plants if they are new to an area (see Section 9.6). Do not offer unlimited amounts of grains or concentrate feeds (including sorghum beer residues and rice) to goats of any age. This can result in enterotoxaemia (overeating disease), ruminal acidosis, urinary calculi, bloat, laminitis-founder, and a host of other very serious rumen-based and therefore life-threatening illnesses
- Enterotoxaemia (overeating disease) is caused by Clostridial organisms (*Clostridium perfringens* type C & D). Under normal conditions, these potential pathogens do not cause harm. However, stress (environmental, physiological or psychological) can cause the population to explode, which releases a toxin that is usually fatal to the host. Vaccines are available for its prevention (e.g. **Multivax P**). See Section 9 on eating disorders.

13.4 Maximise veld use

Carrying capacity

The carrying capacity of veld is the amount of livestock it can carry, which is based on the amount of food that it produces. High rainfall areas with good vegetation cover and good types of grasses produce the most grass and can feed the most animals. Some grasses are said to be 'unpalatable' because animals do not eat them. Sometimes it is because they have a bad taste, sometimes it is because they are too tough to bite off and animals' teeth will wear on them. Examples of these grasses are the Ngongoni (*Aristida junciformis*) and uMtshiki species (such as *Sporobolus africanus* and *Eragrostis plana*).

Since goats graze as well as browse, you need to consider the amount of grass and trees available. Trees that have leaves below 1.5 metres are available to the goats – otherwise you will have to cut the branches for the goats. You also need to consider whether the trees are palatable for goats (i.e. will goats eat them) and whether they lose their leaves during winter.

There are ways to calculate how many goats and other animals can be kept on a given area of land. If you keep more than this number of animals they will not do well and you will also damage the veld.

Sourveld versus sweetveld

Sourveld occurs in cooler, high lying, high rainfall areas that receive frost. In autumn, the quality of the grass declines as it reabsorbs nutrients into the root system (to prepare it to survive harsh conditions). In spring the grass plants produce new leaves that are highly nutritious. In winter it is necessary to supplement the sourveld with protein. This can be supplied in the form of a lick that allows the animals to utilise the poor quality grass that is available. Recovery of this veld from over-utilisation is very slow. The composition of sourveld is generally made up of short grass species.

Sweetveld retains its quality throughout the year. It is generally found in warmer, drier areas. It generally produces less grass than sourveld because of the lower rainfall, but it is good food all year. Less grass often means that the carrying capacity of sweetveld is lower than that of sourveld. This veld is very easy to damage with over-utilisation and can also be prone to bush encroachment.

Resting veld

Vegetation benefits from a full season's rest at intervals. A rest is needed for a full season so that the grass plants can replenish their root reserves. Each time a grass plant is grazed, it withdraws nutrients from its roots to allow it to produce new leaves. If the plant keeps being regrazed without having a chance to replenish its root reserves, it will lose its vigour and in the end it will die or it will be pulled out by a grazing animal.

When trees are browsed too much, a browse line is created (Figure 15.1). This is not beneficial to browsers as it does not leave any leaf matter for further consumption and therefore a correct stocking rate needs to be maintained in order to prevent this. Animals will need to be withdrawn until this is corrected.

What does this mean for the way you manage your goats?

- If you have your own area where you can limit the number of animals grazing there, find out how many animals it can feed and try not to exceed this unless you can afford to buy extra feed for them.
- Goats walk long distances looking for food if it is scarce. If you fence them into an area that does not have enough food they are unable to go and look for additional food.
- Research has shown that goats walk on average four to six kilometres a day. This means that any fencing system or enclosure should take into account this need for a very large browse area.
- Research has also shown that goat herds compete with each other for browse. What this means is that the larger the herd, the further they will need to walk to get sufficient browsing. At herd sizes of about 80+, they reach a threshold where they cannot walk any faster in the time they have and thus start going through nutritional stress because of the size of the herd.
- Make sure that your goats also have access to clean water on a daily basis.
- In communal areas it may be possible to make joint decisions to keep all animals out of a selected area for the summer period to allow the grass to grow and seed and replenish its roots. This requires that all livestock owners agree to cooperate.
- In areas where the trees are tall you may decide to cut branches to feed goats. This may need permission from the traditional leadership.

Important facts on goat grazing habits to keep in mind

- Goats walk on average 4-6 km per day. Distance increases with herd size and season.
- They spend 75% browsing and 25% grazing, even with grass available.
- They spend 8% of their browsing time standing on their back legs.
- They can survive on the green flush following the first storms, while cattle wait for proper rain leading to grass.
- Each goat grazes 2000 trees of palatable varieties with branches of 1.5 metres height per year.
- Unmanaged sweetveld bush has between 1500 and 4400 trees per hectare.

14. Reproduction and kidding

Management directly affects the herd reproductive performance. Reproduction efficiency in the goat herd can be assessed by considering the following aspects:

- The interval between consecutive kiddings of a ewe (i.e. preferably less than 250 days)
- The number of kids per ewe
- The number of kids born and weaned in the herd.

Studies show that the current productivity of herds in communal areas is low. Poor production results mainly from kid mortality. This results in a shortage of ewe kids to keep as replacements when older or unproductive goats are culled. Mortalities of kids are due to poor management (including poor nutrition), unhygienic overnight kraals/facilities, theft, poor herd hygiene (with coccidiosis as a major problem) and predators.

14.1 Breeding season

In general the goat production system found in KwaZulu-Natal is that of free ranging goats with mating occurring throughout the year, but with most kids being born between March and September. In a system where the rams are with ewes throughout the year, the advantage is that the ewes will take the ram as soon as they are ready for the ram. However, it results in kids dropping throughout the year, making good management, recording and strategic feeding of ewes impossible. It also means that the farmer needs to keep the ram in good condition all year round.

The challenge with kids being born in late winter or spring is that there is a shortage of feed during late pregnancy when the growing foetus is putting heavy demands on the ewe, as well as during early lactation.

See the Resources section for more information about improved breeding seasons.

14.2 Ram management

The ram must be managed (and where necessary fed) so that he is healthy and able to work effectively during the mating season. During the breeding season, keep a ratio of 1 ram to 20-30 ewes. Replace rams every three years to prevent inbreeding.

Choosing a ram

It is important to ensure that the ram that you choose is bringing the needed/hoped for genes into your herd. Use only the best animals for breeding. The ram contributes half of the production characteristics of each kid. It is also important to ensure that the ram is fertile. Besides reproductive soundness, it is important to make sure that the ram has sound legs and feet so that he is able to work effectively over the breeding season.

Make sure that:

- The sheath and penis are free from any abnormalities, swellings and wounds
- There are two testicles and they are roughly the same size, well-formed and freely moving within the scrotum
- The testicles feel firm and cool and are without swellings or wounds
- The circumference of the scrotum is 34 cm from 18 months of age.

14.3 Ewe management

Choosing a ewe

Only keep ewes that kid every year. When buying or selecting a ewe make sure that:

- Udder is firm and well-shaped
- Teats are above mother's hocks
- Teats are evenly sized and show no signs of damage
- There are no signs of pain when handling the udder
- The temperature of the udder is the same as that of under the belly
- The milk is creamy, smooth and free from clots or blood
- The vulva has no abnormal discharges or swellings.

Management before mating

It is important that ewes have access to good browse, or a good nutrition from three weeks before mating to two weeks after mating. This may require supplementation over the winter period to ensure reasonable body condition. Body condition score of approximately 3 will be ideal for the mating season. Also, minimise handling during the mating season, and for two weeks after the end of the mating season.

Ewe management during pregnancy

Gestation (or pregnancy) in goats is approximately 150 days (5 months) long. Make sure that there is sufficient feed during the *early stage* (to prevent reabsorption of the foetus) and sufficient food during the *last 6-8 weeks* of pregnancy, when the foetus is growing fast, but do not overfeed the mother as it may cause birth difficulties.

Management practices at kidding

- Avoid disturbing ewes during kidding (e.g. do not move them or handle them)
- Try to separate them from the rest of the herd
- Earmark kids, with a number related to their mothers
- Sufficient feed must be available – animals have increased needs during kidding.

Culling ewes

After weaning kids, decide which ewes to breed with the following season and which ones to cull – cull those with udder or mouth problems as they will not be able to raise another kid properly.

Raising female goats as replacements

Young ewes tend to reach puberty or sexual maturity at 5 to 9 months of age, provided they have been grown adequately and are in good condition. Try to make sure that young ewes do not mate until they are 12 months of age or their growth will be stunted. Therefore, if possible, keep weaned female kids away from the rams to prevent early mating (this may not be practical for many farmers in communal areas).

