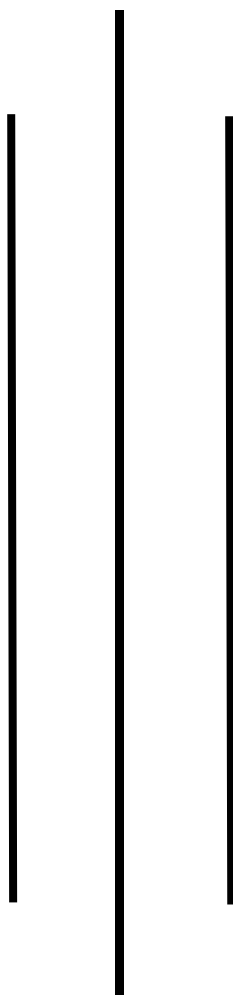


Goat Farming Technical Manual



District Livestock Service Office,
Gorkha

Goat Farming Technical Manual



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Gorkha

Acknowledgement

There is highly potentiality for livestock development due to climate and bio-diversity in Nepal. In the country, there is availability of 64 liter milk, 11 kilogram meat and 32 eggs. There shall be increased in the production of 35% milk, 25% meat and 45% eggs in the present production, to meet the minimum annual consumption of livestock production as 91 liter milk, 14 kilo meat and 48 eggs in the developed country.

In this way, there is important contribution of buffalo, goat, sheep, pig, poultry etc. for especially meat production in livestock production. Likewise, Gorkha district is very important from point of view of goat farming. There are more than 200 thousand goats, and establishment of nearly 250 commercial goat farms in the district at present. Especially, Jamunapari crossed, Khari crossed, Barbari crossed breeds goats are available here. In the recent time, it has also been started of importing Boer crossed goats in this district. District Livestock Development Office (DLSO) has already developed former Bakrang Village Development Committee (VDC) and Dhawa VDC as a resource center of Boer goat; whereas, rearing of Boer goat have also been started through Women's Cooperative in former Barpak VDC (Sulikot Rural Municipality- RM, Ward-1 & 2) from the support of Japan International Cooperation Agency (JICA) Nepal from this year.

In this way, **“Goat Farming Technical Manual”** which is suitable and applicable for the Boer goat farming as well as other goat breeds, is going to be published by JICA Nepal, and this manual shall be very useful to goat farmers in the future. This manual has covered reproduction, health, feeding, management, marketing and diversified aspects. In this way, it is hoped that this upcoming publishing manual shall be helpful for the development and extension of goat farming business in the district, as it is useful as reference to farmers and stakeholders of this business to set up own business.

In addition to, it is very thankful to JICA Nepal for supporting to goat farming business by publishing **“Goat Farming Technical Manual”**.

.....

Dr. Jagat Bandhu Nepali

Senior Livestock Development Officer

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1. Introduction (Basic knowledge)

1.1 Introduction of goat farming

Goat is a multi-use animal which is commonly reared for the meat (chevon). In the different parts of the world, goat is raised for the meat, milk, wool and leather. Goat is also called “the poor man’s cow”. In Nepal, the goats can be reared in different ecological zones; hence, people are adopting goat farming as an enterprise. Sheep and goat are belonging to different species, but their management is almost similar. In Nepal, almost in all parts, sheep and goats are raised. And, as all caste and ethnic people like goat meat; day-by-day, goat farming has become a popular business. For the goat farming, the meager needs of fodder and fewer requirements of feeds compared to rearing other livestock, goat farming requires low investment. Shed making can also be possible in a low cost, and easy to sell goats in the case of needs arises to farmer. So, the goat farming enterprise is in growing trend.



Figure No. 1.1.1 Commercial goat farming

Source: JICA Project Team

Livestock farming consists of one third share of total agricultural Gross Domestic Products (GDP) in Nepal; thus, it contributes a major share in agricultural system. As per data source of Department of Livestock Services, Fiscal Year 2073/74; there are 10,986,114 goats in Nepal. Similarly, 65,583 metric tons of goat meat is produced which is 20 per cent of the total meat produced.

As the goat farming business can be operated through a low investment, it has given opportunity of employment and income generation to small farmers and women. Therefore, goat farming has become a boon to poverty alleviation. The amount of feed and fodder necessary for one cow can be easily reared for 5-6 goats; and farmers having less land can easily raise 2-4 goats.

1.2 Characteristics of goat farming

1.2.1 Management (fodder, feed, shed, disease and parasite control)

After purchasing goats, an entrepreneur needs to manage shed construction as per the suitable to climate, nutritious feeding, treatment of diseases and vaccinations, control and timely treatment of goats from internal and external parasites.

1.2.2 Reproduction

After ensuring appropriate management of doe, it becomes ready for reproduction. The mating should be ensured that parturition does not fall in the month of Ashad/Shrawan (July/August) and Poush/Magh (November/December), as it would be difficult to take care of new born kids.

1.2.3 Production and income generation

After 5 months of mating, kids are produced, and income generation will be ready from selling after rearing 8-10 months.

1.3 Importance and benefits of goat farming

- Meat production: Goat meat consists of 20.3% of the total meat produced in the country and the demand is ever in increasing trend.



Fig. No. 1.3.1 Fresh meat

Source: JICA Project Team

- In goat meat (chevon); We can find
 - 76.8% water
 - 2.6% fat
 - 19.6% protein and
 - 1% minerals
- As, comparatively low quantity of fat and high protein, goat meat is considered beneficial to health.
- Can be operated in low investment: In comparison of starting other livestock farming, interested small farmers can start with goats. Goats farming can bring opportunity of income generation at home for the small farmers with low investment at small space.
- PEWA (Ownership): To create, the work environment at family, traditionally goats and kids are given as Pewa (Ownership) to daughters and women family members. In this way, temptation for making Pewa has promoted positively to goat farming.
- Transformation of fodders into nutritious protein: Comparatively goats can be reared with lesser amount of feeds than swine and chicken. Goats eat normal forage, fodders and store in its body as meat which is full of protein.
- Coping of needs: Goats can be sold at any time, and thus has helped to meet the needs of cash.
- Return in short time: As the goats have capacity to give birth of more than one kid at a time, and three times in the period of two years, it generates quicker income in short time with low investment in comparison of rearing other cattle.



Fig. No. 1.3.2 Compost making from goat

Source: JICA Project Team

- Rearing goats for milk and wool: We are raising goats mainly for the meat. But, in appropriate climate and management, goat farming can be done for the milk and wool.
- Compost fertilizers for crops: Livestock are integral part of agriculture. Goat farming has a major contribution in providing fertilizers to crop production. It has reduced the dependency to chemical fertilizers and enhanced the production capacity of the land.
- Goats are needed for traditions or festivals: In our traditions of celebrating Dashain and meeting commitments to God and Goddesses with offering of bucks and does, goats are considered inevitable livestock.
- For transportation: In parts of Himalayan and Hill-belts where there are no roads connections for transportation, (mountain goats) Sinhal and Chyangra have been in use.



Fig. No. 1.3.3 goats used for transportation

Source: JICA Project Team

1.4 Importance of commercialization of goat farming

- To create opportunity of self-employment to human resources, youths and women, who remains wastage in country; and to enhance their self-respect through appropriate management
- To increase income generation through scientific goat farming in traditional approaches
- To reduce a large volume (corers of rupees) import of goats from neighboring country
- Most people from different religious sects love chevon, and demand of goat's meat is in increasing trend in country, which is only possible to meet with adequate supply through commercialization.

1.5 Breeds of goats reared in Nepal

1.5.1 Local breed

Breed	Local breeds of goats (native)	Geographical distribution
Goats	Terai	Terai Belt
	Khari	Inner Hill Belt
	Sinhal	High Hill Belt
	Chyangra	Mountainous Belt

(A) Chyangra

Chyangra is reared above 2,500 meters in the mountainous region. Hairs are used for making Pashmina. Usually it gives birth once in year. Its average weight is 27-30 kg. Doe and buck's weight is 35-40 kg. Bucks can carry goods almost 30% of its weight.



Fig. No. 1.5.1.1 Chyangra breed goat
Source: Commercial Goat Farming, Central Sheep and Goat Promotion Office

(B) Sinhal

In high hill belt, 1500-2500 meters, Sinhal goats are raised. Its color is brown, white and black. Doe Sinhal's weight is up to 34 kg and buck's weight is up to 42 kg. This goat produces one kid at a year; and annually it gives around 200 grams of rough hairs.



Fig. No. 1.5.1.2 Sinhal breed goat
Source: JICA Project Team

(C) Khari

From 300 to 1500 meters of altitude Khari goats are reared. Khari goats are in different colors and it is usually called hilly or AULE (low land) goats. Doe usually weighs 15-25 kg and buck weighs 25-35 kg. These Khari gives its first birth in average 16 months of age. Stature of its body is smaller and smarter; Khari can be

reared by keeping in bond or by grazing. Among local breeds of goats in terms of numbers, Khari goats are raised in many numbers in hilly belt of Nepal. Keeping in views of climate, immunity from diseases and average growth, Khari goats are regarded useful in the belts of hills and inner hills of Nepal.



Fig. No. 1.5.1.3 Khari breed goat

Source: Central Sheep and Goat Promotion Office

The characteristics of Khari goats are given as below:

- Can give 3 times birth during 2 years of intervals
- Less suffering through diseases, compare to foreign breeds imported in Nepal, Khari has more immunity towards diseases
- Can be reared in normal shed
- Generally, one goat gives birth at time 2 kids
- Can graze in slopes
- Balance feeds are not necessary
- Mortality rate of kids are low
- Meat is tasty and tight

(D) Terai goats:

Terai goats are reared in Terai belt of Nepal. Doe weighs up to 18 kg and bucks weigh up to 32 kg. And, if well managed, it can give 3 times birth within 2 years. In average, there are 2 kids at a time of birth.



Fig. No. 1.5.1.4 Terai breed goat

Source: Central Sheep and Goat Promotion Office

1.5.2 Foreign goat breeds reared in Nepal

(A) Boer

Boer was developed in the South Africa, and it can be reared in all types of climate. Boer breed has more immunity to diseases than the local breeds, and can give 100% twin birth; and within two years, it can give 3 times birth. Adult Boer weighs more than 100 kg, and if it crosses with local Khari breed, weighs 35-40 kg within a year.



Fig. No. 1.5.2.1 Boer breed goat

Source: JICA Project Team

In 2065 BS, Boer had been reared for detailed research in Goat Research Center, Bandipur. Now, in different parts of Nepal, Boer has been commercially reared by leader farmers. In comparison of other breeds, maturity of Boer is quicker. Before and after separation of milking, the growth rate of Boer kids, in both conditions, is 150-300 grams per day.

(B) Barbari

Barbari has small and robust body, short and standing ears, red or brown patches in white body and does not feel interested in grazing, thus it would be better to rear as a stall feeding system. It is reared for both purposes- meat and milk. The adult Barbari doe weighs 20-25 Kg and buck weighs 25-40 Kg. In average, kids weigh 2 Kg at birth.



