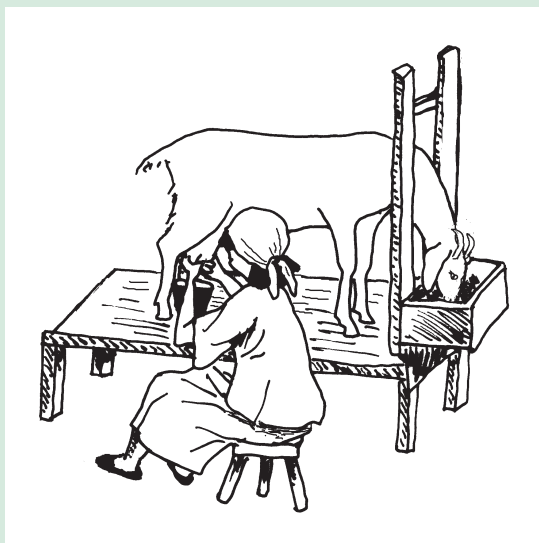
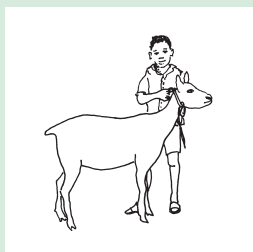


# Goat keeping in the tropics

Agrodok 7 - Goat keeping in the tropics



partageons les connaissances au profit des communautés rurales  
sharing knowledge, improving rural livelihoods

# **Agrodok 7**

## **Goat keeping in the tropics**

Carl Jansen  
Kees van den Burg

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# Foreword

Agromisa's Question and Answer Service receives many questions on goat keeping. We therefore have written this practical Agrodok on goat keeping. The aim is to provide basic information for those who work directly with the small-scale goat farmers in the tropics.

It is not our intention to be comprehensive. For those who wish to know more: a number of good in-depth books are mentioned in the bibliography.

In writing this book, we made use of materials of others. We wish to thank all those who have contributed to this Agrodok. We especially wish to thank Peter Hofs of the Tropical Animal Husbandry section of the Wageningen Agricultural University for his useful comments.

We hope that this booklet will be useful and interesting for the readers.

The Authors,  
Wageningen, March 1991

## **Foreword to the second revised edition**

In this second revised edition the chapter on nutrition and feeding has been improved by Arno Overgaag, one of Agromisa's animal husbandry experts. Dr. M.N.M. Ibrahim of the Department of Animal Sciences, University of Peradeniya, Sri Lanka, reviewed the revised chapter and Robert Corner did the editing work. Barbera Oranje improved the pictures throughout the whole Agrodok. We are thankful to all of them, for their time and effort they spent on this.

We especially want to acknowledge OXFAM (UK and Ireland) in association with FARM-Africa, who have granted us permission to use some of the illustrations from their excellent publication: 'Improving Goat Production in the Tropics' (1996).

We are also grateful to ITDG Kenya and Baobab Newsletter (ALIN) who gave us permission to use an article on making salt licks.

Marg Leijdens, co-ordinator Agrodok Publications,  
Wageningen, 2000

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# 1 Introduction - the importance of goat keeping

Goats play an important role in food production systems in developing countries. Their great popularity can be explained by their good adaptation to many different climates (ecological adaptation) and the many uses for which they can be kept.

Goats are especially important in developing countries: in 1981, 96% of the world's goat population of 496 million goats was to be found there (476 million). In those countries, goats make up 20% of the ruminants which are kept as livestock. Goats are particularly important in Africa and the Indian subcontinent (see table 1).