When choosing what goats to keep and which to cull or sell, look at some of the following characteristics:

- Those goats that you treat the least for worm problems you should keep and breed up
- Those goats that are least prone to diseases and have the least tick problems need to be kept and increased as these are characteristics that can be inherited
- Those goats that are always in good condition in the winters should be kept
- Depending on the intent to sell, you should keep goats of lighter colours, including rams of lighter or popular (speckled) colours
- Mothers that look after their kids, especially at kidding
- Mothers who always have enough milk
- Mothers who have twins or, if the farmer provides supplements, triplets
- In rams the testes are the same size and hang at the same height and are not separated.

Breeding for size

Farmers often want to hybridise their herd with larger breeds like boergoat rams. This option should be approached with caution as often the larger size has been attained at the cost of other traits, like poor mothering. Also, larger breeds like boergoats with stockier frames cannot walk as far to browse so they suffer in harsh conditions. They also cannot stand on their back legs to feed on higher branches – a preferred browsing habit for indigenous goats.

15. Kid rearing

15.1 Interventions to reduce kid mortalities

The following interventions are important for minimising the number of kids that die:

- Let the goats give birth in a quiet, clean, dry place without interference from other goats
- Provide a dry, clean, weather-proof shelter for newborn kids and their mothers
- Dip navels with iodine at birth to stop bacterial infections
- Give kids a drop of iodine on the tongue to prevent deficiencies
- Make sure that the kids are dry and bond with the ewe and consume colostrum within an hour of being born
- Make sure the ewe is healthy after giving birth and has enough good milk for her kid (no mastitis, retained placenta, etc.)
- Ensure that the ewes have access to green fodder after giving birth to stimulate milk production
- Cull ewes with poor mothering abilities or bad udders when they have weaned their kid
- It is important to make sure that the lactating ewe gets enough feed so that she produces sufficient milk to support the growth of the kid
- Give kids supplemental feed from 2-3 weeks of age so that they are able to cope with their mother's poor milk production when feed is short
- Separate ewes and kids from the rest of the herd especially when in the kraal to avoid trampling, which may injure or kill kids
- Providing enclosures to separate and feed the kids is an important way of preventing kid malnutrition – see Section 15.5 and 19.4.

15.2 Castration

It is recommended to castrate male kids at 3 months of age, using a Burdizzo (see Section 11.3 for further information).

WARNING:
If you are using rubber rings to castrate, the kid must be less than 7 days of age. Using rubber rings on older goats can lead to death.

15.3 Rearing orphans

It is important that newborn kids consume some colostrum. This first milk contains antibodies from the mother that are taken in by the kid and which protect it from disease. Kids should receive colostrum within the first hour after birth. You can give a kid colostrum from another ewe if its own mother has died or has no milk.

A replacement for colostrum (the nutritional content)

- Mix 500ml cow's milk, 1 egg beaten in milk, 1 teaspoon cooking oil.
- Give four small (150 to 200 ml each) feeds/day for the first three days (heat to body temperature).

General milk replacer

- After the first three days feeding colostrum, feed normal cow's milk three times a day from 400 ml up to 750 mm daily (i.e. 150-250 ml at each feed) for two weeks dropping to twice daily thereafter (i.e. 200-400 ml at each feed) for at least another 6 weeks.
- NOTE: YOU CAN USE UHT FULL CREAM COW'S MILK AS A MILK REPLACER.
- If normal cow's milk is not available it is possible to raise kids on a **GOOD QUALITY** milk replacer. Any milk replacer with a high fibre content on the label has vegetable products in it and is NOT good for kids.
- Incorrect mixing of milk replacers can quickly lead to a fatal bloat in the kid so it is best to try and get proper milk. If changing onto milk replacer from milk first mix the milk and milk replacer half/half for a number of days for the kid to get used to the new diet.

Note: Hygiene is very important when rearing orphans. Poor hygiene practice can spread diseases between ewes (e.g. mastitis if you are putting orphan kids onto different ewes) and kids (e.g. orf can spread if the same bottle is used for more than one kid).

15.4 Creep feeding kids

It is essential that a kid is allowed to eat solid food or the rumen will not develop properly and the kid will lose condition or even die at weaning. Kids can be introduced to solid food at about 2 weeks old. The kids need to be supplemented until they join the herd. Kids should stay at home for 3 months and should be kept in a separate camp if possible to reduce their exposure to worms. Fresh clean water is **very important** as is a schedule for vaccinating and deworming the kid. See Section 11.5.

Different creep feeds

Build an area where the kid can 'creep' away from its mother to eat and drink or give the kid feed and water when the mother goes out to graze. Creep feeding is a means of providing supplemental feed for kids that are still drinking from their mothers. It is most important at times when the ewes' milk production is low (e.g. in winter when feed is scarce) or when there are lots of twins and triplets.

Positive responses to feeding young kids have been experienced in terms of improved kid growth and survival on communal rangeland in the Msinga area of KwaZulu-Natal.

There are different options for supplementing kids. The best feed would be one specially mixed and sold for growing lambs and kids (as shown in Section 13.2), called lamb creep feed. If this is not available they could be fed goat feed or even a Voermol game block. If it is not possible to buy commercial feed, kids can eat the leaves of trees as well as long as the tannin content is not too high or the tree is poisonous. Fresh cut grass or hay for roughage is also a good idea, but avoid cutting grass from areas where the adult goats have been as they may have left worms behind.

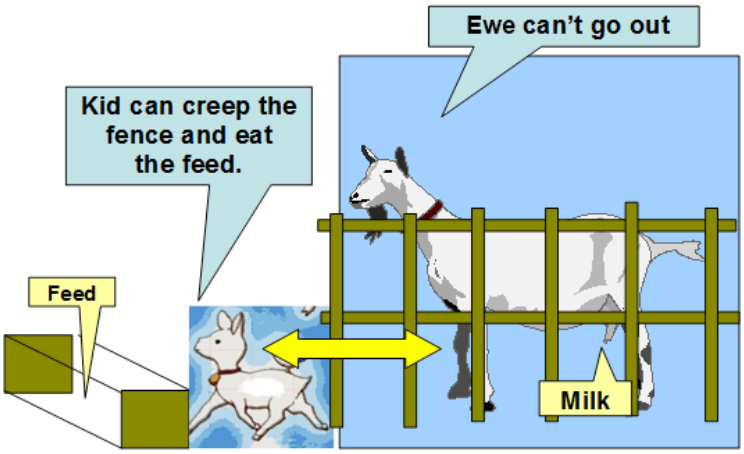
If you are feeding dry feed to the kids, it must always be fresh and palatable. When kids are young they prefer finely ground feed, but as they get older, coarser feeds are preferred, and whole grains are digested very efficiently. If you are buying commercial feed from a shop you should choose one that has crude protein (CP) content of approximately 18% and approximately 12 MJ energy (metabolisable)/kg DM. It also must not contain urea since young kids are very susceptible to urea toxicity. As the kids get older, you can use a feed that contains less protein. For example from weaning they can have a feed with 15-16% crude protein. Pelleted feeds are better because they make sure that the kids don't select the 'best' parts and leave the less desirable. When the creep feed is a concentrate, it is important to allow the kids access to good quality roughage. This will promote the development of proper rumen function.

Other factors to consider include:

- Kids begin to nibble at feed and hay at a very early age. Some kids may have a functional rumen and be chewing their cud by two weeks of age. Therefore, creep should be available by the time kids are 2-3 weeks old. They do not, however, begin to consume significant quantities until they are about 4 weeks old.
- Young kids will not consume stale or contaminated feed. Clean out old feed that accumulates in the troughs at least once per week. It can be fed to older animals, thus avoiding wastage.
- Kids must have access to clean water in, or close to, the creep feeder.

Feeder design

The idea is to allow kids access to feed while preventing access to ewes and older animals. Most creep feeders are constructed by placing troughs in a pen or by building a pen around a feeder in the pasture. Either way, the challenge is to design a gate or entrance through which only the kids can pass. Spacing between the vertical bars of the gate needs to be 12-15 cm.



Creep feeder design (ESGPIP, 2010)

15.5 Enclosures

Linked to the creep feeding concept is keeping the kids in a comfortable and healthy environment while the mothers are browsing. These enclosures can be built for a reasonable price and by local people. Experience has shown that with an enclosure that includes feeding and veterinary support, kid mortalities can be greatly reduced. It should be built outside the kraal to avoid dust, manure and diseases.

The enclosure (see technical specifications in Section 19.4) should have:

- A concrete floor that is angled so that it is easy to clean
- Wire netting outsides to stop other animals eating the food
- Shadecloth to stop wind and cold drafts, but also to prevent chickens eating the kid food
- Gutters on brackets and stop ends to put food and water in at an appropriate height
- A roof to stop rain and direct sunlight
- An extra shelf above the gutter to stop kids climbing into gutters.

