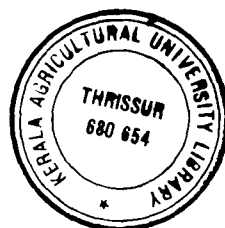


ANALYSIS OF MANAGEMENT PRACTICES AND  
ECONOMICS OF GOAT REARING UNDER  
HOMESTEAD FARMING SYSTEM

By  
**TONY THOPPIL**



**THESIS**

Submitted in partial fulfilment of the  
requirement for the degree of

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Department of Livestock Production Management  
COLLEGE OF VETERINARY AND ANIMAL SCIENCES  
MANNUTHY - THRISSUR

1996

## DECLARATION

I hereby declare that this thesis entitled "ANALYSIS OF MANAGEMENT PRACTICES AND ECONOMICS OF GOAT REARING UNDER HOMESTEAD FARMING SYSTEM" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.

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## CERTIFICATE

Certified that this thesis, entitled "ANALYSIS OF MANAGEMENT PRACTICES AND ECONOMICS OF GOAT REARING UNDER HOMESTEAD FARMING SYSTEM" is a record of research work done independently by Sri. Tony Thoppil, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.




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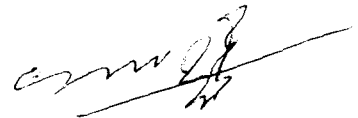
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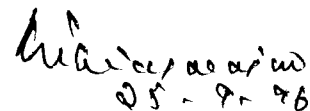
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# ***Introduction***

## INTRODUCTION

Goats (*Capra hircus*) have occupied a place of honour in their long association with man over millions of years, being the earliest ruminant to be domesticated. In developing countries, a large number of small and marginal farmers, and landless labourers maintain goats for their sustenance.

Goats play an important role in the rural economy of our country. The small size of the animal along with its excellent adaptation to different agro-climatic and ecological conditions provide the farmers with significant managerial, biological and economic advantages. They are mainly maintained for meat and milk eventhough, they provide skin, fibre and manure. Slaughter house byproducts are also important sources of economic returns from goats. The demand for goat meat is high throughout the tropics and the inadequacy of supplies result in relatively high price.

Twenty per cent of the world's goat population is in India. Nearly 16 per cent of chevon and 21.5 per cent of goat milk produced in the world is from India (Appendix 1).

In spite of these significant contributions, goats have been a 'misunderstood' animal and considered as the 'enemy of forest'. Also, this species has not figured prominently in the

development plans of the country. A major constraint that critically affects the production performance of goats is the inadequate feed resource base. The systems under which goats are reared, especially in the tropics, do not match potentially high productivity.

Goat forms an important livestock component of most homesteads of Kerala and is well adapted to the mixed farming system prevalent in the homesteads. Goats constitute nearly 28.74 per cent of the total livestock population in the state. Over a period of five years from 1977-1982, there had been an increase of 19.04 per cent in the goat population in the state. The next five year period (1982-87) experienced a decline of 21.12 per cent in the total goat population (Appendix 2).

The system of goat rearing in the homesteads vary widely. Attempts have been made to evaluate the production potential of this species under organised farm conditions. However, very few attempts have been made to study goat production under rural set up. It is well understood that studying a species in the rural set up under farmers' field conditions will go a long way in understanding the production potential of the species and to suggest ways of improving the system of rearing. Thus, the present study is envisaged with a view to understand the existing practises/traditional ways of goat management under homestead farming system. The study also intends to provide

information regarding the economics of rearing this species and the constraints faced by farmers. The information so gathered could be used to further improve the production system as a whole.

The present study has been taken up with the following objective:

To study and document information regarding the existing/ traditional management, feeding, selection and rearing practices of goats under rural set up and evaluate the economics.

## ***Review of Literature***



## REVIEW OF LITERATURE

### 2.1 Socio-economic characteristics of goat farmers

The land holding pattern of goat farmers was studied in detail by many workers. Nilakantha (1992) reported that as per the integrated livestock survey nearly 23 per cent of the goat keeping farmers in Maharashtra possessed less than one acre of land, 69 per cent possessed land holding between 1-10 acres and eight per cent of the farmers possessed more than 10 acres.

Deoghare and Sood (1994) classified the goat rearing farmers of Mathura into landless, marginal (<1 ha), small (1-2 ha), medium (2-4 ha) and large (>4 ha). They found that 21.51 per cent of the farmers were landless goat keepers whereas 29.27, 24.39, 16.63 and 8.2 per cent of the farmers were marginal, small, medium and large respectively.

In a different study, Peters and Deichert (1984) reported that in rural areas of Peninsular Malaysia, the average size of small holdings of goat farmers was 1.9 ha, with a range of 0.34 to 15.7 ha. Hussian *et al.* (1983) reported that in Fiji, 76 per cent of the goats were reared by farmers possessing less than 10 ha of land and only 24 per cent of the goats were reared by farmers possessing more than 10 ha. The proportion of goats reared by subsistence farmers was 91 per cent and only 9 per cent were reared by commercial entrepreneurs.

### 2.1.1 Educational background

Ojha et al. (1993) observed that 62 per cent of the goat farmers in Thandipur village in Mathura were illiterate, 32 per cent had primary education and only six per cent had higher secondary education.

### 2.1.2 Livestock holding pattern

Devendra (1980) reported that, in general, in Asian countries, ownership of small flocks of goats (about 5) was common and these were owned by small holders or peasants whose main occupation was crop production.

Mercado et al. (1992) based on face-to-face interview in South Texas observed that majority of the goat producers tended to have more than one livestock enterprise with 82 per cent having two or more cattle. The main reason for raising goats were found to be personal use (68%), income (50%) and bush control (33%). In a different study, Okello and Obwolo (1985) reported that in Uganda, the number of goats kept in a homestead varied from 5-10.

Ojha et al. (1993) found that 84 per cent, 14 per cent and 2 per cent of the goat farmers in Thandipur village, Mathura possessed a flock size of 1 to 5, 5 to 10 and above ten goats respectively.

Peters and Deichert (1984) reported that in peninsular Malaysia, small holders kept 5 to 16 goats, landless people, 1 to 10 goats and estate workers kept more than 50 goats. Deoghare and Sood (1994) observed that on an average, the number of goats per household in rural areas of Mathura was 5.98. Goat farmers of Chakranagar block of Etawah district were classified by Deoghare and Bhattacharya (1995) as small (1 to 5 goats), medium (6-10 goats) and large (above 10 goats). The proportion of small, medium and large goat keepers were 70.3 per cent, 20.31 per cent and 9.38 per cent respectively.

Reynolds and Adediran (1994) in a study on 22 flocks of goats in South West Nigeria found that the flock size averaged 6.5 at the start and 8.7 at the end of 48 months and of the total strength, 78 per cent were females, and 43 per cent of them were below one year of age. In Fiji, Hussain *et al.* (1983) reported that the average flock size was eight per holding.

### **2.1.3 Experience in goat farming**

Ojha *et al.* (1993) based on a survey in Thandipur village, Mathura stated that 66 per cent of the goat keeping families had an experience of only one to five years in goat keeping.

## 2.2 Procurement of goats

Kaul (1990) based on a survey on goat rearing practices in semi-arid farming systems of Mathura reported three major sources of purchase of goats as local market (33.7%), from other farmers in the village (33%) and from the farm of Central Institute for Research on Goats (22%). Most of the animals were either dry or pregnant at the time of purchase. In a different region in Mathura district, Ojha *et al.* (1993) reported that 60 per cent of the goat farmers procured their goats from other goat farmers, 20 per cent from traders and the rest from butchers.

Reynolds and Adediran (1994) observed that in village goat flocks of south west Nigeria, new entry into the flock was mostly from birth (94%). In Ontario, Nadarajah and Robinson (1992) based on a farm survey in 66 goat farms found that more than 75 per cent of goat farmers raised their own replacement stock. They also found that over 55 per cent of goat farmers considered dam's milk yield, litter size and conformation as top three selection criteria in selecting replacement stock of does. With regard to selection of bucks, 68 per cent of the farmers considered dam's milk yield, litter size and meat production of kids.

### **2.3 Housing**

Reports on housing of goats, especially under village conditions are scanty.

Ojha *et al.* (1993) observed that in Thandipur village of Mathura 98 per cent of the goat farmers kept their goats inside the house and only two per cent kept goats in separate sheds. Kaul (1990) reported that in Mathura majority of the farmers (92%) kept their goats at home during the night and that no separate shelters were provided. During the day time, goats were tied along with other ruminants.

In Uganda, Okello and Obwolo (1985) reported that goats were either kept in houses or in separate shelters or tethered in the verandahs of houses/huts in the evening. In the case of a large flock, the animals were tethered in an enclosure to prevent them from wandering.

Upton (1987) reported that under the traditional system of goat rearing in West Africa, goats scavenge in free-roaming flocks with no provision for housing.

### **2.4 Breeding management**

Under the traditional goat farming system of West Africa, Upton (1987) reported that the entire village flock could be

considered as a single inbreeding flock with no control over mating and that most families sold the male offsprings as very few males were required for mating. Mason (1974) also observed that in Brazil, breeding of goats occurred at random with no control over mating.

#### 2.4.1 Age at first kidding

Different workers reported the age at first kidding of goats under field as well as farm condition.

Stephen and Rai (1993) based on the data from AICRP on Goats for milk production in Kerala observed that the mean age at first kidding in Malabari goats ranged from  $20.3 \pm 1.5$  to  $24.2 \pm 0.8$  months with an overall mean of  $22.3 \pm 0.5$  months. Raja and Mukundan (1974) in a different study reported that in Malabari and Malabari x Jamnapari goats, the age at first kidding averaged 16.5 and 17.78 months respectively. The age at first kidding of Tellicherry (Malabari) goats maintained at the Regional Research Station, Aruppukotai was reported to be 16.93 months (Viswanathan *et al.*, 1995). Age at first kidding was reported to be 13-14 months in experimental station and 14-18 months under village conditions (ILCA, 1979).

Saha and Dhingra (1992) reported that in local goats of Malwa region, the age at first kidding was on an average 23.31 months. Arya *et al.* (1994) based on a sample survey conducted

at Thiruchirapally district of Tamil Nadu reported that the mean age at first kidding of goats was 18.14 months. The age at first kidding of Barbari goats under stall fed conditions was reported to be 16.5 months (Rai and Ram, 1993).

Wilson (1984) found that the indigenous goats reared in traditional system of semi-arid Africa had an age at first kidding of 15.5 months in Mali and 18 months in Kenya. The age at first kidding of indigenous goats in Uganda was reported as 18.9 months (Okello and Obwolo, 1985). Mack (1983) reported that West African Dwarf goats under traditional management had a mean age at first kidding of 18 months. Hussain *et al.* (1983) reported that in Fiji, the age at first kidding of goats was around 24 months.

#### 2.4.2 Kidding interval

Viswanathan *et al.* (1995) reported that the kidding interval in Malabari goats averaged  $250.78 \pm 9.73$  days while, Raja and Mukundan (1974) observed that the kidding interval of Malabari and Malabari x Jamnapari goats to be  $284.69 \pm 18.15$  and  $299.27 \pm 16.17$  days respectively.

Lowar and Wani (1991) found that the kidding interval in local goats (Sangamneri), Angora goats and their crosses with 50, 75 and 87.5 per cent Angora inheritance averaged  $364 \pm 4.6$ ,  $450 \pm 16.0$ ,  $371 \pm 3.2$ ,  $379 \pm 6.6$  and  $415 \pm 24.2$  days

respectively. At the same time, Saha and Dhingra (1992) found that the kidding interval of local goats in Malwa region averaged 349.8 days. Ghosh et al. (1994) reported a value of 226 days as the kidding interval of Bengal goats.

Wilson (1984) reported a kidding interval of 218, 306 and 270 days in indigenous goats maintained in the traditional system in Sudan, Kenya and Mali respectively. Wilson and Durkin (1988) observed that the kidding interval of goats maintained in traditionally managed agro-pastoral systems in Central Mali was 296 days.

Galina et al. (1995) reported a value of  $347 \pm 56$  days as the kidding interval of Mexican dairy goats in a semi-arid region.

## **2.5 Feeding management**

The feeding system and strategy of goats in farm as well as field conditions have been reported by many workers.

Peters and Deichert (1984) classified the management systems of goats in peninsular Malaysia as intensive, semi-intensive, semi-extensive and tethering systems. In the intensive system, green forage was fed *ad lib* once or twice daily. In other systems of management, goats were let out to



graze for about 3 to 6 hours or were tethered during the day time and feed supplementation was not practised.

The mountainous regions of Central Greece which is constituted mainly by range lands, forests were freely grazed by goats with an average stocking rate of two animals per hectare per year (Papanastasis and Yannakopoulos, 1987).

Mason (1977) reported that in drought prone areas of North-east Brazil, goats browse on mature bush and no supplements were provided. Hussain et al. (1993) stated that in Fiji also, goat production was carried out under a very extensive system in which the breeding flock was maintained entirely on unimproved pasture.

Okello and Obwolo (1985) observed that in Uganda, goats were tethered in grazing land near the homesteads and were moved from one grazing site to another. Large flocks were taken to areas away from the homestead and other cultivated areas and returned at night. Under the tethering and extensive system, supplementary feed or water were not generally provided to goats.

Under the traditional system of management in Africa, Ademosun (1987) reported that goats were usually provided with household and kitchen wastes which included yam, cassava and plantain peelings and the bran of maize and other grains. As

free ranging was not possible near homesteads, goats were either tethered or put in enclosures.

Ojha *et al.* (1993) reported that in Thandipur village of Mathura, about 58 per cent of the goat keepers grazed their goats daily for four to six hours whereas, 28 per cent of the farmers let the animals out for more than six hours for grazing. Sixty two per cent of the farmers fed their goats with 100 g concentrate per day.

Sharma *et al.* (1995) studied the grazing behaviour and feed selection pattern of Jamnapari and Barbari goats and stated that there existed striking difference and that goats particularly preferred plants with high nutritive value. Thirumalai *et al.* (1989) found that fresh jack leaves which formed the major tree leaves fed to goats contained 62.42 per cent moisture, 5.01 per cent crude protein, 2.38 per cent ether extract, 6.12 per cent crude fiber, 3.66 per cent total ash and 20.10 per cent N.F.E. and a TDN and DCP content of 25.99 and 3.75 per cent respectively. Mecha and Adegbola (1980) observed that shrubs and herbs provided higher levels of protein and tree leaves and grasses, being more fibrous, were less nutritive. On analysis it was found that mango leaves contained 19.2 per cent dry matter, 10.1 per cent crude protein, 1.3 per cent ether extract, 30.5 per cent crude fibre, 63.1 per cent NFE and 5.8 per cent ash. It was also found that plantain leaves contained 35.7 per

cent dry matter, 19.9 per cent crude protein, 1.0 per cent ether extract, 24.1 per cent crude fibre, 44.5 per cent NFE and 10.5 per cent ash and that acacia leaves contained 29.9 per cent dry matter, 11.2 per cent crude protein, 0.8 per cent ether extract, 23.8 per cent crude fibre, 57.2 per cent NFE and 7.0 per cent ash on dry matter basis.

French (1970) observed that goats have good tolerance towards bitterness and they could secure their nutritional needs by either grazing or browsing depending upon feed availability.

Kaul (1990) stated that the number of times water was provided to goats averaged  $2.38 \pm 0.5$  in Mathura.

## **2.6 Growth rate of kids**

Mukundan and Bhat (1974) found that the birth weight of Malabari goats averaged 1.8 kg for singles and 1.7 kg for twins and the daily gain in weight from birth to one year of age averaged 34 g. The birth weight of male and female kids of Black Bengal goats under rural conditions of Bangladesh was reported to be  $971.9 \pm 7.9$  g and  $925.0 \pm 7.6$  g respectively (Islam and Rahman, 1992).

Mukundan *et al.* (1983) based on a study in AICRP on goats for milk at Mannuthy over a period of four years reported that monthly mean body weights of Malabari goats of 1, 2 and 3 months

of age were  $2.825 \pm 0.494$ ,  $3.965 \pm 0.068$  and  $4.956 \pm 0.116$  kg respectively.

Yadav and Singh (1995) reported that weaning kids at 60 days and 90 days caused no significant difference in growth rate.

## **2.7 Health care of goats**

Musligh et al. (1988) in a clinical survey conducted in Northern Iraq for six years observed that among the various diseases affecting goats the highest incidence was recorded for intestinal parasites (69.28%) followed by respiratory infections (7.04%) and skin lesions (6.49%). Kaul (1990) in a survey at Mathura found that majority of the goat farmers (48%) reported off-feed and decreased water intake as the most common symptoms observed in goats. Ten per cent of the farmers treated the animals at home.

Pander and Kanaujia (1987) based on post-mortem records of 823 Beetal and Black Bengal goats and their reciprocal crosses reported that prevalence of pneumonia, gastroenteritis and colli bacillis were 78.13, 13.0, 8.87 per cent respectively. On the otherhand, Sriraman et al. (1982) reported that in Andhra Pradesh, out of 279 adult goats died, death due to pneumonia was 39.82 per cent and due to enteritis was 48 per cent. Deaths due

to Johnis disease and Coccidiosis were 1.26 and 3.25 per cent respectively.

Mittal (1976) observed that kids with poor birth weight had higher mortality rate and that the main causes for death were pneumonia followed by enteritis, parasitic gastro-enteritis, Johnis disease and liver disorders. Jan and Gupta (1992) reported that out of 1036 kids born in Ludhiana, the mortality was 46 per cent upto four months of age and the main causes were pneumonia, enteritis and coccidiosis.

