1. Introduction:

a.) Goats constitute an important species of livestock in the country as they produce meat, milk, skin & fiber, generate employment & trade. This species is of economic importance to the people living in arid & semi arid, hilly & heavy rain fall & tribal area. The goat is the most important meat animal in the country. Although meat & skins are the major products, milk, fiber, manure & other by products contribute substantially to the agriculture economy. Goat meat, though costliest of all the meats in the country, is the most preferred & high demand.

Goat rearing is a traditional occupation of economically weaker section of the society especially small and Marginal farmers and Landless labors, particularly in semiarid and arid regions of the country. Goat is considered to be major source of economic sustenance for these categories of population in rural area. Comparatively lower body size and their adaptability to wide range of agro climatic conditions have rendered them favorite with poor farmers. Goats are predominantly maintained under extensive range management on community range land, cropped land after harvesting and forest land in mixed grazing with other livestock species employing self or family labors (unpaid and unorganized). Management of small ruminants does not require specialized skills hence the surplus family labor is gainfully employed for management and up keep of the animals. Organized breeding program, feeding management, husbandry practices, and health coverage and marketing structure are needed to be developed.

b. The goat population in India has increased over the past 50 years or so at the highest rate of any species of ruminant livestock in the country. Between 1951 & 2003 the goat population nearby trebled from 47.2 million to 124.4 million. On global level China stands 1 st in goat rearing & India stands 2 nd in goat rearing.

b.) Meat Requirement & Availability:

The National institute of Nutrition recommended that a balanced diet should comprise of 11 kg. of meat per annum per head. The increase in per capita income & urbanization are fuelling the demand for meat & meat products. While the population is expected to double in Asia & Africa by the 2020, the demand for meat & meat product is expected to triple. Per capita meat consumption in India is relatively low at less than 5 kg per year as compare to other developing countries such as Pakistan (13.7 kg.) , china (38.6 kg.) & Brazil (58.6 kg)

The estimated demand for meat is 7.7 million metric tons as against the present production of 4.6 million metric tons.

c.) A Goat is Poor mans' cow:

Late Mahatma Gandhi preferred goat milk daily. Goat milk is cheap, wholesome, easily digestible & nutritious. Hence they honor the goat as a Poor mans' Cow. Goat milk has medicinal value, such as,

- It is recommended for use in Dyspepsia, Peptic ulcer & pyloric stenosis. Also it is preferred to cow milk in Liver Dysfunction, Biliary Disorders, and Acidosis, Insomnia.
- Many people with cow milk allergy can drink goat milk because it contains a different kind of protein.
- The milk fat globules are small, making goat milk very easy to digest.

Sr. No.	**Species**	**Fat %**	**Fat globules in one c.c.**	**Size of fat globule (micron)**	**Diameter of fat globule (micron)**
1	Holstein Cow	3.60	48,00,000	75	2.50
2	Jersey Cow	5.40	27,60,000	210	3.75
3	Goat	3.50	92,00,000	38	1.69

- Babies do extremely well on goat milk formulas with folic acid supplements, when a mother does not nurse or can not nurse her own baby.
- Goat milk has superior ease of digestion & buffering properties, making it an ideal convalescent diet for people with digestive or ulcers
- Goat milk fatty acids have a unique metabolic ability to limit cholesterol deposits in body tissues.
- Fresh wholesome goat milk contributes to the strong & healthy development of growing children.
- Compared to cow's milk, goat milk has similar amounts of protein, fat, iron, vitamin C & Vitamin D. Goat milk has more natural Vitamin A, more Vitamin B & less lactose.
- Recent research shows that goat milk is high in calcium & good for heart plus protect against Alzheimer& heart disease.
- Goat milk is near to mothers' milk (ingredient %),

Sr. No.	**Species**	**Proteins**	**Fat**	**Lactose**	**Salts**	**Solids**	**Water**
1	Indigenous Cow	2.8	4.8	4.6	0.74	12.94	87.06
2	Exotic Cow	3.4	3.7	4.8	0.73	12.63	87.37
3	Buffalo	3.9	6.8	3.7	0.80	15.20	84.80
4	**Goat**	**4.3**	**4.9**	**4.1**	**0-.89**	**14.19**	**85.81**
5	**Woman**	**4.5**	**1.1**	**6.8**	**0.20**	**12.60**	**87.40**
6	Sheep	5.3	5.5	4.6	0.90	16.30	83.70

d) Employment Generation:

A Study in Tamil Nadu showed that goats provided gainful employment of about 184, 399 & 437 labor days per annum in small (1 -8 goats), medium (9-16) & large (above 16 goats) flocks respectively . Women & children contributed to labor force to the extent of 88 - 91 per cent in all the groups.

e) Distribution of goat:

It may be noted that the goat is the major small ruminant found in heavy rainfall areas viz, west coast & north eastern region where the number of sheep is negligible.

f) A misconcepts about goats:

Goat development has not been encouraged because of the bogey that goat development leads to deforestation & environmental degradation. This belief has totally been disapproved by the Hanumanth Rao Commission & the rate at which the goat population has increased without the help of any serious, large scale development programme indicates potential of the species in India.

It is apparent that large scale programmes will have to be launched urgently to meet the domestic demand of meat & sustain growth as also exploit the potentials of goats in a scientific manner.

4) Transport of Goats & Management of New arrival:

It is necessary to keep the goats in good condition & free from contamination during their transport as these will be used for breeding purpose & not for slaughter. The losses occurred during journey are,

i.) Injury /Fracture.
ii.) Transportation stress.
iii.) Loss of weight.
iv.) Dehydration.
v.) Diseases.

Transport of goats to the beneficiary's residence can be done by any of the available method convenient to a given situation,

a.) Driving on Hooves; b) Road Transport.

a) Driving on Hooves:

It is an age-old method of shepherds, if the distance to be covered is short & other mode of transport is not available. Cooler parts are advisable for driving on hooves.