Fig. No. 1.5.2.2 Barbari breed goat

Source: JICA Project Team

(C) Sannen

Sannen was originated in Switzerland, and it is best suitable to rear at cold than hot climate. It is famous for milk production throughout the world, this goat breed is polled (has no horn naturally), ear are flopped towards front side, and has white and small hairs. After parturition, this goat gives milk for 150-180 days resulting in average 600-700 liters of milk production. Normally, it gives birth in a year and gives a kid per birth. Doe weighs up to 68 Kg and buck weighs up to 91 Kg in average.



Fig. No. 1.5.2.3 Sannen breed goat

Source: JICA Project Team

(D) Beetal

It seems to be like Jamunapari breeds, and it is reared for milk and meat. It is believed that Beetal originated in Punjab and Hariyana of India. It has features like wide and medium built body, raised nose, backward and outside bound horn, flat and hanging ears, short and thin tail; and it has also good quality skin. Adult buck weighs 60-70 kg and doe weighs 46 kg; and kid weighs 3 Kg weight at the time of birth.



Fig. No. 1.5.2.4 Beetal breed goat

Source: JICA Project Team

(E) Sirohi

This goat breed has originated at dry place of Sirohi, Rajasthan, India and imported in Western parts of Nepal. Sirohi has tight body, and are good for meat. It has physical characteristics like rough hair; short and pointed nose; flat, long and weaker ears; sharp, upward and backward faced horns. At time of birth, kids weigh 2.5-2.75 Kg; whereas, buck weighs 50-70 Kg and doe weighs 25-35 Kg at lives.



Fig. No. 1.5.2.5 Sirohi breed goat

Source: JICA Project Team

(F) Jamunapari

Huge body, long leg, centrally ridged nose (parrot like nose), hanging long ears, short and flat horns are major physical features of this goat. Adult Jamunapari buck weighs up to 45 Kg and doe weighs 38 Kg. At birth, kids weighs up to 4 Kg in average.



Fig. No. 1.5.2.6 Jamunapari breed goat

Source: JICA Project Team

1.5.3 Hybrid goats in Nepal

- Boer cross (Khari and Boer)
- Jamunapari cross (Khari and Jamunapari: Khapari)
- Barbari cross (Khari and Barbari: Khabari)
- Sannen cross (Khari and Sannen)

(A) Introduction of Boer cross (Khari x Boer)

Boer cross has been developed crossbreeding between in pure Khari doe and pure Boer buck. The crossbreed of Boer can survive in any types of climate. Boer cross has comparatively better immunity towards diseases.



Fig. No. 1.5.3.1 Boer cross breed goat

Source: JICA Project Team

(B) Why we need Boer cross?

- Boer cross has been reared up to 2100 meters high altitude and its growth is good in mid-hill belts.
- Boer cross can be reared by both ways: reared in stall feeding or open grazing.
- Boer cross acclimatizes in all types of weather.
- As adult Boer weighs up to 100 Kg, its cross breed can also be found with heavy weight.
- Both goats breed can give 3 times birth within two years of interval and have capacity to give twin kids.
- Both Boer and Boer cross goats have tasty and compact meat.
- Before and after lactation in both conditions it has higher growth rate in kids and low mortality rate.
- High immunity towards disease is found in Boer cross.

1.6 Feeding Management for goats

1.6.1 Feeds of goats and habits of searching feed

Goats have larger belly comparatively to other cattle, and can eat smaller grasses which other cattle cannot. Goats can also eat bitter grasses. Goats can eat dry matter equivalent of 4% of its own body weight. Goats can produce more meat, milk by taking substandard grass than other cattle. Goats do not like to eat wet and filthy things.

1.6.2 Feeding Management for smaller kids

Offspring needs to be fed with milk for 2-3 times in a day so that kids can be protected from diseases. After two weeks, progeny can have soft grass and feeds. Kids must be weaned from its mother after 10-12 weeks, and feed more forage and feeds with protein.



Fig. No. 1.6.2.1 Feed feeding at paddock

Source: JICA Project Team

1.6.3 Feeding Management for adult goats

After 4 months of parturition, Doeling and Buckling should be kept in separate from preventing unnecessary mating behaviors from bucks to doeling. It is necessary that growth of Boer cross kids should be 50-150 grams per day; if it is not measured, it should be learnt that there is a problem in feeding management. As possible as for the whole 24 hours, green forage and fodders should be kept in the place of stall. Salt and other multi-nutrients minerals cake and clean water adequately needs to be fed to goats. Diet of goats and kids based on its weight has been given as followings:



Fig. No. 1.6.3.1 Concentrate feeding to adult goats

Source: JICA Project Team

Table No. 1.6.3.1

Necessary feed of goats based on its weight

Weight of goat (kg)	Milk intake (ml per day)	Concentrate feed (gm. per day)	Green fodder (kg per day)
22	400		
33	500		
4	600		
5	600	50	as much as the consumed amount
6	700	100	“
7	700	150	“
8	600	200	“
9	500	250	“
10	300	350	“
15	200	350	“
20		350	about 2kg)
30		350	about 4kg
more than 30		400	about 5kg

Source: Central Sheep and Goat Promotion Office, Harihar Bhawan

1.6.4 Methods of preparation of balanced feed by using local raw materials

To obtain cheap feed is an important element for getting profit from any livestock, and as much as 50% cost is incurred in Goat Farming. Healthy livestock's can be produced by ensuring proper quantity and balanced feeding. To obtain maximum benefit, focus to be given in fodder plants than into feeds.

- Crops (non-leguminous) – 3 parts(different varieties of crops like maize, wheat, bran-roughage, products from maize, wheat, millet, rice, etc.)
- Pulses (Leguminous) or wastages from oilseeds (bi-products): 1 part
- By mixing crops and legume or different types of pina very well, balance feed can be prepared.
- If dry bi-product of oilseeds is available, it is necessary to break in small particals, and better to be roasted, but it is not necessary if it is fed after cooking.

- Likewise, it would be better to mix 1 kg salt, 1 kg mixture of minerals and 25 grams of vitamin “A” supplement with 100 kg feed, and it should be mixed well 2-3 times to mix up very well.
- Such feed should be fed to adult goats around (250 gm- ½ MANA), pregnant goats (500 gms-1 MANA) and for breeding buck (500 gms-1 MANA) per day.

1.7 Tagging kids for identification

For the proper management of Commercial Goat Farming, to identify goats, tagging is necessary. Tagging helps to identify productive and unproductive goats from the herds and thus helpful in managing feeding and culling. When kids become 1-2 weeks older, it would be better to tag appropriately. In kid’s ears, such plastic or metal tags can be given. Or, kids can be given the number in the ear by using color tags.



Fig. No. 1.7.1 Tagging in goat’s ear

Source: JICA Project Team

The benefits of tagging are given below:

- Helpful to keep the record and identify the goats.
- Helpful to keep the record of reproduction and health record of goats.
- Helpful for appropriate management of goats.
- Easy for searching in case of theft or missing.
- Easy to submit as evidence to Insurance Company for insurance or claim

2. Management of goat shed

2.1 Introduction of farm shed/barn

As for living human needs house; goats do also need shed/barn. Some people have raised goats together with barn of cattle; but for commercial goats farming, it is good to have goats shed constructed separately for better care. By using local materials, goat farming shed should be constructed resilient to earthquake. As per ages of goats, separate spaces should be allocated within the shed. Kids should be kept into clean,

dry and warm spaces to protect from potential pneumonia. It is appropriate to lay dry and soft grass in the floor. A space from 0.2 to .5 square meters is necessary from parturition to 3 months older per kid. Problem due to internal parasites for the kids arises in wet and damp places, therefore shed should be maintained dry and warm.

2.2 Importance of shed

Shed is necessary to protect goats from the Sun, water and cold; protect from tigers and jackals etc. at night and protect from theft. Sheds built above the ground is good for appropriate management of dung of goats which will help to control infections and non-infectious diseases. As well as, it will be easy for management of goat feeding to farmers.

2.3 Plan for construction of good shed

It is beneficial to construct goat shed by using low cost and locally available materials. While constructing shed, separate spaces should be maintained for kids, dry doe, pregnant doe, kidding doe, wether and breeding buck. There is fear of uncontrolled pregnancy and abortions, if bucks and adult goats are mixed together in one space. Shed's floor is maintained to keep secure footing; but dung and urine should pass from the holes, and it should be easy to clean the shed. If holes are bigger than a finger size, goat's legs get entangled, gets wounded, no secured footings can get fractured legs also.

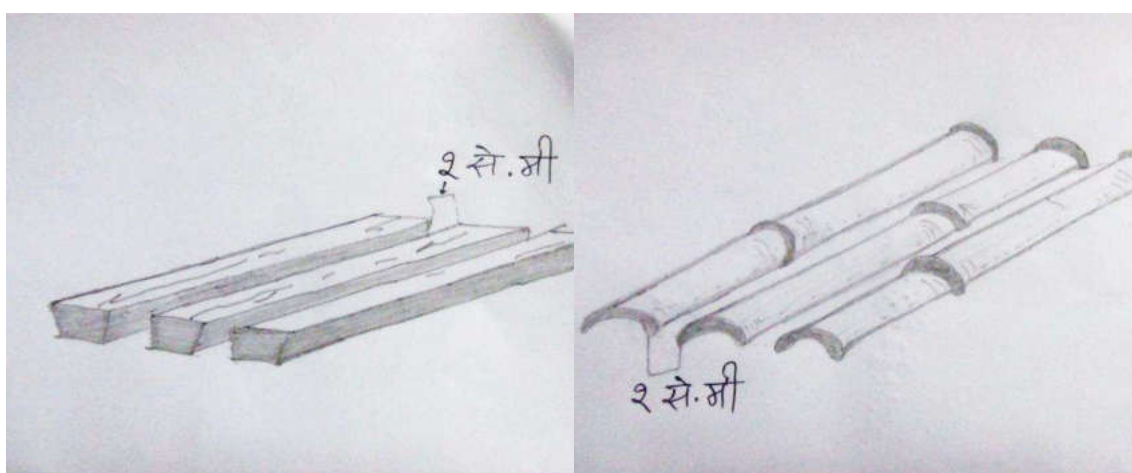


Fig. No. 2.3.1 Wooden planks and bamboos maintained at distance in shed's floor

Source: JICA Project Team

Normally, as goats donot eat fallen fodder from floor and feeds from the ground, stall for grass feeding should be constructed, and there shall be well mangement of enough dinking water. For adequte light and free flow of airs, ventillation should be maintained. Paddock should also be managed for goats feeding space and free movement beyond the goat shed. Inside paddock, there shall be management of feeder/containerfor goat’s feeding and drinking water. It is approprite to plant fodder plants around the paddock. Sick goats and goats bought from other places may be infected disease. So, such goats should be kept away in seperate shed at safe distance.

2.4 Construction of goat shed

2.4.1 Locally available resources while constructing goat shed

As per the recommended standards, locally available low cost materials have to be used while constructing goat shed.