Mason (1977) observed that in North east Brazil, the most serious diseases affecting goats were gastrointestinal helminthiases, caseous lymphadenitis, contagious eczema and foot and mouth disease. In poorly managed goat farms in Fiji, Hussain et al. (1983) reported that parasitism, foot troubles and repeated attack by predators were the major causes of loss. At the same time, in a well supervised farm, it was observed that 28 per cent of the deaths were due to parasitic infestation and 26 per cent due to accidents by predators, stray dogs and nearly 10 per cent due to still birth/dystocia.

Mercado et al. (1992) observed that 77 per cent and 66 per cent of goat farmers in South Texas practised internal and external parasitic control measures respectively and 66 per cent did not vaccinate their animals. Under the traditional system of goat rearing in West Africa, Upton (1987) reported that

farmers did not provide any preventive veterinary care and mortality rates were relatively high.

## **2.8 Marketing**

According to Devendra (1980) in Asian countries, goat marketing patterns were weak and that there was only limited organised marketing.

Observations in several countries in Asia suggested that farmers generally received 55 to 60 per cent of the total value of the animal, the remaining 40-45 per cent going to middlemen and/or butchers (Naidu et al., 1991). Prasad and Kirton (1992) reported that although some kind of live animal sorting based on leg and loin conformation (felt by touch) could be seen in markets, carcass grading or classification schemes do not exist and, as a result middlemen or butchers corner maximum profit. Ojha et al. (1993) reported that 58 per cent of the goat farmers in Jhandipur village sold their goats merely by estimation whereas, 26 per cent sold their goats based on age.

In a study at Mathura, Kaul (1990) observed that the goat farmers sold their goats to businessmen (38%), butchers (29%) or other farmers (14%) and that the main reason for the sale was to get income. Deoghare and Bhattacharya (1995), on the otherhand reported that in Etawah district, 40 per cent of the small goat farmers sold their goats to middlemen, 46.6 per cent to butchers

and 13.3 per cent to other farmers. Out of the medium farmers, 61.5 per cent sold to middlemen, 23.08 per cent to butchers and 13.38 to other farmers. On the contrary, 83.33 per cent of the large farmers sold their goats to middlemen and the rest (16.67%) to butchers.

Deoghare and Sood (1994) reported that in goat rearing rural households of Mathura district, the female kids were reared for milk production and the males were sold in the market for meat purpose. When needed, even the surplus females were also sold.

Peters and Deichert (1984) reported that majority of the goat keepers (64%) sold their goats at less than 18 months of age in the intensive system whereas, in the semi-intensive and semi-extensive system, only 50 per cent and 48 per cent of the farmers disposed off their goats at 18 months of age. Mercado *et al.* (1992) on the otherhand, observed that in South Texas eight per cent of the goat farmers sold their goats at 2 to 4 weeks of age, 24 per cent at 4 to 6 weeks, 45 per cent at weaning (3 months) and 23 per cent at over one year of age.

Papanastasis and Yannakupoulos (1987) stated that goat farmers in Central Greece slaughtered kids at an age of 40-60 days with an average carcass weight of 10 kg, while, the older goats were slaughtered by the time they attain 18 kg body weight.

Reynolds and Adediran (1994) observed that in Southwest Nigeria, the fastest growing male goats were sold first.

According to Kaul (1990), 88 per cent of the goat farmers of Mathura consumed the milk produced by goats and 12 per cent of the farmers sold the milk.

Hussain *et al.* (1993) reported that majority of the goats in households were killed in the backyard for domestic use in Fiji. Consumers visited goat farms to purchase goats and so there was no regular channel for marketing.

## **2.9 Labour use**

Deoghare and Sood (1994) reported that among goat rearing rural households of Mathura district, employment of labour was highest on large farms (83.52 days) followed by landless farmers' units (81.18 days), small (77.94 days), medium (71.17 days) and marginal farms (70.23 days). The employment of female labour was maximum on landless farmers' units (54.3 days) and lowest on marginal farms (37.4 days). In contrast, the utilization of male labour was maximum on small farms (21.25 days) and lowest on large farms (10.06 days). The overall employment per household per year of male, female and children were 15.65, 41.07 and 16.12 days respectively.



Ojha et al. (1993) stated that in Jhandipur village, goats were taken out for grazing mainly by children. The proportion of utilization of female, male and hired labour for taking goats for grazing was 28, 22 and 14 per cent respectively.

Castro (1987) reported that goats produced significant benefits to the farmers in Mexico in the form of permanent employment.

## **2.10 Economics**

The economic analysis of goat farming in different categories of farms/management systems have been studied in detail by various workers.

In Asian countries, goat farming was mainly for meat production and in these areas, milk production from goats was of secondary importance. The infrastructure and resource use for goat production were weak (Devendra, 1980).

Raut and Nadkarni (1974), based on a survey reported that in Mandi and Mahasu districts of Himachal Pradesh, the average cost of maintenance of a goat per year under migratory flock system was Rs.3.85 and Rs.15.70 respectively. The corresponding values for stationary flock were Rs.11.75 and Rs.9.70 respectively in Mandi and Mahasu regions. Labour cost incurred was 60 to 80 per cent of the gross cost.

Among goat farmers in Bichpuri block of Agra district having one or two milch goats, Balishter and Chandra(1986) reported that the fixed cost and variable cost constituted 26 and 74 per cent respectively, whereas, in households having three or more milch goats, the fixed cost and variable cost were 24 and 76 per cent respectively. They also found that the cost of maintenance decreased with increase in the number of goats and that the gross income per goat was Rs.496.00 and net returns, Rs.141.00. Out of the gross income, 93 per cent was from the sale of milk and the rest from the sale of manure.

Deoghare (1995) also found that the cost of maintenance per goat per lactation varied with flock size in Etawah district of Uttar Pradesh. In rural households of Mathura district of Uttar Pradesh, Deoghare and Sood (1994) reported that among the variable cost, labour was the major component followed by miscellaneous expenditure and feed cost. Among fixed cost, the major component was the interest on fixed capital. The income from the sale of milk, animals and manure were 54.04, 22.05 and 2.86 per cent respectively. Raut and Nadkarni (1974) based on a survey in Himachal Pradesh found that cost incurred for labour was the main component of cost in stationary production system and it was much higher in the migratory production system. Feed cost constituted only a small proportion.

Sriramamurthy (1977) reported that a peasant family in Andhra Pradesh earned Rs.140.00 per doe. Ghosh and Khan (1980) observed that in Jodhpur, an indigenous goat provided Rs.250.00 per year to a small farmer besides 2 quintals of manure and the benefit of clearing weeds and thorny bushes. Sharma et al. (1982) reported that a net income of Rs.212.00 per goat per year was obtained from a flock of 10 goats and Rs.252.00 per goat a year from 50 goats.

Acharya and Singh (1992) reported that various studies around the world indicate that the net income per doe per year ranged from Rs.140.00 to Rs.252.00, the maximum contribution being from milk production (58.84%).

Acharya and Patnayak (1974) worked out the relative economics of rearing cattle, sheep and goats (in the hot arid regions of Rajasthan), being primarily maintained on free range grazing with some supplementary feeding to cattle during lactation. The goats were found to be 130 per cent more economical to cattle and 123 per cent more economical to sheep. Sharma (1987) reported that goat provided significantly more meat and milk per unit live weight per year when compared to cattle.

Devendra and Rankine (1970) based on an economic analysis revealed that the expenditure on the purchase of goats represented 65.6 per cent followed by labour cost (14.8%).

Papanastasis and Yannakopoulos (1987) based on a study on goat production systems in Central Greece found that labour productivity was low and the net income was negative. Peters and Deichert (1994) compared the cost of production of goats under different systems of management and found that it was more in intensive system followed by semi-intensive and extensive systems.

## **2.11 Constraints**

The different constraints that impede goat farming in different regions have been discussed by various authors.

Kaul (1990) stated that the most important constraint faced by goat farmers in Mathura was the non-availability of bucks for breeding purpose.

Devendra (1980) reported that in Asian countries, the goat production level was low and the important constraints to production were in adequate feed supplies, diseases and parasitic infections.

Gefu and Adu (1984) observed that the main constraint to the production of sheep and goat in rural areas of Northern Nigeria was disease problems. On the otherhand, under village conditions of South West Nigeria, Sumberg and Mack (1985)

reported that the most important constraint to increased productivity and profitability of goat production was mortality.

Hussain (1985) divided the major constraints in goat production in Pacific island countries into environmental, technical, economic and social factors.

Upton (1987) was of the view that out of the possible constraints in goat rearing under the traditional system in West Africa, feed supply was the most important one. As long as small ruminants were fed mainly on household scrapes, their number should be limited by the amount of feed available. This factor also formed the reason for the early disposal of male kids. Next to feed came labour and cash. Disease was the last of the constraints mentioned.

## ***Materials and Methods***

## **MATERIALS AND METHODS**

The materials and methods employed in this study are furnished under four major sections.

- \* Research setting
- \* Sampling design
- \* Data collection and analysis
- \* Concepts and definitions used

### **3.1 Research settings**

#### **3.1.1 The state**

The state of Kerala is located on the southern tip of India. It lies between 8°18'N, 12°48'N, 74°52'E and 77°22'E covering an area of 38,855 sq.km. It has a coastline of 580 km along the arabian sea in the west. The western ghats make the dominant topography of eastern Kerala and 56 per cent of the total area of the state is covered by Western Ghats. Topographically state is divided into three regions viz. costal low lands, interior midland and eastern highlands. Of late, the state has been declared fully literate.

The performance of agriculture sector in the state is largely influenced by climatic conditions of which rain is the most important factor. There are two distinct rainfall seasons the south-west monsoon (June to mid August) and the North-East

monsoon (September to November). The dry-season from January to April is the most critical period of the year for the cultivation of crops and fodders. The average annual rainfall is approximately 3000 mm, the north and the highlands getting above average and the southern part getting below average.

Animal husbandry is a common activity throughout the state of Kerala. Livestock census (1987) enumerated 34.24 lakhs cattle, 3.29 lakhs buffalo, 15.81 lakhs goats and 17.09 lakhs fowls. During the period from 1964-65 to 1992-93 the per capita availability of milk increased from 33 g/day to 175 g/day.

### 3.1.2 The districts

The two districts that were taken for study were Palakkad and Malappuram. Palakkad district has an area of 4480 sq.km with a human population 20.44 lakhs. The per capita income of Palakkad district at current prices in 1985-86 was Rs.1799. The population of goats was 134110 in 1987. Malappuram district has an area of 3548 sq.km with a human population 24.03 lakhs. The per capita income of Malappuram district at current prices in 1985-96 was Rs.1320. Population of goats in Malappuram was 174412. The meteorological data pertaining to these two districts are shown in Table 1.



Table 1. Meteorological data of Palakkad and Malappuram district for the year 1995.

Region	Total rainfall in mm	Total number of raining days	Mean Max. Temp. °C	Mean Min. Temp. °C	Mean R.H. %	Total sunshine in hours
Palakkad	1532.0	110	32.07± 0.35	23.60± 0.18	87.78± 0.42	75.36
Malappuram	2656.8	115	32.50± 0.20	22.15± 0.14	73.83± 0.80	84.42

### 3.2 Sampling design

From each district one panchayat was selected based on convenience for the study. From each panchayat two villages were taken based on multiple stage technique. From these villages, with the help of key informants a list of farmers owning goats was prepared. From this list 20 homesteads were taken using Tippets random number table. So in all, 80 homesteads were studied, 40 each from the two districts.

### 3.3 Data collection and analysis

The study was carried out from April 1996 to June 1996. The required data was collected from the homesteads by direct

observation and personal interview supported by a structured and pre-tested schedule. For recording growth rate of kids, those homesteads having kids at the time of first visit were later visited three times on successive months.

The information on socio-economic characteristics, livestock position, husbandry practices like procurement and disposal of animals, housing, feeding, breeding, health care, labour and expenses and details of cash farm income from sale of animals, milk, pellets etc. were collected on the date of interview. Using the data collected the cost of maintenance of goat enterprise was calculated.

### **3.4 Concepts and definitions used**

#### **3.4.1 Fixed cost**

Fixed cost consisted of depreciation of housing, equipments and interest on the value of animals and assets (fixed capital) relating to goat production.

The depreciation on goat pens was fixed as 10 per cent and for equipments it was taken as 5 per cent.

The interest on the owned fixed capital comprising the value of goat pen, equipments and goats was worked out at a fixed rate of 12.5 per cent per annum which is the rate at which farm loans are available from banks.

### 3.4.2 Operational cost/variable cost

Operational cost consisted of feed cost, labour and other miscellaneous expenses.

The value of purchased feed was recorded as reported by the respondent. The value of family labour was calculated at half of the prevailing wage rate of casual labour in the study area.

### 3.4.3 Total cost

This included the fixed cost as well as variable cost.

### 3.4.4 Gross income

Gross income include income from sale of milk, pellets and animals. In those homesteads, where pellets are not sold, for calculating income from sale of pellets the assumption made is as follows. An adult goat excretes on an average about 300 g of pellets daily. But quantity obtained for sale is taken half the quantity produced because of the fact that goats are let out for grazing. The value was then calculated based on the existing price prevailing in the area. In those homesteads where the pellets are sold, the amount is recorded is that reported by the farmer.

## ***Results***

## RESULTS

The various aspects of the farming system, namely, the socio-economic characteristics of farmers, goat husbandry practices followed, mode of disposal of animals and products, economics of goat rearing and the constraints in goat production were studied and the results are presented in this chapter.

### 4.1 Location of the study

The location of the study and the number of homesteads selected in each region are presented in Table 2. In all, eighty sample homesteads with goat rearing were selected at random. These belonged to four villages viz., Wadakkancherry and Kannambra of Wadakkancherry panchayat in Palakkad district and Purathur and Tripangode of Tirur panchayat in Malappuram district.

Table 2. Number of homesteads studied in Palakkad and Malappuram

Sl. No.	Village	Panchayat	District	Number of homesteads studied
1.	Wadakkancherry	Wadakkancherry	Palakkad	20
2.	Kannambra	Wadakkancherry	Palakkad	20
3.	Purathur	Tirur	Malappuram	20
4.	Tripangode	Tirur	Malappuram	20

## 4.2 Socio-economic characteristics of farmers

### 4.2.1 Age of head of family

The distribution of homesteads based on the age of the head of family is given in Table 3.

Table 3. Distribution of homesteads according to the age of the head of family.

Sl. No.	Age group	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	20-40	8 (20)	12 (30)	25
2.	41-60	26 (65)	25 (63)	64
3.	61 and above	6 (15)	3 (7)	11

(Figures in parenthesis indicate percentages)

In general, majority of farmers in both the regions belonged to the age group 41-60 years. Only 25 per cent of the farmers belonged to the age group 20-40 years. Eleven per cent of the farmers were above 60 years of age.

### 4.2.2 Educational background of the head of family

The educational background of the head of family is shown in Table 4.

Table 4. Educational background of the head of family

Sl. No.	Educational status	Number of farmers		Per cent to total
		Palakkad	Malappuram	
1.	Illiterate	14 (35)	15 (38)	36
2.	Lower primary	14 (35)	13 (32)	34
3.	High school	10 (25)	9 (22)	24
4.	Pre-degree	2 (5)	2 (5)	5
5.	Degree	-	1 (3)	1

(Figures in parenthesis denote percentages)

It was observed that majority of the farmers rearing goats were literate (64%). Thirty four per cent of farmers had only lower primary education and 24 per cent had high school level education.

#### 4.2.3 Occupation of head of family

It was observed that more than one-half (58%) of the farmers (head of family) rearing goats in the two regions studied were daily wage labourers. Twenty per cent of the farmers were service personnel, either in government or private sector. The proportion of farmers engaged fully in business and agriculture was only 12 and six per cent

respectively. The rest of the farmers (head of family) were non-resident Indians (4%).

#### 4.2.4 Religious status of farmers

The distribution of farmers based on religion is shown in Table 5 and Figure 1.

Table 5. The distribution of farmers based on the religious status

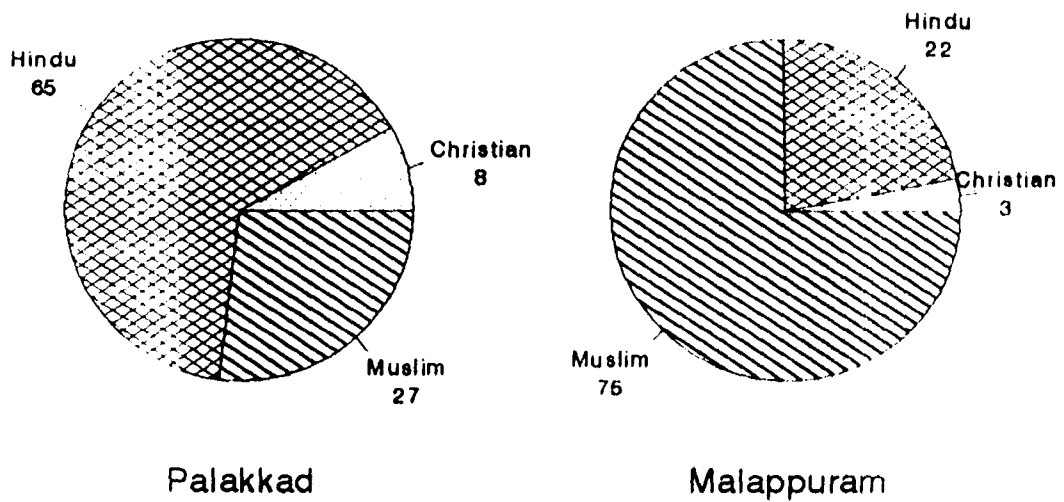
Sl. No.	Religion	Number of farmers		Per cent to total
		Palakkad	Malappuram	
1.	Christian	3 (8 )	1 (3 )	5
2.	Hindu	26 (65)	9 (22)	44
3.	Muslim	11 (27)	30 (75)	51
Total		40	40	100

(Figures in parenthesis denote percentages)

Majority of the goat farmers included in the study in Palakkad belonged to Hindu religion (65%), followed by Muslims (27%) and Christians (8%). In Malappuram, 75 per cent of the farmers belonged to the muslim religion followed by Hindus (29%) and Christians (3%).