The movement should be done slowly otherwise fast walk of goats' leads to exhaustion & fatigue. Goats are allowed to graze enroute. Fresh drinking water should be made available. Proper rest needs to be given during transport to minimize stress on goats.

b) Road Transport :

This is the most common way of transport in our country when the distance is more. Some dos & don'ts have been observed to minimize the losses during transport. Such as,

Do's,

- Allow the goats to graze/browse/fed 4-6 hours before transport.
- Provide bedding material in the truck. This will minimize the chances of fracture.
- Provision should be made for easy loading & unloading.
- Ensure adequate ventilation inside the truck.
- Starts the journey in the cooler parts of the day especially evening, in summer avoid the journey in day time.
- Overhead & side covering with "Tarpaulin" is necessary to protect goats from cold wave & rains in winter & rainy season.
- An experienced attendant is a must inside the truck to take care of goats.
- Adequate feed & water must be offered at least after every 12 hrs. during journey except, where the journey is completed within15 hrs.
- Transportation of no. of goat is depend upon size of vehicle, but generally 60 – 70 No. of goats could be transported in a truck but it is always better to transport minimum number of goats, so that ample space will be available for sitting inside the truck.

Don'ts

- Never cover the vehicle airtight.
- Avoid harsh breaking during journey.
- Avoid fast cornering
- Do not transport advance pregnant goats.
- Do not transport kids with adult goats.
- Do not travel more than 250 – 300 km at one time.
- Do not transport weak & sick goats.
- The speed should not be more than 40 km /hr.
- Do not transport more number of males with females.

c) Management of New Arrival:

When the goats arrive from a long distance at the farm, goats suffer from physical stress. All the new arrival should be kept in isolation under observation (quarantine) for a minimum of 21 days. Following care is needed at this stage to minimize losses.

- ❖ Proper unloading of goats to avoid fracture.
- ❖ Do not send for grazing feed at site & give them rest for a day.
- ❖ Provide quality greens & fresh water free of choice.
- ❖ Drench some electrolyte & B complex orally. Or Drench Mixture of Joggery (10-15 gm) with rock salt (Saindhave /Padelonnamak- 4 to 5 gm) .
- ❖ Anti stress preparation like Zee stress 10 mg/kg body weight may be given orally for 3- 4 days.
- ❖ Allow them to graze on nearby pasture only.
- ❖ Off fed & sick goats should be isolated & treated.
- ❖ Deworming may be done on the 7^{th} – 8 th day of arrival.
- ❖ Deticking may be done if required.
- ❖ Vaccination may be carried out after 21 days of deworming which is required in that season.

After 21 days only healthy & disease free animals should mixed in original stock.

2. Selection of Bucks & Does for Breeding.

General life span of goat is about 12 -13 years, but in normal husbandry practices, female goats are retained only up to 6-8 years of age, where as males are retained until 4-6 years to get efficient production. The most viable offspring are produced between 2- 5 years of age. Female goats come in first heat at the age of 6-7 months. At this stage the physical development is not proper this may be detrimental for female. The growth and development of reproductive system takes place gradually. Therefore, breeding age of female is supposed to be 9 – 12 months. Rearing of goats is mainly done by the landless, small/marginal farmers7 especially rural women & these are low literate. Hence they are unable to maintain production records like births, breeding records, feed-fodder, health coverage, mortality etc. Hence age is decided on dentition.

A. Dentition in Goats.

a. Dental Formula of Goat: $\frac{0\ 0\ 3\ 3}{40\ \ 3\ 3}$ = 32 Permanent.

i. Aging:

a. Milk Teeth –Less than 1 year.

b. 2 Teeth – 1 to 1.5 years

c. 4 Teeth -2 years.

d. 6 Teeths-2.5 years.

e. 8 Teeth/ Full Mouth-2.5 to 3 Years.

f. Worn Mouth or Broken Mouth -Over 3 years of age.

g. Gummy –Aged.

B Selection of Bucks:

i. He should possess all the breed characteristics.

ii. The age should be more than one year.

ii. He should be a twin / triplets

iii. He should be the heaviest goat in the flock. Body weight should be more than 30-35 kg.

iv. There should not be any physical defects and disease.

v. He should be aggressive.

vi. He should be healthy, straight body with strong legs.

vii. He should possess a rugged on the neck and shoulders as this reflects breeding ability.

viii. The chest should be wide.

ix. The body coat should be shiny one.

x. Good semen characteristics

xi. More nos. of conception, no abortions, and increase in body weight & milk production are the signs of Good Buck.

B. Selection of Doe:

i. She should possess all the breed characteristics.

ii. She should be a twin / triplets

iii. The age should be between 1. – 2 years.

iv. She should be healthy and free from disease.

v. The body coat should be lustrous and shiny one.

vi. The conjunctiva should be pinkish and not pale or yellow

(Anemic).

vii. The udder should be well developed & not pendulous.

viii. There should be no super numerary (rudimentary) teats.

ix. The temperament should be good; particularly docility and mothering ability are good features.

x. She should be a good milkier.

xi. Conceive in first service, no abortion, good mothering ability , giving births to more twins, , increase in weight & milk are supposed to be characters of good doe.

C. Mating Season:

Generally 70 % females are exhibiting the heat during rainy season. During the normal breeding seasons, does come in heat at a regular interval of about 18- 21 days. The duration of estrus is usually 24-48 hrs

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D. Signs of estrus:

a. The vulva is swollen, edematous and mucus membrane is pinkish or reddish with thick watery discharge.

b. Twitching of tail & frequent maturation.

c. Excitement and bleating.

d. Loss of appetite.

e. Slight elevation of body temperature.

f. Drop in the milk yield.

g. Mounting on other females.

h. Attraction and acceptance for male if introduce in the flock.

E. **Time of mating:** Females showing estrus in the morning should be mated / inseminated in the evening (after 12 hrs) likewise goats exhibiting signs of estrus in the evening should be mated or inseminated in the next morning to get better conception rate.

