

**ECONOMICS OF GOAT REARING IN AHMEDNAGAR DISTRICT
OF MAHARASHTRA**

by

Miss. Gund Priyanka Himmat

(Reg. No. 018/199)

A Thesis submitted to the
**MAHATMA PHULE KRISHI VIDYAPEETH
RAHURI – 413 722, DIST. AHMEDNAGAR
MAHARASHTRA, INDIA**

in partial fulfilment of the requirements for the degree

of

MASTER OF SCIENCE (AGRICULTURE)

in

AGRICULTURAL ECONOMICS



DEPARTMENT OF AGRICULTURAL ECONOMICS

**POST GRADUATE INSTITUTE
MAHATMA PHULE KRISHI VIDYAPEETH
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RAHURI – 413 722, DIST. - AHMEDNAGAR
MAHARASHTRA, INDIA.**

2021

CANDIDATE'S DECLARATION

I hereby declare that this thesis or part
there of has not been submitted
by me or other person to any
other University or Institution
for a Degree or
Diploma

Place : M.P.K.V., Rahuri

Date : / /2021

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Associate Professor,
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Maharashtra State, India

CERTIFICATE

This is to certify that the thesis entitled, “**ECONOMICS OF GOAT REARING IN AHMEDNAGAR DISTRICT OF MAHARASHTRA**” submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri Dist. Ahmednagar (M.S.) in partial fulfilment of the requirement for the award of the degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL ECONOMICS**, embodies the results of a piece of *bona fide* research work carried out by **Miss. GUND PRIYANKA HIMMAT** under my guidance and supervision and that no part of the thesis has been submitted for any other degree or diploma.

The assistance and help received during the course of this investigation have been duly acknowledged.

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Place : M.P.K.V., Rahuri

Date : / /2021

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Place : M.P.K.V., Rahuri

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LIST OF ABBREVIATIONS

/	- Per
Agril.	- Agriculture
e.g.	- Exempli gratia (For example)
Econ.	- Economics
et al.	- et alia (others)
etc.	- Etcetera
Fig.	- Figure
Ha	- Hectare
Lit.	- Liter
No.	- Number
i.e.	- That is
J.	- Journal
Kg	- Kilogram
Q	- Quintal
Qty.	- Quantity
Res.	- Research
₹	- Rupees
Univ.	- University
Viz	- Videlicet (namely)
Mktg	- Marketing
Vol	- Volume
PP	- Page number

ABSTRACT

ECONOMICS OF GOAT REARING IN AHMEDNAGAR DISTRICT OF MAHARASHTRA

By

MISS. GUND PRIYANKA HIMMAT

A candidate for the degree
of
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In
AGRICULTURAL ECONOMICS
MAHATMA PHULE KRISHI VIDYAPEETH,
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Research Guide	: Dr. A.V. Gavali
Department	: Agricultural Economics

The present investigation has been undertaken to study the maintenance cost and return from goat rearing, work out the break-even point of different size groups of flocks and constraints being faced in goat rearing in relation to different size groups of flocks in the region of Ahmednagar districts of Maharashtra. The study was based upon the primary data collected from 90 sample flock owners by survey method for the calendar year 2018-19. For the purpose of analysis, sample flocks owners were classified in to three categories on the basis of flock size *viz.*, small (Upto 10 goat), medium (11 to 20 goat) and large (21 and above goat).

The multiple regression equation were analysed to fulfil the objectives of investigation. Besides in order to know the feedback of goat rearers to ascertain the problem in goat rearing interviewed with the help of designed schedule prepared for the purpose by survey method.

The per flock, average fixed capital investment was ₹27139.55. The fixed capital investment was the highest in large size class ₹ 33506.99 followed by medium size ₹ 26942.67 and small size class of flocks ₹ 21769.01. The value of the flock stock was the major item of fixed investment (62.03 %) which was followed by the value

of byre (35.37%) at the overall level. The per goat fixed capital investment was ₹ 3281.69 at the overall level. The total labour used at the overall level 92.72 per cent of labour was required for grazing of goats and 7.28 per cent for maintenance of kids and byre. Per goat average cost of maintenance came to ₹4411.97, ₹ 4911.18 and ₹ 3724.32 per annum in the case of small, medium and large size groups of flocks, respectively with an overall of ₹4237.03. Thus per goat cost of maintenance was highest in medium and small size flock due to less number of goat. Study as whole, gross returns in goat rearing include income from sale of goat, manure and milk. At overall level per goat gross returns was ₹ 7372.29. Among flock sizes per goat gross returns in the case of small, medium and large size groups were ₹ 9009.21, ₹ 7218.82 and ₹ 6774.50, respectively.