*Table 1: Division of goats in the tropics and the subtropics*  
*Source: Production Yearbook, Vol 33. FAO Rome*

Region	Number (millions)	Percentage
Africa	144.7	41.3 %
East Asia	13.7	3.9 %
West Asia	52.7	15.1 %
Indian Sub-continent	109.8	31.4 %
Central America	10.9	3.1 %
South America	18.4	5.3 %
Total	350.2	100 %

## 1.1 The importance of goats

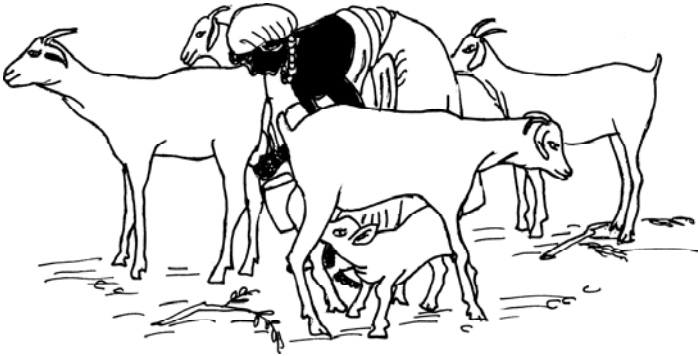
Goats are of high importance to people because of the many functions they provide: they serve as bank account which can be drawn upon when cash money is needed, kids are the interest given; they are used as gifts to strengthen relationships; they are used as sacrificial animal. Furthermore goats provide milk and meat which are high-grade food-stuffs for people.

Goats are much tougher than cattle, they are small animals and cost less per animal. Each farmer usually owns a number of goats. Goat keeping therefore touches on many people's lives.

## 1.2 Attractive properties

For the small-scale farmer, the goat has a number of attractive properties:

- The goat is a small animal. Compared to the big animals as cows its value is not very high. This means keeping goats is not too risky.
- It is easier to find feed for a small animal.
- Even small children can control them.
- It is a quickly maturing animal with a high fertility.
- Animals are regularly available for sale or other uses. Restoration of the herd size is also quickly done.
- Goats can maintain themselves well in poor and dry areas, where other ruminants do not succeed.
- In places where sleeping sickness is present, goats can still be kept where cows cannot survive, because there are resistant goat breeds.



*Figure 1: Woman milking her goats (Adapted from: Baobab, 1998)*



## 2 Goat breeding

For the breeding of goats, a good reproduction is of immediate importance to the goat keeper. Good reproduction is the capability of a group of goats to produce many young in a year. Goats can have up to three litters in two years; one litter a year is usual. If more kids mature, you can sell, slaughter or give away more goats. For milking goats, giving birth to more litters also means a greater milk production.

The topics we will discuss here are:

- the sexual maturity of goat and billy-goat,
- the physical condition of both,
- being in heat,
- servicing of a goat,
- gestation (pregnancy)
- birth.

### 2.1 Breeding goats

In a herd, a billy-goat services a young goat as soon as she is sexually mature and the first time she is in heat (see section 2.3 - symptoms of being in heat). At that stage the young goats themselves are still growing. If they get with young, they must divide their energy between their own growth and the development of the kids growing in their womb. The milk production to raise these kids also competes with their own growth. As a result, the goat herself remains smaller and the kids born are smaller and weaker. The death among these kids will therefore be higher.

#### **When can a young goat best be serviced?**

For this you should look at the weight and not at the age of the goat. You should only let young goats be serviced when they have reached three-quarters of the normal, mature weight for that breed. With good nutrition and care, that weight will quickly be reached.

If a goat is not in good health, she will get in heat less regularly and less obviously. That makes it difficult for the goat keeper to control the mating period. To avoid this problem, it is better to first ensure that the animals are in good condition. Good nutrition and the prevention and timely treatment of disease and parasites will help.

Of course it is also important that there is sufficient feed available during the gestation and suckling period. By correctly planning the delivery date (5 months after servicing) through planning of the servicing you avoid problems.

## **2.2 Breeding billy-goats**

After about 4 months of age, a billy-goat is sexually mature. What you should look for is that both testicles have dropped into place. If that is not the case, the sperm production will be insufficient and perhaps even nonexistent.

One billy-goat can service 10 to 20 goats. Young billy-goats should not be offered too many goats; the quality of the services will decline and the billy-goat becomes exhausted. On the other hand, if you have an exceptionally virile billy-goat then it is possible to share him with your neighbours should both of you have small herds of goats.