FIG.1 RELIGIOUS STATUS OF THE FARMERS STUDIED  
IN PALAKKAD AND MALAPPURAM REGIONS



#### 4.2.5 Land holding of farmers

The land holding of goat rearing farmers ranged from 3 cents to 8 acres in Palakkad with a mean of  $70.25 \pm 1.17$  cents and in Malappuram, it ranged from 7 cents to 2 acres, with a mean of  $25.0 \pm 0.02$  cents.

#### 4.2.6 Livestock holding

Livestock holding of the homesteads were studied in detail. In general, only 28 per cent of the farmers possessed cattle in addition to goats in the above homesteads (Table 6).

Table 6. Livestock holdings of the homesteads studied in Palakkad and Malappuram

Sl. No.	Livestock species	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Cattle			
	local	4 (10)	6 (15)	13
	cross-bred	4 (10)	8 (20)	15
	total	8 (20)	14 (35)	28
2.	Goat			
	doe	40 (100)	40 (100)	100
	buck	20 (50)	13 (33)	41
	kids	38 (95)	24 (60)	78
3.	Poultry			
	chicken	15 (38)	16 (40)	39

Only 20 per cent of the goat rearing farmers in Palakkad and 35 per cent in Malappuram reared cattle along with goats. All the farmers had does, while, only 50 per cent of the farmers in Palakkad and 33 per cent in Malappuram reared bucks. Majority of the farmers in Palakkad (95%) and Malappuram (60%) possessed kids (see Fig.2). The proportion of farmers rearing poultry in Palakkad and Malappuram was 38 and 40 per cent respectively.

#### 4.2.7 Experience of the farmer in goat farming

Distribution of homesteads according to the experience of the farmer in goat rearing is shown in Table 7.

Table 7. Distribution of homesteads according to the experience of farmer in goat rearing

Sl. No.	Experience (years)	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Less than 10	23 (57)	19 (48)	52
2.	11-20	9 (23)	15 (37)	30
3.	Above 20	8 (20)	6 (15)	18
Total		40	40	100

(Figures in parenthesis denote percentages)

FIG. 2 BAND / FLOCK STRUCTURE OF GOATS IN HOMESTEADS OF PALAKKAD AND MALAPPURAM REGIONS

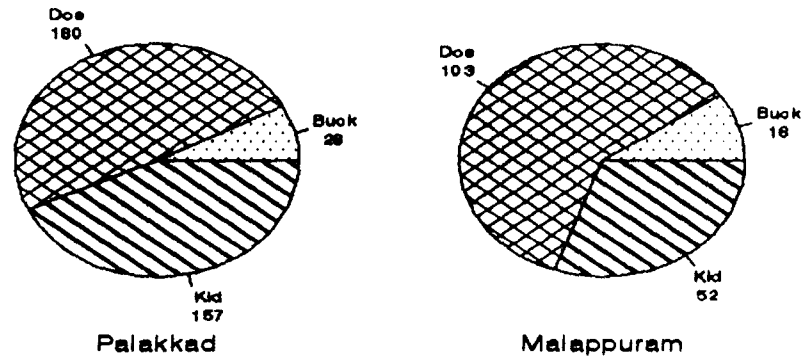
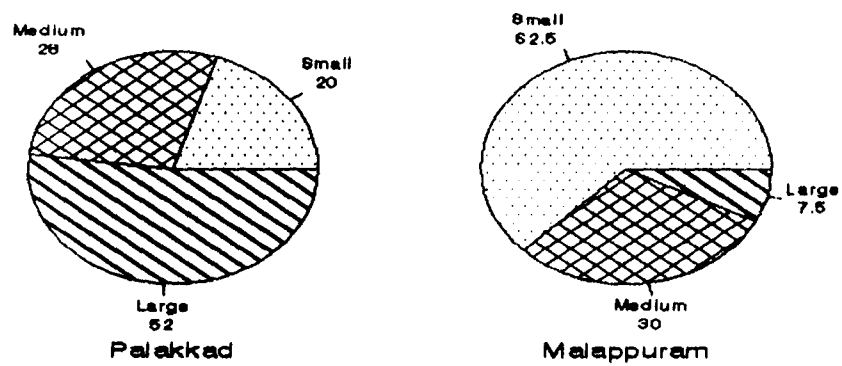


FIG. 3 PROPORTION OF FARMERS BASED ON FLOCK SIZE OF PALAKKAD AND MALAPPURAM REGIONS



Majority of the farmers (52%) in Palakkad and Malappuram possessed only less than 10 years of experience in goat rearing. Thirty per cent farmers had an experience between 11 and 20 years and only 18 per cent of the farmers in both the regions had an experience of above 20 years in goat rearing.

#### 4.2.8 Band/Flock strength

The distribution of homesteads according to band/flock strength is presented in Table 8 and Figure.3.

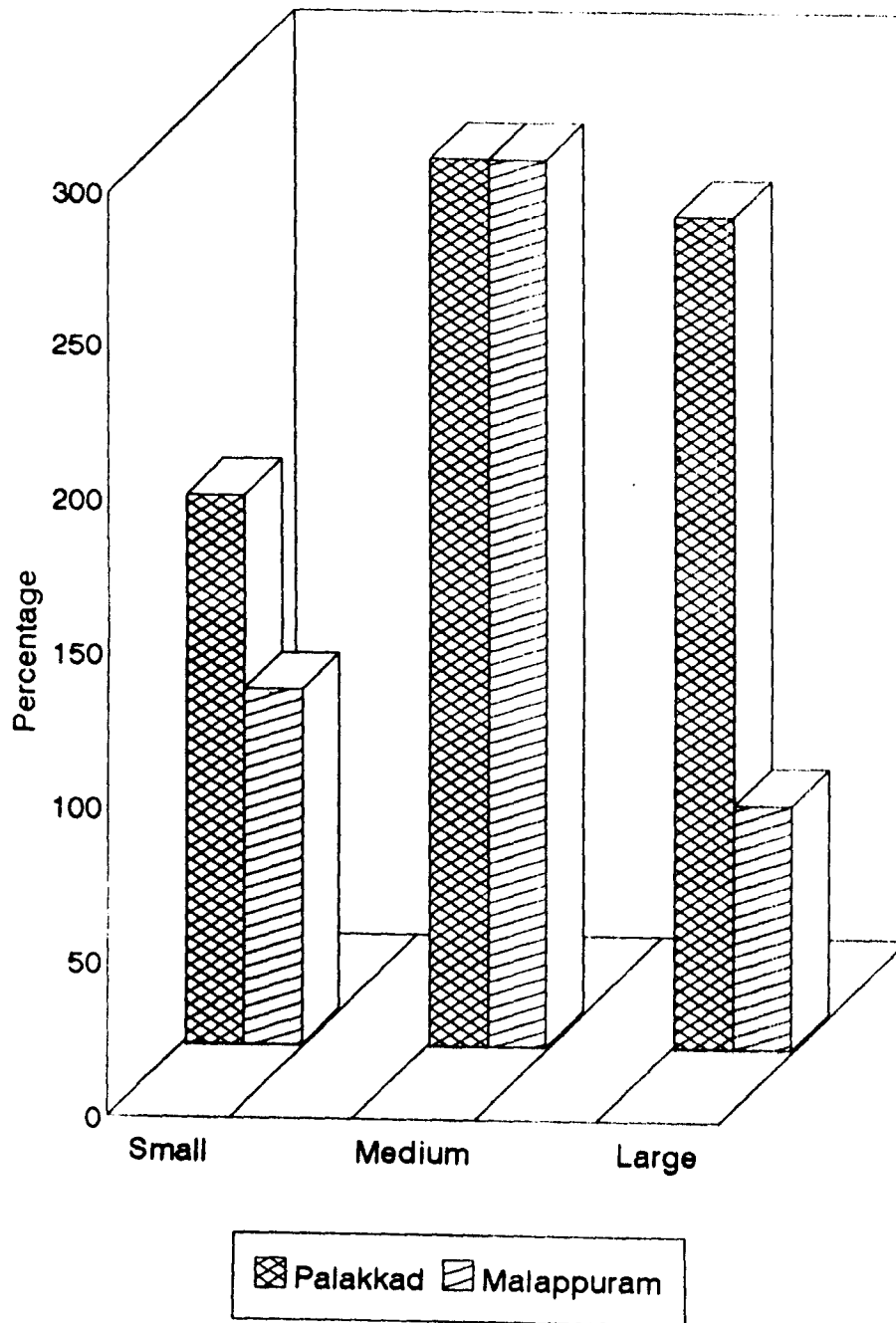
Table 8. Distribution of homesteads according to band/flock strength

Sl. No.	Board/flock strength	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	1-4 (small)	8 (20)	22 (55)	38
2.	5-8 (medium)	11 (28)	15 (38)	32
3.	above 9 (large)	21 (52)	3 (7 )	30
Total		40	40	100

(Figures in parenthesis indicate percentages)

It can be seen from the above table that majority of the farmers in Palakkad (52%) possessed large band/flock size

FIG. 4 PERCENTAGE INCREASE IN FLOCK STRENGTH PATTERN OF GOATS OF PALAKKAD AND MALAPPURAM REGIONS OVER THE YEARS



(more than 9 goats) while majority of the farmers in Malappuram (55%) possessed only a small band/flock size (1-4 goats).

#### **4.2.9 Trends of band/flock strength pattern**

Information on the number of goats possessed by the farmer in the beginning (start) and his present stock position was collected (Table 9 and Fig.4).

In Palakkad, there had been a growth of 177.6, 287.8 and 269.5 per cent in the mean number of goats at the start of farming and as on the date of study in small, medium and large holdings respectively. In Malappuram, the corresponding increase in the band/flock strength of goats was 114.7, 287.7 and 78.6 per cent respectively in small, medium and large holdings. It is evident that the maximum increase occurred in the medium holding category.

#### **4.2.10 Flock composition in the homesteads**

The flock composition in the homesteads of Palakkad and Malappuram at the time of study is presented in Table 10.

Table 9. Trends of band/flock strength pattern of goats in Palakkad and Malappuram

Sl. No.	Region	Mean number of goats per homestead						Per cent change		
		At the start			At present			Small	Medium	Large
		Small	Medium	Large	Small	Medium	Large			
1.	Palakkad	1.125 <sup>±</sup> 0.12	1.64 <sup>±</sup> 0.19	3.48 <sup>±</sup> 1.59	3.123 <sup>±</sup> 0.32	6.36 <sup>±</sup> 0.29	12.86 <sup>±</sup> 1.25	+177.6	+287.8	+269.5
2.	Malappuram	1.29 <sup>±</sup> 0.28	1.38 <sup>±</sup> 0.12	5.60 <sup>±</sup> 3.40	2.77 <sup>±</sup> 0.22	5.35 <sup>±</sup> 0.16	10.00 <sup>±</sup> 0.82	+114.7	+287.7	+78.6



Table 10. Flock composition in the homesteads of Palakkad and Malappuram

Sl. Category No. of flock	Mean number of animals per homesteads					
	Palakkad			Malappuram		
	Kid	Doe	Buck	Kid	Doe	Buck
1. Small	1.50± 0.11	1.50± 0.63	0.12± 0.04	0.36± 0.29	2.14± 0.03	0.27± 0.02
2. Medium	2.64± 0.08	3.36± 0.07	0.36± 0.06	2.00± 0.03	2.86± 0.04	0.46± 0.04
3. Large	5.33± 0.10	6.24± 0.17	1.09± 0.04	4.33± 0.42	4.67± 0.16	2.00± 0.27

It could be seen from the above table that among small farmers, the mean number of kids per homestead in Palakkad was  $1.5 \pm 0.11$  and in Malappuram, it was only  $0.36 \pm 0.29$ . On the other hand, the mean number of does and bucks in Malappuram was more than that in Palakkad.

Among the medium size goat farmers, the mean number of kids and does was higher in Palakkad than in Malappuram. The medium farmers of Malappuram reared more number of bucks than the farmers of Palakkad.

Large farmers of Palakkad also had more number of kids and does whereas, large farmers of Malappuram possessed more number of bucks.

### 4.3 Procurement of goats

All the farmers studied in the two regions procured goats from other farmers (except one farmer in Palakkad who purchased his goats from a butcher).

#### 4.3.1 Status of goats at the time of procurement

The status of goats at the time of procurement in the selected homesteads of Palakkad and Malappuram is presented in Table 11.

Table 11. Status of goats at the time of procurement

Sl. No.	Status	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Kid	4 (10)	10 (25)	18
2.	Doe	27 (68)	27 (68)	68
3.	Doe with kids	8 (20)	2 (5 )	12
4.	More than 2 does + kids	1 (2)	1 (2)	2
Total		40	40	100

(Figures in parenthesis indicate percentages)

Farmers either procured goats as kids, does or doe with kids. Majority of the farmers in Palakkad (68%) and Malappuram (68%) started their goat farming by purchasing only a doe. While 10 per cent of the farmers started their farming with kids in Palakkad, 25 per cent of the farmers in Malappuram started their farming with kids. None of the farmers procured a buck/male kid at the start of farming.

#### 4.3.2 Selection attributes at the time of procurement

#### 4.3.3 Selection of does

The selection attributes that were looked into while purchasing does are presented in Table 12.

Table 12. Selection attributes of does followed by farmers

Sl. No.	Attribute	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Selection based on appearance	26 (65)	28 (70)	68
2.	Selection based on cost	12 (30)	12 (30)	30
3.	Selection based on age	2 (5)	-	2
Total		40	40	100

(Figures in parenthesis denote percentages)

It is seen from the above table that 65 per cent of the farmers in Palakkad and 70 per cent in Malappuram purchased does based on general appearance. Thirty per cent of farmers in both the regions purchased does based on the cost. Age of the animal was considered important only by five per cent of the farmers in Palakkad. This attribute was not considered by the farmers of Malappuram while purchasing does.

#### **4.3.4 Selection attributes of bucks**

No farmer in Palakkad or Malappuram purchased a buck at the start of farming. Instead, bucks were selected later from the kids born in the homesteads.

Out of 20 farmers rearing bucks in Palakkad, 80 per cent reported that they looked into the size and appearance of the animals while selecting them. The rest of the farmers (20%) did not use any specific criteria in choosing breeding bucks.

In Malappuram, 70 per cent of the farmers who possessed bucks considered age, size and appearance of the animal while selecting them. The rest of the farmers (30%) did not use any specific criteria in choosing breeding bucks.

#### **4.3.5 Selection attributes of does at the time of replacement**

The selection attributes of does at the time of replacement from the band/flock are presented in Table 13.

Table 13. Selection attributes of does at the time of replacement

Sl. No.	Attribute	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Based on size and appearance	36 (90)	36 (90)	90
2.	Based on age	1 (2 )	3 (8 )	5
3.	Based on twinning	2 (2 )	1 (2)	2.5
4.	Based on colour	2 (6)	-	2.5
Total		40	40	100

(Figures in parenthesis indicate percentages)

At the time of replacement of does, majority of the farmers in Palakkad (90%) and Malappuram (90%) looked into the size and appearance. Age of the animal was considered by two and eight per cent of the farmers in Palakkad and Malappuram respectively. Twinning of the dam was considered important by two per cent of the farmers in both the regions. Six per cent of the farmers in Palakkad also considered colour (a psychological attribute) while replacing does.

## 4.4 Housing

### 4.4.1 Type of pens

Ninety five per cent of the farmers in Palakkad and all the farmers in Malappuram provided pens for goats. The different types of goat pens observed in the two regions during the study are presented in Table 14.

Table 14. Type of goat pens in the homesteads of Palakkad and Malappuram

Sl. No.	Type of pen	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Lean-to-type	25 (62)	1 (3 )	33
2.	Independent	13 (33)	39 (97)	65
3.	No pen (raised wooden floor only)	2 (5 )	-	2
Total		40	40	100

(Figures in parenthesis indicate percentages)

The above table reveals that the common type of goat pen in Palakkad is lean-to-type (62%) and in Malappuram, independent type (97%). Two per cent of farmers in Palakkad who did not possess any goat pen kept their goats inside their house on a raised wooden floor.

#### 4.4.2 Type of floor provided in goat pens

Two types of floors were observed in goat pens in the homesteads of Palakkad and Malappuram. They included raised wooden floor and mud floor. Only two per cent of the farmers in Palakkad and Malappuram provided mud floor. The rest of the farmers, in both the regions provided raised wooden floors in goat pens.

#### 4.4.3 Type of wall provided in goat pens

The different materials used for the construction of wall in goat pens are as presented in Table 15.

It is seen from the above table that in Palakkad, 33 per cent of the farmers studied used only wooden planks to construct side walls and 32 per cent constructed the side walls by thatching with palm leaves. Ten per cent of the farmers used wooden planks along with bamboo for making side walls of goat pens. Only eight per cent of the farmers used bricks for constructing side walls (that too in lean-to-type sheds only). Twelve per cent of the farmers did not provide any side walls to their goat pens.