Using the enclosure

- Kids should be put into the enclosure from 2 weeks to 3 months
- They should be supplemented with stover and supplements (blocks)
- A 2 metre by 2 metre enclosure should accommodate 10-20 kids
- With more kids the enclosure should be doubled for every 14 more kids
- Water must always be available
- Kids should be taken out of the enclosure when mothers return and allowed to suckle and browse with their mothers
- Kids should be encouraged to browse when not in the enclosure
- Orf and coccidiosis can be spread so ensure water is cleaned and changed daily
- Supplement feeding should be controlled and each kid should not be given more than a handful of food a day
- Uneaten and soiled food should be cleaned out daily.

Open troughs such as pieces of gutter or lengths of PVC pipe cut to size with ends blocked off will work, but must be cleaned and filled frequently (at least once a day). Also, kids will get in the troughs, and urinate and defecate on the feed, which will lead to wastage. Deep troughs or those with sloping bottoms can trap kids and result in suffocation. These 'feed troughs' can be attached onto the side of the creep pen and raised off the ground. You can put a board above the trough to keep their feet out of the troughs. This forces the kids to stand on their hind legs to eat and keeps the feed clean.

Precautions

Prevent disease outbreaks amongst your kids. Outbreaks of orf may occur because they are sharing the same feed and water. If this is a big problem, it may be worth vaccinating against orf with a vaccine such as **Scabivax Forte**. Hygiene is important and the pens should be disinfected regularly to control diseases such as coccidiosis. Another option is to use a commercial feed that contains medicines called coccidiostats.

15.6 Weaning

Weaning is when the kid stops suckling. It normally happens automatically at about 3 months of age. This is a stressful time for kids so a farmer should be attentive of kids going through weaning and showing signs of stress.

PART 3

Commercialisation

16. Economics of keeping goats

It is important to have an understanding of your expected costs and profit based on your system.

16.1 Different production systems

You can either keep goats under intensive conditions, for example in feedlots where you provide all their feed requirements, on pastures (semi-intensive systems) or you can keep them on natural veld under extensive conditions. Different systems have different management requirements and different costs.

Intensive goat farm

Extensive goat farm

16.2 Herd composition – how to make your herd more commercially viable

Once a farmer has decided to commercialise their goat herd, they will need to take control of the herd composition – how many rams, productive ewes, castrates, how many they will retain and how many they will cull or sell.

Management must focus on the ultimate marketing goals. For example, if you aim to sell castrated males, you should castrate all male kids early.

Breeding females should be replaced once they become unproductive. This means that enough maiden ewes must be kept back from sales to fill the gaps of culled females. For further information see Section 19.10: Determining profitability of the business and herd composition.

16.3 Understanding the costs, income and profitability of your business

It is important to understand the potential profitability of your goat business. You need to be able to answer the following questions:

- How many kids will be born each year?

- How many will survive until I can sell them?
- What price should I expect for different goats?
- What does it cost per year to keep my herd (feed, medicines, labour, etc.)
- What goats will I sell each year (age and gender)?
- Can I enhance their value?

This information will allow you to start working out how much money your business is likely to make. It depends on you as an individual and how well you run your goat business. If you have lots of mortalities you will not make money. If your costs are very high you will not make a profit.

In the Resources section there is more information about the profitability of different goat businesses based on different numbers of goats.

17. Value adding and marketing

A township live goat market

17.1 Selling live goats

In South Africa, goats are almost exclusively sold live for ceremonial slaughter in African homes. The majority of goats visibly sold in South Africa are imported from Namibia and sold at taxi ranks or at the side of the road. These are generally boergoats. Large numbers of goats are sold, traded and bartered in communities and between families and farmers. The highest value for indigenous goats is placed on castrates of 3 years or older. They are valued for their size mainly and the important role they play in marriage ceremonies. It is generally very hard to find young ewes (maiden ewes) for sale. Generally, speculators go around the African areas buying a couple of goats from each farmer until they have enough to make a consignment. The important marketing time is around October when Muslims buy goats for Eid. Goat auctions for indigenous African goats have worked and the prices vary according to the number of buyers and sellers. These auctions struggle to break even, given the

huge cost of financial transaction between buyers and sellers. Separate auctions for breeding and slaughter ready goats is important as buyers have different needs. Markets timed around March/April (Easter) and November/December (Christmas) are most successful as goats are in good condition. Also, it is during these periods that sellers need money and want to sell their animals, and buyers are on the lookout for good purchases.

2018 meat prices: Beef: R41/kg; Mutton: R60/kg.

An adult goat of 40kg would give 16kg meat (40% dressing percentage).

At mutton prices (R60/kg) you would get R960 worth of meat from this goat.

2017 price for a 40kg live goat: R1200.

This assumes people would spend as much on mutton as on goat meat.

If it sold at beef prices (R41) you would get R656 for the meat of a goat worth R1200.

In a market like Australia, goat meat is 40% more expensive than mutton: AUS $4 per kg mutton – AUS$7 per kg for goat. At these prices of R75/kg you would be competing on par with live slaughter.

Demand for different colours

Breeding for colours has become a popular pastime for stud breeders of indigenous goats. Currently dappled and spotted goats are popular. You can greatly increase the value of goats being sold to breeders in these colours. The popularity and peculiarity of these colours is often trend driven and can change quite rapidly over time. There are also colour preferences among different African buyers and these should be checked and understood in each locality.

Goats with interesting colouring are of value to stud breeders

Selling live goats in large numbers at auctions

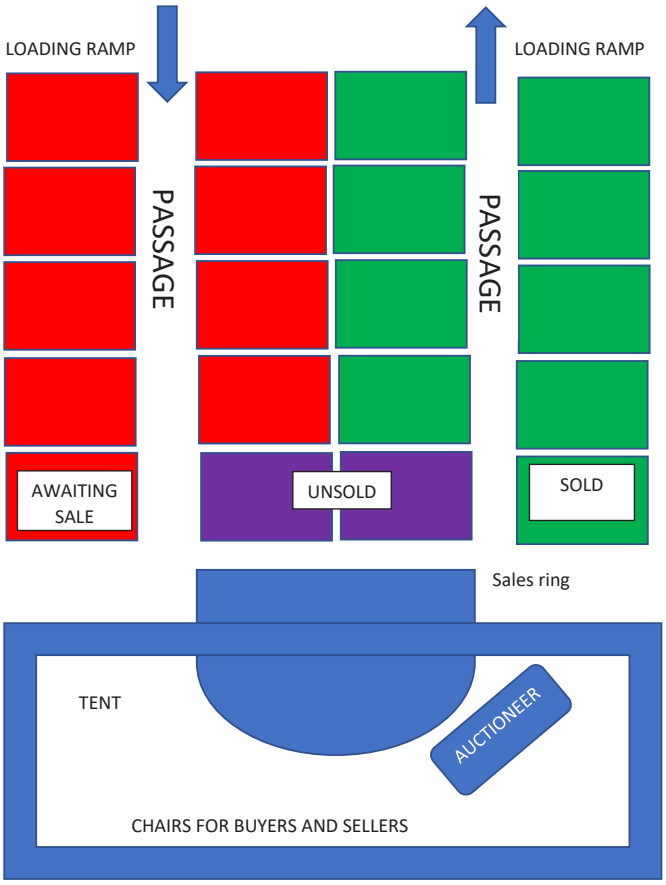
If a number of farmers can agree to sell goats as a group, they can reach a critical mass where they can start controlling the marketing of these goats. This is usually done through an auction or sales days. Auctions can be a very useful tool to set the price for goats and sell a large number of goats at market prices within a short time.

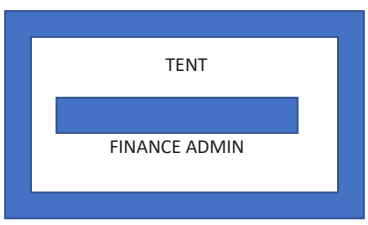
For an auction to be successful these are points to consider:

- Communities must be mobilised because auctions need to be strategically timed to occur when buyers will need goats. This is specially important for slaughter stock but less so with breeding stock.
- Farmers will often agree to sell at times of year when they feel their goats are in good condition and will thus get a better price. This often rules out winter and early spring as auction times.

- For breeding stock (rams and maiden ewes) the best time would be in summer and early autumn when they are looking their best.
- There needs to be a critical mass of goats per auction (approximately 400-600 goats). If too few, buyers won't be bothered and costs may be too high. When there are fewer numbers, especially of breeding stock (100 -180), prices tend to be high.
- There needs to be a critical mass of buyers (10-20), otherwise the prices will be low as the buyers won't compete or will buy what they need and leave early.
- A state levy of 5% is paid on all stock sold on auction to the Red Meat Producers Organisation (a parastatal).
- Often a further amount is charged per animal to pay for the auction and the livestock association that called it. Whether the buyer or seller pays this should be agreed on before the sale and communicated, as it can cause problems.
- Sometimes farmers who are not members of the association can present goats at the auction, but these are auctioned last and as a result may sell for lower prices.
- Animals need to be tattooed with a minimum of a diptank number and optimally with the owner's personal tattoo. They must also be treated for worms and ticks before the auction and the seller must provide proof of ownership.
- Farmers need to agree on a minimum selling price beforehand with the auctioneers, otherwise prices may not be acceptable to the farmer and they will lose money.
- The Livestock Anti-theft Unit must be informed of the sale and preferably be present.
- The post-auction process needs to be well organised so that farmers can get paid or take their unsold goats back home, otherwise the animals can get mixed up.
- Advertising for the auction must be done well in advance so that buyers from further away can plan to attend.