The same applies here: the billy-goat must be healthy and not too fat. If he is too fat, then his rutting desire will decline and the quality of his sperm will decrease.

### **Hornless males**

In hornless breeds, so-called ‘intersexes’ can occur. These are animals which look like males but are completely infertile. They occur because their sex changes during their development in the womb. Usually they are females which become males. The female sexual organs do not develop and the male sexual organs develop incompletely; thus an infertile animal is created. Should you discover after some time that you are trying to “breed” with such a “billy-goat”, then the best solution is to slaughter the animal.

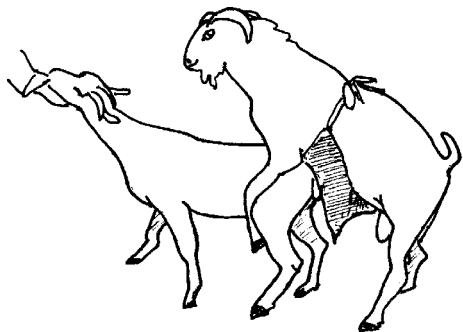
Also in breeds which normally do have horns, hornless billy-goats do sometimes occur. Even if they are fertile and produce offspring, it is better not to use them for breeding purposes as there is a chance of getting 'intersex' offspring.

### 2.3 Symptoms of being in heat

A healthy, sexually mature, not pregnant goat gets in heat every 17 to 21 days. She can then be serviced during 24 - 36 hours. In temperate areas there is usually a clear mating season, which is usually not the case in the tropics. A season-linked rut can occur as a result of a seasonal food shortage: alternation of a dry and a wet season with a great feed scarcity in the dry season. If such a shortage does not occur, there is no clear rutting season. If the goat keeper wants to decide himself when a goat should be serviced, he will have to look himself for the signs of being in heat:

- wagging of the tail, also when you place your hand on the loins of the goat;
- bleating, restless behaviour and jumping on the backs of other goats;
- slightly red and swollen labia (vulva);
- provocative urination in the presence of a billy-goat.

If a billy-goat is nearby, the indications are often more clear. By placing a billy-goat in the pen next to the goats you can easily see which goat wants to be covered; she will stand as close as possible to the billy-goat.



*Figure 2: Billy-goat with cloth to prevent impregnation of the goat (Adapted from: Peacock, 1996)*

A so-called search billy-goat can indicate which goat is in heat. Walk with him past the

goats. Once you know which goat is in heat, you can offer her to the desired billy on the day chosen by you. Be careful that the search billy does not outsmart you! If you wish, you can tie a cloth around the belly of the billy-goat which catches the sperm and thus prevents impregnation.

## **2.4 Servicing**

If the billy-goat has unrestricted access to the goats, you can usually expect kids all year round. A billy-goat which freely walks among the goats will service the goats which are in heat exactly at the right time during the heat and often several times.

For certain reasons it may be that you wish to limit the birth of kids to a certain time of the year. To achieve that, you must then also limit the servicing to a certain period.

The reasons can be:

- avoiding the merging of work peaks (kidding and harvest for example)
- avoiding an unfavourable season, in which for example too little protein-rich feed is available.

If you keep the goats and the billy-goat separate, we advise you to let a goat be serviced twelve hours after the first indications of being in heat. If you wish, you can repeat this 6 hours later. More frequent servicing is unnecessary and the quality of the sperm might decrease.

When a goat is pregnant, she will not come into heat any more. If she does get in heat again after 17 - 21 days, then the goat has not been impregnated. Pay extra attention therefore to the signs of being in heat in those goats which have been serviced after this time period. Let the goat be serviced again if necessary.

### **Influencing reproduction**

There are a number of ways of influencing the reproduction. We will mention two systems here:

➤ *Permanently separating billy-goats and goats*

In this system, you bring the goat to the billy only at the moment she is in heat. Thus you know the exact moment at which the goat has been serviced. Determining when the goat is in heat is therefore done by the goat keeper. This task requires much awareness and is not always easy. The danger is present that you do not notice the heat or too late, with the result that you miss a mating period of the goat concerned. You must then wait 3 weeks before you can again present the goat to the billy. If this occurs regularly, the result will be fewer kids at the end of the year.