Table 15. Materials used for the construction of walls in goat pens

Sl. No.	Material used	Number of homesteads	
		Palakkad	Malappuram
a. Lean-to-type shed			
1.	Wooden planks	4 (10)	-
2.	Wood/bamboo	4 (10)	1 (2)
3.	Thatched with palm leaves	10 (25)	-
4.	Bricks	3 (8)	-
5.	No wall	4 (10)	-
b. Independent shed			
1.	Wooden planks	9 (23)	23 (58)
2.	Wood/bamboo	-	4 (10)
3.	Thatched with palm leaves	3 (7)	11 (27)
4.	Bricks	-	-
5.	No wall	1 (2)	1 (3)
Total		38	40

(Figures in parenthesis denote percentages)



In Malappuram, 58 per cent of the farmers constructed the side wall of goat pens using wooden planks. Twenty seven per cent of farmers provided a side wall using wooden planks and bamboo. None of the farmers in this region used bricks for the construction of wall. The proportion of farmers who did not provide side walls for goat pens was only three per cent in this region.

#### **4.4.4 Type of roof**

Two types of roofs observed in goat pens in Palakkad and Malappuram were tiled and thatched. In Palakkad, majority of goat pens (83%) had thatched roof and rest had tiled roof. The proportion of thatched and tiled roof in Malappuram was 85 per cent and 15 per cent respectively.

### **4.5 Hygiene and sanitation aspects of goat pens**

#### **4.5.1 Hygiene status**

Maintenance of hygiene within the goat pens and premises was observed and was graded into good, satisfactory and poor. Table 16 represents the hygiene status of goat pens in the two regions.



Table 16. Hygiene status of goat pens in Palakkad and Malappuram

Sl. No.	Hygiene status	Number of homesteads	
		Palakkad	Malappuram
1.	Good	-	7 (18)
2.	Satisfactory	35 (92)	31 (78)
3.	Poor	3 (8)	2 (4)

(Figures in parenthesis denote percentages)

The hygiene level in 92 per cent of the goat pens in Palakkad and 78 per cent of the pens in Malappuram was graded as satisfactory. Eighteen per cent of pens in Malappuram were graded as good. The percentage of pens that were graded as poor in Palakkad and Malappuram was eight and four per cent respectively.

#### 4.5.2 Drainage facilities

The drainage facilities provided in the goat pens were observed (Table 17).

Table 17. Drainage facilities provided in the goat pens in Palakkad and Malappuram

Sl. No.	Drainage status	Number of homesteads	
		Palakkad	Malappuram
1.	Adequate drainage	16 (42)	32 (80)
2.	Satisfactory drainage	21 (55)	7 (18)
3.	Poor drainage	1 (3)	1 (2)

(Figures in parenthesis denote percentages)

When only 42 per cent of the goat pens in Palakkad had adequate drainage facilities, 80 per cent of the pens in Malappuram had adequate drainage facilities. The proportion of pens having satisfactory drainage in Palakkad and Malappuram was 55 per cent and 18 per cent respectively.

#### 4.6 Breeding management

The breeding practices of goats followed by farmers in the two regions were studied. None of the farmers practiced artificial insemination. Natural service was the only means of breeding.

#### 4.6.1 Source of breeding bucks

Only 41 per cent of the farmers in both the regions reared bucks for breeding. The rest of the farmers depended upon bucks maintained by other farmers. The farmers in Palakkad (50%) and Malappuram (33%) who were having bucks allowed them to breed on other farmer's goats.

#### 4.6.2 Age at first kidding

The age at first kidding as reported by farmers is shown in Table 18.

Table 18. Age at first kidding as reported by farmers

Sl. No.	Age of goats (months)	Number of farmers reported		Per cent to total
		Palakkad	Malappuram	
1.	16	15 (38)	16 (40)	39
2.	18	17 (42)	14 (35)	39
3.	20	8 (20)	10 (25)	22

(Figures in parenthesis denote percentages)

Majority of the farmers in Palakkad (42%) reported that their goats kidded for the first time by 18 months. Thirty eight and twenty per cent of the farmers reported the age at

first kidding as 16 months and 20 months respectively. In Malappuram, 40 per cent of the farmers reported the age at first kidding of goats as 16 months whereas, 35 per cent and 25 per cent of the farmers reported the same as 18 and 20 months respectively.

#### 4.6.3 Kidding interval

The kidding interval of goats in the homesteads of Palakkad and Malappuram as reported by farmers is presented in Table 19.

Table 19. Kidding interval of goats as reported by farmers in Palakkad and Malappuram

Sl. No.	Kidding interval (days)	Number of farmers reported		Per cent to total
		Palakkad	Malappuram	
1.	210	12 (30)	16 (40)	35
2.	240	20 (50)	18 (45)	48
3.	360	8 (20)	6 (15)	18

(Figures in parenthesis denote percentages)

Nearly one-half of the farmers in Palakkad (50%) and Malappuram (45%) reported that the goats had a kidding interval of 240 days. When 30 per cent of the farmers in

Palakkad reported the kidding interval as 210 days, 40 per cent of the farmers in Malappuram reported the same. Twenty per cent of the farmers in Palakkad and 15 per cent in Malappuram reported the kidding interval as 360 days.

## 4.7 Feeding Management

### 4.7.1 System of feeding

The system of feeding of goats in homesteads followed by farmers is presented in Table 20.

Table 20. Feeding system of goats in homesteads of Palakkad and Malappuram

Sl. No.	Feeding system	Number of homesteads	
		Palakkad	Malappuram
1.	Let loose for browsing	5 (12.5)	-
2.	Tethering	-	1 (3)
3.	Concentrate feeding + browsing	35 (87.5)	15 (37.5)
4.	Concentrate feeding + tethering	-	24 (60)

(Figures in parenthesis indicate percentages)

In the present study, it is seen that most of the farmers fed concentrates to goats in small quantities especially

during dry/summer period only (3-4 months). When 87.5 per cent of the farmers fed concentrates to goats in Palakkad, 97.5 per cent of the farmers in Malappuram fed the same. As far as roughage feeding is concerned all the farmers in Palakkad let loose their animals for browsing but in Malappuram only 37 per cent of farmers let loose their animals for browsing. In Malappuram, most of the farmers (63%) tethered their animals near the homesteads for roughage feeding.

#### 4.7.2 Concentrate feeding

All the farmers in the two regions reported that they practiced group feeding of goats. Concentrate mixture was mixed with rice gruel and fed to goats in one or two troughs/bowls depending on the band/flock size. Bucks, does and kids were fed simultaneously from a single trough/bowl. Most of the farmers in both the regions fed concentrates to goats only during the summer period (February-May) for three to four months only. The quantity of concentrates fed to goats per day per homestead in both the regions is shown in Table 21.

Table 21. Mean quantity of concentrates fed to goats per day in Palakkad and Malappuram

Sl. No.	Type of farming (Flock/band size)	Mean quantity of concentrates feed/day (g)	
		Palakkad	Malappuram
1.	Small	300	480
2.	Medium	368	548
3.	Large	586	1166

It can be seen from the above table that farmers in Malappuram fed more concentrates to goats than the farmers in Palakkad.

None of the farmers provided mineral mixture to goats.

#### 4.7.2.1 Type of concentrates

The type of concentrates fed to goats in the homesteads of Palakkad and Malappuram and their cost (per kg) is presented in Table 22.



Table 22. Type of concentrates fed to goats in the homesteads of Palakkad and Malappuram

Sl. No.	Type	Cost per kg (Rs.)		Number of homesteads	
		Palakkad	Malappuram	Palakkad	Malappuram
1.	Compounded feed	7.50	-	1 (2)	-
2.	Coconut cake	9.00	9.00	3 (8)	18 (45)
3.	Ground nut cake	8.50	8.50	28 (70)	21 (53)

Only one farmer in Palakkad provided compounded feed to goats. Majority of the farmers in Palakkad (70%) and Malappuram (53%) provided groundnut cake to goats. The proportion of farmers providing coconut cake to goats was less in Palakkad (8%) than in Malappuram (45%).

#### 4.7.3 Roughage feeding

Majority of the farmers either let loose their goats into waste lands, forested lands, fallow lands or tethered them near the road side and around homesteads for browsing.

##### 4.7.3.1 Duration of browsing

The duration of browsing ranged from 3 to 8 hours in both the regions, the mean duration being 5.8 hours in Palakkad

and 5.3 hours in Malappuram. The duration of browsing varied during rainy season and dry season (scarcity period).

#### 4.7.3.2 Type of roughages

The goats in the homesteads of Palakkad and Malappuram were fed on various browse that were available on road sides, hillocks, waste lands and around the homestead. During the dry season, the farmers fed the goats with various tree leaves. Some farmers obtained tree leaves from the agro-forestry components of the homestead while, others purchased tree leaves. The quantity of tree leaves purchased per day varied from one bundle (approximately 2 kg) to one head load (approximately 15 kg). Majority of the farmers in Palakkad (85%) and Malappuram (97.5%) provided jack tree leaves to goats. Other tree leaves provided include mango tree leaves, plantain leaves, glyricidia leaves and kaini leaves.

#### 4.7.4 Watering

Goats in the homesteads of Palakkad and Malappuram were provided rice gruel with or without the addition of salt. Fifty three per cent of the farmers in Palakkad added salt to rice gruel, whereas, only 38 per cent of the farmers in Malappuram provided salt. The proportion of farmers who provided water to goats two times a day was 65 and 78 per cent

in Palakkad and Malappuram. The rest of the farmers (35% and 22% respectively) provided water three times day.

#### 4.7.5 Special feeding of breeding bucks

Out of the 20 farmers who reared breeding bucks in Palakkad, only five farmers provided an additional ration consisting of one cup of cooked rice. In Malappuram, out of the 13 farmers rearing bucks, only three farmers provided one cup of cooked rice in addition to the normal ration fed to other goats.

#### 4.7.6 Feeding of kids

Table 23 depicts the various kid rearing practices in the homesteads of Palakkad and Malappuram.

Table 23. Kid rearing practices in the homesteads of Palakkad and Malappuram

Sl. No.	Kid rearing practice	Number of homesteads	
		Palakkad	Malappuram
1.	Kept throughout the day and night with the dam	31 (78.5)	10 (25)
2.	Part of the day and throughout the night with dam	5 (12)	28 (70)
3.	Kept with dam only for part of the day	2 (5)	1 (3)
4.	Kept with dam only during day time	2 (5)	1 (2)

(Figures in parenthesis denote percentages)

It can be seen from the above table that 78 per cent of the farmers in Palakkad kept the kids along with the dam throughout the day and night. But, in Malappuram, 70 per cent of the farmers kept the kids along with the dam for part of the day and throughout the night. The study also revealed that none of the farmers in both the regions practised total weaning at birth. The kids were allowed to suck milk whenever they were with the dams. The kids were weaned at about 3-4 months of age in both the regions. Preferential feeding according to sex was not seen in both the regions.

#### 4.8 Growth rate of kids

The body weight of twenty kids of one month age was taken three times at an interval of one month to assess the growth rate of kids in the homesteads of Palakkad and Malappuram. The mean body weight of kids at 1 month, 2 months and 3 months of age is presented in Table 24.

Table 24. Mean body weight of kids in the homesteads of Palakkad and Malappuram

Sl. No.	Age group (months)	Mean body weight of kids (kg)		Overall Mean Malappuram
		Palakkad		
1.	1 month	2.11 ± 0.10	2.52 ± 0.12	2.30
2.	2 month	3.62 ± 0.11	4.05 ± 0.13	3.83
3.	3 month	4.40 ± 0.14	5.01 ± 0.07	4.70

From the above table, it is evident that the body weight of kids at 1, 2 and 3 months of age was lower in Palakkad than at Malappuram. The daily gain in body weight from 1 to 3 months of age was found to be 38.3 g in Palakkad and 41.8 g in Malappuram.

## **4.9 Health disorders of goats**

### **4.9.1 Health disorders of adult goats**

Major health disorders encountered in adult goats as reported by farmers is presented in Table 25.

Eight per cent of the farmers in Palakkad and 20 per cent in Malappuram reported that their goats were not affected with any major health disorder. Majority of the farmers in both Palakkad and Malappuram reported that digestive disorders were the major health disorders affecting adult goats, followed by respiratory disorders.

Table 25. Major health disorders encountered in adult goats as reported by farmers

Sl. No.	Health disorder	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Diarrhoea	2 (5 )	4 (10)	8
2.	Anorexia	-	7 (18)	9
3.	Indigestion	15 (37)	9 (23)	30
4.	Poisoning	2 (5 )	1 (2 )	4
5.	Respiratory problems	12 (30)	3 (7 )	18
6.	Cough and diarrhoea	3 (8 )	-	4
7.	Skin lesions	-	3 (7 )	4
8.	Fever	2 (5 )	-	2
9.	Dog bite	1 (2 )	-	1
10.	No problem	3 (8 )	13 (33)	20

(Figures in parenthesis denote percentages)

#### 4.9.2 Health disorders of kids

Table 26 represents the major health disorders encountered by kids as reported by farmers in Palakkad and Malappuram.

Table 26. Major health disorders of kids as reported by farmers

Sl. No.	Health disorder	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Diarrhoea	28 (70)	19 (48)	59
2.	Anorexia	3 (7)	-	4
3.	Debility	3 (7)	3 (7)	7
4.	Respiratory disorders	6 (16)	11 (27)	21
6.	Diarrhoea and respiratory disorder	-	7 (18)	9

(Figures in parenthesis indicate percentages)

Majority of the farmers in Palakkad and Malappuram reported digestive and respiratory disorders as major health disorders of kids.

#### 4.9.3 Preventive health care

None of the farmers in Palakkad and Malappuram adopted any preventive health care measures/vaccinations against goat diseases.

#### **4.9.4 Deworming**

Only 5 per cent of the farmers surveyed in Palakkad and 10 per cent in Malappuram reported that they dewormed their goats.

#### **4.9.5 Source of veterinary service**

Majority of the farmers in both Palakkad and Malappuram (85%) adopted own treatment of sick animals. Only 15 per cent of the farmers in both the regions studied sought the help of veterinary personnel in treating sick animals.

#### **4.9.6 Insurance against disease and death**

None of the farmers in both the regions insured their goats against disease and/or death.

### **4.10 Marketing strategy**

#### **4.10.1 Marketing of milk**

The proportion of farmers who milked their goats was 37.5 per cent in Palakkad. Out of this, only 2.5 per cent sold out the milk and the rest consumed the milk at home. On the other hand, 85 per cent of the farmers in Malappuram milked their goats. Out of this, 53 per cent sold out the milk and the rest used the milk for home consumption.



## 4.10.2 Marketing of animals

### 4.10.2.1 Sale outlet of bucks

The distribution of homesteads based on the sale outlet of bucks is shown in Table 27.

Table 27. Distribution of homesteads based on the sale outlet of bucks

Sl. No.	Sale outlet	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Middleman	8 (20)	8 (20)	20
2.	Butcher	3 (8)	2 (5)	6
3.	Other farmers	-	-	-
4.	Middleman/ butcher	19 (47)	15 (37)	43
5.	Middleman/ other farmer	2 (5)	3 (8)	6
6.	Middleman/ butcher/ other farmer	8 (20)	12 (30)	25

(Figures in parenthesis denote percentages)

It could be seen from the above table that only a small proportion of the farmers surveyed in Palakkad disposed bucks directly to middlemen (20%) or directly to butcher (8%). None of the farmers in this region disposed of their animals

directly to other farmers. When only a small proportion of the farmers in Palakkad (5%) disposed of their bucks to either middleman or other farmer, nearly one-half of the farmers in this region reported that they either disposed their goats to middleman or butcher. Twenty per cent of the farmers in this region reported that they disposed of their bucks either to middleman, butcher or other farmer.

In Malappuram, as in the case of Palakkad, a small proportion of the farmers sold their bucks directly to middleman (20%) or butcher (5%). As in the case of Palakkad, in Malappuram also, none of the farmers disposed their bucks directly to other farmer. When only 8 per cent of the farmers in Malappuram reported that they sold their bucks to either middleman or other farmer, 37 per cent of the farmers reported that they sold their bucks to either middleman or butcher. Thirty per cent of the farmers in this region reported that they disposed of their bucks to either middleman, butcher or other farmer.

#### **4.10.2.2 Sale outlet of does**

The distribution of homesteads in Palakkad and Malappuram according to the sale outlet of does is depicted in Table 28.

Table 28. Distribution of homesteads according to the sale outlet of does

Sl. No.	Sale outlet	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	Middleman	10 (25)	2 (5 )	15
2.	Butcher	-	2 (5 )	3
3.	Other farmers	6 (15)	3 (8)	11
4.	Middleman/ butcher	4 (10)	4 (10)	10
5.	Middleman/ other farmer	16 (40)	14 (35)	37
6.	Middleman/ butcher/ other farmer	4 (10)	15 (37)	24

(Figures in parenthesis denote percentages)

In Palakkad, majority of the farmers (40%) reported that they sold their does either to middleman or other farmers. When 25 per cent of the farmers in this region reported that they sold their does to middleman directly, only 15 per cent sold does directly to other farmers. None of the farmers sold does directly to butchers. Ten per cent each of the farmers reported that they disposed of their does to middleman or butcher or to either middleman, butcher or other farmer.

In Malappuram, on the other hand, majority of the farmers (37%) reported that they disposed of their does either to middleman, butcher or other farmer. Thirty five per cent of the farmers in this region (35%) reported that they sold their does to either middleman or other farmer. Only a small proportion of the farmers in Malappuram reported that they sold their does to either middleman or butcher (10%), directly to other farmers (8%), directly to butcher (5%) and directly to middleman (5%).

It could be generally seen that in the homesteads of both the regions studied, majority of the farmers preferred disposing their does to middlemen or other farmer and only a small proportion of the farmers sold their does directly to butchers.