Basic infrastructure for an auction





Options for financing auctions:

- Subsidised auction – this can be paid for/subsidised externally by the state or NGOs. Here an entity separate from the livestock association or farmer group carries the cost of the process and infrastructure.
- Private or industry-paid auction – This is the more common type. The farmers' association or similar structure pays the auctioneer to hold the auction. In addition, the auctioneers charge a fee per animal sold (often 8%). Often if a minimum number of good quality animals is guaranteed, the auctioneers will not charge the livestock association anything and will make sufficient profit from the commission charged.

Items that need to be considered as costs for auctions:

- **Advertising and informing buyers** – this is done by the auctioneer through appropriate newspapers and publications. An sms system is commonly used to inform buyers who have a relationship or history with the auctioneer. Advertising in national media outlets can cost up to R50,000. An sms system is charged at cost of bulk sms which is approximately R0.35 per sms.
- **Informing sellers** – this should be done by the livestock association.
- **Sale pens** – there is a need for gates that can be erected in a way that goats can be kept in separate lots and channelled to the auction arena and then kept in separate groups belonging to different buyers. Access to a loading ramp facilitates the loading of goats after the auction (see diagram on the previous page).
- **Administration** – to mark each goat coming in, check that ownership is legitimate and agree on conditions of sale, to hold and control the goats in lots, feed them and water them, and to separate and hold them for buyers.
- **Food and water** – for the goats.
- **Catering** – for the buyers.
- **Financial systems** – these is often the largest cost for an auction, to allow transfers of moneys between buyers and sellers. It is preferable if sellers are paid electronically by the buyer, but options for paying with a cheque or cash may also be required. Cash liquidity is a requirement. The auctioneer usually carries the financial liability and sells goats to buyers who deposit the totals electronically in the auctioneer's account. The auctioneer often pays out the sellers before he has the money from the sales. This means the auctioneer needs a reasonably large credit facility and relationships of trust with buyers.
  Cheques are the payment of choice for farmers as they receive them on the same date as the sale and they can be post-dated to give the auctioneer time to be paid out by the buyers. Banks are withdrawing cheques as a payment system so vouchers or money transfers of various types are the next best system. Facilitators need to look at what the best systems for each are.
- **Security** – goats are sometimes brought in early, on the night before the auction, and need to be guarded. The premises, which are assembled several days before the auction, also need to be watched to prevent theft and damage.

- **Auctioneers** – to conduct the auction.
- **Transport** – to transport goats to the auction and if unsold, to transport them back home.
- **Tent and stands/seats for buyers** – permanent structures can cut these costs. Auctions can cost up to R500 000 per event.

Infrastructure of sales

For any formal or semi-formal sales a sales site to restrain goats that are being sold needs to be erected. Very few goat specific sales sites are available so arrangements must be made to adapt the local cattle sales yard into a goat sales yard or create a mobile sales site. The latter is much more expensive. The cattle sales yards can often be adapted by using shadecloth hung over the cattle yards to stop goats escaping.

Note use of shadecloth over the poles

A permanent structure of fencing and gates can be constructed. It may be liable to pilfering, but is very cost effective.

Gates specially made by local engineering works with slats small enough to stop goats can be used. These are usually 3 metres by 1.5 metres and can be transported on site and erected in a short time by interlocking them. They are a large initial outlay but can be used almost indefinitely.

To make a set of 4 enclosures for a sale of 60 goats, two pens for goats to be sold and two for sold goats would require 12 gates. A small auction would need between 60 and 120 of these gates to make 20 pens each able to hold 15 goats, totalling 300 goats. A 600-goat sale would need 120 gates.

Farmer-led markets

These are markets regulated by farmers'/livestock associations and cover small geographic areas. They can be held at monthly events like social grant days or market days, and are an alternative to large, formal auctions.

Advantages

- There is control and oversight so there is less selling of stolen goats
- As it is a regular event, there is more than one buyer so competition should lead to higher prices
- Farmers can walk their goats to the market point and back
- If there are enough goats, buyers' prices will stabilise
- Associations charge a smaller commission but still get the benefit of organising it for their members, and by being present they control stock theft issues.
- Being regular events, the farmers can plan and manage their herds in order to produce numbers needed for household income (e.g. planned sales versus selling only when quick cash is needed)
- There is a higher level of quality assurance for the buyers
- It can set a market environment where farmers know they can sell regularly and safely.

Disadvantages

- There can still be speculators setting low prices
- There are fewer buyers as markets are localised
- The whole system of carrying cash in the community is still a problem
- The ebb and flow of supply and demand is not clear so prices and numbers can fluctuate dramatically.

Informal sales as an alternative to formal auctions

This is where sellers and buyers meet in the field without oversight or planning.

Advantages

- There is no organising
- The seller agrees on the price with the buyer.

Disadvantages

- There is no assurance for the buyer that the goats are not stolen
- Sellers are not always informed of what their goats are worth, and so a local speculator can often abuse the pricing
- The health of the animal cannot be guaranteed
- Farmers often sell at times when they need money so they may be more likely to take a lower price as they need quick cash.

Individual (rope) sales (above) and back of bakkie sales (below)

Other types of sales

Bakkie sales

- Found in most urban African centres
- Informal and unregulated
- Goats are often of poor quality and condition
- Bought for urgent need at a high price

- Goats sold from enclosures in small towns usually have no regulation or control. Often bought in numbers from local farmers and sold as is.
- The largest market for live goats from Namibia is KwaZulu-Natal (see table in Section 19.9). These are brought in on consignment and cannot be quantified, but fluctuate between 150 000 and 1 000 000 a year from Southern Namibia.

  Challenges:

  – They are often stressed from the journey that takes days in changing environments
  – They are only expected to live a couple of weeks before being slaughtered
  – The consignment system can lead to abuse of sellers as they have to drop and go once they are here
  – There are only a few speculator/exporters who are prepared to brave the market which leads to many claims of abuse
  – The veterinary restrictions are seen as restrictive.

18. Transporting goats

Marketing of goats will require transporting them from the farm to the market. It might also be necessary to bring in goats from elsewhere at some stage. It is useful to consider what can be done to ensure that the goats travel quietly and safely without being injured or becoming ill. Note that there are legal requirements that people need to look up and be familiar with.

The vehicle must have:

- Sides high enough to prevent jumping
- Shelter from rain and wind as goats are sensitive to cold (shadecloth on the sides will help)
- A floor that prevents slipping
- Partitions to control movement of animals (if it is a large vehicle)
- No sharp edges, gaps or loose items that can cause injuries
- Sufficient ventilation while providing protection against bad weather conditions
- The driver must drive smoothly so that goats do not fall down in the vehicle.

Different vehicles used for transporting goats

Density of goats in the vehicle:

- Do not overcrowd goats – each goat must have at least 0.4 m^2 space (1 m x 0.5 m)
- Do not have too few or they will be thrown around the vehicle. It might be better to restrain a single animal in a sack (but not for more than 4 hours at a time).

Long distance travel:

- Allow all goats to have access to water and food up until loading
- A single trip must not exceed 36 hours (this means leaving at 5am on one day and arriving at the destination by 5pm the following day)
- For longer trips, goats should be rested at least every 24 hours. The rest involves removing them from the vehicle for a 12 hour period and providing them with feed and water
- Goats should be administered with **Multivax P** as soon as possible once a farmer knows the goat will travel to give them some immunity before they go
- On the day of transport, the goats should receive a dose of long acting tetracycline.