F Gestation period is 151$\pm$ 3 days. The mean gestation period in goats is 147 days.

F. Signs of Pregnancy:

a. The cessation of coming into heat.

b. The goat becomes quieter in disposition & generally goes down in milk yield during 2-3 weeks.

c. There seems to be a little alteration in the goat's performance, but milk yield begins to decline very slowly. By the time, she is half way in kid, her figure begins to show her condition.

d. Compared to other animals, goats becomes heavily pregnant & lethargic, leading to difficult kidding, in case they are not forced to take some light exercise daily.

e. They should be allowed to dry up six weeks before kidding.

G. Care of Pregnant Does :

a. Don't allow the pregnant does for long distance to avoid the stress/ energy utilization for walking & it will affects the growth of fetus

b. Deworm the doe& if required anti lice /tick treatment. Vaccinate the doe if not vaccinated against infectious disease.

c. Pregnant doe should keep separately from dry goats & buck. If they are in milking then they should be allowed to dry up by irregular & incomplete milking.

d. Give extra ration as a pregnancy allowance in form of concentrate feed after 3rd month of pregnancy, initially starts with 150 gms & gradually increase up to 300 gm depending upon body weight. Addition to concentrate feed gives proteinous green & dry fodder. If doe will give birth to twins give about 20 % extra ration. So that doe will give birth to healthy kid & she will have a more milk.

e. Stop grazing at the last week before expected date of kidding.

f. Protect the pregnant doe from cold wind in winter or hot waves in summer.

g. Provide the minerals in form of mixture or mineral bricks.

H. Signs of approaching birth:

a. Visible labor pains.

b. Loss of appetite.

c. Swollen udder.

d. Uneasiness, frequently sitting down and standing up. Rapid breathing.

e. Swollen genital opening.

f. Discharge from vulva.

g. Looking back.

I. Kidding:

The date of time can be easily calculated if the breeding date is known. As the goat approaches in term, the kid can be felt moving inside the bulge on the right side.

Normally goat delivers their kids without much problem. Kidding begins with the labor pain, with white mucus discharge. Soon the first & second water bags come. It follows the foreleg come out. The kidding takes about 30 minutes.

J. Care of Kids.

- Immediately after birth, the nose of the kid should be cleared of any entangling membranes or mucus to prevent suffocation.
- Naval swabbed with tincture of iodine.
- The kid, if healthy and strong, would stand on its legs and make for its mother's teat. Failure to reach the teats, however, is of no consequence.
- Colostrums should be the first food to be given to kids; it clears the stomach & develops immunity in them. The colostrums should be fed within 10-15 minutes after birth @ 10% of the body weight. Feeding of colostrums is very important, as it contains immunoglobulin against various diseases. It also contains Vitamin A, which is required to increase the resistance. If the colostrums feeding is delayed then the digestive tract becomes impermeable and immunoglobulin will l not absorbed. The kid will not get the protective antibodies to fight against various diseases.
- Care of Orphan Kid: If the mother doesn't have sufficient milk the fed on another doe which is recently kidded or feed boiled & cooled cow milk or feed a artificial colostrums

  Composition of Artificial Colostrums:

  a. Whole Egg: 1
  b. Water (boiled & cooled): 200 ml.
  c. Milk (Boiled & cooled): 300 ml.
  d. Liq. Paraffin / Castor Oil: 10 ml.

- Fresh Drinking Water: The kids should be given fresh & clean drinking water by adding sanitizer. The water should be frequently changed.
- Protection from cold.
- Health care & isolation: There should be routine checkup of kid which fails to suckle the milk, & exhibit diarrhea and pneumonia. They should be isolated immediately and given treatment.

- Fodder for young kids: the kid should be provided the tender leaves of subabhool, Lucerne, Berseem at the age of 15 days along with 50gm concentrate which containing minimum18 % protein. The gradual supplementation of such leaves would help in early development of rumen. The leaves should be hanged in bundles at the height of 1 to 2 feet from the ground. Same time they should provide mineral mixture in form of mineral bricks.

- Coccidiosis prevention: Dampness in sheds is the predisposing factor for coccidiosis. All the kids of one month age may be given cocciodiosis like Sulmate @ 0.3 ml/kg. body weight. The growth will be stunted & rough body coat will be observed in kids suffering from coccidiosis.

- Deworming for Endoparasites: Worm infestation is the most common problem in goats affecting the growth rate in kids. All the kids aged 3 months & above should be dewormed.

- Cleanliness & Hygiene: The kid house should be kept clean & dry. The feeders & water troughs should be washed periodically. This will help in minimizing many neonatal infection in kid rearing system.

- Vaccination: All the young kids of 3 months and above should be vaccinated to protect them from various diseases.

3. Goat Nutrition:

i. Feeding of Goats.

Performance of a goat depends on, how goat is fed during its period of growth, pregnancy and lactation. Breeding bucks or goats kept for meat purpose will also perform according to what they are fed. Therefore, for the practical feeding programmes of goat one must be aware of their feeding habits, feeding standards & feeding problems.

ii. Feeding habits of Goats.

- Goats have special mouth parts and are able to extract nutrition from the poorest of the waste land vegetation.

- They are browsers and thrive in the areas richer in bushy plants, where they get enough opportunity for browsing.

- They like to stand on their hind limbs and pluck the tender leafy twigs of herbs, shrubs & small trees.

- Proteinous feeds and fodders like green legumes or their hays are preferred by goat.

- They are very choosy in their selection of feeds.

- They love to eat tree leaves.
- Goat has higher tolerance for bitter taste.
- They have a sense of taste.
- They like fresh fodder & will hesitate to take wet or sticky feed and spoiled feed or fodder by other animals.
- Among concentrates they willingly like corn, barley and oat grains.
- They also relish oil cakes like groundnut cake, sesame cake & rape cake, which should be in the form of small pieces rather than ground form.

iii. **Goats' are browser.**

Cattle, horse, sheep & goat are the herbivorous animals. But their feeding habits are quite dissimilar to each other. Goats like tree leaves especially leguminous species.