#### **4.10.2.3 Age at disposal of bucklings**

The distribution of homesteads in Palakkad and Malappuram according to the age at disposal of bucklings are presented in Table 29.

Table 29. Distribution of homesteads according to the age at disposal of bucklings

Sl. No.	Age (months)	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	1-5	1 (2)	-	1
2.	6-8	15 (37)	10 (25)	31
3.	9-12	23 (58)	23 (58)	58
4.	13-18	-	5 (12)	6
5.	Above 18	1 (3)	2 (5)	4

(Figures in parenthesis denote percentages)

In Palakkad and Malappuram, majority of the farmers (58% each) opted to sell bucklings in the age group 9 to 12 months, followed by bucklings in the age group 6 to 8 months (37% in Palakkad and 25% in Malappuram). The proportion of farmers who sold their bucklings in the age group 1-5 months and 13 months and above months was very small.

#### 4.10.2.4 Stage at disposal of does

The distribution of homesteads according to the stage at disposal of does in Palakkad and Malappuram is depicted in Table 30.

Table 30. Stage at disposal of does in the homesteads of Palakkad and Malappuram

Sl. No.	Stage at disposal	Number of homesteads		Per cent to total
		Palakkad	Malappuram	
1.	After 4 kiddings	6 (15)	3 (8)	11
2.	After 5 kiddings	15 (38)	4 (10)	24
3.	After 6 kiddings	13 (32)	25 (62)	47
4.	After 7 kiddings	6 (15)	8 (20)	18

(Figures in parenthesis denote percentages)

It is seen that in Palakkad most of the farmers preferred to dispose their does after fifth kidding (38%) followed by disposal after sixth kidding (32%). In Malappuram, majority of the farmers (62%) reported that they sold the does after sixth kidding followed by disposal after seventh kidding (20%).

#### 4.10.2.5 Factors influencing disposal of goats

The various factors influencing the disposal of goats in the homesteads of Palakkad and Malappuram were studied in detail. The major factors included need for cash, old age and over stocking. More than one-half of the goat farmers in Palakkad (55%) and Malappuram (52%) reported that the main factor influencing the disposal of animals was need for cash

for 30 per cent of the farmers in Palakkad and 45 per cent in Malappuram, the major factor for the disposal of goats was old age of animals, especially in the case of does. Only 15 per cent of the farmers in Palakkad and 3 per cent in Malappuram sold the animals due to overstocking.

#### 4.10.2.6 Disposal of goats during the previous year of study

The mean number of goats disposed of during the previous year of study in the homesteads of various flock sizes in Palakkad and Malappuram is presented in Table 31.

Table 31. Mean number of goats disposed of per homestead per year in Palakkad and Malappuram

Sl. No.	Type of animal	Mean number disposed per homestead					
		Palakkad			Malappuram		
		Small	Medium	Large	Small	Medium	Large
1.	Buck	0.50± 0.09	1.90± 0.09	3.09± 0.07	0.85± 0.04	1.06± 0.08	0.66± 0.16
2.	Doe	0.25± 0.08	0.18± 0.04	0.61± 0.03	0.47± 0.03	0.50± 0.05	1.33± 0.31
3.	Young stock	0.87± 0.16	0.54± 0.07	2.33± 0.08	1.14± 0.05	1.12± 0.01	2.30± 0.87
	Total	1.63± 0.15	2.60± 0.09	6.03± 0.10	2.46± 0.07	2.68± 0.08	4.29± 0.87

It could be seen from the above table that in small flock size homesteads, the overall mean number of goats disposed of during the previous year was only  $1.63 \pm 9.5$  in Palakkad, whereas, in Malappuram it was  $2.46 \pm 0.07$ . Among this, in Palakkad and Malappuram, youngstock (bucklings and doelings) formed the majority of the animals which were disposed of during the previous year of study.

Among medium flock size homesteads, it could be seen that the overall mean number of goats disposed of during the previous year of study was  $2.60 \pm 0.09$  in Palakkad and  $2.68 \pm 0.08$  in Malappuram. In this, the major share in Palakkad was bucks whereas, in Malappuram, youngstock formed the major share.

The overall mean number of goats disposed of during the previous year of study was  $6.03 \pm 0.10$  in Palakkad and  $4.29 \pm 0.87$  in Malappuram in the case of large flock size homesteads. Among this, bucks formed the major share in Palakkad, whereas, in Malappuram, youngstock formed the major share.

#### 4.10.3 Marketing of manure

It was found that 70 per cent of the goat farmers sold out the goat manure in Palakkad, whereas, only 5 per cent of the farmers in Malappuram sold out the manure. The remaining 30 per cent of the farmers in Palakkad and 95 per cent in



Malappuram reported that they either utilized the manure for incorporating in the soil or gave it to other farmers free of charge.

#### **4.11 Division of labour in goat rearing**

A number of daily and seasonal chores have to be carried out for the maintenance of goats. These activities could be broadly divided into indoor and outdoor activities. The indoor activities include mainly shed cleaning, milking and feeding and outdoor activities mainly include taking goat for grazing/ browsing, for treatment and milk sale.

The division of labour in goat rearing under the homestead farming system of Palakkad and Malappuram is presented in Table 32.

It could be seen from the table that women's involvement in indoor activities relating to goat rearing was more than that of men. In Palakkad, when in, 81, 31.5 and 72 per cent homesteads women performed the activities of shed cleaning, milking and feeding of goats, in 74.5, 70 and 78 per cent homesteads in Malappuram, women performed these activities. The proportion of homesteads in which men performed these activities was 3.2, 2.3 and 16 per cent in Palakkad while in Malappuram, it was 7.5, 2.5 and 8 per cent respectively.

Table 32. Division of labour in various operations of goat rearing in the homesteads of Palakkad and Malappuram (in percentage)

Sl. No.	Activities	Palakkad				Malappuram			
		Husband	Wife	Children	Hired labour	Husband	Wife	Children	Hired labour
1.	Cleaning of shed	2.5	8.1	14.0	2.5	7.5	74.5	18.0	-
2.	Milking	3.2	31.5	2.8	-	2.5	70.0	12.5	-
3.	Feeding	16.0	72.0	9.5	2.5	8.0	78.0	14.0	-
4.	Taking goats for browsing	64.2	3.1	7.75	2.5	22.0	33.0	12.5	-
5.	Health care	42.5	24.0	8.5	2.5	40.0	33.0	14.0	-
6.	Disposal of milk	-	-	2.5	-	18.8	31.2	87.5	-
7.	Collection of fodder/leaves	44.5	35.5	7.5	2.5	30.0	34.0	32.0	-
8.	Disposal of animals	75.0	20.0	5.0	-	64.5	32.5	3.0	-

As far as out-door activities were concerned male participation was more than that of female in Palakkad, whereas, in Malappuram, in certain out-door activities, the participation of women was more. In Palakkad, when in 64.2, 2.5, 42.5, 44.5 and 75 per cent homesteads men performed the activities of taking goats for browsing/tethering, taking for breeding, health care activities, collection of fodder/leaves and disposal of goats, in 3.0, 24.0, 35.5 and 20.0 per cent homesteads women were involved in taking the goats for browsing/tethering, health care activities, collection of fodder/leaves, and disposal of goats.

In Malappuram, the participation of women was more than that of men in out-door activities like taking goats for browsing/tethering, taking goats for breeding and collection of fodder/leaves. At the same time, the participation of men was more (65.5%) when compared to that of women (32.5%) in the disposal of goats. In both the regions the involvement of children in the disposal of milk was more than that of men and women.

The involvement of hired labour was negligible in the homesteads of Palakkad and Malappuram. Only 2.5 per cent of the homesteads in Palakkad utilized hired labour. Hired labour was not utilized in Malappuram.

#### **4.12 Economic evaluation of goat rearing**

The economics of goat rearing in various flock sizes homesteads has been studied. The homesteads were classified into small (1-4 goats), medium (5-8 goats) and large (>9 goats), according to the flock size.

To ascertain the net returns, the following cost concepts were taken into account.

Cost A : Paid out expenses like feed and fodder + hired labour (if any) + miscellaneous recurring expenses + depreciation.

Cost B : Cost A + interest on fixed capital.

Cost C : Cost B + imputed value of family labour.

##### **4.12.1 Capital investment**

The capital investment in goat rearing in various flock sizes per homestead is depicted in Table 33.

Table 33. Capital investment in goat rearing in various homestead flock sizes

Sl. No.	Variable	Palakkad			Malappuram		
		Small	Medium	Large	Small	Medium	Large
1.	Purchase of animals	2050	4109	8314	2133	3487	6133
2.	Construction of pens	394	423	1217	798	1143	1667
3.	Purchase of equipments	38	39	49	31	37	52
Total		2482	4571	9580	2962	4667	7852

The initial investment include the cost of goats, cost of construction of goat pens and cost of equipments purchased. The above table reveals that the cost incurred for the construction of goat pens was lower in Palakkad compared to that of Malappuram in all categories of homesteads. The amount spent on the purchase of equipments was higher in Palakkad in the case of small and medium homestead categories. The total initial investment was comparatively higher in Malappuram as far as small and medium homestead were concerned and was comparatively higher in Palakkad in the case of large homestead category.

#### 4.12.2 Expenditure on goat rearing

The total expenditure incurred on goat rearing was classified into variable and fixed cost. The variable cost included the expenditure on feed, labour and miscellaneous expenditure including cost of repair of goat pens, purchase of medicines etc. The fixed cost included the depreciation on goat pens equipments and the interest on capital investment. The depreciation on goats were not taken into account because the entity appreciates and has a high salvage value at the time of disposal. The depreciation on housing was taken, at 10 per cent level and on equipments, at 5 per cent level. The interest on capital investment was taken at 12.5 per cent level. The pattern of expenditure on various homestead categories is presented in Table 34.

The fixed cost component of goat rearing was found to be lower in Palakkad in small and medium homestead categories whereas in large homestead category, it was higher in Palakkad than at Malappuram (Fig.5). Among the variable cost components, it is seen that the cost of feeding goats and cost of labour was lower in Palakkad for all three categories of homesteads than in Malappuram. The miscellaneous cost incurred in goat rearing was lower in Palakkad for small and large homestead category. The total variable cost was higher in Malappuram for all categories of homesteads when compared to that in Palakkad (Fig.6).

FIG.5 FIXED COST FOR SMALL, MEDIUM AND LARGE FARMERS OF PALAKKAD AND MALAPPURAM REGIONS

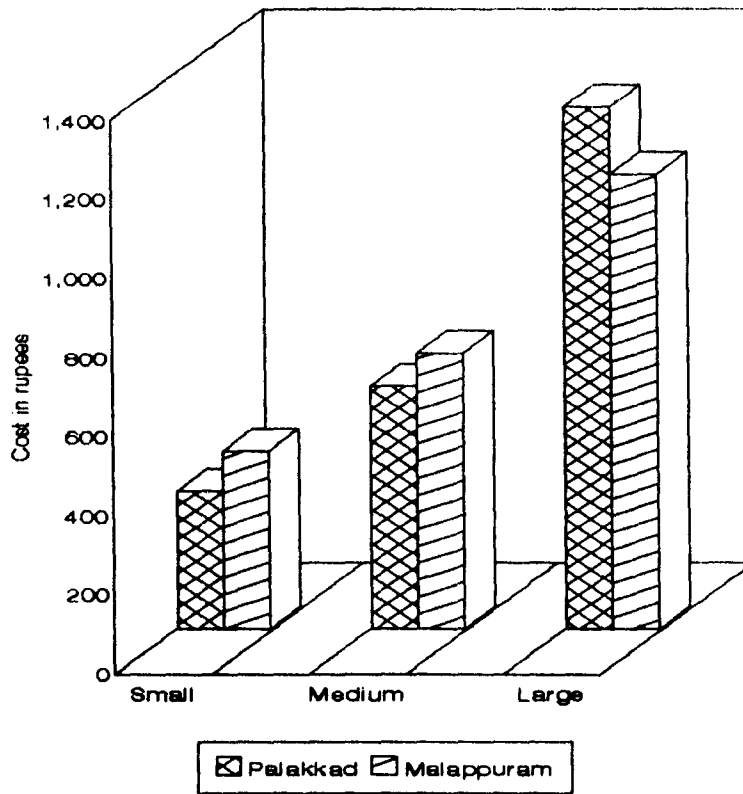


FIG.6 VARIABLE COST FOR SMALL, MEDIUM AND LARGE FARMERS OF PALAKKAD AND MALAPPURAM REGIONS

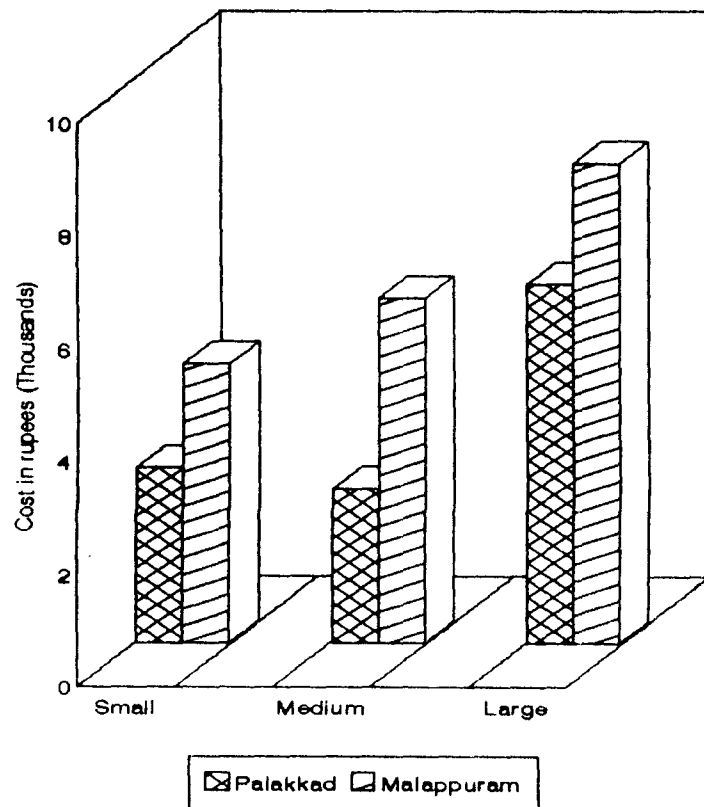


Table 34. Expenditure on goat farming in homesteads, in Palakkad and Malappuram

	Palakkad			Malappuram		
	Small	Medium	Large	Small	Medium	Large
<b>Fixed cost component</b>						
1. Depreciation on housing (10%)	39.40	42.30	121.70	79.80	114.30	166.70
2. Depreciation on equipments (5%)	1.87	1.93	2.43	1.55	1.85	2.60
3. Interest on fixed capital (125%)	310.25	571.38	1197.50	370.25	583.38	981.50
Total	351.52	615.61	1321.63	451.60	699.53	1150.80
<b>Variable cost component</b>						
1. Cost of feeding	424.00	502.00	832.88	618.40	780.70	1302.28
2. Labour cost	2586.03	3119.84	5433.03	4234.00	5256.00	7095.60
3. Miscellaneous cost	96.25	108.63	86.19	112.00	76.00	92.00
4. Total	3106.28	3730.47	6352.10	4964.40	6112.70	8489.88



#### 4.12.3 Gross income

The gross income from goat rearing in the two region are shown in Table 35.

The gross income from goat rearing per homestead per year was more in Malappuram than in Palakkad for all categories of homesteads (Fig.7). It could be seen from the above table that the income from the sale of milk was negligible in Palakkad when compared to that of Malappuram. Income from sale of goats was less in Palakkad in the case of small and medium homestead categories, but, in the case of large homestead category, it was more in this region. The income from manure was more in all categories of homesteads of Palakkad.

#### 4.12.4 Net margin

The net margin from goat rearing in the homesteads of Palakkad and Malappuram over Cost A, Cost B and Cost B is presented in Table 36.