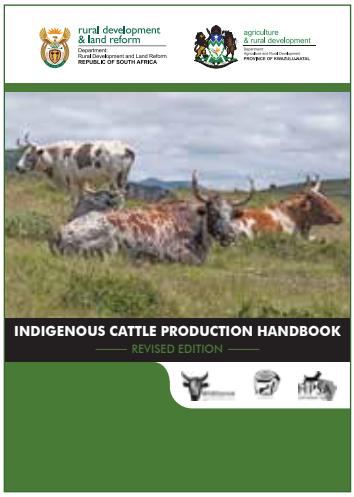
PART 4

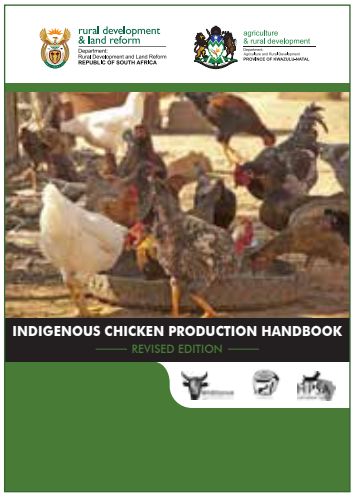
Value adding, tools and resources

19. Resources

19.1 Website and resource materials

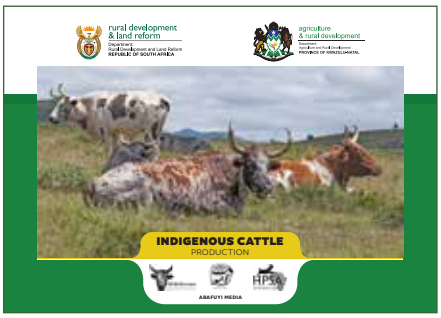
This book is a part of a series of books. The others in the series are **Indigenous Cattle Production** and **Indigenous Chicken Production**.





The websites of Mdukatshani, GAP and HPSA are a resource to use together with this book. They have training videos on these interventions as well as .PPT presentations for download which facilitators or practitioners can use to further train farmers on these interventions. They are available for **Goat Management**, **Chicken Management**, **Cattle Management** and **Resources**, all with a focus on improving production in rural homesteads.

These are linked to AgriSETA approved training modules. All these materials are not for sale, but can be downloaded free and used with appropriate accreditation to Abafuyi Media.



The sites are:

- Goat Agribusiness Project **www.gapkzn.co.za**
- HPSA **www.hpsa.org.za**
- Mdukatshani Rural Development Projects **www.mdukatshani.com**

19.2 Other value adding initiatives

Leather tanning

The market for value adding for skins has been explored extensively and although there is a huge demand, the fact that people slaughter at home at different times of the year means that to collect and properly preserve these skins has been unviable. A local market for goat skins for making traditional leather marriage skirts, izidwaba, does exist. The skins and the finished product have high value but have not been exploited or developed sufficiently.

There is also a market for hair-on leather products like computer bags and handbags as long as the colours are interesting, and the quality is good. The softer and more delicate skin of a goat is easier to work and needs less processing, softening and splitting than cowhide.

Agrivet shops

Agrivet shops are shops where farmers can be assured of getting all their animal care products at reasonable prices and in fair condition. They are able to get vaccines and medicines that have been maintained in a cold chain and are in good condition and within their usage dates. The farmer can also sell products here for other farmers. CAHWs can use an Agrivet shops to stock up and sell products like mineral blocks. They can have a loyalty system to get loyalty from regular buyers with discounts or trainings. Some larger Agrivet shops organise or facilitate stock sales or buy in animals for sale to speculators. An Agrivet shop can be rural or urban and range in size from a spaza shop to a supermarket.

Meat products

Goat meat is consumed more than beef in the developing world but in South Africa it is not sold in shops or in market places. The pricing is a problem as it is competing with goats that are sold for sacrificial purposes. See Section 17.1. South Africa has no abattoirs that are made to handle goats but in countries north of South Africa there are working examples like this one in Tete town Mozambique.

19.3 Community Animal Health Workers

Community Animal Health Workers (CAHWs) are young people who provide farmers with health and production support for their livestock. This creates work opportunities for young people in agriculture and helps women-headed household owners of stock to improve their productivity.

Types of CAHWs

- Animal health paravets
- Supplementary feed production (blocks and winter feed)
- Leather processing
- Agrivet shops and cold chains

Purpose of a CAHW programme

A CAHW is a specially trained local community member who helps farmers to raise healthy animals to maximise their benefits. CAHWs have a wide range of tasks to perform, like providing basic preventive health care, training and advisory services. Through regular household visits, they provide

a critical link between farmers, livestock associations, local government offices and state vets. Various names are used interchangeably for CAHWs, such as community livestock workers (CLW) or paravets. The primary purpose of a CAHW programme is to help prevent animal mortality and disease outbreak while increasing productivity.

The need for a CAHW programme

There are three primary factors leading to the need for a CAHW programme. These are the positioning of state vets, the cold chain process and farmers' limitations.

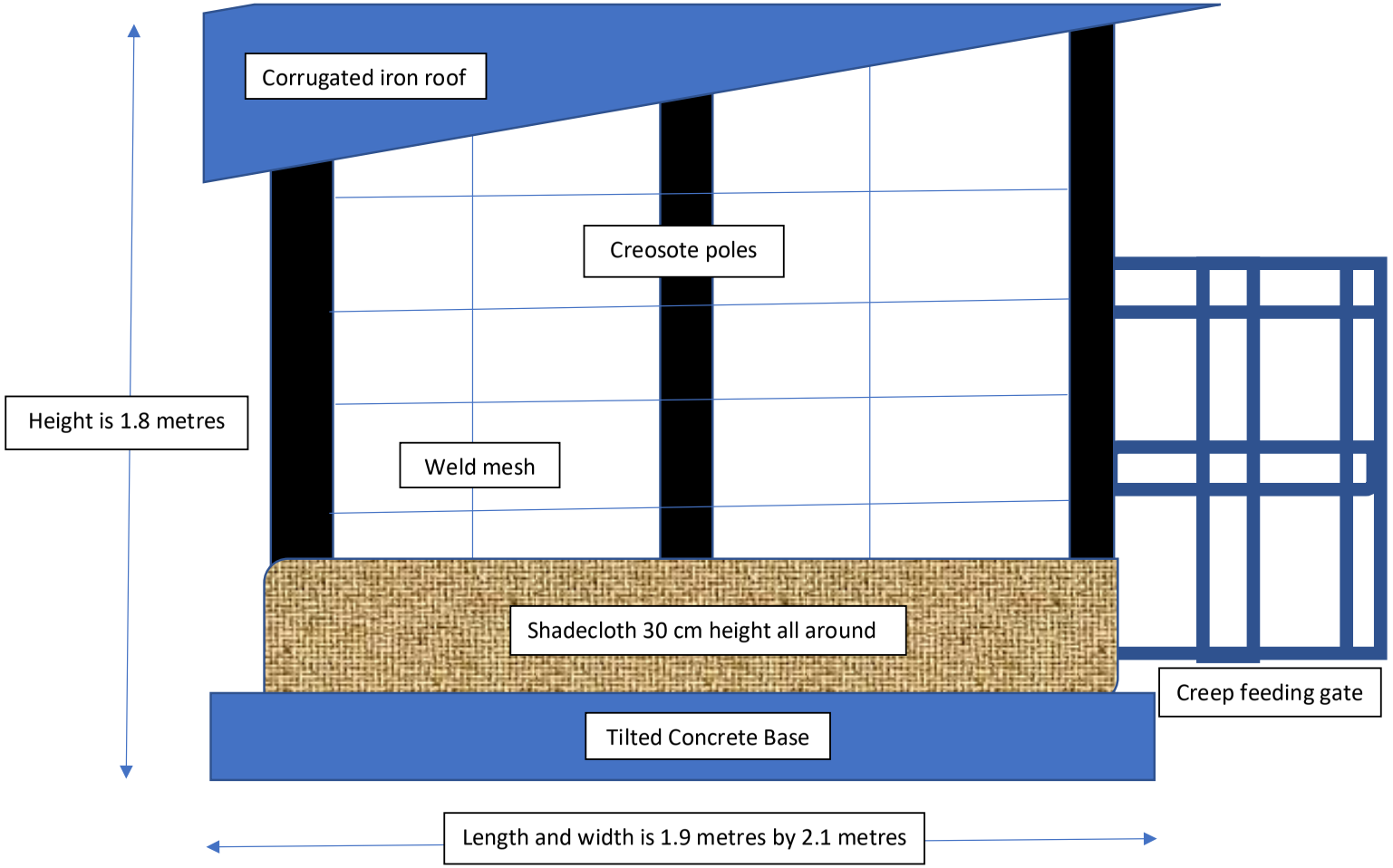
Limitations of a CAHW programme

1. **Limitations** – a CAHW is not legally allowed to inject or dose a farmer's animal for profit. But he/she can charge for diagnosing and selling medicine to the farmer. This is South African law around veterinary practice and professionals charging for their skills.

2. **Control diseases and zoonotics** – diseases by their very nature are contagious and should be referred to vets.

3. **Referrals** – a CAHW identifying or suspecting a controlled disease outbreak or a zoonic disease must by law inform the state vet. Where there is an outbreak of a disease or condition that falls outside of these that the CAHW cannot identify and what does not know how to treat they should initially request support from the state vet and production officials. If this is not forthcoming, they should take this issue to a private vet to try and get help. See **www.gapkzn.co.za** for more information.