Table No. 2.4.1.1

Locally available materials for constructing goat shed

Materials	Utility
NIGALO/ Arundinara artistata	For fencing shed
Babmboo	Used for pole, creating a floor, fencing of shed
SALLO, JAMUN(Euqenia jambolana) (generally available solid wood)	To use as pillars
Sacks of jute (JUTKO BORA)	To cover shed in the winter
CGI Iron Sheets (Corrugated Ginc Iron)	For roofing
(Fencing)	To make wall, fencing of shed

Source: JICA Project Team

2.4.2 Area required for goats

Table No. 2.4.2

Area required for goats based on age

Age	Space needed inside shed (square meter per head)	Outside open space (Square meter per head)
Upto 3 months	0.2 to 0.3	0.4 to 0.6
From 3 to 9 months	0.6 to 0.75	1.2 to 1.5

From 9 to 12 months	0.75 to 1.0	1.5 to 2.0
Adult goats	1.5 to 2.0	3.0 to 4.0
Adult buck	2.5 to 3.0	5.0 to 6.0

Source: Central Sheep and Goat Promotion Office, Harihar Bhawan

2.4.3 Sample of Shed

The numbers of kids and goats kept by goat farmer depends on the size of the goat shed also. However, considering the small size of farmers of Barpak, it has been presented earthquake resistant goat shed for maximum one breeding buck, 2 mother goats, and 6 kids including breeding buck and without breeding buck with the size from four to eight square meters.



Fig. No. 2.4.3.1 Constructing earthquake resistant goat shed using cross beam

Source: JICA Project Team



Fig. No. 2.4.3.2 Laying the wooden planks with appropriately so the goat's leg will not pass from holes

Source: JICA Project Team

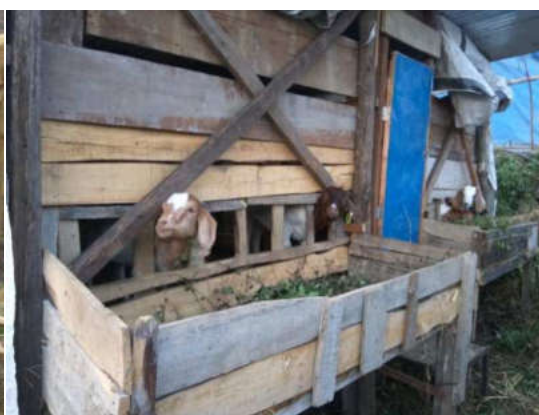


Fig. No. 2.4.3.3 Goat reared in earthquake resistant shed using cross beam

Source: JICA Project Team

(A) Sample shed of eight square meters including breeding buck (For one breeding buck, two mother goats, and six kids)

Fig. No. 2.4.3.4 Sample of ground of goat shed

Source: JICA Project Team

Fig. No. 2.4.3.5 Sample of front and side of the goat shed

Source: JICA Project Team

(B) Sample shed of four square meters excluding breeding buck (For two mother goats, and six kids)

Fig. No. 2.4.3.6 Sample of ground of goat shed

Source: JICA Project Team

Fig. No. 2.4.3.7 Sample of front and side of the goat shed

Source: JICA Project Team

2.4.4 Important things to be considered in shed management

- It has to be covered the shed with Jute sacks to protect goats from cold in the winter, but at day time (except during rainy and cloudy day); it is hygienic to let the sun-light enter inside the shed by rolling up the sacks.
- It has to be removed the dung deposited under the shed at least twice in a week. If dung deposit is not removed time to time, with the gas emission and filth, it will adversely affect health, growth and reproduction capability of goats, and it rises death rate of small kids also.
- It has to be cleaned regularly feed container for goats.
- It has to be applied fencing wires for the safety of livestock.
- It has also to be disinfected the shed by limes to control external parasites for goats.



Fig. No. 2.4.4.1 Shed in good condition – clean and dry

Source: JICA Project Team



Fig. No. 2.4.4.1 Shed in bad condition- littered waste

Source: JICA Project Team

3. Plan for feeding safety

For the livestock raising and production purpose, management of feeding should be carried out appropriately. Best feed for livestock is green grass. Grasses from grounds obtained from pastures, edges of farmlands, forage and fodder plants are the major sources of feeding for livestock in Nepal. Therefore, availability of different types of grasses from grounds should be ensured throughout the year, and forage and fodders have to be planted. Similarly, while grazing goats, it is better to take cyclic order than to graze in one place, so that new leaves can grow up. At the time of availability of adequate grasses, it's better to make hay and silage for storage and feeding in winter.

3.1 Basic feeds for Goats



Fig. No. 3.1.1 Basic feeds for goat

Source: JICA Project Team

(A) Pure water: 5 liter is necessary for a goat per day

(B) Forage and fodder: There is different requirement of necessary forage and fodder for goats based on its weight. The required forage and fodder for goats based on its weight is as followings:

Table No. 3.1.1 Required forage and fodder for goat based on weight

Goat	Forage and fodder
Growing kids (Up to 10-15 kg)	2-3 kg per day
Small goat (Up to 20 kg)	4 kg per day
Medium goat (Up to 25 kg)	5 kg per day
Big goat (Up to 30 kg)	6 kg per day

Source: Central Sheep and Goat Promotion Office, Harihar Bhawan

(C) Concentrate Feed (Balance diet): Compulsorily concentrate feeds are given to especially sick goats, recovering doe, pregnant and growing young kids in shed.



Fig. No. 3.1.2 Concentrate feeding to goats

Fig. No. 3.1.3 Leguminous feed

Source: JICA Project Team

Source: JICA Project Team

Table No. 3.1.2

Materials used for making goat's feed

Raw materials		Raw protein in percent
Non-leguminous crops	Maize	10
	Wheat	10
	Rice bran	12
	Wheat bran	14
	Jai	9
	Barley	10
	Millet	11
Leguminous crops	Soybean or bi-product of Soya (PINA)	41
	Bi-product of oilseeds (TORIKO PINA)	27

Source: JICA Project Team

(D) Salt and minerals block: Method of making salt and minerals block/cake are as followings:

- **Necessary materials:**
 - Red clay – 2 kg
 - Salt – 0.5 kg
 - Wheat Floor - <0.5 kg, as per need
 - Egg shell – 25-30 pieces,
 - Water- as per need
- **Preparation method:**
 - Mince red clay into dust, screen it before use.
 - Mince egg shell to dust
 - Mixed dust of red clay, dust of egg shell, salt and white floor in a pot. Add adequate water to shape it as cake/block, otherwise thinner mixture, it is difficult to prepare a cake/block.
 - The volume of mixture is enough for making 2-3 cakes/blocks.
 - Shape of Cake/blocks should be made rectangular or circle; and in the middle, there should be made small hole for hanging.
 - After 4-5 days, the prepared mineral cakes/blocks are ready for use.
 - Mineral cake/block should be placed where goats can easily lick it, and it should be placed for goat to lick it at once in a day.



Fig. No. 3.1.4 Making dust of red clay



Fig. No. 3.1.5 Making powder of egg shell



Fig. No. 3.1.6 Adding water: well mixed

Source: JICA Project Team



Fig. No. 3.1.7 Making rectangular shape, and small hole in center

Source: JICA Project Team

3.2 Feeding method

- For easy feeding to goats, forage and fodder are always given in stall-fed, and if stall-fed remains empty, it shows inadequacy of forage and fodder to goat.
- Twice in a day, goats should be fed in the morning and evening; and changing of water and feeding time table should be maintained at the same time.
- Unnecessarily, feed should not be over fed to goat. Over feeding may cause bloat out stomach and sometimes goat can die.

4. Reproduction/Breeding Management

4.1 Introduction to reproduction of goats

The estrous cycle for doe is 21 days; in 21 days doe gets in heat, and searches buck for mating. After mating, doe gets pregnancy for 5 months or 150 ± 5 days. Breeding of doe is not fixed on season/time. The crossbreed of Boer and Khari, it gives birth to single kid in its first parturition, and second time onward, it can give birth to two kids.

Well fed, well-nourished does can have estrous cycle in the winter and summer too. Availability of adequate forage and fodder; and in environment moderate with temperate, in between the month of Bhadra (July/August) to Kartik (October/November) more cases of does are found in heat. In high hill and Mountainous belts, always does do get heat in hot months.



Fig. No. 4.1.1 Breeding to doe

Source: JICA Project

4.1.1 Major signs of does in heat

- Wagging her tail
- Less willing to take feeding, forage and fodder
- Suddenly reduced milk production
- Continuous bleating
- Mucus seen in the vagina
- Reddish and swollen valve
- Mounting to buck and goat whatever comes in front

If doe's in heat, ensure mating with buck (breed) after 12-14 hours. The time of heating and mating time is as followings:

Table No. 4.1.1.1

Time of heating and mating time

Time of mucus seen	Appropriate time for mating with Buck
Morning	At the same day: from evening till morning
Noon- day time	Next day: from morning till noon
Evening	Next day: from morning till noon

Source: JICA Project Team

If again after 21 days, mucus is seen in doe; it should be known that doe is not pregnant; in that case; again mating with buck breed is needed. Generally, after 50-65 days of parturition, doe comes in heat. 2-3 months after parturition, it is appropriate for mating with buck. By doing so, within 2 years, 3 times does can have parturition.

4.1.2 Reproduction Age (For Boer Cross)

- Doe – >18 kg (approximately 7 month to 7 years)
- Buck - >25 kg (approximately 8 month to 5 years)

Doeling usually are in estrous cycle before 7 months, but as it has no physical growth, it is not good for mating. In 3 months, doeling do get in heat but considering its maturity, mating with buck is prevented.

Harms of immature mating

- Low pregnancy rate
- Difficulty during labor
- Fear of abortion
- Premature birth
- Inadequate milk production and no growth of kids

Things to be considered for reproduction

- Does age must reach 7-month-old.
- There shall not be in-breeding at any cost.
- Parent doe and buck should not be kept mixed in same space, otherwise there are chances of uncontrolled pregnancy, and buck will create hassles to doe unnecessarily.
- Maintain ratio of in average 25-30 does for breeding by one buck.
- Buck for breeding should not be reared to heavy or too skinny.
- Buck's age must be reached 8-month-old, and can be in reproduction service for 5 years.
- Breeding management should be maintained in such a way that there should be no parturition, in the winter season-Poush/Magh (November-January) and in heavy rainy season-Shrawan (July/August). It means there shall not be mating in months of Shrawan, Bhadra, Poush and Magh). If parturition in these months happens, kid's mortality rate will be high or becomes difficult of rearing kids.

4.2 Reproduction with different kinds of breeds

Mating with local buck and improved breed of doe should be prevented. If such mating happens with a local breed buck, simultaneously the quality deteriorates. If doe gets mating with good breeding buck, then parturition of high quality kids will be ensured.

4.3 Record keeping for reproduction/breeding

To maintain the quality of goat, there should be record keeping of reproduction. The record keeping can be done as followings:

Table No. 4.3.1

Sample of reproduction record keeping

Doe Tag No.	Buck Tag No.	Mating Date	Expected date		Number of kid	Sex of kid	Weaning Kids No.	Remarks
			Late	Real				
150123	20412	Falgun18 Chaitra9	Shrawan17	Shrawan15	2	M+F	1	
150234	20412	Chaitra2	Shrawan31	Bhara1	1	F	1	

Source: JICA Project Team

5. Management of Buck and Doe

5.1 Importance and introduction of buck and doe management

The farm management activities have special role, and taking care of buck and doe for obtaining maximum benefit from commercial goat farming. Therefore, good management of doe and buck is important. Comparatively buck needs more feeds and exercise than does, and as according to time, it needs special care for doe (pregnant doe, expecting doe, parturition doe, dry doe).

