

# **TECHNOLOGY PACKAGE FOR GOAT REARING**

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**Animal Sciences Section**  
**ICAR RESEARCH COMPLEX FOR GOA**  
(Indian Council of Agricultural Research)  
Ela, Old Goa - 403 402, Goa India

*Technical Bulletin No. 14*

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**2008**





## - CONTENTS -

	Page No.
1. Introduction	01
2. Housing	03
3. Feeding	05
4. Reproduction	06
5. Selection of Breeding Stock	07
6. Health care	08
7. Economics	10
8. Model Project	11

## INTRODUCTION

Livestock production is steadily gaining importance in India and it is considered to be an integral part of rural economy. Livestock farming provides regular income to the farmer /landless poor. Poor landless families who can not keep one or two dairy animals, small ruminants like sheep and goat form their livelihood. India has a total of 180.90 million small ruminant population which comprises of 123 million goats. The demand for meat and meat products each increasing. Among the meat products goat meat is popular, costlier and fetches good return for the farmer. There is no social taboo for goat raising and chevon consumption. India ranks first in the world in goat population. The economic value of goats can also be realized from the continuously increasing trend in their population during last 40 years, in spite of more than 1/3<sup>rd</sup> population being slaughtered for meat and skin every year. Around 410 million kgs of goat meat, 1900 kg of milk, 100.9 million kgs of skin and 85000 metric tons of manure are available annually.

Goat is a versatile animal. It is known as the 'poor man's cow' in India and as 'wet nurse' of infants in Europe. Goat milk is cheap, wholesome, easily digestible and nutritious. It is recommended for use

in dyspepsia, peptic ulcer and pyloric stenosis. It is preferred to cow milk in liver dysfunction, jaundice, biliary disorders, acidosis and insomnia. Goats are litter bearing animal since they give twin or triplets two times in a year, indicating its prolificacy. Goat milk is nutritious due to its nature of grazing tree leaves and herbs. The milk is easily digestible due to smaller fat globules, with 4.9% fat, 9.3% solid-not-fat (SNF), 4.33% protein and 0.877% ash. The ash content of goat milk is high indicating the mineral status of milk.

Goat in general is a hardy animal and is adaptable to varied climatic conditions. Since goat is commonly reared in small herd, it can also form an ideal component under watershed management. Integration of the different components like crop and horticulture, recycling manure and use of crop residues as local resources will enhance productivity.

Available shrubs and tree leaves like Subabul, drumstick, bamboo leaves etc. in the watershed area can be fed with minimum concentrate feed of 0.3kg/day for an animal. The West Coast region having plenty of shrubs and tropical rain forest offer better scope for rearing goats.

## **Advantages of Goat Rearing**

- 1) Goat meat has good potential market value.
- 2) There is no social taboo for the goat meat.
- 3) It provides self employment for the rural mass.
- 4) The manure can be added to the soil as nutrient for enrichment.
- 5) Prolificacy of goat is good.
- 6) Unwanted weeds and vegetable wastes can be converted into useful animal protein.
- 7) Goat milk also provides income to the farm family.

## **Present status of Goat rearing in Goa**

To ascertain the present status of goat rearing in Goa, an investigation was undertaken through a research project **“Investigation on the present status of Goats”** by ICAR Research Complex for Goa during 2001-2006. Observations indicated that the demand for meat and meat products is increasing. Goat is mainly reared in the Ghat section viz. Bicholim, Pernem, Satari, Quepem and Canacona Talukas. In most of the places particular community is rearing goats as their traditional occupation. They live as tenants and

some are nomads. Awareness about the Government schemes is very poor and the farmers are reluctant to approach the officials. Majority (62.25%) are landless laborers. Some rear other livestock like buffaloes for milk and work as farm laborers during summer season.