Fodder	Horse	Cattle	Sheep	Goat
Grass	**90 %**	**70%**	**60 %**	**20%**
Weed	**04 %**	**20%**	**30 %**	**20 %**
Tree tops	**06 %**	**10 %**	**10 %**	**60%**

iv. Dry Matter requirement of goat.

Goat, cattle, sheep are ruminants. Cow, Sheep requires 2.5 % to 3 % dry matter of their body weight but goat requires 4 to 7 % dry matter.

v. Water requirement

Intake of water varies with the season and the ability of the animal to take dry matter. The water consumption during winter season is less in comparison to summer season. However, the water requirement of goat is four times of dry matter / kg body weight.

vi. Mineral & Vitamin: Minerals should be given as an essential part of the ration as they contribute to the building of the skeleton, physiological functions & production of milk. The most important of these salts are calcium & phosphorus. requirement for the goat at maintenance per day and per kg milk is as under,

Maintenance	Requirement	Production	Requirement
Calcium	4.7 g.	Calcium	1.3 g.
Phosphorus	3.3 g.	Phosphorus	1.1
Magnesium	0.8 g	Vitamin requirements for 50 kg body weight.	
Sodium	1.0 g	Vitamin A	5500 IU
Iron	50 mg	Vitamin D	325 I.U.

Zinc	40 mg.		
Copper	7 mg		
Cobalt	0.1 mg.		

Feed the mineral in form of mixture or brick (Lick) brick.

vi. **Feeding of Roughages & Concentrates.**

1. **Roughages :**

   a) Tree leaves: Neem, Peepal, Bargad, Golar, Jamun, Babul, Jharberi, Ber, Mulberry, Bamboo leaves, Subabhul, Susbenia.

   b) Hay: Cowpea hay, berseem hay & Oat hay.

   c) Straws: Arhar straw, gram, wheat straw & paddy straw. Straw should be enriching with joggery-salt.

2. **Concentrates: Concentrate mixture** is rich in protein & low in fibers. Goats are generally required minimum 18 % protein. Concentrate mixture can be prepare by using Maize, jawar, bajra, barley , gram, wheat rice bran , groundnut cake, sesame cake, arhar grain, etc.

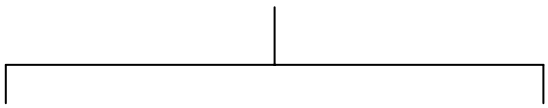
3. **Preparation of Concentrate mixtures.**
   For feeding to kids, creep mixtures containing high amounts (50 % to 60%) of maize, jawar, barley with groundnut cake should be prepared so that they may be adequate in energy & protein having about 18 % DCP .

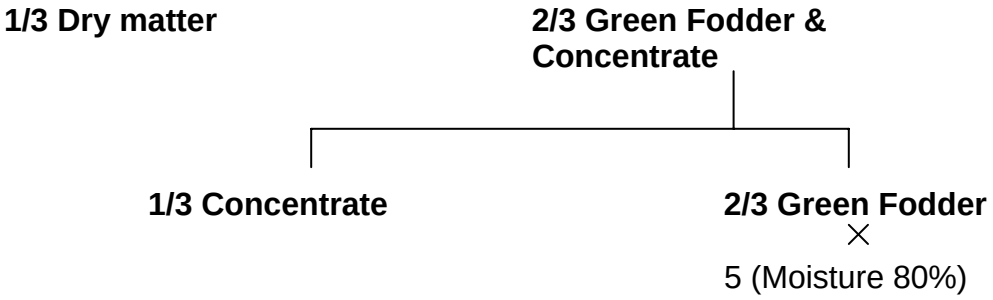
   Recommended feed to formulate mixtures. (Feed may be changed as per the local availability)

Ingredient	**Ingredient in per cent by weight**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.Maize	**37**	**20**	**37**	**20**	**30**	**17**	**47**	**-**	**20**	**20**
2.Oats	**--**	**20**	**--**	**-**	**17**	**-**	**-**	**-**	**30**	**-**
3.Baeley	**--**	**-**	**20**	**30**	**-**	**-**	**-**	**20**	**-**	**-**
4.Gram/Chuni	**15**	**10**	**10**	**-**	**10**	**30**	**-**	**17**	**20**	**40**
5.Wheat bran	**20**	**37**	**20**	**20**	**20**	**20**	**40**	**40**	**10**	**20**
6.Ground nut cake	**25**	**10**	**10**	**27**	**20**	**30**	**10**	**20**	**17**	**17**
7.Mineral & Common salt	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

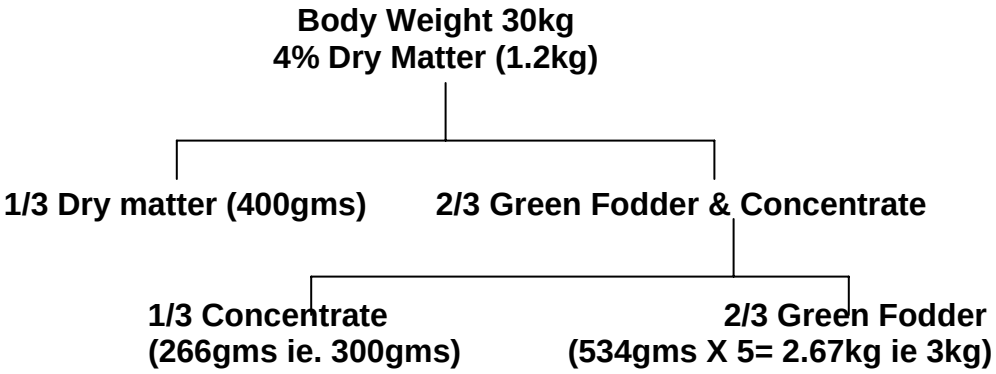
4. **Requirement of Feed & Fodder in Goats:**