The regression analysis indicated that the six selected independent variables *viz.*, flock size (X_1), feeding charges (X_2), grazing charges (X_3), human labour (X_4), concentrate charges (X_5) and veterinary charges (X_6) jointly explained 58 to 91 per cent variation in case of small, medium and large size group of flocks in the gross returns in goat rearing. The regression coefficient of the, flock size (X_1) which was observed to be highly significant at 1per cent level at the overall level. This means that increase in the size of flocks by one goat, the annual gross income from goat rearing would increased by ₹ 3123.84 at overall level.

The break-even point analysis indicated that the minimum size of flock should be 6, 11 and 23 goat in case of small, medium and large size flocks, at which the flock owners should have no loss, no profit.

In case of price spread, lowest price spread in channel-I and highest in channel-III. It was conclude that the net price received by producer in channel-I was high as compared to other channel, hence producer in channel-I was benefited because this is direct channel. Marketing efficiency was maximum for the channel-I i.e. 209.45, while it was minimum for the channel-III i.e. 5.92.

A large number of problems were faced by goat rearers of which, shrinkage of grazing land, shortage of green fodder and dry fodder, less availability of organised market, and veterinary clinic were the major problems in goat rearing. In order to improve the goat rearing, the goat rearers suggested the upgradation of village grazing lands, supply of adequate fodder, need of goat rearer training about balanced feeding, availability of concentrates at cheaper price, establishment of co-operative marketing societies, credit facilities, and veterinary services, which needs to be given thought by the policy makers.

1. INTRODUCTION

1.1 General

Goats were the foremost farm animal to be domesticated. It is indicated by the archaeological evidence, they have been associated with man in a symbiotic relationship for upto 10,000 years (Ensminger and Parker, 1986). Goats are reared for milk and meat and manure. Goat is a multi functional animal, plays a important role in the economy and nutrition of small and marginal farmers and laboures in the country. Large section of population in rural areas is engaged in goat rearing enterprise. Goats can efficiently survive where no crops can be grown, on available shrubs and trees in adverse environment. Goats were observed throughout the world because of their great adaptability to changing environmental conditions and the different nutritional regimes under which they were evolved and subsequently maintained. They were useful to man throughout the ages due to their small size, prolificacy, productivity, and non-competiveness among them for food.

Goats make a very valuable contribution in the developing countries, specially to the poor section in the rural areas. Therefore, goats are known as moving banks of poor man. Importance of this precious genetic resource is misjudged and its extent of contribution to the livelihood of the poor is unsatisfactorily understood. Goats are often neglected in comparison with cattle and sheep. Reason of this attitude towards the goats can probably be due to recognition of their capability, rather any detriment against them. As it is believed that goats are independent, intelligent, acrobatic and tolerant to many diseases and pest parasites and can look after themselves much better than other livestock species.

1.2 Goat rearing in India

Accurate statistical values are required to determine the future outlook of the goat population and their productivity. They are also required before any improvement policies which can be planned on a realistic basis and implemented with confidence. The world total number of goats was 861.9 million. (FAO STAT, 2008). There are immense variations among the different part of the country. The total number

of goats in the world increased by 146 per cent of the total number (590.1 million) come across in 1990.

India has the largest goat population (148.88 Million) in the world of which 87 million goats are breedable. In India out of the popular 20 breeds of goats Jamunapari and Barbari are the important milch breeds. The average milk yield per lactation is 30 to 60 liters in case of indigenous goat and 360 liters from crossbreed goats. The total milk production in India during the year 2017-18 was 176.3 million tonnes in which goat contributed 5.4 million tonnes.

Goat contributes about 7 per cent (0.94 million MT) of country's current meat production. Goat skin, chilled and frozen meat are the important export items for earning substantial foreign exchange to the country.

Poor man's cow: Goats are called as poor man's cow (or mini-cow) because of their valuable contribution to the poor man's economy. They provide nutritious and easily digestible milk to their children and a stable, regular source of additional income for labours, poor and or marginal farmers. Goats are small-sized animal, so they can easily managed by women and children. Feeding, milking and care of goats do not require much equipment and hard efforts.

Capital investment, feeding costs and maintenance costs are also quite low. Four goats can be reared as cheaply as one indigenous cow. Goats can be outstandingly reared in areas where fodder resources are limited and milch cattle do not thrive. Returns on capital of up to 50 per cent and recovery of 70 per cent of retail price is possible in goat rearing. In rural areas, goat farming plays a important role in providing employment and income.

1.3 Goat rearing in Maharashtra

The economy of Maharashtra is mainly rural based where 65 per cent of it's population are residing in rural areas. In the rural economy, animal husbandry mostly provides subsidiary means of livelihood to the agriculturist and agricultural labourers and thus, livestock raising has become an integral part of agriculture.