➤ *Billy-goats and goats to be serviced are kept together*

In this system, only those goats which should not be serviced are kept separate from the billy-goats. Those goats which must get with young can be kept either the whole day with the billy, or kept in the same stall only at night. The advantage of this system is that the billy-goat ensures that no period of heat is lost. The disadvantage is that you cannot be entirely certain whether a goat has been serviced and when that happened.

## **2.5 Gestation**

Only several months after the servicing can you be entirely certain if a goat is with young. Her belly will get larger and you can feel the foetuses and see them move (right flank of the goat).

The goat has a gestation period of 145 - 150 days (21 weeks). During this period the animals must be left undisturbed as much as possible to avoid them aborting. Especially during the last six weeks of the pregnancy, you must pay extra attention to the feeding of the future mother goat. Give her your better feed (i.e. feed with plenty of protein and minerals).

Eight weeks before the birth, any milk production still remaining from the pregnant goat must be stopped. Wean the existing kids and stop milking (for milking goats). The unborn kid will then continue to

grow well and the mother will be able to produce enough milk again after the birth.

## 2.6 Birth

The birth is announced several days before the event by the swelling of the vulva and udder of the goat.

On the day of the birth, the goat becomes restless and will alternate between standing and lying down. She no longer drinks or eats; her udder is very tense. She sniffs at kids in her neighbourhood. The goat will isolate herself from the herd and will, for example, stand in the corner of the stall.

The vaginal secretion (a slime which protects the birth canal against infections) hangs as a long thread of slime out of the vagina. Usually the goat lies down now, but a standing birth is also possible. The contractions increase in number and intensity.

At the moment of birth the opening in the cervix and the vagina widen.

The kid is surrounded by two bladders (membranes): the inner membrane is the food bladder and around that is the water bladder. These are squeezed out first. These bladders must not be punctured as they help stretching and widen the birth openings.

Eventually the bladders burst one after the other. With a normal positioning, first the two forelegs and later the head of the kid become visible (still covered by the inner membrane). The rest of the kid's body follows in short time, being squeezed out by the continuing contractions.

### **Important!**

In general the birth does not present any problems. Make sure that the surroundings are clean and quiet. Giving birth takes a couple of hours (sometimes less); therefore do not start pulling on the kid after a quarter of an hour! This can damage the uterus and cause infections. What you should do or have done in such a situation is described in the section below on difficult births (2.8).

## **2.7 Care after the birth**

In general the goat is very well capable of caring for her new born kids and if the birth happens without problems, the little ones can already start grazing with the herd the day after the birth.

Still it is a good idea to keep an eye on how the birth progresses and how the young are coping. Problems may occur and your help and care might be needed.

### **The umbilical cord and the membranes**

By the time the kid has been born, the bladders and the umbilical cord should be broken. If this has not yet happened, you must do it yourself. Break it by pulling the umbilical cord until it is constricted so much that it is cut off; do not cut it off!

The kid is wet and plastered with membranes. The mother gets to know her young and licks the young. By licking she removes the membranes and the kid can dry. If necessary help her to remove the membranes

### **Breathing**

After this, more kids may follow. Check that the nose and mouth of the kid are not covered by a membrane or filled with mucus. If necessary remove this (with water); the animal can suffocate otherwise.

If the young animal still has difficulty breathing, you can stimulate it by very briefly immersing the head in cold water. A little salt in the water can dissolve the remaining mucus in the nose. If the animal remains listless, grasp it by its hind legs and whirl it around a few times. Although this may seem rough, it is effective; it stimulates the blood circulation and breathing.

Please note: these are exceptional situations, generally you will not have to resort to such emergency measures.

### **First drinking - colostrum**

The healthy kid will quickly search for the teats of its mother to drink the colostrum. The colostrum is the first milk that the goat produces, and has a fundamentally different composition to that of later milk! It

is of great importance that the kid drinks quickly, a lot and often of this colostrum as the colostrum contains antibodies against diseases. In this way the kid gets its resistance to diseases. Sometimes the teats are blocked with hard plugs of colostrum; if necessary milk these out.