Total Dry matter requirement
4% of body weight





Feed Fodder requirement of goats weighing 30kg is as under



i) Maintenance Requirement of feed & fodder in goats. Is 3 to 4 kg. of green fodder , 0.500 to 1 kg. of dry fodder, & 200 to 300 gms of concentrate feed which have minimum 18 % protein

5. Schedule of flock feeding at N.D.R.I.

Body Wt. (kg)	Milk (g)		Concentrate (g)	Green Fodder (kg)
	Morning	Evening		
2.5	200	200	--	--
3.0	250	250	--	--
3.5	300	300	--	--
4.0	300	300	--	--
5.0	300	300	50	Adlib
6.0	350	350	100	Adlib
7.0	350	350	150	Adlib
8.0	300	300	200	Adlib
9.0	250	250	250	Adlib
10.0	150	150	350	Adlib
15.0	100	100	350	Adlib

20.0	**--**	**--**	**350**	**1.5**
25.0	**--**	**--**	**350**	**2.0**
30.0	**--**	**--**	**350**	**2.5**
40.0	**--**	**--**	**400**	**4.0**
50.0	**--**	**--**	**500**	**5.0**
60.0	**--**	**--**	**500**	**5.5**
70.0	**--**	**--**	**500**	**6.0**

6. Role of Tropical Herbage in Goat Feeding.

A number of plant materials which are conventionally not included in the forages and concentrates of livestock could serve very well for feeding goats. These include variety of tree leaves, shrubs, weeds & grasses and vegetable waste, which are not palatable for cattle & buffaloes.

A. Tree leaves

The protein digestibility of tree leaves is low due to presence of tannic acid. They are quite rich in calcium but poor in phosphorus contents. Crude fiber per cent is also comparatively more in tree leaves.

Proximate Analysis Important Common Trees

Tree	Protein	Salts	Calcium	Phosphorus
Mango	7.80	13.30	1,24	0.11
Ardu	19.50	15.50	2.42	0.27
Anjan	12.60	6.20	1.20	0.46
Banana Leaves	9.50	13.30	1.43	0.17
Banana Stem	8.70	17.10	0.92	0.26
Babhul	7.00	6.00	1.21	0.11
Subabhul	21.40	8.30	2.70	0.17
Ber	12.90	14.10	2.16	0.23
Bamboo	18.60	11.80	-	0.17
Bel	15.10	--	5.93	0.69
Imli	13.5	9.5	2.28	0.24
Neem	8.50	-	-	-
Tuti/Malberi	10.60	--	--	--
Umbar	10.40	--	--	--

B. Vegetable waste

The common vegetable waste such as cabbage leaves, flower leaves, empty pods of peas are usually fed to goats.

Names	Proteins	Total salt	Calcium	Phosphorus
Sweet Potato leaves	17.2	16.7	1.18	0.56
Cabbage leaves	19.3	12.4	3.24	0.45

Flower leaves	29.3	13.3	4.49	0.54
Elephant foot	15.3	16.3	0.52	0.81
Tomato	23.9	9.5	-	
Green Onion leaves	9.5	9.4	-	-
Orange coverings	10.00	5.4	1.1	1.12
Water melon seed	20.6	4.1	1.4	0.46
Empty pods of peas	10.30			

C. Nutrient ingredient in Dry Fodder

Name	Proteins	Fat	Crude Fiber	Carbohydrate	Total Salt	Ca	P
Jawar	4.7	1.5	28.0	58.1	7.7	0.55	0.25
Bajra	2.4	0.9	40.6	48.3	7.8	0.44	0.32
Empty Corns of Maize	2.1	0.08	36.4	57.9	2.8	0.05	0.06
Wheat Straw	3,2	1.4	37.0	45.6	12.8	0.34	0.15
Rice straw	4.7	2.0	30.2	46.0	17.1	0.45	0.23

4. HOUSING OF GOAT.

Goats like plenty of fresh air and love a clean and dry place. Housing of goats' is not a serious problem. It is enough to provide a dry comfortable, safe and secure place, free from worms & affording protection from excessive heat and inclement weather. In Indian villages goats are mostly kept under wide spread shady trees when the climate is dry, provided the goats are safe from thieves and wild animals such as wolves and panthers.

The kids are kept under large inverted baskets until they are old enough to run along with their mothers. Male & females generally kept together.

It is worthwhile to design a cheap house for goats which may result in increased milk and meat production. Some kind of housing is necessary if herds of goats are maintained for commercial farming. Adequate space, proper ventilation, good drainage and plenty of light should be provided for while constructing shed.

Successful goat rearing largely depends on the site where goats are kept. Goats do not thrive on marshy or swampy ground. Grazing/browsing areas should be free from pits and shallow pools, goats contract parasitic infection mainly from such places.

Considering above, floor space requires as under,

Sr. No.	Type of Goats	Requirement of Space in Sq.Mt.		Feeding Space (In c.m.)	Watering Space (In c.m.) .
		Closed	Open		
1	Buck	1.5 to 2	3 to 4	50	40
2	Doe	1 to 1.5	2 to 3	50	40
3	Kids	0.4 to 0.5	0.8 to 1	35	30
4	Dairy Does	1.5 to 2	3 to 4	50	40

Orientation of shed with its long axis running East-West provides a cooler environment underneath than one with a North-South Orientation.

In village condition, "Lean -to" type shed is the largest form of building. The "lean - to " type shed located against the side of an existing building

Stilted Housing:

Stilted housing is common in Assam, Kerala & Orissa areas of heavy rain fall under humid climate or in temperate cold & humid climate. The floor of the pen is raised about 1 to 1.5 above ground level. This facilities easy cleaning & collecting of the dung and urine. The bamboos are often constructed from bamboo & the roofs are thatched.