India has 148.88 millions of goats out of that Maharashtra has 10.60 million of goat population. Out of which 7.59 lakh are in Ahmednagar district alone, which contributes 8.25 per cent of the total population in the state. Thus, it is at the top

position in respect of goat population among the districts followed by Solapur (7.7 %), Nashik (5.8 %), Pune (4.8 %), Yeotmal (4.3 %), Jalgoan (4.0 %), Sangali (3.6 %) and Beed (3.5 %).

In view of the role of goats in the Indian economy their development and maintenance are essential. Sangamneri is an important breed of goat commonly reared in Ahmednagar, Nashik and part of Pune.

Goat milk can be stable source of income. Meat production is usually of greater significance with reference to goat rearing. The goat are one of the most economical producer of meat among farm animals. The extremely low purchasing power of the average farmer in India makes it imperative that these people tend livestock which need very less investment and that time can provide a definite and stable income. The goat meat is more lean (low cholesterol) and proved good for people who prefer low energy diet especially in summer and sometimes goat meat (chevon) is preferred over mutton because of its chewability.

Goat manure is rich in nitrogen and phosphoric acid and serves as supply of ready money for the farmers. The goat rearers get better manure for improving their crop yields. Other by-products obtained from goat are goat hide, skin, hair, fetch an additional income. These are utilized for many purposes in tannin industries. Some breeds of goat like Angora and Kashmire are famous for quality hair which can be used in the textile industries. the common hair of other breeds of goats may be used for preparation of coarse carpet.

Goat generate an employment to the rural poor besides, effectively utilizing unpaid family labour. There is scope for establishing cottage industries based on goat meat and value addition to skin and fibre. Another important aspect of goat rearing is that the goat under proper condition goats has kidding three times in two year and twinning is very common. Goat has religious importance in many societies.

1.4 The Problem

There lies a scope for production of meat, manure and other goat products in Western Maharashtra. This region has about more than half goat population. Economic backwardness of goat rearing in the state has hampered the development of this activity on modern lines. However, under prevailing situation of small holding and unpredictable

behaviour of monsoon rains resulting in low yields in crop production, goat rearing is assuming an importance in Western Maharashtra, particularly in the scarcity region. The region consists of Ahmednagar, Solapur, Eastern part of Pune and Sangli districts where in the goat enterprise serves as a source of income and employment to goat owners throughout the year.

The goat owners in this region have either small, medium or large size of flocks of goat apart from some agricultural land. They obtain some income from the sale of kids and milk of goats. This provides a stable and consistent flow of income to the flock owners. The necessity was felt to undertake scientific appraisal of this enterprise to understand its contribution for the development of economy of the goat owners in the region. The factual data on economics of goat rearing according to different size classes of flocks are also scanty. In view of this, it was decided to undertake the present study viz., "Economics of goat rearing and marketing in Ahmednagar district of Maharashtra" with the following objectives

1.5 Objective

1. To estimate per flock and per animal maintenance costs and return in goat rearing
2. To study the marketing practices, marketing cost and price spread of goat marketing.
3. To determine the break- even point in different size of goat flocks.
4. To study the constraints in goat rearing.

Hypotheses

- i. Hypothesis H_0 : As flock size increases, cost of maintenance and returns do not increase.
Alternative H_A : As flock size increases, cost of maintenance and returns also increase.
- ii. Hypothesis H_0 : Goat rearing is not profitable enterprise.
Alternative H_A : Goat rearing is profitable enterprise.

1.6 Scope and utility of the study

The scientific goat rearing issues related to breeding, feeding, marketing and health care are very important. There are also a number of problems related to

finance and management related to this enterprise. This requires studies in cost of goat rearing and profitability in order to make decisions on the matters of goat rearing.

Due to the increase in population and preferred for goat meat the demand for goat is increasing. The milk of goat is more palatable and digestible than other milk, because of that goat milk is preferred for children. In view of this, goat rearing is playing an important role in the economy of agricultural labourer's, small and marginal farmers families. It is an important activity, instead of that no proper attention has been paid so far towards this enterprise. Therefore, it is essential to study the various aspects such as economics of goat rearing, economical size of goat unit and problems faced by the goat reares.

Findings of the study would be useful to the policy makers in the light of varying prices of fodders, grazing, medicine and other inputs. The conclusions would also be useful to individual goat rearers to improve their decision making ability so as to obtain maximum profit by improving management practices.

2. REVIEW OF LITERATURE

In any systematic research study the review of literature relevant aspect under study, forms an integral part of the research work. This helps in highlighting the methodology and results obtained by various research workers in alike field and provide a guideline for research to be accomplish. This chapter is, devoted to take a brief review of the research carried out by the other research workers in the area.