The net margin over cost A in small homestead category was Rs.970.75 and Rs.2519.81 in Palakkad and Malappuram respectively. Among medium homestead category, the net margin over Cost A was Rs.2247.40 and Rs.350.09 in Palakkad and Malappuram respectively. In the case of large homestead

FIG.7 GROSS INCOME FOR SMALL, MEDIUM AND LARGE FARM OF PALAKKAD AND MALAPPURAM REGIONS

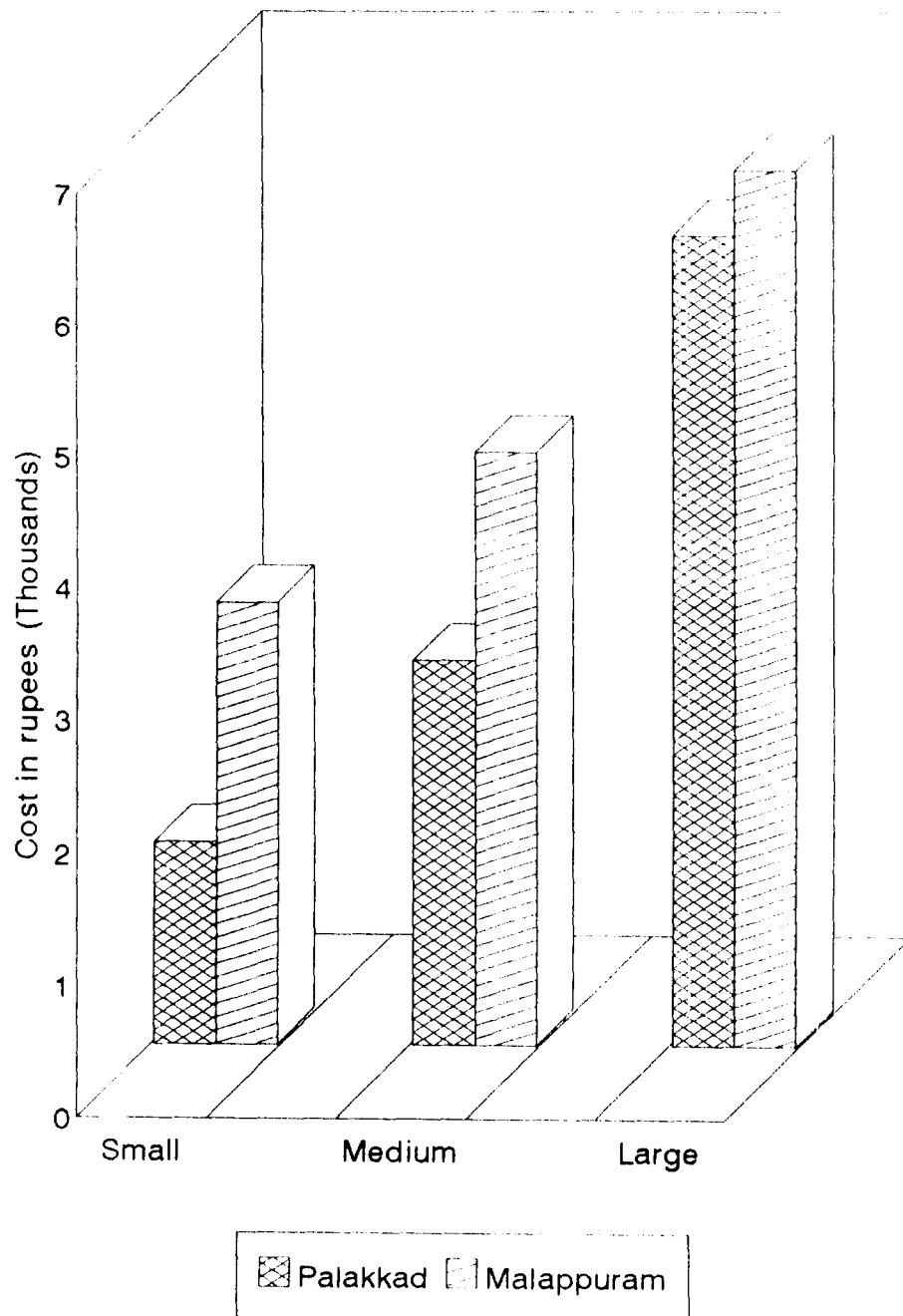


Table 35. Gross income from goat enterprise (per household per year in Rupees)

	Palakkad			Malappuram		
	Small	Medium	Large	Small	Medium	Large
Income from milk	-	-	130.95	1078.00	1893.00	2677.00
Income from sale of goats	1322.00	2594.00	5407.00	2104.76	2343.75	3466.67
Income from manure	210.27	308.26	590.94	148.80	245.19	484.04
Gross income	1532.27	2902.26	6128.99	3331.56	4481.94	6627.71

Table 36. Net margin from the goat enterprise (per household per year in Rupees)

	Palakkad			Malappuram		
	Small	Medium	Large	Small	Medium	Large
Cost A	561.52	654.86	1043.20	811.75	972.85	1563.58
Cost B	871.77	1226.24	2240.70	1182.00	1556.23	2544.50
Cost C	3457.80	4346.10	7673.23	5416.00	6812.23	9640.10
Gross income	1532.27	2902.26	6128.99	3331.56	4481.94	6627.71
Margin over						
Cost A	970.75	2247.40	5085.79	2519.81	3509.09	5064.13
Cost B	660.50	1676.02	3888.29	2149.56	2925.71	4083.21
Cost C	-1925.53	-1443.84	-1544.24	-2084.44	-2330.29	-3012.39

category, the margin over Cost A was more in Palakkad (Rs.5085.79) than in Malappuram (Rs.5064.13).

The net margin over Cost B in small medium and large homestead categories was lower in Palakkad (Rs.660.50, Rs.1676.02 and Rs.3888.29 respectively) than in Malappuram (Rs.2149.56, Rs.2925.71 and Rs.4083.21 respectively).

The net margin over Cost C was found to be negative in both the regions in all homestead categories mainly because of high inputted labour cost.

#### **4.13 Constraints**

The constraints faced by farmers in rearing goats in the homesteads of Palakkad and Malappuram are presented in Table 37. The major constraints included constraints in feeding, housing, labour and health care.

Table 37. Constraints faced by goat farmers in Palakkad and Malappuram

Sl. No.	Constraint	Number of homesteads	
		Palakkad	Malappuram
1.	Feeding	34 (85)	35 (87.5)
2.	Health care	8 (20)	8 (20)
3.	Housing	4 (10)	6 (15)
4.	Labour	18 (45)	22 (55)
5.	Procurement and disposal of goats	-	6 (15)
6.	Marketing of manure	18 (45)	32 (80)

(Figures in parenthesis denote percentages)

More than one constraint was faced by many farmers, majority of the farmers in both Palakkad (85%) and Malappuram (87.5%) considered feeding of goats as a major constraint in rearing goats. The major factors under this included high cost of concentrates/ingredients and reduced availability of roughages. In Palakkad (45%) and Malappuram(55%), high cost of hired labour was considered as a constraints. When 20 per cent of the farmers in Palakkad and Malappuram considered health problems as constraints, only 10 per cent of the farmers in Palakkad and 15 per cent in Malappuram considered

housing as a major constraint. When a large proportion of farmers in Malappuram (80%) considered disposal of manure as a constraint, only 45 per cent of the farmers in Palakkad considered this as a major constraint. In addition, 15 per cent of the farmers in Malappuram, also considered procurement and disposal of animals as constraints.

## ***Discussion***



## **DISCUSSION**

### **5.1 Socio-economic characteristics of farmers**

#### **5.1.1 Age of head of family**

The distribution of homesteads based on the age of the head of family has been presented in Table 3. It is evident from the table that majority of the goat farmers in both the regions (Palakkad and Malappuram) belonged to the age group 41-60 years and only 25 per cent of the farmers belonged to the age group 20-40 years. The proportion of farmers above 60 years was very less (11%).

#### **5.1.2 Educational background of the head of family**

It is evident from Table 4 that majority of the farmers rearing goats in Palakkad (65%) and Malappuram (62%) were literate. Out of this, the proportion of farmers possessing lower primary, high school and Pre-degree level education was 35, 25 and 5 per cent respectively in Palakkad and 32, 22 and 5 per cent respectively in Malappuram.

In a study on the socio-economic aspects of goat farmers in Thandipur village in Mathura, Ojha *et al.* (1993) reported that majority of the farmers (62%) were illiterate, 32 per cent had primary education and only six per cent had higher secondary

education which is in contrast to the observation in the present study.

### 5.1.3 Occupation of the head of family

Majority of farmers (head of family) in both the regions studied (58%) were daily wage labourers. While 20 per cent of the farmers were service personnel in government or private sector, 12 per cent were engaged fully in business. Only six per cent of the farmers were fully engaged in agriculture and four per cent were non-resident Indians. It could be assumed that goat farming in the homesteads of the two regions studied was carried out as a part-time farming activity or was mainly tended by females and children.

### 5.1.4 Religious status of farmers

Table 5 depicts the distribution of farmers in Palakkad and Malappuram based on religion. Majority of the goat farmers in Palakkad belonged to Hindu religion (65%) followed by Muslims (27%) and christian (8%). In Malappuram, 75 per cent of the farmers belonged to Muslim religion followed by Hindus (22%) and Christians (3%). There exists regional differences in the religious status of farmers. Therefore, it cannot be attributed that goat farming was mainly concentrated with farmers belonging to a particular religion.

### 5.1.5 Land holding of farmers

Goat farmers of Palakkad possessed on an average  $70.25 \pm 1.17$  cents (range 6 cents to 8 acres) and in Malappuram possessed  $25.0 \pm 0.02$  cents (range 7 cents to 2 acres). The farmers of Palakkad possessed more land than the farmers of Malappuram region.

George and Nair (1990) observed that as human population pressure on land increased, the size of land holdings tended to decline in Kerala.

### 5.1.6 Livestock holding

The types of livestock kept in 40 homesteads of goat farmers in Palakkad and Malappuram have been indicated in Table 6. It is evident that in the goat rearing homesteads, poultry came next in number followed by cattle in both the regions studied.

All the farmers studied in both the regions possessed adult does, while, only 50 per cent of the farmers in Palakkad and 33 per cent in Malappuram reared bucks. Majority of the farmers in Palakkad (95%) and Malappuram (60%) possessed kids.

George and Nair (1980) reported that the average size of land holdings, by and large, influenced the types of livestock kept by the farmers. Mercado *et al.* (1992) reported a similar

observation in South Texas, where majority of the goat farmers tended to possess more than one livestock enterprise. The rearing of one or more species of livestock components along with various crop components could be considered as the basic aspect of mixed farming in homesteads.

#### 5.1.7 Experience of the farmer in goat farming

Table 7 shows the distribution of homesteads according to the experience of the farmer in goat rearing. Majority of the farmers in Palakkad (57%) and Malappuram (48%) possessed only less than 10 years of experience in goat farming. The proportion of farmers possessing 11 to 20 years and more than 20 years experience in goat farming were 23 and 20 per cent respectively in Palakkad and 37 and 15 per cent respectively in Malappuram.

In a similar study on the socio-economic status of goat farmers in Thandipur village in Mathura, Ojha et al. (1993) stated that 66 per cent of the farmers possessed an experience of only 1 to 5 years in goat farming.

#### 5.1.8 Band/flock strength

It is evident from Table 8 that majority of the farmers in Palakkad (52%) possessed large band/flock size (above 9 goats) while, majority of the farmers in Malappuram (55%) possessed only a small band/flock size (1-4 goats). The proportion of

farmers possessing a medium band/flock size (5-8 goats) was 28 per cent in Palakkad and 38 per cent in Malappuram.

In contrast to the above findings, Ojha et al. (1993) and Deoghare and Bhattacharya (1995) reported that majority of the goat farmers in Mathura (84%) and Etawah (70.3%) possessed only a small band/flock size (1-5 goats). Devendra (1980) stated that, in general, in Asian countries, ownership of small flocks of goats (about 5) was common and these were owned by small holders.

#### 5.1.9 Trends of band/flock strength pattern

The trends of growth in the band/flock of goats in the homesteads of Palakkad and Malappuram has been depicted in Table 9. In Palakkad, there had been a growth of 177.6, 287.8 and 269.5 per cent in the mean number of goats at the start of farming and as on the date of study in small, medium and large holdings respectively. In Malappuram, the corresponding increase in the band/flock strength of goats was 114.7, 287.7 and 78.6 per cent respectively in small, medium and large holdings. In Palakkad as well as Malappuram, the maximum increase in the flock strength of goats occurred in the medium holding category. The increase in flock strength recorded in the large holding category was less in Malappuram when compared to that in Palakkad mainly because of the fact that in

Malappuram, the mean number of goats at the start of farming was more.

The above observation is in contrast to the finding of Reynolds and Adediran (1994) who reported that in South West Nigeria, the flock size averaged 6.5 at the start and 8.7 at the end of 48 months, registering a growth rate of only 33.85 per cent.

#### 5.1.10 Flock composition in the homesteads

Table 10 depicts the flock composition of goats in the homesteads of Palakkad and Malappuram at the time of study. Among small farmers, the mean number of kids per homesteads in Palakkad was  $1.5 \pm 0.11$  and in Malappuram it was only  $0.36 \pm 0.29$ . On the other hand, the mean number of does and bucks in Malappuram was more than that in Palakkad among small farmers.

Among the medium and large size goat farmers, the mean number of kids and does was higher in Palakkad than in Malappuram. The number of bucks reared by the medium and large farmers in Malappuram was higher than that in Palakkad.

The above finding is in confirmation with the general flock composition of any species of livestock. As only a few bucks were needed for breeding purpose, most of the male kids were disposed of.

In all the farmer groups in Palakkad and Malappuram, it could be seen that does constituted the maximum proportion followed by kids. Reynolds and Adediran (1994) in a study on 22 flocks of goats in south west Nigeria also observed that among the flocks does constituted the maximum proportion.

## **5.2 Procurement of goats**

All the farmers in Palakkad and Malappuram procured their goats from other farmers (except one farmer in Palakkad who obtained his goats from a butcher). The status of goats at the time of procurement has been presented in Table 11. Majority of the farmers in Palakkad (68%) and Malappuram (68%) started their goat farming by purchasing only a doe. While 10 per cent of the farmers started their farming with kids in Palakkad, 25 per cent of the farmers in Malappuram started their farming with kids. None of the farmers possessed a buck at the start of farming.

In contrast to the source of obtaining goats observed in the present study, Kaul (1990) and Ojha et al. (1993) stated that in Mathura, farmers procured their goats from local markets, other farmers, government/institutional farms, traders or butchers.

## 5.2.1 Selection attributes at the time of procurement

### 5.2.1.1 Selection of does

The selection attributes that were looked into while purchasing does included appearance, cost and age of the animal in both the regions studied (Table 12). The proportion of farmers who looked into the general appearance of does at the time of purchase was 65 per cent in Palakkad and 70 per cent in Malappuram. Thirty per cent of farmers in both the regions purchased does based on the cost. Age of the animal was looked into by only five per cent of the farmers in Palakkad and none in Malappuram.

### 5.2.1.2 Selection attributes of bucks

None of the farmers in Palakkad and Malappuram purchased a buck at the start of farming. Instead, bucks were selected later from the kids in the homestead. Out of 20 farmers rearing bucks in Palakkad, 80 per cent reported that they looked into the size and appearance of the animals while selecting them. In Malappuram, 70 per cent of the farmers who possessed bucks considered age, size and appearance of the animal while selecting them. Nadarajah and Robinson (1992) based on a farm survey in 66 goat farms in Ontario found that majority of the farmers considered dam's milk yield, number of kids born, and meat production of kids while selecting bucks.



### 5.2.2 Selection attributes of does at the time of replacement

The selection attributes of does at the time of replacement have been presented in Table 13. It could be seen that majority of the farmers in both the regions (90% each) selected replacement does from within the flock based on size and appearance. Very few farmers considered the age, twinning ability and colour for selecting does from the flock.

In earlier studies of Reynolds and Adediran (1994) in South-West Nigeria and Nadarajah and Robinson (1992) in Ontario, it was found that majority of the goat farmers raised their own replacement stock. With regard to the selection of does from the replacement stock, Nadarajah and Robinson (1992) reported that over 55 per cent of the goat farmers of Ontario considered dam's milk yield, litter size and conformation as top three selection criteria. The difference noticed in the present study might be due to the difference in the purpose of rearing goats in Kerala (mainly meat purpose) and Ontario (mostly milk).

### 5.3 Housing

Majority of the farmers in Palakkad (95%) and all the farmers studied in Malappuram provided pens for goats. Table 14 depicts the different types of pens observed in both the regions studied. Majority of the farmers in Palakkad provided lean-to-type Pens (62%) for goats followed by independent

pen (33%), and raised wooden flooring only (5%). On the contrary it was observed that the number of farmers providing independent pens was more (97%) and those providing lean-to-type pens was very less (3%).

In contrast to the present finding Ojha et al. (1993) and Kaul (1990) reported that in Mathura, majority of the goat farmers (above 90 per cent) kept their goats inside the house of the farmer and no separate shelters were provided. On the other hand, in Uganda, Okello and Obwolo (1985) observed that goats were either kept in houses or in separate shelters or tethered in the verandahs of houses/huts in the evening. Upton (1987) reported that under the traditional system of goat rearing in West Africa, goats scavenge in free-roaming flocks with no provision for housing. It could be assumed that the utilization of the space around the home for growing different crops in the homesteads of Kerala necessitated the need for keeping goats in shelters.

#### 5.3.1 Type of floor provided in goat pens

The types of floor provided in the goat pens in the homesteads of Palakkad and Malappuram included raised wooden floor (98%) and mud floor (2%). The type of floor provided in goat pens were not reviewed previously.

### 5.3.2 Type of wall provided in goat pens

Different materials like wooden planks, bamboo, palm leaves and bricks were used as walls in the goat pens of Palakkad and malappuram (Table 15). It is evident from the table that in Palakkad, 33 per cent of the goat farmers used only wooden planks to construct side wall and 32 per cent constructed the side wall of goat pens by thatching with palm leaves. Ten per cent of the farmers used wooden planks along with bamboo for making side wall of goat pens. Only eight per cent of the farmers used bricks for constructing side wall (that too in lean-to-type sheds only). Twelve per cent of the farmers did not provide any side wall to their goat pens.

In Malappuram, 58 per cent of the farmers constructed the side wall of goat pens using wooden planks. Twenty seven per cent of farmers provided a side wall using wooden planks and bamboo. None of the farmers in this region used bricks for the construction of wall. The proportion of farmers who did not provide side walls for goat pens was only three per cent in this region. The type of side wall used in goat pens has not been reviewed previously. It is observed that majority of the farmers in both the regions used planks and other locally available materials such as bamboo, palm leaves etc. for making side wall of goat pens. Very few farmers only relied on bricks for this purpose.

### 5.3.3 Type of roof

The two types of roofs observed in the goat pens of Palakkad and Malappuram were tiled and thatched. In both the regions the proportion of thatched roof was more than that of tiled roof. Here also, it could be seen that farmers utilized locally available materials for the construction of roof of goat pens.

## 5.4 Hygiene and sanitation aspects of goat pens

### 5.4.1 Hygiene status

Maintenance of hygiene within the goat pens and premises has been observed physically and graded into good, satisfactory and poor. The hygiene status of the goat pens in both the regions studied has been presented in Table 16.