Income from goat units ranges from Rs. 800-1500 and from labour Rs.1500-Rs.2000 per month during the season. In many places, goat rearing is a part time occupation combined with seasonal labor work and crop cultivation. In Volpoi area the herd strength ranges from 10 to 90 animals combined with crop cultivation. In Pernem area, goat units with 15 to 40 animals are common. Cashew cultivation is their part time seasonal occupation. In some units goat farming is the only source of income and their herd strength ranges from 50-300 animals.

A Goat unit was established in Krishi Vigyan Kendra of this institute to study the management practices. Osmanabadi and local non-descript goats were maintained for crossbreeding. Leaf and dry fodders collected from the grazing field were analyzed for chemical composition to ascertain the nutrients available for goats through grazing.



## **Housing**

Goats can be kept with little expense. Marginal or undulating lands unsuitable for other types of livestock, may be used and any inexpensive shelter can suffice. The goat farm buildings are constructed without any careful planning and designing. While preparing house for goat care should be taken that it provides sufficient ventilation. It should be able to protect goats from adverse weather like hot sun, heavy rains and chilling cold. In Goa due to heavy rain goats are always preferred to be housed at raised platform. This helps for proper drainage and to maintain dry flooring.

The following points should be considered in selecting the site for constructing goat pens/sheds.

1. The site of goat sheds/pens should be on higher land with better drainage.
2. Plenty of good quality water should be available for drinking and cleaning of pens.
3. The orientation of the sheds should be on "east west direction".
4. Goat houses with raised slatted floor are best and suitable in hot, semi-arid and humid climatic areas and perforated floors for small goat units. The wooden

slatted floor is raised about 1-1 ½ meter off the ground. This helps for the collection of manure and to maintain hygienic condition of the goat house.

## **Breeds**

There are about 13 well-known Indian goat breeds, apart from a number of local non-descript animals scattered throughout the country. The breeds are described on the basis of their locations. They are suited as per their local agro-climatic conditions. The important breeds are Himalayan breed Pashmina, Chegu, Jamnapari, Beetal, Barbari, Marwari (Mehsana and Zelwadi), Berari, Kathiawari, Deccani (Osmanabadi), Malabari (Tellicherry), Assam hilly breed and Black Bengal.

## **Exotic Breeds**

Apart from indigenous breeds there are exotic breeds catching attention as they are more productive and fast growing. The principal exotic dairy breeds of goat are Toggenberg, Saanan, French Alpine and Nubian. They are well known throughout the world on account of their high milk yield. These breeds are being tried in India for evolving, suitable cross-breeds, and new breeds with more milk or for improving the non-descript.



A



B



C



D



E



F

A, B, C, D & E : Different housing types and floorings for Goats used in Goa region.  
F: A tribal with his goat.



## Feeding

It was observed during the investigation that the number of units is becoming less in Goa due to restriction on free range grazing. Considering the constraints on free range system semi intensive rearing with partial feeding may be practiced to sustain goat rearing as a viable subsidiary occupation. Studies at the Institute unit indicated that the weight gain was marginally higher in free range system as compared to stall feeding. The daily weight gain under

free range system was 83.60 g. and under stall feeding 77.5 g. The performance of crossbred goats with partial grazing and supplementary feeding was encouraging. Concentrate feed with 20.01% CP and 2675 Cal DE was given for young animals at the rate of 300 g per day. Maximum weight gain of 121.32 g/day was recorded. This indicated that partial grazing with supplementary feeding would be more suitable for goat rearing under the local condition.



Feeding of concentrates improves growth rate in goats.