5. Insurance of Goats.

Goat Insurance is a financial security measures to avoid financial loss resulting from unexpected sudden death of goats due to diseases or accident.

i. Age Group: Animals of 6 months to 7 years age group are covered.
ii. Premium Rate: 4 % of the goat cost for 1 year 10.2 % of the goat cost for 3 years.
iii. Insurance Coverage: The policy shall provide coverage what you covered in Proposal Form, generally coverage is given against death of goats due to diseases occurring during the period of insurance & accident if covered.
iv. Insurance Companies:

A. Public Sector Insurance Companies.

- United India Insurance Company.
- New India Insurance Company.
- Oriental Insurance Company.
- National Insurance Company.

B. Private Sector Insurance Companies.

- Reliance Insurance Company.
- Bajaj Allianz Insurance Company.

v. Conditions not Covered for Claim:

a. No tag no claim.
b. Death of the animal due to diseases within 30 days from the inception of the policy.
c. Theft or sale of insured animal.
d. Death due to unskilled treatment.
e. Death due to management negligence.
f. Intentional slaughter.

vi. Veterinary Soundness Certificate:

The report of the veterinary surgeon giving the age, identification marks, health of the goat & indication that protective inoculation has been completed, must be obtained for each animal.

vii. Identification of Animals:

All insured goats should be suitably identified by metal ear tagging. Natural identification marks should be clearly mentioned in the proposal form & veterinary health certificate.

viii. Loss Settlement:

Loss settlement shall be made on the basis of market value as certified by veterinary surgeon on sum insured, whichever is less.

ix. Claim Procedure:

In the event of death of goat, immediate intimation (within 24 hrs.) should be given to the company & the insured should furnish the following documents & required information:

a. Duly completed claim form.
b. Death certificate from a veterinary surgeon.
c. Post mortem examination report.
d. Ear tag, some time insurance company asked to produce ear tag with piece of ear.
e. Panchnama Report.
f. Certificate of death from village Surpanch /Police Patil/President of the Co-operative Society.

The above requirements should be submitted to the insurance company within 30 days from the date of death of goat. **Company may engage an independent veterinary surgeon or another investigator in special circumstances.**

6. Marketing of Goats:

Marketing of goat is unorganized. As the goat breeders are low literate & the middle man, agents are takes the disadvantage of low literacy & exploit them. Price of live goats is directly proportional to the prevalent goat meat price.

Computation of Meat Price:

Meat price is roughly calculated on the basis of Dressing Percentage. If the goat meat price is Rs.320 /- kg & yielding meat about 50 % i.e. purchase price will be Rs. 160/- per kg.

7. HEALTH COVERAGE

While discussing before diseases breeder should know about normal behavior of goats. Deviation from normal state of health is called as Disease. Disease prevention plays an important role in goat management. Kid & adult mortality is a crucial problem in goat husbandry. Saving of goat mortality will make goat rearing profitable & economically viable.

Normal Behavior of goats.

Sr. No.	Particulars.	Observations.
1	Food Intake on the Basis of Dry Matter Requirement.	4 to 7 % of body weight.
2	Rumination	130-150 per minutes – day time. 228-267 per minutes –night time.
3	Urine Voiding	11 to 13 times /day.
4	Pulse	70-80 per minute
5	Respiration	12-20 per minute.
6	Temperature	102^{0}– 103^{0} F
7	Breeding.	
	a. Age of First estrus Months.	7-9 Months.
	b. Suitable breeding age	9-12 months.
	c. Estrus cycle	17-21 days.
	d. Estrus Period	1-3 days.
	e. First estrus after parturition	30-40 days.
	f. Best time for breeding	Second day
	g. Gestation Period	150 days.

Signs of Healthy & Diseased Animals

Sr. No.	Parameter	Healthy	Diseased
1	Appetite	Normal	Reduced or absent
2	Water intake	Normal	Usually reduced.
3	Milk Yield	Normal	Decreased.
4	Rumination	More frequently	Less frequently or stops.
5	Body condition	Normal	Mostly emaciated i.e. weak.
6	Look of the animal	Active	Dull
7	Gait	Move freely & with ease.	Move slowly & with difficulty.
8	Head	Forward & raised	Downward.
9	Eyes	a. Bright b. Wet c. Wide open	Dull. Dry or profuse lacrimation Partially or completely closed. .

10	Ears	Erect & move frequently.	Drooping & move less frequently.
11	Mouth	Wet & without odor.	Dry or profuse salivation & usually bad odor.
12	Nose	No discharge	May be some discharge.
13	Muzzle	Moist	Dry.
14	Skin/ hair coat	Smooth & glossy	Rough & dull
15	Dung	Semisolid	Hard or loose.
16	Urine	Slightly yellowish.	Dar yellow, coffee colored or pinkish.
17	Tail movement	Quite frequently	Less frequently.
18	Temperature	Normal.	Mostly increase but decreased in calcium deficiency caused after parturition .
19	Respiration	Normal	Increased, labored.
20	Pulse rate	Normal	Usually increased.

CLASSIFICATION OF DISEASES:

A. According to mode of origin

a. Hereditary diseases; are transmitted from parents to the offspring. i.e. Hemophilia.

b. Congenital diseases: are acquired during inter-uterine life e.g. T.B.

c. Acquired diseases: are acquired after birth.

B. According to cause:

1. **Specific diseases**: are produced by a specific pathogen or factor. They area subdivided into:

   i. Infectious diseases: are caused by pathogenic organism's e.g.

      a. Viral diseases: Foot & Mouth Disease (FMD), Peste de Petits Ruminants

         (PPR) .

      b. Bacterial Diseases: Hemorrhagic Septicemia (H.S.), Enterotoxaemia (ET).

      c. Protozoan diseases: Coccidiosis, Trypansomiosis.

   ii. Non infectious diseases: are caused by physical or chemical or poisonous agents, nutritional deficiency or disturb metabolism e.g.

      a. Deficiency diseases- Rickets.

b. Metabolic diseases: Milk fever.

c. Poisoning: Pesticide poisoning.