Generally, does can be used up to 7 years; whereas, buck can be used up to 5 years for breeding purpose in case of Boer cross breed. If any problems occurred in this period, the goats can be used as meat. And, its productive period can also be extended if it has good reproductive capacity.

5.2 Feed and hoof management for buck

- Feed management – During mating, buck usually runs after doe without eating. Therefore, farmers need to pay heeds to buck's weight. If weight gets lesser, then buck is given more feeds. If buck gets heavy, reproduction becomes difficult; in such case weight needs to be loosened. If breeding capacity of buck is decreased or in-active, the eggs with flour should be mixed and feed to buck so that it helps to resumes its health condition.

- Hoof management –Time to time, goat’s hoof must be trimmed otherwise it may start rotting on. Due to long hoof, it may face difficulty in walking and at the time of mating also. If goat is reared in the shed only, trimming of hoof may be necessary, but in open grazing, it may not be required.

5.3 Importance and introduction of removing inbreeding in goats

Inbreeding is said while reproduction system in same lineage of goats related to same ancestry. For example: breeding between sister and brother, father and daughter; uncle and niece, maternal uncle and niece are some examples.

There are following harms of inbreeding between five generation of same buck and doe:

- Continuous decline in breeding capacity,
- Offspring may be in unique condition, weak and small in shape
- Reduction in physical weight and production,
- Bad traits may transfer in kids
- Genetic disorder may transfer from one generation to the next
- Reduction in immunity power
- Age of first for parturition may increase from one generation to the next,
- More affected by diseases

5.4 Management of buck in rotation for removing inbreeding

It is necessary to avoid inbreeding in goats for ensuring better kids growth, prevent being easily affected by diseases and good production etc. To avoid such inbreeding; in every 15 months, buck should be rotated. Or, buck can be reared separately in many groups if goat farming is through cooperative to avoid inbreeding. For this purpose, the following method can be applied:

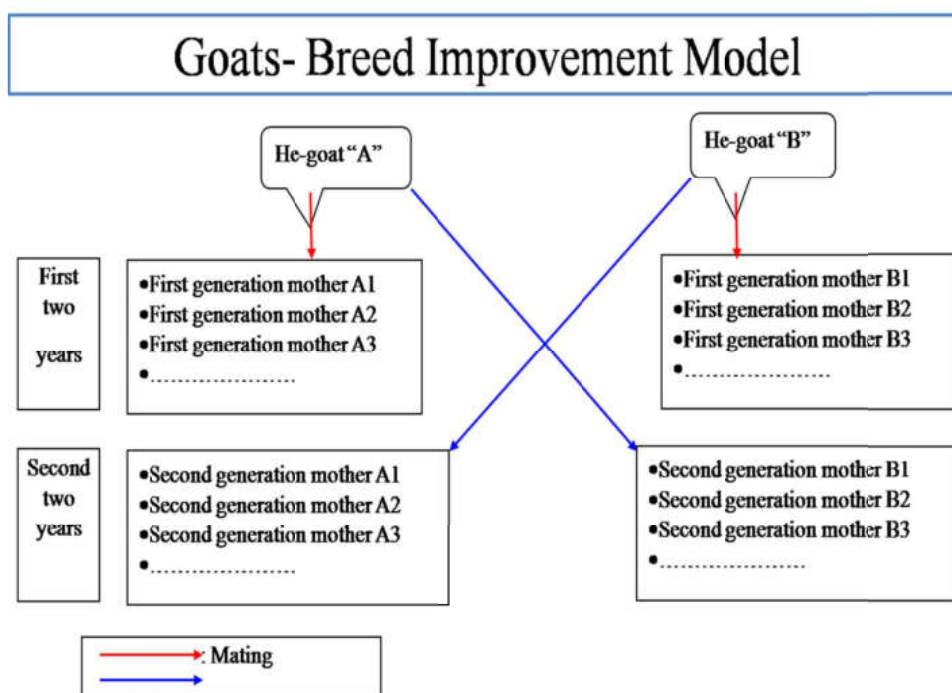


Fig. No. 5.4.1 Goat breeds improvement method

Source: JICA Project

5.5 Record keeping

5.5.1 Record keeping of every doe

While goat farming is done through groups and cooperative, one sheet for record keeping should be prepared for each goat, and always refer to the same sheet. Sample record keeping is as followings:

Table No. 5.5.1.1

Sample of record keeping of doe

Doe's Tag No. 150123		Date of Birth:		Breed: 50% Boer	
Buck Tag No.		Mother's Tag No.		Color: White Brown	
Kids:					
S.N.	Buck's Tag No.	Parturition Date	Sex	Weaning kid no. and sex	Remarks
1	20412	Bhadra 2	1 buckling	1 buckling	
2	20412	Baisakh 2	1 buckling, 1 doeling	1 doeling	1 dead
Diseases: vaccination of scabies, Chaitra 2073					

Source: JICA Project Team

5.5.2 Record keeping for each buck

For each buck, one sheet for record keeping should be prepared and always refer to the same sheet. Such record becomes helpful while selecting buck for breeding. Sample record keeping for each buck is as followings:

Table No. 5.5.2.1

Sample record keeping for buck

Buck's Tag No.: 20412		Date of Birth:		Breed: Boer 50%	
Father's Tag No:		Mother's Tag No.		Color: White black	
Name of goat farmer	Doe's Tag No.	Mating date	Expected date of parturition	Sex of kids	Remarks
	150123	Falgun 11	Shrawan 12	1 buckling	
	150234	Falgun 30	Bhadra 1	1 buckling, 1 doeling	1 dead
Disease: Hoofing trimming/cutting: Chaitra 2073					

Source: JICA Project Team

6. Health and Nutrition Management

6.1 Health: Introduction and Importance

Health management is an important and integral part in goat farming. Through goat management, it is necessary to improve the productivity of goats, such as: general health management, parasite control, vaccine management, environment management and proper record keeping. Health management in farm level includes proper care taking of health of pregnant doe, newborn kids, youth and adults. Similarly, health management help to reduce the mortality rate of newborn kids, and it provides knowledge, skill and practice of control of infectious diseases.

'Prevention is better than cure', the statement best fits for livestock too. In healthy livestock, better immunity and recovery is quicker. But, if livestock fall sick, farmer must buy medicines, and it increases cost also. Treatment of disease must be faster; otherwise it will be very difficult to treat.



Fig. No. 6.1.1 Healthy goat

Source: JICA Project Team



Fig. No. 6.1.2 Infectious goat

Source: JICA Project Team

6.1.1 Methods of recognizing sick and ailing goats

Ailing goats show different symptoms as per the nature of diseases. But, normally sick goat shows as followings:

- Droopy, poor or no appetite
- Stays aloof from herd
- Loss of smartness and hair get risen, standing hunch
- Coarse and dull skin
- Low physical growth rate
- Red eye, runny and watery eyes
- Pulse speed (it can be felt by touching interior side of rear thigh), breathing, variant temperature than usual and stinking breathing
- Loose feces, mixed with blood or mucus
- Dark yellow pee and sometime blockage of urine,
- Floating saliva from mouth etc.



Fig. No. 6.1.1.1 Droopy / ailing goat

Source: JICA Project Team

6.1.2 Tasks to keep the goats healthy

- Feed adequately and quality feeds along with clean water
- Know major diseases and vaccinated against those diseases
- Control of internal and external parasites
- Keep ailing goat/s separately and do not mix with healthy goat/s
- Thoroughly screen at the time of bringing new livestock/goat
- Construct good shed to protect from unsuitable climate

6.2 Major diseases in goats

6.2.1 Bloat in goat

- **Causes:**
 - By overeating damp and very old fodder
 - By overeating legume pastures or crops
 - By overfeeding the concentrate feeds
- **Symptoms:**
 - In the beginning of this disease, seems depressed, loss of appetite and bulging starts from left flank of belly,
 - Difficulty in breathing, striking legs, bleating,
 - In some cases, goat death is found in pasture also.
- **Treatments:**
 - Hold frontal legs of goat and massage in left flank of belly
 - Drench oil or feed paraffin liquid to goat
 - Contact to technician if these treatments do not heal
 - Do not feed more crops or leguminous forage to goat

6.2.2 Diarrhea (Loose feces)

- **Causes:**

- Small kids usually get affected.
- Causes of diarrhea are consuming impure milk, too much milk or colostrums.
- Certainly, changes in environment may also cause diarrhea.
- Diarrhea can also be caused by virus and internal parasites



Fig. No. 6.2.2.1 Goat with diarrhea

Source: JICA Project Team

- **Symptoms:**

- Looks like in pain in belly, not interested in feeding and watery feces
- If diarrhea persists for long time, body may go with dehydration, cannot stand, and goat's eye and temple get sunken

- **Treatment:**

- Diagnose the real diseases and do the treatments accordingly,
- Goats are in dehydration, so feed enough water and liquid. If necessary, give intravenous treatment by giving saline water.
- If it is due to cause of virus, then as per advice of technician, medication to be started.

6.2.3 Pneumonia

- **Causes:**

- Virus, Bacteria, parasites and environmental effects etc.

- **Symptoms:**

- Droopy goat/s in the beginning
- Raised temperature-fever and coughing
- Dark discharge from nose

- Difficulty in breathing and fast breathing
- **Treatment and control:**
 - With the help of technician, administer injection of antibiotic
 - Keep separately the sick goat/s from herd
 - Manage transportation of goats with less stress
 - Keep shed dry and cover with jute sacks in cold

6.2.4 Hoof rot

- **Cause:**
 - Hoof rot disease is caused by bacterial infection.

- **Symptom:**

- Goat's hoof becomes painful due to which doe's do not get proper growth and buck has difficulty in mating.
- Suddenly goat starts limping at the beginning and inflammation between hooves start.
- There is wound inside hooves and goat cannot stand.



Fig. No. 6.2.4.1 Hoof rotting disease

Source: JICA Project Team

- **Treatment:**
 - Separate sick goat from other herd and pay attention in maintaining hygiene.
 - Use soap or iodine for cleansing infected hooves.
 - Use antibiotic as per recommendation of technician.

6.3 Importance of trimming hooves and trimming methods

- Time to time hoof should be trimmed, as when it gets longer, it gets rotten and difficult to move around for those goats which are reared in stall-fed, rather than goats in grazing
- Hold goat tightly and make immovable,

- Check the color of hoof, whether it is rotten or not,
- Cleanse dirt from the hooves,
- Trim small upper tip of hoof,
- Trim the tip of hooves maintaining the level (like people's nail)
- Trim more slightly interior part of hooves than the outer tips.