Majority of the goat pens in Palakkad (92%) and Malappuram (78%) were graded as satisfactory as far as the hygiene status was concerned. While 18 per cent of the goat pens in Malappuram were graded as good, none of the pens in Palakkad could be classified under this category. The proportion of pens that were graded as poor in Palakkad and Malappuram was eight and four per cent respectively.

Grading the hygiene status of goat pens of homesteads under rural conditions has not been attempted earlier.



#### 5.4.2 Drainage facilities

The drainage facilities provided in the goat pens were physically observed and graded as adequate, satisfactory and poor (Table 17). When only 42 per cent of the goat pens in Palakkad had adequate drainage facilities, 80 per cent of the pens in Malappuram had adequate drainage facilities. The proportion of pens having satisfactory drainage facilities in Palakkad and Malappuram was 55 per cent and 18 per cent respectively. Only a small proportion of the goat pens in Palakkad (3%) and Malappuram (2%) possessed poor drainage facilities.

### 5.5 Breeding management

Natural service was the only means of breeding practice in goats in the homesteads of Palakkad and Malappuram. The practice of artificial insemination has become popular only in cattle and buffaloes.

#### 5.5.1 Source of breeding bucks

Only 50 per cent of the homesteads in Palakkad and 33 per cent in Malappuram possessed breeding bucks. These bucks were allowed to breed on other farmer's goats also. This condition is similar to that reported by Upton (1987) in West Africa, where, only a few bucks were maintained in village flocks for breeding purpose as most of the farmers sold their male kids.

### 5.5.2 Age at first kidding

The age at first kidding of goats maintained in the homesteads of Palakkad and Malappuram ranged from 16 to 20 months. When majority of the farmers in Palakkad (42%) reported the age at first kidding as 18 months, majority of the farmers of Malappuram (40%) reported the same as 16 months. Twenty and 25 per cent of the farmers in Palakkad and Malappuram reported that their goats kidded for the first time by 20 months of age.

Under farm conditions the age at first kidding of Malabari goats in Kerala was reported to range from 20.2 to 24.2 months (Stephan and Rai, 1993); Malabari x Jamnapari crossbred goats as 17.78 months (Raja and Mukundan, 1974); Malabari goats in Tamil Nadu as 16.93 months (Viswanathan et al., 1995); Barbari goats as 16.5 months (Rai and Ram, 1993). Under field conditions, the age at first kidding of local goats of Malwa region was reported to be 23.31 months and that of Tamil Nadu to be 18.14 months (Arya et al., 1994). The indigenous goats of semi-arid Africa had an age at first kidding of 15.5 months in male and 18 months in Kenya (Wilson, 1984) and the indigenous goats of Uganda kidded for the first time at 18.9 months (Ukello and Obwolo, 1985). The age at first kidding of the goats maintained in the homesteads of Palakkad and Malappuram was within the range mentioned above. However, Hussain et al. (1981) reported a higher value (24 months) for the age at first kidding in the

goats of Fiji, which is higher than the range observed in the present study.

### 5.5.3 Kidding interval

Nearly one half of the farmers in Palakkad (50%) and Malappuram (45%) reported that the goats maintained in their homesteads had a kidding interval of 240 days. Thirty per cent of the farmers in Palakkad and 40 per cent in Malappuram reported a lesser value of 210 days as the kidding interval. A small proportion of the farmers (20 and 15 per cent in Palakkad and Malappuram respectively) reported the kidding interval of goats as 360 days.

The above values reported by the farmers in Palakkad and Malappuram were in agreement with the observations of Raja and Mukundan (1974) Ghosh *et al.* (1984), Wilson (1984), Wilson and Durkin (1988) and Viswanathan *et al.* (1995). However, the values reported in the present study were found to be less when compared with those reported by Lawar and Wani (1991), Saha and Dhingra (1992) and Galina *et al.* (1995). This difference might be due to the difference in the region, type of animal and also the management practice.

## 5.6 Feeding management

### 5.6.1 System of feeding

The different systems of feeding goats in the homesteads of Palakkad and Malappuram have been presented in Table 20. It is seen that very few farmers (12.5%) completely let loose their animals for browsing, with no concentrate supplementation. Similar system of feeding goats has been reported by Peters and Deichert (1984) in Malaysia wherein goats were let out to graze/browse for about 3 to 6 hours with no concentrate supplementation. In the mountainous regions of Central Greece also, goats were freely let out for browsing in the rangelands and forests (Papanastasis and Yannakopoulos, 1987) and in drought prone areas of North Brazil also goats were browsed on mature bush and no supplements were provided (Mason, 1977).

The rest of the farmers in Palakkad (87.5%) provided small quantity of concentrates especially during the dry/summer period (3-4 months) along with browsing. In Malappuram, 37 per cent of the farmers let loose their goats for browsing along with the provision of a small quantity of concentrates during dry/summer period. At the same time, majority of the farmers in Malappuram (63%) tethered their animals near the homestead for roughage feeding.

A similar system of feeding was noticed in Uganda (Okello and Obwolo, 1985) where in the goats were tethered near grazing



land near the homesteads. Under the traditional system of goat rearing in Africa, Ademosun (1987) reported that goats were either tethered or put in enclosures as free ranging was not possible near homesteads.

As more of waste lands are available in Palakkad than in Malappuram, most of the farmers let out their animals for browsing. On the otherhand in Malappuram the practice of tethering the animals near the homesteads was more prevalent than letting them out for browsing.

#### **5.6.2 Concentrate feeding**

Most of the farmers in Palakkad and Malappuram provided concentrates to their goats only for a short duration (3 to 4 months only) during the dry/summer period. During the rest of the period the animals subsisted only on browsing.

The quantity of concentrate fed to goats per day per homestead in both the regions has been presented in Table 21. It could be seen from the table that the farmers in Malappuram provided more concentrates to goats than their counterparts in Palakkad. Group feeding was practised in the regions. It was also noticed that none of the farmers in both the regions provided mineral mixture to goats.

### 5.6.2.1 Type of concentrates

The type of concentrates fed to goats in the homesteads of Palakkad and Malappuram has been presented in Table 22. Majority of the farmers in Palakkad (70%) and Malappuram (53%) provided ground nut cake to goats as it was slightly cheaper than coconut cake. Eventhough, the cost per kg of compounded feed was less than the cakes, only one farmer in Palakkad provided the same to goats.

### 5.6.3 Roughage feeding

#### 5.6.3.1 Duration of browsing

The duration of browsing in both the regions varied during rainy and dry season and ranged from 3 to 8 hours. Goats were fed on various browse that were available on road sides, hillocks, wastelands and around the homestead. During the dry season, tree leaves were provided to goats. This was either purchased or obtained from the homestead itself. The various tree leaves provided to goats included jack tree leaves, mango tree leaves, plantain leaves, glyricidia leaves and kaini leaves.

Thirumalai *et al.* (1989) found that jack tree leaves formed the major tree leaves fed to goats whereas, Mecha and Adegbola (1980) observed that mango leaves, plantain leaves and Acacia leaves were fed to goats.

It is seen that all the farmers in Palakkad and Malappuram relied on browse and/or tree leaves for feeding their goats. French (1970) also observed that goats could secure their nutritional needs by either grazing or browsing.

#### **5.6.4 Watering**

Water was provided two or three times to goats by the farmers of Palakkad and Malappuram. In addition the farmers provided rice gruel to the animals with or without adding salt. When 53 per cent of the farmers in Palakkad added salt to rice gruel, only 38 per cent of the farmers in Malappuram provided salt.

The frequency of watering goats observed in the present study almost tallied with the finding of Kaul (1990) in which it was stated that in Mathura the number of times water was provided to goats averaged  $2.38 \pm 0.5$ . On the other hand, it was reported that water was not provided to goats by farmers under the tethering and extensive system in Uganda (Okello and Obwolo, 1985).

#### **5.6.5 Special feeding of breeding bucks**

Only a very few proportion of farmers in Palakkad (23%) and Malappuram (23%) who reared breeding bucks provided an additional ration consisting of one cup of cooked rice. This is apart from the routine feeding practice.

### 5.6.6 Feeding of kids

The practice of kid rearing in the homesteads of Palakkad and Malappuram has been presented in Table 23. Majority of the farmers in Palakkad (78%) kept the kids along with the dam throughout the day and night whereas, only 25 per cent of the farmers in Malappuram followed this practice. The proportion of farmers leaving the kids during part of the day and throughout the night along with the dam was less in Palakkad (12%) and in Malappuram. Majority of the farmers (70%) followed this practice. It was also seen that none of the farmers in both the regions practised total weaning at birth. Weaning was done at 3-4 months of age in both the regions. Farmers in both the regions did not follow any preferential feeding of kids according to sex.

### 5.7 Growth rate of kids

The mean body weight of kids from one to three months of age has been presented in Table 24. It was found that, the kids maintained in the homesteads of Palakkad had lesser weight when compared to those in Malappuram. The daily gain in body weight from one to three months of age also was found to be higher in Malappuram (41.8 g) than that of Palakkad (38.3 g). This observation throws light to the fact that better kid care and management practices were being followed in the homesteads of Malappuram than at Palakkad.

The daily growth rate of kids in the homesteads of Palakkad (38.3 g) and Malappuram (41.8 g) has been found to be higher than that reported by Mukundan and Bhat (1974) in Malabari kids (from birth to one year of age) under farm conditions. The body weight of kids recorded in the homesteads of Palakkad at 1, 2 and 3 months of age has been found to be lower than that reported by Mukundan *et al.* (1983) in Malabari goats. On the other hand, the body weight in the 2 months and 3 months age group of kids in Malappuram is found to be higher than those reported by Mukundan *et al.* (1983).

## **5.8 Health care of goats**

### **5.8.1 Health disorders of adult goats**

Table 25 depicts the major health disorders encountered in adult goats as reported by farmers. Very few farmers in Palakkad (8%) and Malappuram (20%) reported that their goats were not affected with any major health disorder. It was reported that digestive disorders followed by respiratory disorders was the major health problem in adult goats in both the regions.

Similar observations on the incidence of health disorders were reported by Mason (1977) in Brazil, Sriraman *et al.* (1982) in Andhra Pradesh, Musligh *et al.* (1988) in Northern Iraq and Kaul (1990) in Mathura. On the other hand, Pander and Kanaujia

(1987), Mittal (1976) and Jan and Gupta (1992) observed that pneumonia was more prevalent in goats than enteritis.

#### 5.8.2 Health disorders of kids

The health disorders of kids as reported by the farmers of Palakkad and Malappuram are presented in Table 26. As in the case of adult goats, digestive disorders followed by respiratory disorders were the common health disorders of kids in the two regions. In contrast to this finding, Mittal (1976) and Jan and Gupta (1992) observed that respiratory problems followed by digestive disorders was the common cause of mortality in kids.

#### 5.8.3 Preventive health care

None of the farmers in Palakkad and Malappuram adopted any preventive health care measures/vaccinations against diseases of goats. This observation is in agreement with the report that farmers did not provide any preventive veterinary care in West Africa (Upton, 1987) and that majority of the goat farmers (66%) did not vaccinate their animals in Texas (Mercado *et al.*, 1992).

#### 5.8.4 Deworming

Only a very few proportion of goat farmers in Palakkad (5%) and Malappuram (10%) reported that they dewormed their goats.

The above observation is in contrast to the report by Mercado *et al.* (1992) wherein, majority of the goat farmers in

South Texas practised internal (77%) and external (66%) parasite control measures.

#### **5.8.5 Source of veterinary service**

Only 15 per cent of the farmers in Palakkad and Malappuram sought the help of qualified veterinary personnel for treating sick animals and the rest resorted to own treatment.

#### **5.8.6 Insurance against disease and death**

None of the farmers in both the regions insured their goats against disease and/or death.

### **5.9 Marketing strategy**

#### **5.9.1 Marketing of milk**

The proportion of farmers who milked their goats was more in Malappuram (85%) than that in Palakkad (37.5%). Out of this, a majority in Malappuram (53%) sold out the milk, whereas, only 2.5 per cent of the farmers in Palakkad sold out the milk. The rest of the farmers consumed milk at home.

In an earlier study in Mathura (Kaul, 1990) observed that 88 per cent of the goat farmers used goat milk for home consumption and only 12 per cent, sold out the milk.

## 5.9.2 Marketing of animals

### 5.9.2.1 Sale outlet of goats

The distribution of homesteads in Palakkad and Malappuram according to sale outlet of bucks and does have been presented in Tables 27 and 28 respectively. Majority of the farmers in Palakkad (47%) sold their bucks to either middleman or directly to butcher. On the otherhand only 37 per cent of the farmers in Malappuram sold their bucks to either middleman or butcher. As far as the disposal of does are concerned, it was seen that, in Palakkad, most of the farmers (40%) disposed off their does either to middleman or other farmer and in Malappuram, majority of the farmers (37%) sold does either to middleman, butcher or other farmer.

It could be seen that middleman plays a significant role in the marketing of bucks and does in Palakkad as well as in Malappuram and that goat marketing strategies are very weak in these regions. This is in line with the statement of Devendra (1980) that in Asian countries, goat marketing patterns were weak and that there was only limited organised marketing.

The disposal pattern of goats observed in the present study is in agreement with the findings of Deoghare and Bhattacharya (1995) that majority of the goat farmers in Etawah district sold their goats either to middleman or butcher.



#### 5.9.2.2 Age at disposal of goats

The age at which bucklings were disposed in Palakkad and Malappuram has been presented in Table 29 and the stage of disposal of does in Table 30.

It could be seen that in both the regions, farmers preferred to sell male goats at the age group 9-12 months (68% each) followed by the age group 6-8 months (37%) in Palakkad and 25% in Malappuram. As far as does are concerned, in Palakkad majority of the farmers preferred to dispose of does after fifth kidding (3.8%) followed by sixth kidding (32%) and in Malappuram after sixth kidding (62%) followed by seventh kidding (20%).

This finding is in contrast to the observation made by Peters and Deichert (1984) wherein most farmers sold their goats at a less than 18 months of age.

#### 5.9.2.3 Factors influencing disposal of goats

The various factors influencing the disposal of goats in the homesteads of Palakkad and Malappuram were studied in detail. The major factors included need for cash, old age and over stocking. More than one-half of the goat farmers in Palakkad (55%) and Malappuram (52%) reported that the main factor influencing the disposal of animals was need for cash, for 30 per cent of the farmers in Palakkad and 45 per cent in Malappuram, the major factor for the disposal of goats was old

age of animals, especially in the case of does. Only 15 per cent of the farmers in Palakkad and 3 per cent in Malappuram sold the animals due to overstocking.

#### 5.9.2.4 Disposal of goats during the previous year of study

The mean number of goats disposed of during the previous year of study in the homesteads of various flock sizes in Palakkad and Malappuram is presented in Table 31.

It could be seen from the above table that in small flock size homesteads, the overall mean number of goats disposed of during the previous year was only  $1.63 \pm 9.5$  in Palakkad, whereas, in Malappuram it was  $2.46 \pm 0.07$ . Among this, in Palakkad and Malappuram, youngstock (bucklings and doelings) formed the majority of the animals which were disposed off during the previous year of study.

Among medium flock size homesteads, it could be seen that the overall mean number of goats disposed of during the previous year of study was  $2.60 \pm 0.09$  in Palakkad and  $2.68 \pm 0.08$  in Malappuram. In this, the major share in Palakkad was bucks whereas, in Malappuram, youngstock formed the major share.

The overall mean number of goats disposed off during the previous year of study was  $6.03 \pm 0.10$  in Palakkad and  $4.29 \pm 0.87$  in Malappuram in the case of large flock size homesteads.

Among this, bucks formed the major share in Palakkad, whereas, in Malappuram, youngstock formed the major share.

### **5.9.3 Marketing of manure**

It was found that 70 per cent of the goat farmers sold out the goat manure in Palakkad, whereas, only 5 per cent of the farmers in Malappuram sold out the manure. The remaining 30 per cent of the farmers in Palakkad and 95 per cent in Malappuram reported that they either utilized the manure for incorporating in the soil or gave it to other farmers free of charge.

### **5.10 Division of labour in goat rearing**

A number of daily and seasonal chores have to be carried out for the maintenance of goats. These activities could be broadly divided into indoor and outdoor activities. The indoor activities include mainly shed cleaning, milking and feeding and outdoor activities mainly include grazing/ browsing.

The division of labour in goat rearing under the homestead farming system of Palakkad and Malappuram is presented in Table 32.

It could be seen from the table that women's involvement in indoor activities relating to goat rearing was more than that of men. The proportion of homesteads in which woman performed the activities of shed cleaning, milking and feeding of goats in

Palakkad were 81, 31.5 and 72 per cent and the corresponding proportion in Malappuram was 74.5, 70 and 78 per cent. The proportion of men performing these activities was 3.2, 2.3 and 16 per cent respectively in Palakkad while in Malappuram, it was 7.5, 2.5 and 8 per cent.

As far as out-door activities were concerned male participation was more than that of female in Palakkad, whereas, in Malappuram, in certain out-door activities, the participation of women was more. In Palakkad, when in 64.2, 2.5, 42.5, 44.5 and 75 per cent homesteads men performed the activities of taking goats for browsing/tethering, taking for breeding, health care activities, collection of fodder/leaves and disposal of goats, in 3.0, 24.0, 35.5 and 20.0 per cent homesteads women were involved in taking the goats for browsing/tethering, health care activities, collection of fodder/leaves, and disposal of goats.

In Malappuram, the participation of women was more than that of men in out-door activities like taking goats for browsing/tethering, taking goats for breeding and collection of fodder/leaves. At the same time, the participation of men was more (65.5%) when compared to that of women (32.5%). In the disposal of goats. In both the regions the involvement of children in the disposal of milk was more than that of men and women.