### **Navel infections**

Should the kids sometimes be affected by navel infections, you can heal this (and prevent it) by disinfecting the end of the navel cord.

Use for example iodine tincture, lysoform, chloramphenicol or creoline.

### **Cleaning the pen**

During the birth, a large amount of moisture and mucus gets into the pen which should be cleaned up. Hygiene is important

### **The afterbirth**

The afterbirth usually lets go within twelve hours and is forced out by contractions and the pull of membranes which already hang out. For two to four weeks after the birth, some fluid will still be excreted from the uterus. This is how the uterus cleans itself. The flow of fluid changes colour, from red to brown to clear. If it does not become clear and/or it stinks, then there is an infection of the uterus. The infection must be cured using antibiotics. Internal disinfection of the uterus using a salt water solution (one teaspoon of salt per litre of water) is also possible.



*Figure 3: disinfecting the end of the navel cord*



## 2.8 Difficult births

If a goat has been showing signs of wanting to give birth for a long time and she has strong, continuous contractions but no kid is being born, you must intervene. Regularly contractions exhaust the mother animal. Probably the kid is lying in such a position that it cannot come out, despite the contractions and the pressing.

The correct position of the kid in the womb which leads to a birth without problems is shown in figure 4 A. You can help the goat by turning the kid in the womb, so that it lies in a suitable position for being born. To do so, you (or better somebody who is experienced) must carefully (!) insert your hand and arm into the vagina and birth canal. Feel in what position the kid lies in the womb, the following positions can occur:

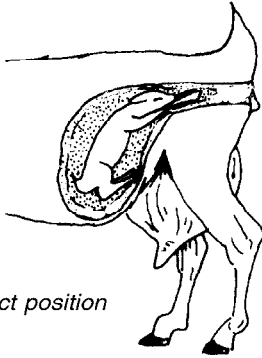
- The kid is lying with its hind legs towards the vulva (figure 4 B). It is impossible to change its position. In this case, the kid should come out backwards (breach birth); the birth should not take too long because if the navel cord breaks and the kid still has its head inside the mother goat, it may suffocate.
- The kid lies backward with folded legs (figure 4C) or the head of the kid is turned (figure 4D) . In these positions it is necessary to first carefully push the kid back towards the uterus, where there is more room to unfold folded legs or turn the head or turn the whole body.

Push in between the contractions when the goat is not squeezing. Remember also that the birth canal points down and that you must therefore never pull upwards towards the tail.

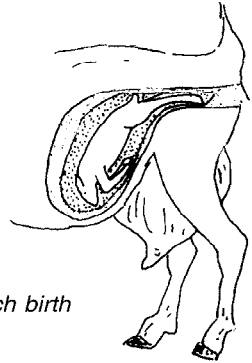
### *Note:*

The tissue in the animal is susceptible to wounds and infections. Therefore it is important that:

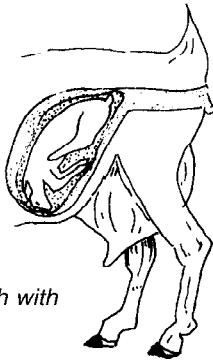
- someone with small hands does this;
- nails are cut short and are not sharp;
- all rings are taken off;
- the hand and arm to be inserted are washed well and disinfected;
- a lubricating fluid is used.



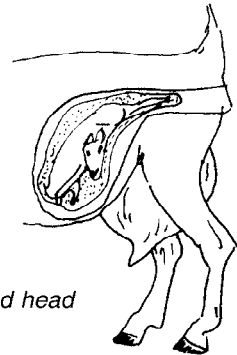
*A: Correct position*



*B: Breach birth*



*C: Breach birth with folded legs*



*D: Turned head*

*Figure 4: Positions of kids in the womb*

## 3 Raising and selection

By “raising”, we mean taking care of the newborn kids until they are sexually mature. The better the care, the greater the number of animals of good quality which will reach maturity.