Fig. No. 6.3.1 Hoof trimming equipment

Source: JICA Project Team



Fig. No. 6.3.2 Trimming the hoof of goat

Source: JICA Project Team



Fig. No. 6.3.3 Trimming the hoof of goat

Source: JICA Project Team



Fig. No. 6.3.4 Trimming the hoof of goat

Source: JICA Project Team

6.4 Attention be given to health of goats

- It is necessary to have update information of the health of livestock and nutrition status
- Information on goat's health can be learnt by observing its physical condition

- By observing goat's teeth, age of the goat can be assessed and according to the age of goats, physical condition of goats can be known
- Similarly, by observing eyes of goat, quantity of bloods in body can be known,
- By observing feces of goat, information on health condition can be known

6.5 Observation of healthy goats

Whether goat has anemia or not, can be identified observing the goat's eye (mucus membrane). The methods of identifying the condition of goats from color of eyes are as followings:

- Dark pink color: adequate condition
- Pink color: Not anemic
- Light pink color: Guess for anemic
- More Light Pink color: Anemic and needs urgent treatment

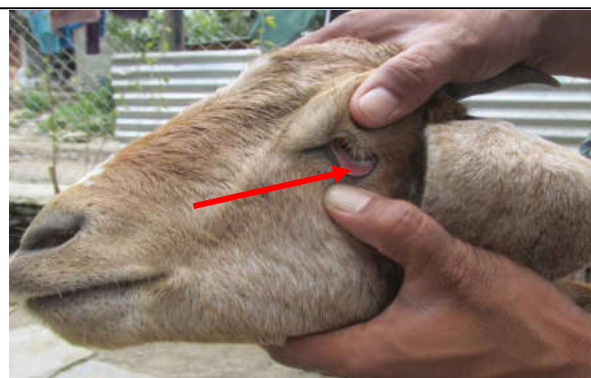


Fig. No. 6.4.1.1 Identifying the condition of goat observing the goat's eye

Source: JICA Project Team

6.5.1 Teeth condition of goats based on its age

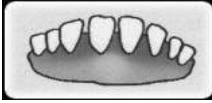
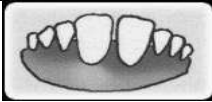

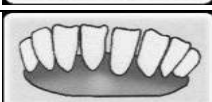
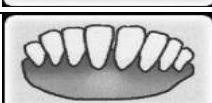
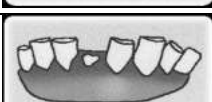
SN	Age	Teeth	Figure of teeth
1	6 to 10 month	Incisors-8 front side milky teeth	
2	10 to 14 month	2 frontal fixed and 6 milky teeth	
3	Age of 2 years	4 frontal fixed and 4 milky teeth	
4	Age of 3 years	6 frontal, fixed and 2 milky teeth	
5	Age of 4 years	8 frontal, fixed teeth	
6	Age of above 6 years	Grind and loosened Frontals, fixed teeth	

Fig. No. 6.4.2.1 Condition of goat teeth based on age

Source: Central Sheep and Goat Office, HariharBhawan

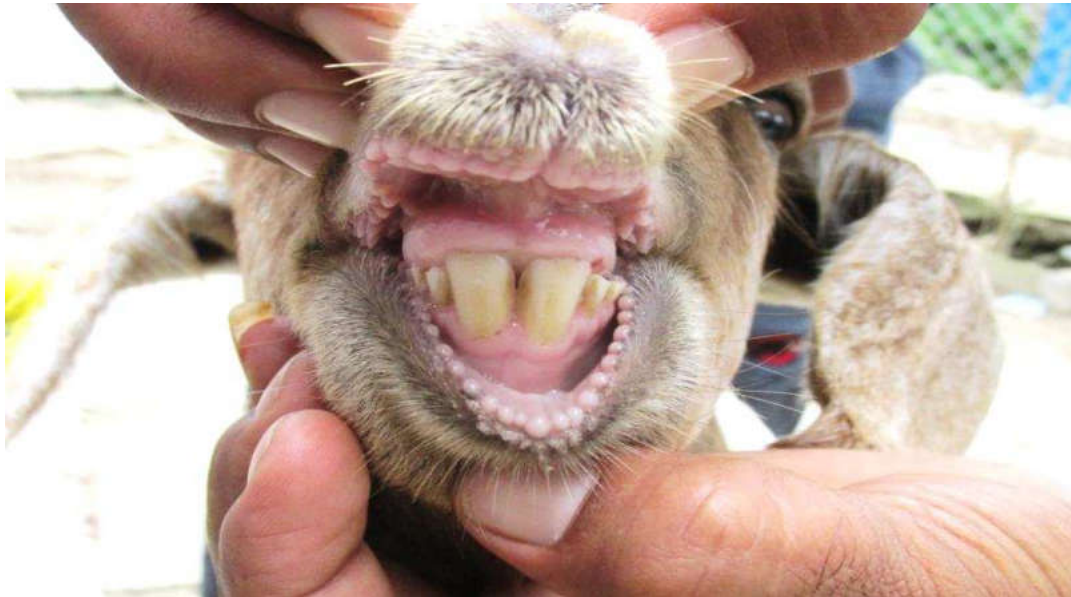


Fig. No. 6.4.2.2 Identifying the condition of goat teeth based on age

Source: JICA Project Team

6.5.2 Identifying health condition of goat observing goat dung

<p>→ Consult with Technician ←</p>	

Photo 3-12: Good (Pelleted!)

Photo 3-13: Good (A bit softer!)

Photo 3-14: Bad (Watery).

Photo 3-15: Bad (Diarrhea).

Fig. No. 6.4.3.1 Methods of identifying the situation of goat health by observing dunks

Source: CD-CAAM-JICA

6.5 Introduction of nutrition in goat farming and importance of appropriate nutrition

For subsistence of livestock and production of livestock related matters, nutrition is very essential. In nutrition, there 7 elements included; carbohydrate (source of energy) protein (physical growth), fats (source of energy), minerals, vitamins and water. Goats are stronger than sheep and cow; and it can consume meager feeding, forage and fodder. Specially for increasing meat, protein-based feeds are essential to kid's growth. High protein containing forage and feeds are like: Ipil Ipil, soybean curd, soybean husks, residue of oilseeds etc.

Table No. 6.5.1

Required nutrition for goat

Proper Nutrition	Requirement for livestock
carbohydrate	For subsistence
protein	For physical growth
minerals	Pregnancy
vitamin	Production (meat and milk)

Source: Goat nutrition by Oregon State University Extension Service

6.6 Required nutrition for kids, adult and pregnant doe

6.6.1 Pregnant and parturition goat

- In the last month of parturition date, pregnant doe needs more nutritious feed and quality fodders. Attention has to be given to pregnant goat in feeding.
- If does are fed adequately before mating, there is high chances of having good embryo and twin gestation.
- By feeding mineral block, calcium and phosphorous required for body can be supplemented.



Fig. No. 6.6.1.1 Feeding to pregnant goat

Source: JICA Project Team

- Compared to others, lactating doe requires more feeding. Like: additional 350 grams of feeds in per liter of milk production.
- Feeds should have mixture of 1% minerals, 1% calcium and phosphorous. Also, molasses can be mixed up.
- Do not let pregnant doe go for obesity. Obese pregnant doe may face complication during labor.

6.6.2 Method of feeding newborn kids

- Newborn kids must be fed colostrums within 1 hours of birth. It provides immunity to kids, helpful for defecation of first soft feces, and helpful in intestinal cleansing. But, if kids are let feeding more milk, then diarrhea may occur.
- After 3-4 months, soft legumes grass should be started to give to kids

6.6.3 Goat weaning management

Young kids do eat less; therefore, it should be fed more nutritious feeds. Feeds can be prepared by mixture of flour from maize, barley, bran and continuously fed after 4 months young till the date of mating. Methods of daily feeding from birth to 90 days are as followings:

Table No. 6.6.3.1
Method of daily feeding to kids (birth-90 days)

SN	Age (Day)	Milk (ml/day)	Creep feeds (gm)	Young soft grass
1	1-3	Feeding 300 ml colostrum for 3 times	-	-
2	4-14	Feeding 350 ml milk for 3 times	-	-
3	15-30	Feeding 350 ml milk for 3 times	Little	Little
4	31-60	Feeding 400 ml milk for 2 times	100-150	Feed as much as possible
5	61-90	Feeding 200 ml milk for 2 times	200-250	Feed as much as possible

Source: Central Sheep and Goat Office, Harihar Bhawan

6.6.4 Buck management

- It is necessary to feed adequately protein-rich feeds to buck. The necessary amount of feed has to be fed every day.
- Based on the weight of buck, concentrate feed has to be fed to buck 450-500 grams in daily basis.
- Breeding buck needs a sufficient exercise. Obese buck is not efficient in mating. Thus, in timely manner, weight of buck should be monitored.

6.7 Methods of feeding

- Time of feeding: 2 times daily (morning and evening). Water should also be changed at the same time.
- Forage and fodder for goats should be maintained regularly. Irregularity of forage and fodder with empty grass container means that goats do not have adequate feeding and gradually goat/s loses weight.
- We must keep in mind that goat should not be over fed; if goats are over fed, then problem of bloating may occur.
- Goats must be given balanced feeds. Nutrition value for goat/s may not be adequate by giving similar type of daily feeding.
- Goats have to be given foddors and grasses. Goats are picky and selective for grasses.
- Young leave and buds are enriched with protein and phosphorous.



Fig. No. 6.7.1 Concentrate feeding to breeding buck

Source: JICA Project Team



Fig. No. 6.7.2 Adequate fodder given in paddock

Source: JICA Project Team

6.8 Changing feeds

- It takes time for changing feeds for goats. At once, new feed and over feeding to goats should not be happened. It should not exceed than 100 gm for such new feed.
- It takes some time to bacteria of stomach to interact with new feeds. Therefore, only to introduce new feeds at one time in a day and increase gradually.
- Such feeds can be given twice in a day.

7. Parasite control and vaccination for infectious disease

7.1 Parasites

- Parasites live on nutrition from goat.
- Internal parasites live inside goat's body.
- External parasites live outside goat's body.
- The parasites attack on healthy goats. But, if the parasites attack in big scale, the goats fall sick and sometimes may die of it.

7.1.1 Internal parasites

(A) Stomach worms

- **Cause:**
 - Goats having eaten contaminated feeds, water, grasses or fodders with eggs of worms or such worms are developed through infection in healthy goats
 - Stomach worms grow in shape like earthworm.
- **Symptom:**
 - There is no appetite in feeds, any speedy growth, droopy, rough skin and loss of hair coat to goat.
 - Sometimes feces seem normal and sometimes loose (watery feces).
 - While touched, the belly feels harder.
 - It is stinking feces.