2. **Non- specific diseases:** Those diseases whose causes are indefinite or multiple. E.g. Diarrhea.

C. According to mode of spread:

a. Contagious diseases: Spread by means of direct or indirect contact of diseased animal, e.g. FMD, H.S. Pl. keep it in mind that " All infectious diseases may or may not be contagious but all contagious diseases are infectious "

b. Non- contagious diseases; do not spread by means of direct or indirect contact, e.g. Rickets.

D. According to duration & severity:

a. Per acute diseases: Is characterized by very short course. (few hours to 48 hours) & very severe symptoms, e.g. Anthrax.

b. Acute diseases: is characterized by a sudden onset, short course (3-14 days) & severe symptoms, e.g. Hemorrhagic septicemia. Black Quarter.

c. Sub acute diseases: Whose course is 2-4 weeks & severity is lesser than acute one, e.g. sub acute mastitis.

d. Chronic diseases: Whose course is more than 4 weeks 7 signs are not severe in character, e.g. Tuberculosis.

E. According to area of spread:

a. Sporadic diseases: affects one or two animals & shows little or no tendency to spread within the herd, e.g. Jhones' Disease.

b. Enzootic / Endemic disease: means an outbreak of disease among animals in a definite area or particular district, e.g. Anthrax. H.S.

c. Epizootic/Epidemic disease: which affects a large population of animals in large area at the same time & spreads with rapidly, e.g. FMD,PPR.

d. Panzootic/Pandemic disease: is a wide spread epidemic disease usually of world wide distribution, e.g. influenza.

e. Zoonotic disease: a disease which can be transmitted from animal to man & vice versa, e.g. Anthrax, Brucellosis.

F. GENERAL MEASURES FOR PREVENTION OF CONTAGIOUS DISEASES:

1. Identification & isolation of infected & in contact animals.
2. Treatment of affected goats.
3. Slaughter of goats suffering from incurable diseases.
4. Disposal of dead animals either by burning or deep burial.
5. Destroy contaminated fodder by burning.
6. Proper disposal of contaminated water.
7. Regular disinfection of goat shed & its premises with 1-2 % phenyl.
8. Don't allow grazing/browsing in affected area.
9. Restrict the movement of animals from affected to clean area.
10. Don't allow animals to drink water from ponds, rivers etc. during outbreaks of disease.
11. Close animal markets, animals shows etc. during outbreak of diseases.
12. Regular spraying of insecticide to control external parasites.
13. Regular deworming to control internal parasites.
14. Avoid stress associated with long distance transportation, inclement weather & under nutrition.
15. Provide adequate ventilation & sunlight.
16. Provide ample fresh & clean water.
17. Provide sufficient quantity of balanced ration.
18. Avoid overcrowding.
19. Keep the goats shed clean & dry.
20. Give enough exercise to goats.

1. Important Bacterial Diseases:

A. Hemorrhagic septicemia:

- It is an acute infectious disease of cattle, buffalo, sheep & goats.
- It usually occurs during extreme environmental conditions, malnutrition & long distance transportation.
- It generally occurs during rainy season.
- The disease is enzootic in India.

B. Etiology: It is caused by Pasturella haemolytica in goats.

C. Transmission: The disease spreads through,

a. Ingestion of contaminated feed & water.

b. Inhalation.

D. Symptoms.

a. High fever.

b. Loss of appetite

c. Suspended rumination.

d. Dullness & depression.

e. Rapid pulse & heart rates.

f. Profuse salivation & lacrimation.

g. Congestion of mucosa.

h. Difficult /snoring respiration.

i. Swelling of throat regions.

j. Shivering.

k. Recumbence & death within 10-72 hours.

E. Control:

a. General measures.

- Isolation &treatment of the affected goats as per advice of a Vet.

- Close goat markets, goat rallies etc.
- Burning or burial of dead goats.
- Proper disposal of contaminated feed & water.
- Disinfection of goat shed.
- Avoid long distance transportation & exposure to extreme weather, malnutrition.

b. **Vaccination:** As per guidance of a Vet during April-May i.e. before Monsoon

1.1 Enterotoxaemia: It is also called Pulpy Kidney Disease.

- Generally noticed at onset of monsoon.
- It affects lambs & kids that are typically over one month of age.
- They are most often the best growing lambs & kids in the flock.
- As a consequence of heavy infestations of gastrointestinal parasites, such as nematodes (worms) & coccidian.
- When animals have a diet rich in grains & low in dry matter.
- When animals have any condition or disease that slow the peristalsis(motility of the gastrointestinal tract).

A. Etiology: Clostridium perfingens, type D.

B. Symptoms:

a. Most frequent in young animals, the per acute form is characterized by sudden death that occurs 12 hours after thee first signs of the disease appear. Sudden death occurs only minutes after a lamb or a kid shows signs of central nervous system alteration. These signs are excitement, convulsions, circling, staggering, and falling followed by sudden death.

b. Loss of appetite.

c. Abdominal discomfort, shown by kicking at the belly & arching the back.

d. Profuse diarrhea (watery consistence with without blood).

C. Preventive Measure: Affected animals are treated as per advice of a Vet. Treatment is costly hence **the vaccinate the goats before monsoon especially in the month of April may. Booster dose is followed by the 15 days of first dose.**

1.2 BRUCELLOSIS:

It is an acute or chronic contagious disease of domestic animals. In India, disease causes an annual economic loss due to abortion, infertility & reduced milk yield. It is common in sexually mature animals. It is major zoonotic disease in India.

A. Etiology: It is caused by Brucella abortus capri in goats.

B. Transmission: The disease is spread through,

   a. Ingestion of feed & water contaminated with discharges of aborted fetuses.

   b. Inhalation.

   c. Vagina during coitus.

   d. Abraded skin or conjunctiva.