19.4 Goat enclosure



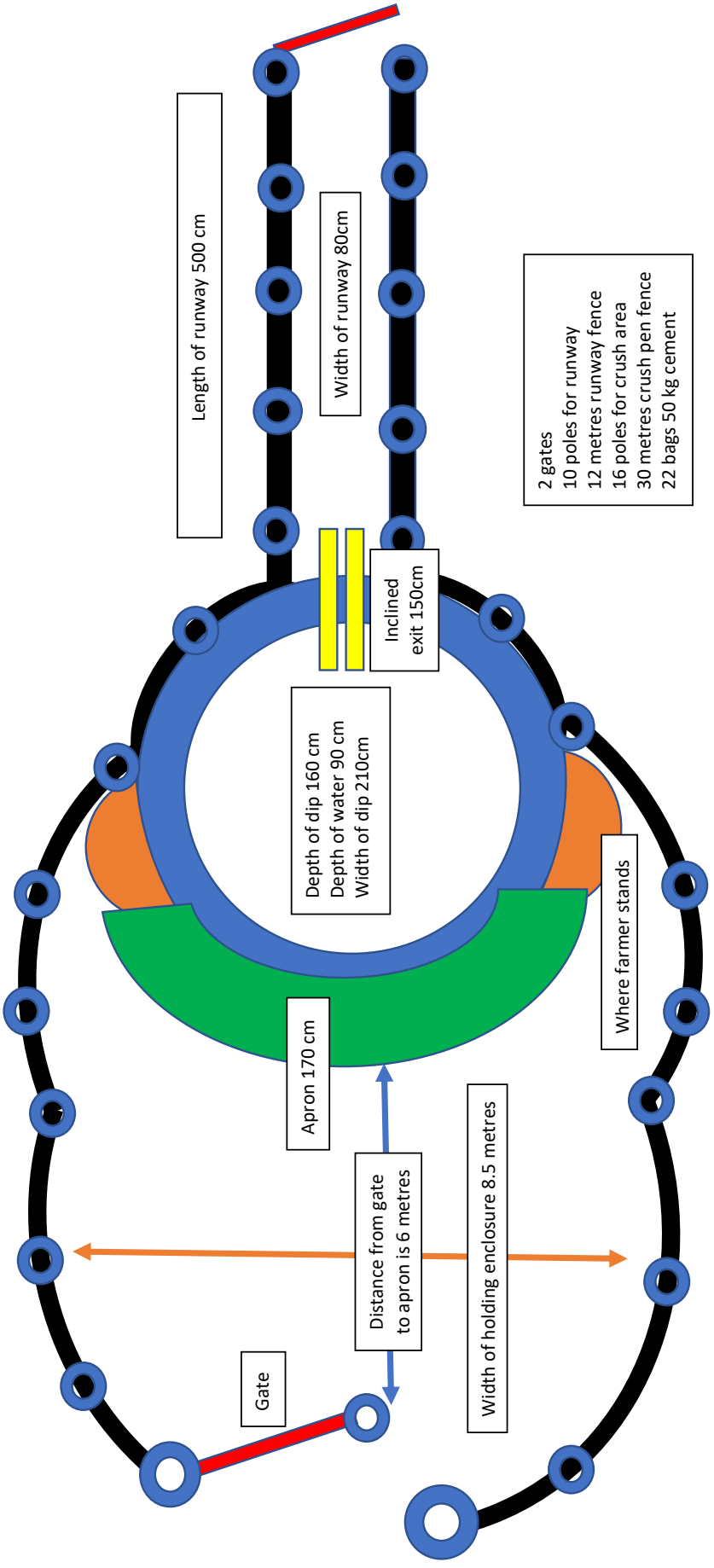
Cement × 2 bags
Corrugated iron: 3 × 2.4m
Creosote poles: 8 x 1.6m
Weld mesh or wire netting: 10m
Planks: 5.4m x 125mm x 25mm
Nails: 500g of 100mm
Nails: 500g of 50mm
Roofing screws x 50
Pvc glue x 250ml
Half round gutter x 6m
Stop ends for gutters x 6
Brackets for gutters x 9
Cable ties: 1 packet
Shade cloth x 4m x 50cm of 80%
Metal elbows x 6

2 by 2 metre shed will hold 15 kids

4 by 2 metre shed will hold 30 kids

4 by 4 metre shed will hold 60 kids

19.5 Dip spec sheet



19.6 Composition of GAP energy blocks

Recipe for goat energy blocks (referred to in Section 13.3)

Ingredient	Recipe by volume (litres)	Recipe by weight (kg)
Coarse salt	4	3
Procon 33	32	19
Maize meal	14	10
Liquid molasses	16	21
Whitewash	8	7
TOTALS	**74 litres**	**60 kg**
YIELD	**46 blocks**	**46 blocks**

Goats need to be adapted to blocks to prevent disease and death!

This block is meant as a supplement and must not be fed to goats as their only source of food. **Kids can safely eat 300 g a day if adapted.** Kids: for 10 days feed 100 g per kid per day, 13 kids per block. **Mothers can safely eat 500 g a day if adapted.** Mothers: for 10 days feed 200 g per goat per day, 7 mothers per block.

Block breakdown	DM	CP	ME	Fat	Ca	P
As fed basis	**%**	**g**	**MJ**	**g**	**g**	**g**
Energy block (1 kg)	83	126	8.1	17.2	5.1	3.1
As dry matter basis						
Energy block (1 kg)	100	151	9.7	20.5	6.1	3.7
Abbreviations: DM - Dry matter; CP - Crude protein; ME - Energy; Ca - Calcium; P - Phosphorous						

19.7 The need to know your goat's weight

For good animal husbandry, the measurement of live body weight is absolutely essential for health management, breeding, nutrition and marketing. For example:

- To administer the proper dosage of dewormers and other medication
- To determine the wellbeing of the goat or the presence of problems
- To be able to feed animals properly
- To be able to ensure that young female animals are mated at the ideal weight
- To be able to sell animals at a specific weight.

Determining live weight

A weight belt is a specially marked tape used to measure the heart girth and convert that measurement to a fairly accurate estimate of the goat's live weight (see Section 5.2). It provides a practical alternative solution for those farmers who do not have access to a weighing scale.

On this page is an example of a goat weight belt. The weight belt was designed by studying the correlation between live weight (measured in kg) and heart girth (measured in cm) on 1200 indigenous goats, boergoats and crosses between indigenous and boergoats. Farmers can make a weight belt themselves using the information in this table to measure out the centimetre values on a piece of canvas or pvc (non-stretching material) and writing the corresponding weight with a permanent marker.

Girth (cm)	Weight (kg)
37.7	5
45.9	10
53	15
59.2	20
64.8	25
69.9	30
74.5	35
78.7	40
82.6	45
86.3	50
89.7	55
92.9	60
96	65
98.9	70

For more detail, read article:

De Villiers, J.F., Gcumisa, S.T., Gumede, S.A., Thusi, S.P., Dugmore, T.J., Cole, M., Du Toit, J.F., Vatta, A.F. & Stevens, C. 2009. Estimation of live body weight from the heart girth measurement in KwaZulu-Natal goats. Appl. Anim. Husb. Rural Develop, Vol 1, 1 – 8: www.sasas.co.za/aahrd/

19.8 Improved breeding system

To address management factors, it is recommended that a certain breeding season is practiced, allowing for improved, controlled management of the herd. This is only possible if you can prevent rams from mating with your ewes. If possible, it is best to limit the breeding season to a six week period so that you can manage kids as a single group. The farmer must develop a plan that best suits his/her circumstances and consider the following: When are parasites bad? When is feed limited? When is weather bad for kids? A further advantage by kidding at a specific time/period is that it makes it easier to identify ewes/does that do not kid and raise the kids.

The optimal kidding time is from April to September when the weather is drier and the parasite burden lower. During rainy periods, parasites contribute to kid losses. A better system (if mating can be controlled) is to mate the goats in November/December so that they kid (give birth) in April/May the following year. During this period there is plenty of grass and browse and the kids can be weaned on maize residues. In some areas it has proved best for goats to give birth in November when there is forage available and the kids have a chance to grow before the start of the dry season. This would require them to mate around June-July.

Spring kidding

An autumn breeding season, leading to spring kidding depends on grazing quality and fodder flow.

Advantages:

- Fertility is high
- Offspring are weaned on good quality pasture
- Young ewes are mated for the first time at 18 months in the autumn.

Disadvantages:

- Kidding in September/October when dry matter availability is limited
- Internal parasites are severe during spring and summer and kids are particularly susceptible
- Cold spells during September may cause mortalities.

Autumn kidding

Advantages:

- Dry matter is abundant during kidding season (May/April)
- Internal parasite infestation is lower and the young are generally healthier
- Weaned kids can be set to utilise maize crop residues which, when supplemented with a protein/nitrogen lick, can be adequate to finish them for the market.