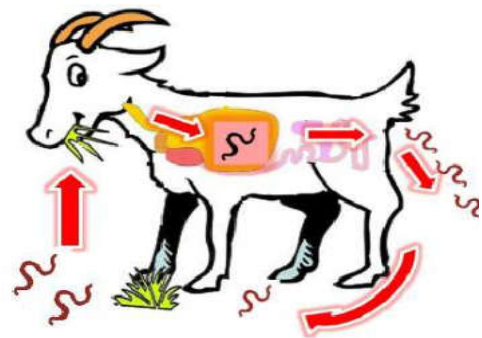


Fig. No. 7.1.1.1 Worm infected goat

Source: JICA Project Team

(B) Lungworm

- **Cause:**
 - It is developed if goat eats grass with the eggs of lung worm.
- **Symptom:**
 - Weight loss in goat, droopy, loss of appetite, yellow eyes (anemic)
 - Sometimes watery feces, sometimes constipation symptoms
 - Dull skin
 - Swollen jaw
- **Treatment and control**
 - Albendazole: feed 15 mg. / kg as per body weight. But, it should not feed to pregnant doe or
 - Oxyclozanide: 15 mg/kg as per body weight of goat or
 - Fewendazole: 5 mg/ kg as per body weight of goat or
 - Levamisole: 8 mg/kg as per body weight of goat or
 - Ivermectin: 0.2 mg/kg as per body weight of goat inside skin administered through injection



Fig. No. 7.1.1.2 OXYCLOZANIDE medicine

Source: JICA Project Team



Fig. No. 7.1.1.3 Oxyclozanide medicine

Source: JICA Project Team



Fig. No. 7.1.1.3 ALBENDAZOLE medicine

Source: JICA Project Team

(C) Tape worm

- **Cause:**
 - In goat's feces of infected with tape worm, eggs and small pieces of worms drops on ground; such particles may be swallowed with grazing grasses by livestock; and reach to stomach and intestines and such tape worms is developed.
- **Symptom:**
 - Anemia
 - Weight loss
 - Constipation in defecation
 - Seen tapeworm in size of rice piece in feces of goat
- **Treatment and control**
 - Praziquantel: 5 mg/kg feed goat as per body weight or
 - Pyrental: 10 mg/kg feed goat as per body weight

7.1.2 External Parasites

- **Cause:**
 - The following problems are seen in goats, livestock and bird due to external parasites
- **Symptoms:**
 - Scabies
 - Anemia,
 - Weight loss
- **Treatment:**
 - Dipping: Soak sick goat (protecting nose, eyes and mouth) in the mixture of dipping tank with prepared medicine of 1000 parts water and 3-5 parts of Malathene or Saythene,
 - Control external parasites like lice, tick, mites, fleas, flies etc.
 - Avermectin: 0.2 mg/kg as per weight of goat's body administered through injection deep in skin



Fig. No. 7.1.2.1 Medicines used in treatments of external parasites

Source: JICA Project Team

7.2 Importance of immunization and schedule

Proper immunization will help in having good health of livestock. Vaccines will help to promote immunizations in livestock, therefore timely vaccination is required.

Table No. 7.2.1

Vaccination schedule for goat

SN	Name of disease	Time for vaccine	Interval for vaccine
1	PPR	After 3 months old	Once in every 3 years
2	Foot and Mouth Disease (FMD)	After 4 months old	Once in every year

Source: Central Sheep and Goat Office, Harihar Bhawan

7.2.1 PPR

- **Cause**
 - This disease is caused by viruses
- **Symptoms**
 - Goats are in fever from 106° to 108° Fahrenheit (use thermometer for measurement)
 - Goats do not eat fodder and water; and eyes get red.
 - Sore will start affecting gum and tongue; and slowly covers in mouth.
 - Difficulty in breathing process
 - Feces get watery and sometimes mixed with blood and mucus; death at the end.
- **Treatment and Control**
 - There is no effective treatment of PPR, therefore it is wise to be attentive and start prevention on time.
 - Sick goat needs to be isolated



Fig. No. 7.2.1.1 Medicines used in treatments of external parasites

Source: JICA Project Team

from other herd to prevent from infection from one goat to another,

- Discard all matters and materials used to treat sick goat or purification process.
- Dig deep hole to put with adequate lime and salt together with carcass of infected goat and cover the hole

7.2.2 Foot and Mouth Disease (FMD):

- **Cause:**
 - FMD is caused by viral infection in goats. It affects less compared to cow, buffalo and pig. But, if the goats are severely affected, it can cause abortion, feeding difficulty and walking difficulty in goats
- **Symptoms:**
 - Fever
 - Salivate
 - Lost appetite
 - Munching mouth
 - Red sore in between hooves and lameness
 - Swollen tongue and abscess
- **Treatment and control**
 - Cleanse sore of mouth with salty solution, zinc or copper sulfate solution
 - Cleanse wound of legs with phenol liquid and put hymex ointment
 - Isolate sick goat from herd
 - Annually vaccinate goats

8. Management of grass production and harvesting

8.1 Introduction of grass

Any species of plants, consumed by animals as feeds are called grasses. Goat can eat leaves of plants, stems, roots, green or dry flowers.

- **Fodder trees:** Young branches and leaves of planted trees with purpose of grasses are called fodder trees. Leguminous fodders are those trees which have glands in roots; where nitrogen from environment is deposited, like: Ipil Ipil.
- **Perennial (multi-year) fodder:** Namaro (*Ficusroxburghii*), Raikhanyu (*Ficusuncica*), Tanki (*Bauhina Purpurea*), Badhar (*Artocarpus Lakoocha Roxy*), Koiralo (*Bauhinia Variegata*), Bakena (*Melia Azedarach*) etc.
- **Ground grass:** Grasses easily cut by standing or sitting are called ground grasses. Grasses are small, rough or fine and green leaves. It has covered all surface of ground. Like:
 - Annual: Maize, Junelo, Passmalam, Babiyo, Kans, Mulato etc.
 - Perennial: Napier, Guneagrass, Amliso (broom grass) etc.
- **Pasture management:** Grass and leguminous fodder seeds must be sowed in pasture land for livestock for free and open grazing.

8.1.1 Different kind of grasses

- **Leguminous fodder:** These fodders are regarded important among grasses. In leguminous grasses 20-25% protein contents can be found, but in other grasses it has up to 5-10%. If leguminous grasses are overfed, bloat in goats may occur. Therefore, lesser amount of leguminous fodder can be fed to goats. (1-2% fodders of goat's total weight)



Fig. No. 8.1.1.1 Leguminous grass

Source: JICA Project Team

- Annual: Beans and Soybean grasses
- Perennial: Ipil Ipil and Larsson

- **Non-leguminous Fodder (Grass and crop):** Generally, livestock takes much more energy from these grasses and it is fed in large quantities. These grasses equivalent of 10% of total weight of livestock can be fed.

8.2 Importance and benefits of grass

- Feeding grass is much cheaper in comparison to concentrate feeds
- Green grasses can be fed throughout the year with plantation of grass
- Quality feed is available in dry season too.
- For collecting grass, one no needs go to jungle and it lessens labor

8.3 Method of farming (sowing and plantation), land preparation and harvesting

8.3.1 Farming period

- Summer grass: {Asar to Asoj (June/ July to September/ October)}: Beans, Junelo, Maize, Soybean and Napier
- Winter grass {Asoj to Magh (September/ October to January/February)}: Larsson, Jai and Barley
- Grasses in hot season {Chaitra to Jestha (March/ April to May/ June)}: Soybean, Junelo, Napier and Amliso (Broom grass)

8.3.2 Selection of grass

While selecting grass, following points should be considered:

- Land availability
- Types of Soil
- Productivity of soil
- Climate
- Irrigation availability
- Numbers of livestock and breed, etc.

8.3.3 Nemaro (*Ficusroxburghii*):

- **Introduction:** Nemaro is a perennial small tree which is up to 12 meters tall. It has big egg-shaped leaves upto 30-40 cm. Young leaves are red in color and turn to green. When fruits are like pears and red brown in colors, these are edible.



Fig. No. 8.3.3.1 Nemaro tree

- **Available place:** Nemaro can be found in tropical and sub-alpine places. This grass is available from Terai to high hills (up to 2000 meters elevation), and it is perennial medium sized fodder.
- **Proper climate and soil:** This grass grows nicely in compost fertilised damp soil. It does not grow or suitable to farm in places where hot air is blown and in dry soil.
- **Sowing method:** Seed and Stem Cutting can be used for plantation.
 - **Sowing seeds:** In Bhadau (July/August), from mid-hill to high-hill areas, seed of Nemaro can be sown and in Terai, in second week of Falgun (April), seed can be sown by preparing the bed. After sowing seeds, we have to cover with thin layer of sands. 4-5 weeks after, seedling should be transplanted.
 - **Plantation of Stem Cutting:** Stem cutting has to be prepared in one year matured stems with length of 3 frames for its easier growth. Stems should be 2 cm in breadth and 2 handsbreadth long (Clipping can be planted in the Falgun (March/April) month. Plantation of stem cutting should be one frame deep in soil, next second in the surface and



Fig. No. 8.3.3.2 Fodder of Nemaro tree

Source: JICA Project Team

third frame above the surface. Stem should be angular cut into edges which is planted deep into soil.

- Methods of grass collection: After plantation of 3-4 years stem cutting of trees, twigs are ready for pruning. Then, pruning of branches/twigs is ready as per the condition of trees.

8.3.4 Raikhanyu (*Ficus cunica*)

- **Introduction:** This is a kind of fodder. It grows like an umbrella approximately from 3 to 10 meter tall. It is brought from jungle for fruit, wood and medicine.
- **Available places:** It is found in the periphery of jungle around 600-1900 meter elevation.
- **Plantation method:** Through seed and stem cutting.
 - Sowing seeds: In the month of Bhadai (July/August), from mid-hill to high-hill areas, seed of Raikhanyu can be sown and in Terai, in second week of Falgun (April), seed can be sown by preparing the bed. After sowing seeds, we have to cover with thin layer of sands. 4-5 weeks after, seedling should be transplanted.
 - Plantation of Stem Cutting: Stem cutting has to be prepared in one year matured stems with length of 3 frames for its easier growth. Stems should be 2 cm in breadth and 2 handsbreadth long (Clipping can be prepared in the Falgun (March/April) month. Plantation of stem cutting should be one frame deep in soil, next second in the surface and third frame above the surface. Stem should be angular cut in to edges which is planted deep into soil.
 - Methods of grass collection: After plantation of 3-4 years stem cutting of trees, twigs are ready for pruning. Then, pruning of branches/twigs is ready as per the condition of trees.



Fig. No. 8.3.4.1 Raikhanyu tree
Source: JICA Project Team



Fig. No. 8.3.4.2 Fodder of Raikhanyu tree
Source: JICA Project Team

8.3.5 Ipil Ipil (*Leucaenaleucocephala*)

- **Introduction:** Ipil Ipil's successful farming can be done from Terai to 1500 meters high hills. This grass is nutritious for livestock. Roots of this tree can go deeper in soil and remains green even in dry season.
- **Climate and soil:** Temperature 25-30° and average rainfall 650-1500 ml. are necessary for Ipil Ipil. For this plant, there should be a good outlet for water.
- **Plantation method:** Seedlings of Ipil Ipil is ready for transplantation in the months of Asar (June/July) and Shrawan (July/August). Seeds of Ipil Ipil can be sowed in one hand length difference directly in the edges of farm by digging a passage of water.
- **Production:** Generally, after cutting fodders from branches in 2-3 months interval, quality fodder is available. 30-40 kg green grass can be produced per root of grass.

8.3.6 Napier grass (*Pennisetum purpureum*)

- **Introduction:** This grass is produced largely among soil grasses. Napier has various kinds of species which can be grown in different climates. Dry or wet, in small land or commercial farming; Napier grass is an evergreen, a strong grass, has roots in knobs and with small hairs. From its knobs, strong roots are developed, and are 2-3 meters tall.

- **Proper climate and soil:**

Napier is a perennial non-leguminous grass which is grown up to 2000 meters elevation. Its growth is good at 25-40° Celsius and needs 1500 ml. rain fall. But, in winter up to 15° Celsius, its growth delays and dies in snow. Napier



Fig. No. 8.3.6.1 Napier grass

Source: JICA Project Team

does not grow in swamps and best grows in risen land. It does not bear with dews.