### 3.1 Raising new born kids

Milk is the first food of the kid. The gastro-intestinal tract of the young goat is geared to properly digesting this energy- and protein-rich food. The first milk of the mother animal, the colostrum, is initially very concentrated, but 24 hours after the birth the milk already closely resembles that which is produced during the rest of the lactation. Apart from nutrients the colostrum contains antibodies which are not yet broken down in the digestive tract of the newborn kid; they are therefore absorbed as a whole through the wall of the intestine by the blood. These antibodies provide protection against certain bacteria. However, the digestive tract quickly changes and all protein is then broken down, including the antibodies. It is therefore important that the newly born animals drink the colostrum as soon as possible after birth, often and a lot. This will be no problem as the kids will find the teats themselves.

Young mother animals, or animals in poor health, sometimes have difficulty accepting their young. You can then either hold the mother still so that the young can drink, or place the young with a mother who will accept them. If the latter has also just given birth, rubbing the “orphan” in with her afterbirth can help with acceptance (scent recognition).

It is important to carefully observe the kids. You will see that one kid is much more active than the others, or grows faster. If a kid stands somewhat listlessly alone, with raised hairs on an arched back, staring straight ahead, then it has not had any milk that day. Avoid letting this go unobserved: know your kids.

## Supplementary feeding

For manual (supplementary) feeding, goat's milk is best. Should no goat's milk be available, for whatever reason, give other kinds of milk. Cow's milk (if necessary made from milk-powder) is an obvious choice; you will have to give it to the kid yourself using a baby bottle or a bowl. Playing with the kid's tail, or offering it a finger to suckle, stimulates it to drink. It is also very important that the milk is at the right temperature, 40 °C. All this is no easy task but can be learned.

Cleaning the bowl or bottle very thoroughly is extremely important! Harmful bacteria quickly multiply in leftover milk and cause diarrhoea.

## Fresh roughage

From several days after the birth on, the kids must have access to daily fresh roughage: grass, herbs, hay, etc. In the beginning the kids will only nibble at this food, nevertheless it is important. With this food, a kid takes in useful bacteria which ensure that the digestive tract becomes adapted to the digestion of roughage.

## 3.2 Weaning the young

After three months a young goat can in principle live entirely off high quality roughage, and could be separated from its mother: this is the so-called weaning. The young are then no longer allowed to stay with the goat so that they can no longer drink from their mother.

Clean drinking water must be available in the weaning period.

Early weaning is important when keeping milking goats as the milk is then available earlier for your own consumption and sale. If the rapid growth of the young goats is more important because of meat production, you can leave them a little longer with the mother goat. Do remember to wean the young goats at least two months before the next gestation period of the mother.

### **3.3 Caring for the young animals**

Young animals need high quality feed to continue to grow well. The best grazing areas should first be for them, in some cases together with their mothers. They can then select the best parts of the plants, and there is less risk they will get a serious worm infection than if they graze with the herd. You can also separately give the animals extra, high quality feed (see Chapter 4 on Nutrition).

### **3.4 Selection**

The reason for selecting animals is maintaining or improving the properties of a group of goats. The relevant properties for production are: reproduction, growth (meat production) and/or milk production.

A goat doing well for all properties does not exist. The goat keeper tries to get goats which are most suited to local circumstances and requirements. To achieve this, goat keepers select goats with desirable properties from the herd and use those goats for breeding. Otherwise you can buy animals from outside, in order to improve the properties of the herd.

#### **Environmental factors**

The properties of a goat are not only determined by its genetic characteristics but also by the possibilities to manifest this characteristic. The extent to which it is possible to do so is determined most by the environmental factors, such as climate, feed (quality and availability), hygiene, housing and general care. It is pointless to start selecting animals if you do not first ensure optimal environmental conditions. By doing so, you will have more rapid results than by selecting for hereditary properties.

#### **Animal factors**

Apart from the environmental factors, animal factors also influence the properties of a goat. Animal factors are: the age, the sex, being in heat or not, carrying young or giving milk, first time bearing young or having had more litters, etcetera. During selection, it is necessary to











































































































































