### Chemical composition of important tree leaves and shrubs available in Goa (%DM basis)

Sr.No	Specimen	Crude Protein	Crude Fibre	Ether extract	Total ash
1	Cashew leaf	10.50	23.54	3.30	6.70
2	Guava leaf	8.72	16.72	2.70	9.66
3	Mango leaf	9.22	23.20	2.15	7.46
4	Gulmohar leaf	12.15	14.63	1.60	5.73
5	Bamboo leaf	9.60	21.71	2.35	6.48
6	Jackfruit leaves	10.60	14.74	2.24	6.47
7	Sal tree leaf	9.60	15.27	1.92	7.66

### Chemical Composition of important tree leaves.

Local Name of tree	Botanical name	Chemical Composition ( %DM basis)				
		CP	DCP	TDN	Ca	P
Pipal	<i>Ficus religiosa</i>	9.7	7.0	38.3	4.1	0.2
Jamun	<i>Eugimia jambolana</i>	7.3	0.1	43.1	1.4	0.2
Bargad	<i>Ficus bengalensis</i>	9.6	2.0	44.5	1.8	0.2
Lasora	<i>Cardia oblique</i>	12.8	5.4	27.0	4.3	0.2
Bamboo	<i>Denro calamustriatus</i>	15.1	9.3	48.9	1.6	0.2
Mahua	<i>Madheua indica</i>	9.8	0.0	37.0	1.6	0.1
Gular	<i>Ficus glomerata</i> Roxb.	11.2	6.7	53.8	2.7	0.3
Pakar	<i>Ficus infectoria</i>	16.0	-	-	2.5	0.3
Bhimai	<i>Grewia oppositifalis</i>	24.9	16.7	54.6	3.6	0.3
Beri	<i>Zizyphus jujuba</i>	8.7	3.1	30.7	1.5	0.3

### Feed Formula for Goat

Ingredient	Grower mash	Adult mash
	( % DM)	( % DM)
Maize	29	50
GN Cake	30	24
Wheat bran	40	25
Min.Mix	1	1
CP	20.01	17.80
CF	7.25	6.42
Energy	2645	2900
(DE kcal))/kg		

Depending upon the availability and cost, other feed ingredients like sunflower cake, gram husk, rice bran, Jower etc can be proportionately added to replace the costly ingredients.

**Feeding schedule:** Dry matter intake of goat (Total feed intake/day) is around 3 to 3.5% of its body weight.

An animal weighing 30 kg will consume around one kg of dry feed/ day.

Concentrate feed requirement / day:

Kids

1 – 3 months age	50 to 75gm
3 to 6 months	75 to 150 gm.
6 months to 1 year	200-250gm.
Adult female	300 gm
Adult male	400 gm

In addition to the above 4-6 hours grazing in a pasture land with tree leaves and forages is essential.

### Reproduction

Goat is litter bearing animal since they get twin or triplets two times in a year, indicating its prolificacy. They are seasonal breeders. In Goa mostly goats show estrous in



December to January and May to June.

## **Selection of Breeding Stock**

### **Doe**

Selection of doe is very important as it is the nucleus of a productive herd. Doe with good body development is essential for high milk production. The doe should be well grown, healthy in appearance, and stand squarely on her feet and not down on the pastern. The body should be wedge-shaped and sharp at the withers. The depth of the ribs denotes a capacity for consuming large amount of food. The thighs should provide plenty of room for a round, well-attached udder of fair size. The milk potential cannot be estimated from the size of the udder. The udder of good milch goat should be soft and pliable rather than meaty. The teats should be pointed slightly forward. The udder in a freshly milked goat should have a collapsed appearance.

### **Buck**

The buck should have a strong, well-developed frame, good conformation and breed characters. Good depth of ribs is essential. Legs should be straight and well placed under the body. The buck should be healthy and free from external and internal parasites. It should be

chosen from a good milking strain and should be the progeny of dams having good performance record. Many herdsmen prefer the bucks to be hornless. A well-grown buck kid may be bred to five or six does during his first season at an approximate age of six months. At 18 to 24 months old buck may be permitted to service 25 to 30 does, and when fully mature 50 to 60 does in a breeding season. Bucks are mostly sexual in winter and spring. During this period they emit a strong odour, offensive to some people.