- **Preparation of land:** In barren land, prepare very smooth soil after plowing 2-3 times. Thirty to forty Doko (basket) of compost have to be applied in one Ropani (500 square meters) land before plantation of Napier cane cuttings.
- **Cultivation time:** Appropriate time of cultivation for Napier grass is Jestha (May/June) and Asadh (June/July), but in the irrigated land, it can be cultivated from Kartik (September/October) to Falgun (February/March).
- **Cultivation method:** It can be planted with 3 nodes cane of Napier in slanting position at 45° and spacing at 15cm. plant to plant distances. While cultivating, put 2 nodes covered by soil, and 1 node in top of the ground surface. There should be row to row distance of 90-100 cm in plain land; whereas, there should be plant to plant distance of 50 cm. and row to row distance of 60 cm. while planting at the edge of farm in sloppy land.
- **Harvesting:** After 75-80 days (around 3 month) of cultivation, first harvest can be done. Thereafter, harvest can be done in every 15-45 days interval (in summer). 6-12 inches from surface level, grasses need to be cut while harvesting grass. It yields 4-5 Tons of green grasses from a Ropani land which is enough for 24 goats in average.



Fig. No. 8.3.6.2 Transplanting Napier cone cutting

Source: JICA Project Team

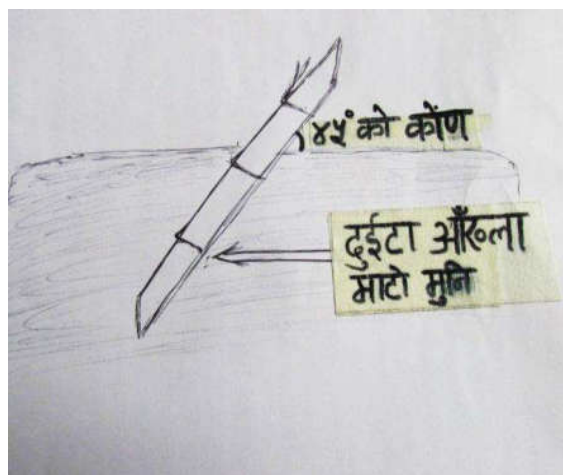


Fig. No. 8.3.6.2 Method of transplanting Napier grass

Source: JICA Project Team

8.4 Grass cutting and storage

8.4.1 Introduction: Grass cutting and storage

Quantity of grass differs from season to season; and to collect grasses in winter is very difficult. Therefore, enough grasses on time needs to be collected and appropriately kept in storage. Fresh grass can be collected, and fed to goats in the same day after 2-3 hours. For keeping storage, grass can be stored by making silage or hay.

Table No. 8.4.1.1

Description of silage and hay

Name	Moisture	Appropriate grass	Method	pH	Season for making
Silage	60-70% of weight	Any grasses Napier, Jai, Maize (big stems and leaves)	locked up Air tight	Acidic (pH. 3-4)	Any time
Hay	10-15% dry	Grass (small stems and leaves)	Dry out under the Sun	Neutral (pH. 7)	Grass available season and Sunny day

Source: JICA Project Team

8.4.2 Importance and benefit of grass storage

Farmers can take following advantages by storing grasses:

- Availability of grasses in the winter.
- No extra cost for purchasing additional feeds.
- Off-season usage of seasonal extra produces of grasses.
- Nutritious elements of grasses can be kept.
- Time and labor will be reduced for grass collection in the winter.

8.4.3 Method of Silage making

- Silage is made through fermentation (as like Gundruk) and it can be stored more than one year.
- Selection of grasses (like: Maize, Sudan, Junelo, Makaichari, Napier etc.)
- Check status of moisture and growing stage (moisture 60-70%)
- Grass cutting and collection (Silage should not be made of matured grass; cutting grass during flowering time will be more nutritious)
- Cut grasses in pieces (2-3 cm. and make small pieces of stems)
- Put into bag and make it air tight (if possible, mix molasses or any grains of 2-10% of total weight of grasses)
- **Storage:** Prepare two plastic bags and put grasses in plastic bag pressing with foot or put heavy weight to press so that air comes out. Then, close the plastic bag and make it air tight. Put the silage filled bag in place where sun, rain and insects do not affect for 45 days.



Fig. No. 8.4.3.1 Preparing crop flour to mix with silage



Fig. No. 8.4.3.2 Making small pieces to grass to make silage



Fig. No. 8.4.3.3 Pressuring materials into the sack

Source: JICA Project Team Fig.



Fig. No. 8.4.3.4 Making tight not to enter air

Source: JICA Project Team

(A) Qualities of good silage:

- Generally, good quality of silage is soft, juicy, good sour smell and dark brown or light yellow in color.
- It should have no fungus and not sticky.
- It should have from 4.2 to 4.5 pH level

(B) Methods of feeding silage:

- Goats can be fed about 1 kg of silage in a day. Once silage bag is opened, it should be finished early, otherwise fungus may be seen. In beginning, goats may not eat silage alone, so mixed with rice or maize and feed for some days. Fungus may develop if bag remains open, and bad odor may come out. Such silage should not be fed to goats.

8.4.4. Method of preparing hay

Hay can be prepared through drying grasses. Moisture in hay should be 10-15%, and it can be stored for a year. Sunny weather is necessary to prepare hay. If it is not well dry out, then fungus may be developed or grass rotting will be started. The followings processes have to be followed while preparing hay:



Fig. No. 8.4.3.4 Prepared hay

Source: JICA Project Team

- Selection of grass
- Check status of moisture and growing stage of grass
- Cut and collect grass
- Properly dried (time to time moving grasses upwards/downwards) under the Sun
- Bundle and keep in store

Dry the collected grasses under the sun, and turn/move it twice in a day. It takes 4-5 days for grass to dry out properly (season must be considered). Even if, it gets wet with drizzling rain, we can dry it again, but quality may deteriorate. During grass collection, if it is too mature before cutting or already dried before collection; then making hay is not possible. If it is already dried, then it is called straw, which is less nutritious. Dried and ready hay is made bundle and store in dry place.

(A) Qualities in good hay

- Good hay must include all leaves.
- Better hay will be prepared by mixed grasses.
- Better hay is prepared with 10% of grasses of booting stage.
- Good hay consists of green color.
- Good hay is soft and tasty along with free from fungus

(B) Method of feeding hay

Goats can be fed hay as much as possible like as fresh grasses. If hay is properly dried up, it can be fed adequately with no fear from fungus. But, if hay gets fungus and wet, then it should not be fed. Such grasses are poisonous for goats.

9. Management of kids and pregnant doe

9.1 Pregnant doe management (before parturition)

After 150 days of gestation, pregnant doe will give birth. We can calculate parturition date after successful mating adding 150 days. Therefore, mating date must be recorded. Only by observing a doe, one cannot define whether the doe is pregnant or not. After mating of 18-21 days, if doe does not show symptom of heat again, it is understood that the doe is pregnant and give birth after 150 days of successful mating date. In gestation period of 2-3 months; the development of fetus is so rapid, so pregnant doe needs to be well fed with nutritious grass and feeds. The followings additional management should be done for pregnant doe

- Pregnant doe should not be kept together with buck and kids.
- Record of mating date should be checked, keep in isolation to pregnant doe and provide feedings separately.
- It should have time to time health checkup for pregnant doe, and manage vaccines and medicine accordingly.
- Keep one week prior the pregnant doe should be isolated. If parturition happens at night, keeping in isolation saves newborn kids from stamped by other goats/kids.
- Pregnant doe needs adequate exercise. If good pasture is available, it should be allowed for grazing.

9.2 Caretaking during parturition of doe

When expecting date approaches, expecting doe shows symptoms. Before the parturition, pregnant doe does not stay in one place, does not eat feeding and sometimes stands and sits. In case too long labor of doe persists, technician should be contacted.

Amniotic sac like a bubble of water will come out first from the womb at the time of parturition. After 15 minutes of amniotic sac is seen, the sack will be broken down, and normally two legs with head will appeared. It is difficult if two rear legs come out first, and takes long hours at the time of parturition. Then, rest of body slowly comes out.



Fig. No. 9.2.1 Pregnant doe

Source: JICA Project Team

Generally, the delivery of goat is easy and few problem at parturition. The people should not pull out the kids hurriedly. If pulled out the kids, there are chances of wound at womb, and later problems will arise on doe and kids. However; if the labor continues more than 3 hours, the farmer should call the technician to avoid the dystopia.



Fig. No. 9.2.2 Broken amniotic sac during parturition of goat

Source: JICA Project Team



Fig. No. 9.2.3 Legs is coming out

Source: JICA Project Team



Fig. No. 9.2.4 Frontal part of head coming out

Source: JICA Project Team



Fig. No. 9.2.5 Newborn kid licked by mother doe after parturition

Source: JICA Project Team

9.2.1 Problems faced at the time of parturition

If the labor is prolonged, and kid does not come out, urgently technician or skilled and experienced person has to be called for help. In below diagram (left side of figure), if kid/s is in such position, without any problem it will come out. In other cases, if position of kid/s is in different position (cases in right side of figures), such kid/s must be moved to normal position and pulled out.

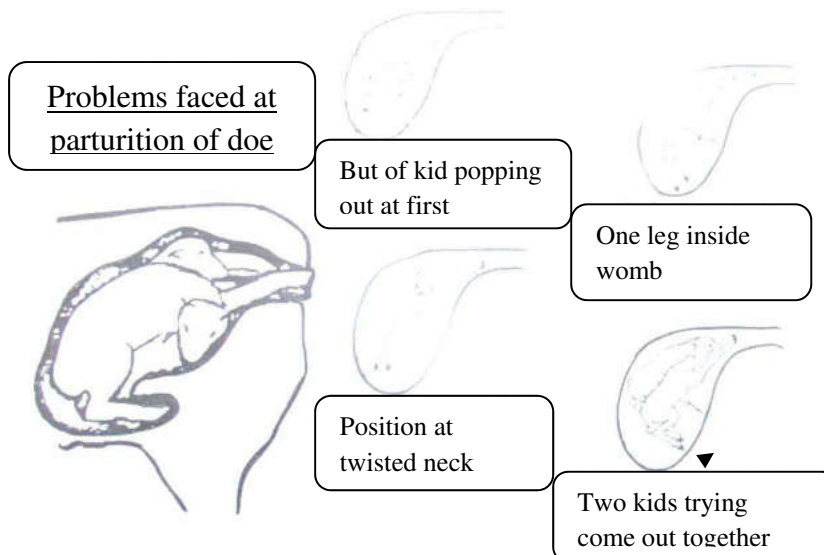


Fig. No. 9.2.2.1 Problem faced during parturition

Source: JICA Project Team

9.3 Caretaking at postpartum

- During parturition the doe is very tired. If doe is given fresh soup (*kudo* and *bheli*) and molasses, it is helpful and gives energy for doe in giving birth. After tying knot in naval cord by nylon thread at one inch above and half inch in rear side, naval cord is cut to detach it from the body. In separated/cut area, Iodine solution or mixture of oil and turmeric has to be put on it. It will prevent the naval cord infection and getting contact with Tetanus to kids.