Disadvantages:

- Lower kidding rates
- The 18-month-old replacement females will be mated during a period of reduced sexual activity.

19.9 Costing goat inputs and sales prices

The main supplier for the South African market for live goats is Southern Namibia. A visit in 2017 revealed the following figures of goat farmers' inputs and possible profits once the goat was landed in KwaZulu-Natal, South Africa. The Msinga reference point is what a rural farmer in KZN would expect to see in terms of expenditure.

	Msinga	Namibia communal	Namibia commercial
Feeding costs	R40	R45	R55
Vet costs	R50	R30	R30
Herding costs	0	R50	R0
Breeding stock	0	R5	R80
Transport (inspection, purchasing supplies and feed, sales)	0	R30	R40
Enclosure	R100	R60	R120
Labour	R100	0	R20
Land	0	0	R30
Water	0	R3	R7-40
Auction levy	R20	R49	R49
Total	R310	R272	R464
Goat sales for	R1000	R750	R750
Profit	**R690**	**R478**	**R380**
Profit	**69%**	**63%**	**33%**

19.10 Determining the profitability of the business

Examples of assumptions:

- Mortality rate in kids is 20%
- Mortality rate in adults is 10%
- 20% twinning rate
- Goats kidding twice in 18-month period
- Kidding 50% males 50% females
- 80% of male kids will be castrated with the goal of selling at 3 years
- 20% of reproducing females will be culled every year
- 40% of female kids will be retained yearly for breeding stock
- 100% of 3-year-old castrates sold each year, e.g. all of year 1 castrated kids will be sold at year 3 plus 33% of existing year 1 castrates
- Year 3 sales of 3-year-old castrates will spike due to selling the ones born in year 1 plus the remaining 33% from existing castrates in year 1
- 3-year-old castrates compose 33% of castrates due to varying ages
- Bucks are sold after 5 years and replaced from young uncastrated male pool
- 40% of uncastrated males sold each year
- No male kids are sold each year
- 3-year-old castrates sold at R1500
- 1-year-old females sold at R900
- Culled older females sold at R800
- Uncastrated males sold at R1200
- Bucks sold at R1500
- Farmer is spending an average of R200 per year per goat; or R100 as specified.

Note: The money spent per goat per year (See last bullet) must cover medication, vaccinations, supplementary feeding. The amount that you spend will vary according to where you are farming and the amount of natural vegetation available for your goats.

Herd Composition Goal of 10 Average

	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7	
Bucks	1		1		1		1		1		1		1	
Young uncastrated males	1		1		1		1		1		0		1	
Castrates	3		4		5		4		3		5		5	
Reproducing Females	5		5		5		5		5		5		4	
Total (not including kids)	**10**		**11**		**12**		**11**		**10**		**10**		**12**	
Kids Male	4		4		3		3		3		3		3	
Kids Female	4		4		3		3		3		3		3	
Total Including kids	**17**		**19**		**19**		**17**		**17**		**17**		**18**	
Sales														
Bucks	0	R -	0	R -	0		0		0		2	R 3 000	0	
Young uncastrated males	0	R 480	0	R 570	1	R 612	1	R 629	1	R 632	0	R 185	0	R 391
Castrates	1	R 1 485	1	R 2 178	4	R 5 805	1	R 1 819	1	R 1 594	1	R 2 247	2	R 2 661
Culled Females	1	R 800	1	R 800	1	R 767	1	R 751	1	R 735	1	R 720	1	R 705
Kids Male	0	R -	0	R -	0	R -	0	R -	0	R -	0	R -	0	R -
Kids Female (1 year old)	2	R 1 944	2	R 1 904	2	R 1 864	2	R 1 825	2	R 1 787	2	R 1 750	2	R 1 714
Total Sales	**5**	**R 4 709**	**5**	**R 5 452**	**7**	**R 9 049**	**5**	**R 5 024**	**4**	**R 4 748**	**6**	**R 7 903**	**5**	**R 5 471**

Average sales per year (not including year 3) **5551**

Profit	**Year 1**		**Year 2**		**Year 3**		**Year 4**		**Year 5**		**Year 6**		**Year 7**	
	avg R200 per goat	*avg R100*	*avg R200 per g*	*avg R100*	*avg R200 per goat*	*avg R100*	*avg R200 per g*	*avg R100*	*avg R200 per goat*	*avg R100*	*avg R200 per goat*	*avg R100*	*avg R200*	*avg R100*
Income	**R 4 709**	**R 4 709**	**R 5 452**	**R 5 452**	**R 9 049**	**R 9 049**	**R 5 024**	**R 5 024**	**R 4 748**	**R 4 748**	**R 7 903**	**R 7 903**	**R 5 471**	**R 5 471**
Expenses	R 3 440	R 1 720	R 3 707	R 1 854	R 3 833	R 1 917	R 3 488	R 1 744	R 3 350	R 1 675	R 3 382	R 1 691	R 3 589	R 1 794
Net Profit/Loss	**1269**	**2989**	**1745**	**3599**	**5215**	**7132**	**1536**	**3280**	**1398**	**3073**	**4521**	**6212**	**1882**	**3676**

Profit breakdown	*avg R200 per goat*	*avg 100*
3 year castrate	900	1 200
1 year old female	700	800
Culled females	-200	300
Uncastrated males	800	1 000

Average profit (with costs at R200 per goat) per year **R 2 059**

Average profit (with costs at R100 per goat) per year **R 3 805**

Herd Composition Goal of 20 Average

	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7	
Bucks	1		2		2		2		2		2		2	
Young uncastrated males	3		3		3		3		3		1		2	
Castrates	5		9		11		8		7		10		12	
Reproducing Females	11		11		11		10		10		10		10	
Total (not including kids)	**20**		**25**		**26**		**23**		**22**		**23**		**25**	
Kids Male	8		8		8		7		7		7		7	
Kids Female	8		8		8		7		7		7		7	
Total Including kids	**36**		**40**		**42**		**38**		**37**		**37**		**39**	
Sales														
Bucks	0	R -	0	R -	0		0		0		2	R 3 000	0	
Young uncastrated males	1	R 1 440	1	R 1 462	1	R 1 459	1	R 1 444	1	R 1 422	0	R 523	1	R 930
Castrates	2	R 2 475	3	R 4 315	8	R 11 979	3	R 3 978	2	R 3 492	3	R 4 935	4	R 5 847
Culled Females	2	R 1 760	2	R 800	2	R 1 688	2	R 1 652	2	R 1 618	2	R 1 584	2	R 1 551
Kids Male	0	R -	0	R -	0	R -	0	R -	0	R -	0	R -	0	R -
Kids Female (1 year old)	5	R 4 277	5	R 4 188	5	R 4 101	4	R 4 015	4	R 3 932	4	R 3 850	4	R 3 770
Total Sales	**10**	**R 9 952**	**11**	**R 10 765**	**16**	**R 19 227**	**10**	**R 11 090**	**10**	**R 10 464**	**12**	**R 13 892**	**11**	**R 12 098**

Average sales per year (not including year 3) **11377**

Profit	**Year 1**		**Year 2**		**Year 3**		**Year 4**		**Year 5**		**Year 6**		**Year 7**	
	avg R200 per goat	*avg R100*	*avg R200 per g*	*avg R100*	*avg R200 per goat*	*avg R100*	*avg R200 per g*	*avg R100*	*avg R200 per goat*	*avg R100*	*avg R200 per goat*	*avg R100*	*avg R200*	*avg R100*
Income	**R 9 952**	**R 9 952**	**R 10 765**	**R 10 765**	**R 19 227**	**R 19 227**	**R 11 090**	**R 11 090**	**R 10 464**	**R 10 464**	**R 13 892**	**R 13 892**	**R 12 098**	**R 12 098**
Expenses	R 7 168	R 3 584	R 8 009	R 4 004	R 8 323	R 4 162	R 7 649	R 3 825	R 7 339	R 3 669	R 7 444	R 3 722	R 7 882	R 3 941
Net Profit/Loss	**2784**	**6368**	**2756**	**6760**	**10904**	**15065**	**3441**	**7266**	**3126**	**6795**	**6448**	**10170**	**4217**	**8157**

Profit breakdown	*avg R200 per goat*	*avg 100*
3 year castrate	900	1 200
1 year old female	700	800
Culled females	-200	300
Uncastrated males	800	1 000