### **Mating season**

The does are more or less continuous breeders. The signs of heat in the doe usually are uneasiness, twitching of tail (shaking), pink and swollen genitalia, frequent urination, restlessness, bleeding and a little mucous discharge for one to three days. The period between heats varies from 18 to 21 days. It is better to inseminate the doe on the second day of the heat period. The sperms survive in the female genital tract for 22 to 42 hours. Mating should be so timed that the kids are born in a season when mortality among them is at its lowest and an adequate amount of food is available for their nourishment and growth. Breeding season will, therefore, vary with breed, locality and climate.

## Mating of the doe

Does must be fed well, allowed liberal exercise and protected from rain and cold. Does may be mated when 10 to 15 months old so that they kid at the age of 15 to 20 months. But as a rule a goat should not be mated until it is one year old. The average gestation period is  $145 \pm 3$  days. The condition of the doe during gestation may influence on the quality of kids at birth. A doe in good condition will produce strong, lively kids, whereas a doe in poor condition may produce ungainly kids, weak in constitution. The doe should be put in the pen a few hours before parturition. She becomes fussy about two or three hours before actual kidding. The udder becomes engorged with milk, the belly appears shrunk and the flanks appear rather hollow. The tail head is raised higher than usual as the ligaments of either side relax. There is a thick, white, starchy discharge which soon changes to a more opaque substance.

## Healthcare

In Goa, the goats are mainly brought from Karnataka and Maharashtra for slaughter. Cleanliness and hygiene maintenance helps to reduce diseases to a large extent. Regular deworming, balanced feeding,

vaccination of commonly prevailing diseases is a way to maintain healthy herd. Contagious caprine pleuropneumonia (CCPP), blue tongue and peste des petits ruminants (PPR) are important infections of goats. CCPP is severe disease of goats caused by *Mycoplasma*. CCPP gained prominence as cause of several disease conditions in sheep and goats e.g. polyarthritis, pneumonia, septicemia. PPR is highly contagious pathogen and belongs to *Morbillivirus* genus of the family *Paramyxoviridae*. PPR is an acute febrile viral disease of goats characterized by mucopurulent nasal and ocular discharge, necrotizing and erosive stomatitis, enteritis and pneumonia. The disease is endemic in India and cause large economic losses each year due to high mortality and morbidity in infected goats. Foot and mouth disease is also common in goats. Blisters or vesicles form in lips, tongue, teats, or the coronary band of the hoof which tend to become lame and possibly salivate excessively. Brucellosis caused by *Brucella melitensis* causes abortion in late pregnancy. Retention of placenta and metritis are common. In male goat, infertility, orchitis and swollen joints are seen. Goats should be tested for brucellosis and





A non-descript buck



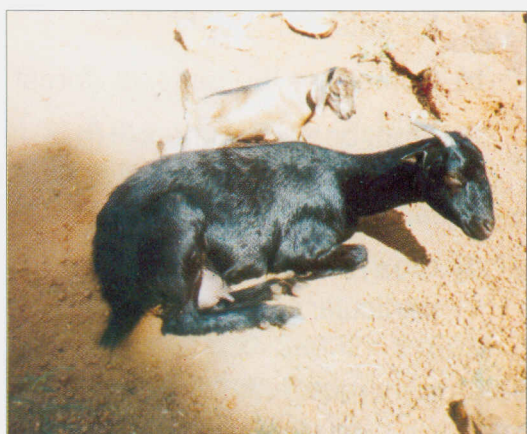
Osmanabadi buck



Osmanabadi goats



Grazing goats on farm land



Sick goat



Contagious ecthyma in a goat

isolated or culled if found positive. Cases of contagious ecthyma have been observed in goats in Goa. It develops pustular and scabby lesions on the muzzle and lips. To check the spread of contagious ecthyma, infected goat kids should be isolated. The lesions should be treated with antiseptic drugs. In generalized or systemic infection antibiotic should be given to prevent secondary bacterial complication Bronchopneumonia and gastroenteritis have been observed in goat kids.

In a study conducted at ICAR complex for Goa samples from different herds from Goa were tested. Out of 140 sera tested from goats, 37 (26.43%) and 4 (2.86%) were positive for CCPP and PPR, respectively. Out of 131 sera tested for blue tongue 76 (58.01%) were seropositive. Goats should be vaccinated against contagious caprine pleuropneumonia and enterotoxaemia.