Fig. No. 9.3.1 Colostrumfeeding to new born kids

Source: JICA Project Team

- Newborn kids get cleaned by mother doe by licking it if it kids are kept closure to doe in warm place. By cleansing breast gland of doe after one hour of postnatal, the kids must be allowed to suck the milk and letting down milk 2-4 times. In case of kids cannot be at self-stances, people should help kids to suck the milk.
- For newborn kids, colostrums are an invaluable food. The colostrums have variety of nutritious elements and adequate number of elements of immunity to diseases. Therefore, kids must be fed with colostrums necessarily. If drafting kids need colostrums, kids can be fed a solution of 500 ml milk, an egg and 1 spoon of oil, and milk of other doe can be fed in replacement of milk.
- Generally, after the parturition, placenta drops within a half day. If it takes more than twelve hours, doe needs to be fed medicine with the advice of technician. Feeding *Amriso* (Broom grass) or leaf of sugarcane to doe also helps in dropping placenta. Some residue may come out from womb even after 2-4 weeks of postnatal period, and it works for self-cleansing of womb.

9.4 Management of kids

- Postpartum period of 1-2 days, mother doe and kid/s should be kept in small shed separated from other goats. If mother doe does not feed milk to its kids; the mother doe should be caught in one place and feed milk to kids. Mother goat should be fed adequate green grasses; otherwise less milk will be produced for kids. In case of lesser milk volume, additional feeding must be fed to doe.



Fig. No. 9.4.1 Feeding milk to drafting kid

Source: JICA Project Team

- If doe does not give milk to its kids, kids must be fed with additional milk. Other doe's milk is better, but if there is no doe's milk, then cow's milk can be fed. Lukewarm cow's milk at 40° can be fed through bottle to kids, but bottle should be clean. If bottle is not cleaned, there may be bacterial infection.
- Kids must be fed fodders after 2 weeks of postpartum. Initially, kids may pick up small quantity of grasses. But the feeding grasses to kids help in developing good bacteria in stomach for good digestion.
- For better development of stomach, kids should be fed solid matters (fresh grasses and feeds). If kids are not fed with solid matters, the development of stomach does not take place well; and they may die after weaning. Young kids should not be mixed for one month with other adult goats; otherwise it may get infected with worms and diseases. Even during the period of feeding milk, kids require clean water. In addition, kids require open ground to play and sunny place.

9.4.1 Creep feeding for kids

Creep Feeding is a method of feeding additionally to suckling kids. Isolating kids from does after 2 weeks have to be fed grains and fodder in certain place. This method is also effective when doe gives less milk (especially at the winter season, when grasses are less; or at the birth of twin and triplet). Kids do not eat old and filthy fodders.

Table No. 9.4.1.1

Feeding amount to new born kids

Age of kids	Grain feeds¹ (Gram per day)	Quality fodder²
From 2 weeks to 1 month	Little	Little
2 months	30-60	As much as goats can feed
3 months	60-100	As much as goats can feed
4 months	100-150	As much as goats can feed

Source: JICA Project Team

9.4.2 Creep feeding

- Prepare space separated by vertical bars put at 12-15 cm widths, where kids can only move freely (creep feeder).
- Enough quantity of dry and clean feeds should be given in creep feeder. Clean and fungus-less feeding tank (manger) should be used. Otherwise, fungus may be infected.

9.5 Castration of male kids

- The burdizzo castration for male kids has to be done before 3 months old. Castration and weaning of kids should not be done in same time.

¹Grain feeds=-Rice, maize, Soya bean, barn, residues of millet and oilseeds (PINA) etc. In case of over feeding to kids, bloating stomach happens and kids can die.

²Quality Fodders- Feed goats a mixture of leguminous grasses, Non-luminous grasses, forage and fodders



Fig. No. 9.5.1 Burdizzo castration machine

Source: JICA Project Team



Fig. No. 9.5.2 Castrating to male kid

Source: JICA Project Team



Fig. No. 9.5.3 Applying Tincture Iodine after castrating to male kid

Source: JICA Project Team

9.6 Weaning of kids

After 3 months, young kids need weaning, and they need to be totally stopped from suckling milk by 4 months old. After 4 months, kids are fed grasses and concentrate feeds and a lot of clean water. Weaning of kids makes doe able to reproduce again.



Fig. No. 9.6.1 Sucking to young kid (Wrong)

Source: JICA Project Team

Weaning period is important time, and kids need to be fed with additional feeds. As per condition, additional feeds up to 60 grams/day to be fed to kids.

9.7 Separation of weaned kids

Weaned doeling of 5-9 months old become ready for mating, but sometimes still not ready for reproduction. Therefore, buck should be kept separately to doelings. Otherwise, unwanted pregnancy to doelings may occur. Also, to secure the feed for weaned kids and prevent kids from suckling from their mother doe again, the separation is very important.



Fig. No. 9.7.1 Separation of young kids

Source: JICA Project Team



Fig. No. 9.7.1 Separation of weaned kids by using local bamboo net

Source: JICA Project Team

10. Selection of Goats

10.1 Introduction and Importance of Goats selection

All goat-farmers need to select good quality goats. Goat selection is done to improve the ability of keeping herd. Reproduction and physical growth (meat production) are the relevant qualities, and the farmers have to consider the priority traits among other different characteristics. For this purpose, culling of other less productive goats is necessary, after selecting breeding bucks and does. Production cost can be lowered down by selecting productive goats.

The best buck and does must be selected for reproduction. By selecting good bucks and does, good kids will be born, and be able to sell the goat with high price. The effect of the selection of goats will remain for long-term:

- Major goals of Goat selection:
 - For improving the reproduction ability
 - For improving the growth and meat production

10.2 Method of selection

While comparing goats, we must compare goats in own herd and other farms (Herds in similar condition). While selecting it, we should compare record of goats. Selection of goat should not be based on considering only one characteristic. Goats with strait legs and wide/deep body should be selected.

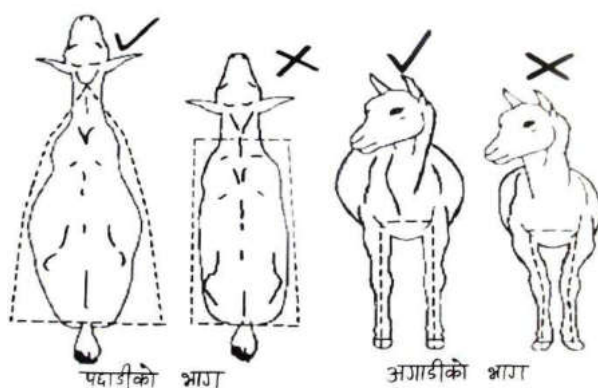


Fig. No. 10.2.1 Methods of goat selection

Source: JICA Project Team



Fig. No. 10.2.2 Selecting the goat

Source: JICA Project Team

- **Method of observing physique**
 - Healthy and smart, well-built body, standing on four legs equally, good raising of kids
 - Enough size to be able to deliver twin birth, almost 3 times of birth in two years
 - Wide chest, can eat much and good growth
 - Good and suitable development of body, shining and attractive body; and good development of reproductive organs
- **Method of weight estimation through measurement:**
 - Note: While measuring goat, it should be in standing position with all four legs must be in equal surface. Weight must be Kilogram and measurement should be considered in Inches.

$$\text{Weight (kg)} = \frac{\text{length} \times \text{breadth} \times \text{circumference}}{660}$$

660

Where,

Length (Inch) = Length between shoulder to but-bone

Circumference (Inch): Circumference of chest



Fig. No. 10.2.3 Measuring the length of goat

Source: JICA Project Team

Fig. No. 10.2.4 Measuring circumference of goat's chest

Source: JICA Project Team

10.3 Selection of goats for reproduction/breeding

Goat selection is a most important for breeding. During selection, following points must be considered:

- How many times give births in one year?
- How many kid/s at parturition?
- What is the record of stillbirth or live birth of kid/s?
- How many kid/s are successfully weaned?

Above facts can be determined by referring the record of goat. Removal of less productive goats must be done through culling.

10.3.1 Selection of breeding buck

- Physically healthy buck should be selected
- Buck's legs are important because it needs a lot of exercises during mating time
- Status of physical condition should be neither obese nor thinner
- Information on mother of buck- it can forecast of offspring's ability
- Big and good testicles of buck

- Errection in buck- A good breeding buck can mate with 3 does within 30 minutes.

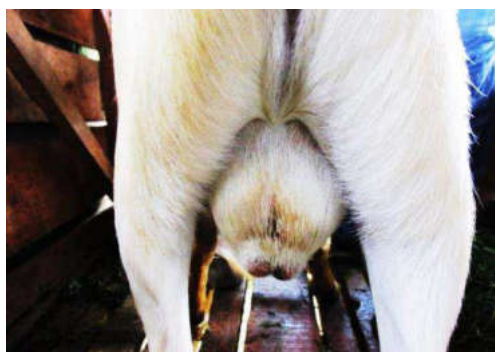


Fig. No. 10.3.1.1 Big enough and good conditioned testicles

Fig. No. 10.3.2.1 Heating of buck

Source: JICA Project Team

Source: JICA Project Team

- Castration of male kids: after selecting good breeding buckling, rest of the male kids must be castrated. Before 3 months old, unselected male must be castrated.

10.3.2 Selecting of doelings

While selecting doelings, following points be considered:

- Healthy and voluptuous
- Good development of breast
- No lump or feeling of pain while touching the breast
- Similar temperature of belly and breast
- Good vulva and no any abnormal matters

10.3.3 Points to be considered while purchasing buckling and doeling

The following points to be considered while purchasing buckling and doeling

- Buckling/buck should be purchased from outside of community to avoid inbreeding.
- Genetic information of buckling and doeling must be considered (e.g.: father, mother, health, de-worming and vaccination, any problems etc.)

10.4 Selection of goats based on condition

Give weightage marks by observing all goats, and then select goats by looking at the data. Weightage marks must be based upon muscle growth rate, quality of meat,

physical condition etc. While selecting the kids, compare their growth and conditions under similar age.

- High muscle built up and good growth: select for breed (keep them as breeding bucks/ does)
- Average muscle built up and medium growth: select for meat (fattening for meat or sell to others)
- Poor muscle built up and poor growth: remove from herd (slaughter for meat)

10.5 Removal of unproductive does

After selecting goats for breeding, rest of goats with low or no production, need to be sold out or removed, and good breed of goats to be bought.

10.5.1 Condition for removal of doe

- Goats with physical problem: e.g. having fault/disease on breast, mouth or legs
- Unable to raise kids well
- Matured for reproduction (too old)
- Low production: low weight, low pregnancy rate, cost full, etc.
- No production or without reproduction capacity



Fig. No. 10.3.2.1 Weak and thinner goat
Source: JICA Project Team

10.5.2 Keep following doe for breeding:

- With annual parturition
- High growth rate of kids; means it can give much milk,
- Give twin birth or high twins rate
- Easily identify the symptom of estrous
- High pregnancy rate
- With cool behavior and healthy

10.5.3 Importance of doe removal

- Keeping low productive goat only increases the cost
- No or less reproduction means no or less income
- By selling such low productive goats, can purchase new and good productive goats

10.6 Effective utilization of Cross-breeding

Generally, the local breed goats have also good and high productivity in the local climate and environment. Such high productivity does can be cross breed with Boer buck. At Barpak, cross breed kids with local doe and Boer buck will be raised very well in such climate.



Fig.No. 10.6.1 Kids born from local goats crossing with Boer breed

Source: JICA Project Team

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