The involvement of hired labour was negligible in the homesteads of Palakkad and Malappuram. Only 2.5 per cent of the homesteads in Palakkad utilized hired labour. Hired labour was not utilized in Malappuram.

In a different study (Deoghare and Sood, 1994) it was observed that employment of female labour was maximum among the landless goat keepers and lowest among marginal farmers. The utilisation of male labour was maximum in small farms and lowest in large farms.

Also, the observations in the present study is in contrast with the finding of Ojha *et al.* (1993) that labour involvement for taking goats for browsing involved 36 per cent (children), women (28%) men (22%) and hired labour (14%).

### **5.11 Economics**

The fixed cost component of expenditure is shown in Table 34. It could be seen from the table that fixed cost increase with flock size. Among goat farmers in Bichpuri block of Agra district having one or two milch goats, Balishter and Chandra (1986) reported that the fixed cost constituted 26 per cent and in household having three or more milch goats, the fixed cost constituted 24 per cent of total cost. In a different study Deoghare and Sood (1994) reported that major component in fixed cost was interest on fixed capital.

The variable cost that are incurred in goat rearing in both the regions are shown in Table 34. In a similar study Balishter and Chandra (1986) reported that the variable cost constituted 74 per cent and 76 per cent at total cost in homesteads, with one or two goats and three or more milch goats respectively.

Among the variable cost the major component was labour cost. Deoghare and Sood (1994) also reported a similar result. Raut and Nadkarni (1994) reported that labour cost incurred 60 to 80 per cent of the gross cost. In contrast Devendra and Rankine (1970) reported that the expenditure on the purchase of goats was 65.6 per cent followed by labour cost (14.8%).

The cost of production was more in Malappuram than in Palakkad. This is due to more management care and labour cost seen in Malappuram. A similar observation was reported by Peters and Deichert (1994), cost of production of goats was more in intensive system followed by semi-intensive and extensive system of management. Balishter and Chandra (1986) reported that cost of maintenance decreased with increase in the number of goats. Deoghare (1995) also found that the cost of maintenance per goat varied with flock size in Etawah district of Uttar Pradesh.

The gross income per homestead per year from the sale proceeds of milk, goat and manure is shown in Table 35. The gross income from goat rearing was more in Malappuram than in

Palakkad. Balishter and Chandra (1986) found that gross income per goat was Rs.496.00 and out of this 93 per cent was from the sale of milk and the rest from the sale of manure. Deoghare and Sood (1994) Acharya and Singh (1992) also reported a similar observation with respect to income from milk. This is contrary to observation revealed in this study where more income was from sale of animals.

The net margin over Cost A, Cost B and Cost C shown in Table 36. When net margin over Cost A and Cost B are found to be positive, net margin over Cost C was negative. This may be due to higher labour cost prevalent in these areas. In a similar study Papanastasis and Yannakopoulos (1987) reported that the labour productivity was low and net income was negative in goat production system in Central Greece.

Sriramamurthy (1977), Acharya and Singh (1992) and Sharma *et al.* (1982) reported that net income per goat ranged from Rs.140 to Rs.252.

## **5.12 Constraints**

The various constraints faced by goat rearing farmers in these two regions are shown in Table 37. The most important constraints were feeding and labour utilization. This observation was similar to observation made by Upton (1987) that, goat rearing under the traditional system in West Africa,

feed supply was the most important one. Devendra (1980) also reported that the important constraints in Asian countries were, feed suppliers, disease and parasitic infections.

Gefu and Adu (1984) and Sumberg and Mack (1985) reported diseases and mortality as major constraint for goat farmers. But in this study the disease and mortality had comparatively lower impact on farmers rearing goats.

Availability of a breeding buck was not a constraint to farmers in the study area but Kaul (1990) reported that important constraint faced by goat farmers in Mathura was non-availability of breeding bucks.



## ***Summary***

## **SUMMARY**

The study was carried out in two different regions (Palakkad and Malappuram). The respondents were selected at random and a total of eighty homesteads were studied. The information was collected by means of a structured, pretested schedule by personally interviewing the farmers.

The majority of the goat farmers in both the region (Palakkad and Malappuram) belonged to the age group 41-60 years and only 25 per cent of the farmers belonged to the age group 20-40 years.

Majority of the farmers rearing goats in Palakkad (65%) and Malappuram (62%) were literates. The proportion of farmers having lower primary, high school and pre-degree level education was 35.25 and 5 per cent respectively in Palakkad and 32, 22 and 5 per cent respectively in Malappuram.

In both the regions studied, 58 per cent of the farmers were daily wage labourers. The proportion of farmers working as service personal, business, agriculture and non-resident Indian were 20, 12, 6 and 4 per cent respectively.

More number of farmers in Palakkad belonged to Hindu religion (65%) followed by Muslim (27%) and Christian (8%). In

Malappuram proportion of farmers belonging to Hindu, Muslim and Christian religion was 22, 75 and 3 per cent respectively.

Goat farmers in Palakkad on an average possessed 70.25 cents while in Malappuram it was 25 cents. When all the farmers in both the region possessed adult does, only 50 per cent of the farmers in Palakkad and 33 per cent in Malappuram possessed bucks. The proportion of farmers possessing kids were 55 and 60 per cent in Palakkad and Malappuram respectively. Majority of farmers in Palakkad (57%) and Malappuram (48%) possessed only less than 10 years of experience in goat farming.

More than one half of the farmers in Palakkad (52%) possessed large flock size (above 9 goats) while majority of the farmers in Malappuram (55%) possessed only a small flock size (1-4 goats). The proportion of farmers possessing a medium flock size (5-8 goats) was 28 and 38 per cent in Palakkad and Malappuram respectively. In Palakkad, there had been a growth of 177.6, 287.8 and 269.5 per cent in the mean number of goats at the start of farming and as on the date of study in small, medium and large holdings respectively, whereas, in Malappuram the corresponding increase in small, medium and large flock size was 114.7, 287.7 and 78.6 per cent respectively.

The mean number of kids per homestead among small farmers in Palakkad was 1.5 and in Malappuram it was 0.36. The mean number of does per homestead in Palakkad and Malappuram was 3.36

and 2.86 respectively for medium farmers. The corresponding number in large farmers homesteads was 6.24 and 4.67.

Almost all the farmers in the two regions procured their goats from other farmers. Majority of farmers in Palakkad (68%) and Malappuram (68%) started their goat farming by purchasing only a doe. While, 10 per cent of the farmers started their farming with kids in Palakkad, 25 per cent of the farmers in Malappuram started the farming with kids. None of the farmers possessed a buck at the start of farming. With respect to selection attributes at the time of procurement of goats, the proportion of farmers who looked into the general appearance of does was 65 per cent in Palakkad and 70 per cent in Malappuram. Thirty per cent of farmers in both the region purchased does based on the cost. Age of the animal was looked into by only five per cent of the farmers in Palakkad and none in Malappuram.

None of the farmers in Palakkad and Malappuram purchased a buck at the start of farming. In Palakkad out of 20 farmers rearing bucks, 80 per cent looked into size and appearance of the buck for selecting them for breeding. For replacement of does, majority of the farmers in both the region (30% each) selected replacement does from within the flock based on size and appearance.

When all the farmers in Malappuram provided pens for goats only 95 per cent provided pens in Palakkad. Two types of pens

observed in these region were lean-to-type and independent type. The proportion of lean-to-type pens were more in Palakkad than in Malappuram. Two types of floor seen in pens were raised wooden floor and mud floor. The wall of the pen was constructed with either wooden planks, wooden planks with bamboo, brick or by thatching it. Two types roof observed in the area were tiled and thatched. Majority of the goat pens in Palakkad (92%) and Malappuram (78%) were having satisfactory hygiene status. The proportion of pens having adequate drainage facilities was 42 and 80 per cent in Palakkad and Malappuram respectively.

With regard to the breeding management, the only means of breeding goats in the study regions was natural service. Fifty per cent and 33 per cent of homesteads in Palakkad and Malappuram possessed breeding bucks. These bucks were allowed to breed on other farmers goats also.

For majority of the farmers in Palakkad (42%) and Malappuram (40%) the age at first kidding was 18 and 16 months respectively and it ranged from 16 to 20 months. Kidding interval was 240 days for 50 per cent and 45 per cent of the farmers in Palakkad and Malappuram. Age at first kidding was 210 days for 30 and 40 per cent of the farmers in Palakkad and Malappuram.

In Palakkad the proportion of the farmers, completely let loose their animals for browsing with no concentrate

supplementation was 12.5. Majority of the farmers provided small quantity of concentrate during summer period along with browsing. Majority of farmers (63%) in Malappuram tethered their goats near the homestead for roughage feeding. The mean quantity of concentrate fed to goats per homestead ranged from 300 grams to 1166 grams. The concentrate included either groundnut cake or coconut cake. The duration of browsing on both the region ranged from 3 to 8 hours. During dry/summer season, tree leaves were provided to goats. Water was provided two or three times to goats by the farmers of both the region.

The proportion of farmers who kept kids along with the dam throughout the day and night was 78 and 25 per cent in Palakkad and Malappuram. None of the farmers practiced weaning at birth in both the region.

The daily gain in body weight from one to three months of age was 38.3 grams and 41.8 grams in Palakkad and Malappuram regions.

Only eight and twenty per cent of the farmers in Palakkad and Malappuram reported that their goats did not have any major health disorder. The health disorders reported by the farmers were Indigestion, diarrhoea, anorexia, respiratory problems, poisoning, skin lesions, fever, dog bite and debility. None of the farmers in both the regions adopted preventive health care measures/vaccinations against diseases of goats. Only a very

few proportion of goat farmers in Palakkad (5%) and Malappuram (10%) reported that they dewormed their goats. Only 15 per cent of the farmers in both the region sought the help of qualified veterinary personnel for disease treatment. None of the farmers in both the regions insured their goats against diseases and/or death.

The proportion of farmers who milked their goats in Palakkad and Malappuram were 37.5 and 85 per cent. Out of this, proportion of farmers sold out the milk was 2.5 and 53 per cent.

In the two regions studied the proportion of farmers who disposed bucks to middleman, middleman/butcher, middleman/butcher/other farmer was 20, 43 and 25 per cent. The proportion of farmers who sold bucks directly to butcher, other farmers and middleman/other farmer was 6, 0 and 6 per cent respectively. In the case of disposal of does, 24 per cent of the farmers sold the doe to either middleman/butcher/ other farmer. Fifteen per cent of farmers sold the does directly to middleman. The most common sale outlet of does was to middleman/other farmer (37%). The proportion of farmers who sold does directly to butcher, other farmer was 3 and 11 per cent.

In both the region 58 per cent of the farmers sold the bucklings between 9-12 months of age. Thirty seven per cent of the farmers in Palakkad and 25 per cent of the farmers in Malappuram disposed bucklings between 6 to 8 month of age. The

proportion of farmers who sold the bucklings between 1 to 5 months, 13 to 18 months and above 18 months was 1, 6 and 4 per cent.

The proportion of farmers who sold does at various stages was as follows. When 47 per cent of farmers disposed does after sixth kidding, 24 per cent disposed does after 5th kidding. The proportion of farmers who sold does after fourth and seventh kidding was 11 and 18 per cent. The main factor influencing the disposal of animals in Palakkad (55%) and Malappuram (52%) was need for cash. For 30 per cent farmers in Palakkad and 45 per cent in Malappuram the major factor was old age of goats. Only 15 per cent of the farmers in Palakkad and 3 per cent in Malappuram sold the animal due to over stocking.

In small flock size homesteads, the mean number of goats disposed during the previous year was  $1.63 \pm 0.15$  in Palakkad and  $2.46 \pm 0.07$  in Malappuram. Among medium flock size homesteads the corresponding number was  $2.60 \pm 0.09$  in Palakkad and  $2.68 \pm 0.08$  in Malappuram and in case of large flock size homesteads the mean number of goats disposed was  $6.03 \pm 0.10$  in Palakkad and  $4.29 \pm 0.87$  in Malappuram. Only 70 per cent of the goat farmers sold out the goat manure in Palakkad, whereas, only 5 per cent in Malappuram sold out the manure.

Woman's involvement in in-door activities relating to goat rearing was more than that of men. In both the regions the



involvement of children in disposal of milk was more than that of men and women. The involvement of hired labour was negligible in both the regions. The fixed cost component of goat rearing was found to be lower in Palakkad in small and medium flock size categories. In large homestead category, it was higher in Palakkad than at Malappuram. Among the variable cost components, cost of feeding goats and cost of labour was lower in Palakkad in all the three categories of homesteads than in Malappuram. The total variable cost was higher in Malappuram for all the categories than in Palakkad.

The gross income from goat rearing per homestead per year was more in Malappuram than in Palakkad for all categories of homesteads. The income from sale of milk was negligible in Palakkad when compared to that of Malappuram. Income from the sale of goats was lower in Palakkad for small and medium flock size homesteads while it was more for large flock size homesteads.

The net margin over cost A in small homestead category was Rs.970.75 and Rs.2519.81 in Palakkad and Malappuram respectively. Among medium homestead category the net margin over cost A was Rs.2247.4 and Rs.3509.09 in Palakkad and Malappuram and the net margin for larger farmers was Rs.5085.7 and Rs.5064.13 respectively for Palakkad and Malappuram. The net margin over cost B on small, medium and large flock size homestead categories was Rs.6605, Rs.1676 and Rs.3888.29 in

Palakkad and the corresponding net margin was Rs.2149.5, Rs.2925.71 and Rs.4083.21 in Malappuram. The net margin over cost C was found to be negative in both the regions studied.

Major constraints in goat rearing were reported to be feeding, availability of labour, cost of labour and marketing of manure. In both the regions only 20 per cent of the farmers reported health care of animals as a constraint. Ten and fifteen per cent of the farmers in Palakkad and Malappuram reported housing as a constraint. None of the farmers in Palakkad reported procurement and disposal of goats as constraint but 15 per cent of the farmers in Malappuram reported these as constraints.

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\* Originals not seen

# ***Appendices***

Appendix-I

Goat production and population

	World	India
Population (m)	592	1176 (19.86)
Meat (1000 MT)	2958	466 (15.75)
Milk (1000 MT)	10294	2220 (21.57)
Skim (1000 MT)	633	110 (17.38)

Appendix-II

Change in pattern of goat population over the years

District	1977		1982		1987		Percentage variation over the previous census		
	Number	%	Number	%	Number	%	1977	1982	1987
Palakkad	138672	8.24	184665	9.72	134110	8.49	+2.1	+40.38	-27.38
Malappuram	169658	10.08	224613	11.21	174412	11.04	+23.7	+32.39	-22.35
Kerala	1683297	100.00	2003795	100.00	1580562	100.00	+14.7	+19.04	-21.12

**ANALYSIS OF MANAGEMENT PRACTICES AND  
ECONOMICS OF GOAT REARING UNDER  
HOMESTEAD FARMING SYSTEM**

By  
**TONY THOPPIL**

**ABSTRACT OF A THESIS**

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## **ABSTRACT**

The existing practises of management of goats in the homesteads of Palakkad and Malappuram and the economics of rearing have been studied.

Majority of the goat farmers in both the regions belonged to the age group 41-60, and were literate. They belonged to the class of daily wage labourers or service personnels. Hindus were predominant in Palakkad, whereas in Malappuram, Muslims were predominant. The land holding of the goat farmers studied in Palakkad ranged from 3 cents to 8 acres and in Malappuram, 7 cents to 2 acres. They were having more than one livestock component in their homesteads. The farmers possessing less than 10 years of experience were more in both the regions.

There has been an increase in the flock/band strength from the start of farming in all the homesteads. The animals were procured mostly from other farmers. Does were purchased based on appearance, cost and age and were replaced taking into consideration their size and appearance, age, twinning and also colour. Bucks were generally replaced taking into consideration their appearance and age.

The type of housing provided to goats was either lean-to-type or a separate shed. The type of floor included

either mud or raised wooden floor, the type of roof included either tiled or thatched. The hygiene status of majority of the goat pens was graded as satisfactory in both the regions. The drainage facilities provided were only satisfactory in Palakkad, whereas, in Malappuram, it was adequate.

Natural service was the only means of breeding goats in both the regions. Only 41 per cent of the farmers (in general) reared breeding bucks and the rest of the farmers depended on the bucks maintained by other farmers. The age at first kidding in majority of the cases in Palakkad was reported to be 18 months and in Malappuram, 15 months. Majority of the farmers in both the regions reported the kidding interval of goats to be 8 months.

The goats were either let loose outside or tethered around the homestead for roughage feeding. Concentrate mixture was fed only during very dry/summer season and consisted of groundnut cake and coconut cake. The duration of browsing varied from 3-8 hours. Kids were kept along with the dam. The daily body weight gain of kids was 38.3 g in Palakkad and 41.8 g in Malappuram.

Major disease problems encountered by goats in the two regions were digestive problems, respiratory problems, skin lesions, dog bite wounds etc. Farmers, in general did not practise any preventive health care measures for goats.

The proportion of farmers who milked their goats was high in Malappuram than Palakkad. Goats were disposed of to other farmers, butchers, and/or middlemen. Goat manure was sold out by majority of farmers in Palakkad (70%) and 5 per cent in Malappuram.

Involvement of women in indoor activities were more than men. Children were involved more in the disposal of milk. The hired labour utilisation was negligible.

In general, fixed cost and variable cost were lower in Palakkad than Malappuram but the gross income was more in Malappuram than Palakkad. The net margin over Cost A and Cost B was positive whereas net margin was negative over Cost C. The major constraints faced by farmers were feeding, availability of labour and disposal of manure.