### **Economics**

It is hardy, prolific and most economical among all milk producing farm animals. The economic value of goats can also be realized from the continuously increasing trend in their population during last 40 years, in

spite of more than 1/3<sup>rd</sup> population being slaughtered for meat and skin every year.

### **Number of units are declining in Goa due to:**

1. Restrictions on grazing (urbanisation, intensive cultivation, mining and industrial activities).
2. Non availability of monetary help is a constraint since majority of the goat farmers are landless poor.
3. Communication and approach roads are yet another constraint. Most of the units are located in remote areas.
4. In none of the units supplementary feeding of concentrates is practiced. Training on alternate methods of rearing goats to improve the growth rate and to adopt disease control measures is essential.
5. a) 80% of the farmers stay as tenants.  
b) Some are nomads in forest land  
c) Some as tenants in private land or Temple land.  
d) Goats are reared by a particular community



## Model Project under Semi intensive goat rearing ( 40 adults and kids)

### Expenditure

#### (A) Non Recurring Expenditure:

i. Purchase of animals 38 F + 2 M (Rs1000/animal)	Rs. 32,000
ii. Cost of Goat shed construction 40 s.mt@ Rs.1000/m2.)	Rs. 40,000
Sub Total	Rs. 72,000/-

#### (B) Recurring Expenditure:

I st year:(a)Feeding i.Adult (40 No.) (40 x 0.25 x 365 xRs.6)	Rs.21,900
ii.36 kids (180 x0.15kg x36 x Rs.6)	Rs. 5832
(b) Miscel .Expenditure	Rs. 3600
Sub Total	Rs. 31,332
Total Expenditure	Rs. 1,03,332

#### II. REVENUE:

##### I st year

Sale of young animals 32 x 1400	Rs. 44,800
Sale of manure 13.14 mt	Rs. 18396
Total receipt	Rs.63196
(Total loan Rs.1,03,332- Repayment	15196
Balance of loan at the end of 1 st year Rs. 88,136)	

##### 2 nd year

i) Recurring Expenditure	Rs.39932
ii) Receipt:	
Sale of young animals 62 x 1200	Rs. 74 400
Sale of manure 19.45 mt (Rs.1400 /Mt)	Rs.27,230
Total receipt	Rs.1 01 630
(Rs.1 01 630- 39932 = 61698)	
Loan 88,136- Repayment 13,698 = Bal loan 74438)	
Net income /annum	Rs.48,000

#### III. Repayment of loan

End of 1 st year  $1\ 03\ 332 - 15\ 196 = 88\ 136$

End of 2 nd year  $88\ 136 - 13\ 698 = 74\ 438$

End of 3 rd year  $74\ 438 - 13\ 698 = 60\ 740$

End of 4 th year  $60\ 740 - 13\ 698 = 47\ 042$

End of 5 th year  $47\ 042 - 13\ 698 = 33\ 344$

End of 6 th year  $33\ 344 - 13\ 698 = 19\ 646$

End of 7 th year  $19\ 646 - 13\ 698 = 5\ 948$

End of 8 th year  $5\ 948 + \text{intr}$

### **Important points**

1. Goat rearing can be considered as a potential component for livelihood of landless poor and marginal farmers as well as under watershed management for increasing the productivity.
2. An area of 3 square meters for buck and 2 square meters for the Doe will be sufficient. Thatched house with elevated floor, 1.5 meter above ground level is ideal to keep the pen dry and airy.
3. Any nonpoisonous weed even thorny bushes are relished by goat.
4. A concentrate feed mixture containing 45% maize, 35% wheat bran, 17% oil cake, 2% mineral mixture and 1% salt can be given at the rate of 300 gm per day per animal in addition to partial grazing on top feed and shrubs.
5. The urine and waste materials will be an added benefit for crop cultivation through soil enrichment