Average profit (with costs at R200 per goat) per year **R 3 795**

Average profit (with costs at R100 per goat) per year **R 7 586**

Herd Composition Goal of 60 Average														
	Year 1		**Year 2**		**Year 3**		**Year 4**		**Year 5**		**Year 6**		**Year 7**	
Bucks	2		2		2		2		2		2		2	
Young uncastrated m	10		9		8		8		7		6		7	
Castrates	13		22		27		20		17		24		29	
Reproducing Females	27		26		26		25		25		24		24	
Total (not including k	**60**		**59**		**63**		**55**		**52**		**57**		**61**	
Kids Male	19		19		19		18		18		18		17	
Kids Female	19		19		19		18		18		18		17	
Total Including kids	**99**		**97**		**100**		**91**		**87**		**92**		**96**	
Sales														
Bucks	0	R -	0	R -	0		0		0		2	R 3 000	0	
Young uncastrated m	4	R 4 800	4	R 4 272	3	R 3 951	3	R 3 744	3	R 3 599	2	R 2 743	3	R 3 158
Castrates	4	R 6 435	7	R 10 809	20	R 29 763	7	R 9 775	6	R 8 578	8	R 12 117	10	R 14 356
Culled Females	5	R 4 320	5	R 800	5	R 4 142	5	R 4 056	5	R 3 972	5	R 3 889	5	R 3 808
Kids Male	0	R -	0	R -	0	R -	0	R -	0	R -	0	R -	0	R -
Kids Female (1 year o	12	R 10 498	11	R 10 279	11	R 10 065	11	R 9 856	11	R 9 651	11	R 9 450	10	R 9 254
Total Sales	**25**	**R 26 053**	**27**	**R 26 160**	**39**	**R 47 922**	**26**	**R 27 432**	**24**	**R 25 799**	**28**	**R 31 200**	**27**	**R 30 576**

Average sales per year (not including year 3) **27870**

Profit	**Year 1**		**Year 2**		**Year 3**		**Year 4**		**Year 5**		**Year 6**		**Year 7**	
	avg R200 per goat	*avg R100*	*avg R200 p*	*avg R100*	*avg R200 p*	*avg R100*	*avg R200 p*	*avg R100*	*avg R200 p*	*avg R100*	*avg R200 per*	*avg R100*	*avg R200*	*avg R100*
Income	**R 26 053**	**R 26 053**	**R 26 160**	**R 26 160**	**R 47 922**	**R 47 922**	**R 27 432**	**R 27 432**	**R 25 799**	**R 25 799**	**R 31 200**	**R 31 200**	**R 30 576**	**R 30 576**
Expenses	R 19 776	R 9 888	R 19 449	R 9 724	R 20 055	R 10 027	R 18 281	R 9 140	R 17 479	R 8 739	R 18 300	R 9 150	R 19 131	R 9 565
Net Profit/Loss	**6277**	**16165**	**6711**	**16435**	**27867**	**37895**	**9151**	**18291**	**8321**	**17060**	**12899**	**22050**	**11445**	**21010**

Profit breakdown	*g R200 per goat*	*avg 100*
3 year castrate	900	1 200
1 year old female	700	800
Culled females	-200	300
Uncastrated males	800	1 000

Average profit (with costs at R200 per goat) per year **R 9 134**

Average profit (with costs at R100 per goat) per year **R 18 502**

19.11 Monthly Record

Date: _____ Farmer's name: _____ Village: _____

Medicinal inputs	Cost	Feed inputs	Cost	Other inputs	Cost

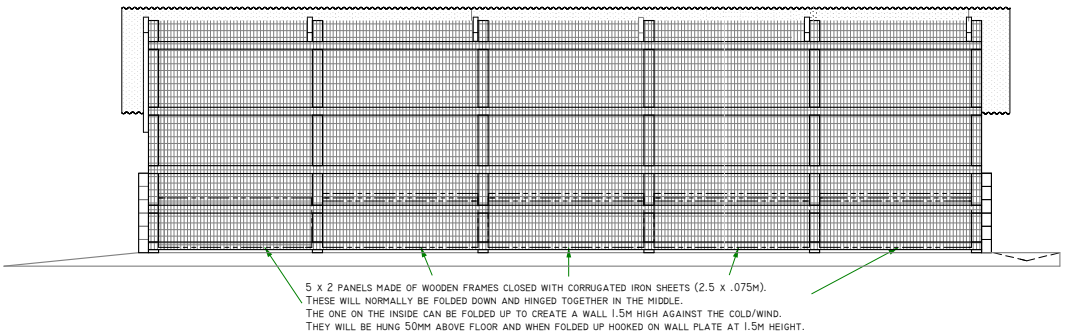
Diseases affecting goats	
Symptoms shown	
Treatment of disease	
How many ewes gave birth since last visit?	

	Date:		GOATS COMING IN							GOATS GOING OUT						
	Number of goats last month	Movements between age groups	Kids born	Single births	Twin births	Through damages	Through swapping	Through other means		Through other means	Sales	Slaughtered	Damages / fines	Stolen/ missing	Deaths	Number of goats this month
Adult ewes																
Young ewes (maidens)																
Rams																
Castrates																
Female kids (Separated)																
Male kids (Separated)																
Female kids (Unseparated)																
Male kids (Unseparated)																
TOTAL																

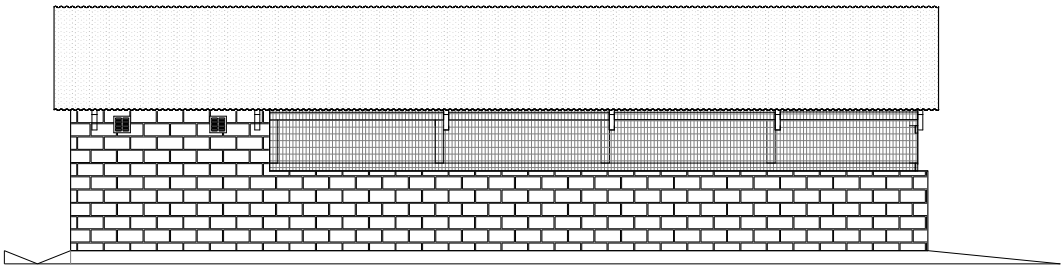
Other information

19.12 Alternative design for a goat shed

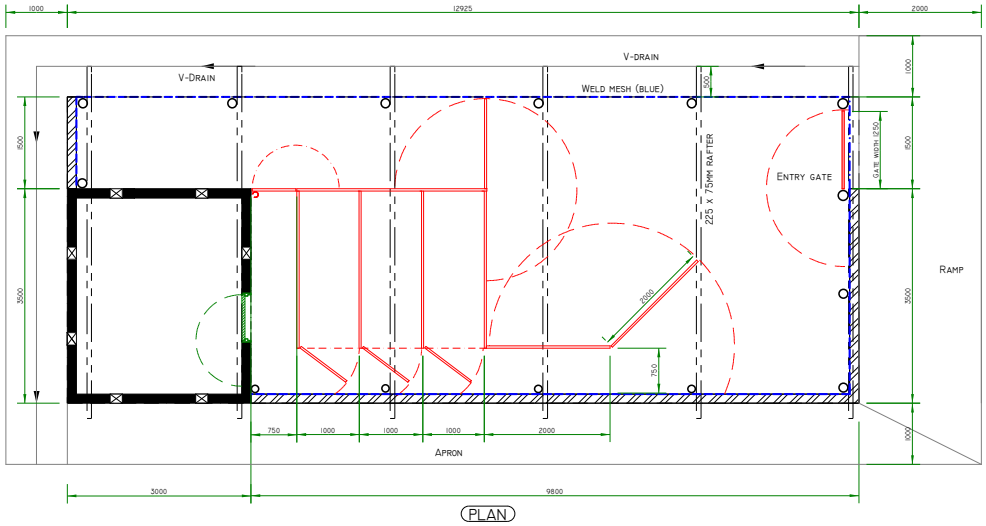
Below is the design for a commercial goat shed. The drawings show different views of the shed.



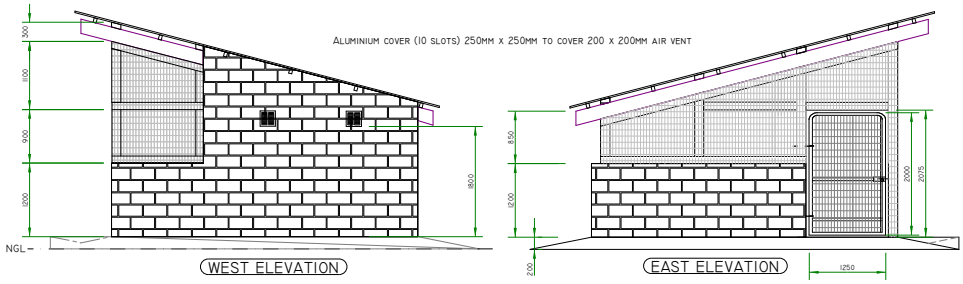
NORTH ELEVATION



SOUTH ELEVATION



PLAN



WEST ELEVATION

EAST ELEVATION

For more information visit our websites:

www.mdukatshani.com
www.hpsa.org.za
www.gapkzn.co.za