C. Symptoms:

   a. Abortion mainly during advance or late pregnancy.

   b. Retention of placenta.

   c. Opaque vaginal discharge.

   d. Infertility i.e. low conception rate.

   e. Orchitis i.e. inflammation of testicles.

   f. Steal birth or weak kids born.

D. Control:

   a. There is no known treatment which can cure brucellosis in domestic animals.

   b. Test entire herd for brucellosis at least once in a year.

   c. Slaughter of infected or carrier animals.

   d. Adopt AI practice as far as possible.

   e. **Proper disposal of aborted fetuses, placenta & uterine discharge**.

   f. Disinfection of infected premises.

g. Newly purchased animals should be tested for brucellosis before introduction in herd.

2. Viral Diseases:

2.1 Peste des petits Ruminants (PPR).

PPR is also called as Goat Plague. PPR is characterized by morbidity & mortality rate that can approach about 80 %. Disease can lead to important direct economic losses.

A. Etiology: It is viral disease, Morblli virus group of Paramyxoviridae family.

B. Symptoms:

a. The typical clinical form of PPR infection is that of acute manifestations characterized by a sudden & quick appearance of respiratory distress, fever, depression, diarrhea & death.

b. The ocular & nasal mucous membranes are congested with ocular & nasal discharge that appears serious at first, leading to a muco-purulant character later in the course of diseases.

c. Erosive stomatitis gives the animal a fetid breath.

d. These signs are accompanied by pneumonia, respiratory difficulties & coughing & diarrhea.

C. Control:

a. General Measures:

- Identification & isolation of sick animals.
- Restriction of animal movements.
- **Disposal of dead animals.**
- **Disinfection of contamination shed & premises.**

b. **Vaccination: vaccinate the goats before onset of monsoon, i.e. in April-May. Immunity remains up to 3 years**.

2.2 Foot & Mouth Disease:

It is highly contagious viral disease of cloven footed animals, viz. cattle, buffalo, sheep & goat & pigs. In India, the disease causes an annual economic loss of Rs. 1000 Crores due to reduction of milk, meat & working capability of draft animals.

A. The disease usually occurs at the end of winter i.e. in February & March.

B. It is caused by “Picorna Virus”. There are 7 major strains of virus namely, O,A,C, Asia-1, SAT-1, SAT-2, SAT-3. A22.

C. Transmission:

a. It usually spreads through ingestion of contaminated feed & water.
b. Air borne infection can also occur.

D. Symptoms:

- High fever for 24-48 hours.
- Loss of appetite.
- Drop in milk yield.
- Blisters/vesicles & ulcers on tongue, dental pad & oral mucosa.
- Profuse salivation.
- Painful mastication.
- Vesicles & ulcers develop in inter digital space & on the coronet.
- Lameness, Stamping of feet.
- Recovery within 8 days, if complications don’t occur.

E .Post FMD complications:

- Abortion.
- Temporary Infertility.
- Mastitis.
- Pneumonia.
- Deformity in hooves.
- Anemia.
- Excess growth of hairs.
- Panting.

F . Control:

a. General measures.

- Isolation of all affected animals immediately after detection.
- Slaughter of all affected & in contact animals

- Restriction of animal movements.
- Contaminated bedding & fodder should be burnt.
- **Goat shed must be cleaned with 1-2 % caustic soda & spread the lime powder.**
- Human movement to & fro infected premises must be reduced to minimum.
- **Animals should not be allowed to graze in common grazing pasture or to drink water from ponds & rivers.**

b. Vaccination: Vaccinate the goats as per advice of a Vet.

2.3 Parasitic Diseases:

Parasites are of two types,

a. Endoparasites: Those parasites that live within animal body.

b. Ectoparasites: Those parasites which live on the outside the body.

a. Endo-parasites: Endo parasites are divided into three groups,

Nematodes or Round Worms.	Cestodes or Tape worms.	Trematodes or Flukes.
They are elongated, cylindrical& tapered at both ends, e.g. Haemonchus, Trichostrongylus, Toxocara, Trichuris, Oesophagostomum.	They are flat, segmented or tape like worms. They range in length from 2mm to 20 meters, e.g Moneizia species,	They are flat, unsegmented leaf like worms, e.g. Liver flukes, Fasciola hepatica, Fasciola gigantic.

3. A Transmission: Mainly transmission through ingestion of eggs or infective larvae, mites (Orbatid mites), contaminated pasture & drinking water.

3. B. Symptoms:

a. Loss of body weight.
b. Dry & rough hair coat.
c. Poor growth rate.
d. Pot belly.
e. Continuous diarrhea.
f. Anemia
g. Pica or depraved appetite- eating of soil & clothes, chewing of stones etc.
h. Excretion of tapeworms.
i. Fall in milk yield.
J. Bottle jaw i.e. swelling below chin.

3. B. Control.

a. Isolation & treatment of affected animals.
b. Cleaning of animal shed.
c. Feed & water should not get contaminated with faece(dubng). Do not keep young & old animals together.
d. Overcrowding is to be avoided.
e. Rotational grazing has to be encouraged.
f**. Deworming should be done at least twice i.e. before & after monsoon.**
g. Examination of fecal samples of the herd at regular interval.

4. Ectoparasites:

The ectoparasites of animals can be divided into following groups.

1. Lice. 2. Ticks. 3. Fleas. 4. Mites. 5. Flies.

A. Symptoms;

   a. Irritation/itching.

   b. Loss of hairs i.e. alopecia.

   c. Restlessness.

   d. Loss of body weight.

   e. Decreased milk & meat production.

   f. Decreased growth rate.

   g. Some flies produces maggot wound.

   h. Can transmit bacterial, viral, protozoan & ricketsial diseases.

B. Treatment: As per advice of a vet.

C. Control:

   a. Isolation & treatment of affected animals.

   b. Spraying of insecticides in goat shed at regular interval.

   c. Close cracks & crevices on the wall of animal shed.

   d. Maintain sanitary conditions.

   e. All vegetation surrounded the animal shed should be cleared.