Some research studies have been carried out to examine the economics of goat rearing business in India and abroad. The studies were also undertaken to determine the profitability of Indian goat to judge the practicability of its improvement. Where most of the studies were of the nature of fact finding and restricted in their objectives. The literature closely related to the present investigation has been scanned and the reviews are categorized keeping in view the objectives into following sub-heading:

- 2.1 Per flock and per animal maintenance costs and return in goat rearing
- 2.2 Marketing practices, marketing cost and price spread of goat marketing.
- 2.3 Break- even point in different size of goat flocks
- 2.4 To study the constraints in goat rearing.

2.1 Per flock and per animal maintenance cost and returns in goat rearing

Lohar and Patil (1980) studied the deccani goat. They concluded that the space requirement in shed was very less and i.e. 10-12 sq ft. Feed requirements was also less i.e. 3.4 kg per day. The total fixed cost was ₹ 1538.75, variable cost was ₹ 3928.00 and total expenditure was ₹ 5446.75. The gross income was ₹ 9470.00 and net profit per annum was ₹ 4003.25 per farm. They found that the goat rearing has a tremendous potentiality of becoming low cost and simple technology

Khemnar (1988) work out economics of goat rearing in Ahmednagar district. He revealed that the value of flock stock was the important item of fixed investment (61 %) followed by value of byre (38.30 %) and value of equipment (0.70 %) of the total labour used at the overall level 39.02 per cent of labour was used for feeding including maintenance of kid, 36.91 per cent for grazing of goats and 24.07 per cent for cleaning of byres.

Das (1992) studied comparative economics of goatary and piggery in West Bengal. He reveal that, gross surplus in case of piggery was higher than goatary and i. e ₹ 5350.00 and ₹ 3092.00 respectively. The unit cost was higher in piggery and therefore the net income per month per goat was higher than pig (₹ 41.13 and ₹ 24.00) so, goatary was profitable enterprise.

Moorti *et al.* (1992) studied comparative economics of sheep and goat rearing. The average size of small flock was 64 and 39, large size of flocks was 166 and 84 of sheep and goat, respectively. In goat and sheep rearing maximum expenditure on labour was 78 and 81.20 per cent, respectively. Net returns were estimated to be ₹ 27.50 per sheep and ₹ 65.74 per goat and total income from sheep and goat at small and large farm was worked out to be ₹ 4370 and ₹ 10045 respectively. They found that, goat rearing was highly remunerative as compared to sheep business.

Murdia (1993) studied on recent advances in goat breeding and management cost per unit. He also determines that the recent advance in goat development programme has been launched to improve various goat breed like Deccani breed and Black Bengal for meat production. He also suggested that a minimum of 30 female goats with one male as a unit is recommended for any beginner. He also calculated net expenditure on goat unit for 5 years was ₹ 13,980 and total income from that goat unit was ₹ 25,600.

Deoghare and Bhattacharyya (1994) worked out on costs and returns of goat rearing for the agricultural year 1991-92 from 64 households in three villages in Jamuapari goat breeding tract in Etwah district of Uttar Pradesh, India. Gross and net income from milk, sale of animals, manure and stock acceleration is shown for small (1-5 does) medium (6-10 does), and large (> 10 does) flock sizes. To ascertain the net returns the concepts like cost-A, cost-B and cost-C were used. Out of 64 households 70.3 per cent households of small size, 20.13 per cent of medium size and 9.38 of households were above 10 does.

Deoghare and Sood (1994) studied income and employment potential of goat rearing on farm in the rural household of Mathura district of Uttar Pradesh and found that the capital investment per household was ₹ 3475.80 and per goat ₹ 1025.24. Taking cost-A (cash cost and depreciation) into account a goats keeper could earn about

196.00 per month. The overall margin over cost-A, cost-B and cost-C was ₹ 2351.43, ₹ 2003.87 and ₹ 1120.84, respectively. The net return per rupee of cost-C was 0.76. Employment per household a year of male, female and child was observed to be 15.65, 41.07 and 16.12 days, respectively. Female labour employment was maximum in the farms as compared to male and child.

Pawar (1995) examine growth and economics of Osmanabadi goat in Western Maharashtra. He revealed that the requirement of dry and green fodder, concentrate and human labour was 0.449, 2.135, 0.135 quintals and 29 man days per goat per year, respectively.

Deoghare and Bhattacharyya (1994) studied capital investment per sheep and goat in year which was highest on small farm ₹ 772.29 followed by marginal farm ₹ 763.17 and landless sheep and goat keepers ₹ 733.36. The margin of profit on small farm was much greater than that of landless sheep and goat keeper and marginal farm. The overall returns over cost-A (paid out expenses and depreciation) was ₹ 4146.62 over cost-B (cost-A interest on fixed capital) was ₹ 3203 and over cost-B + input of family labour was ₹ 902.05.

Pawar and Thombre (1995) work out economics of goat rearing in Maharashtra during 1992 and reported that, goat rearing which was considered with 11-12 invested goats gave maximum gross profit of ₹ 12149 and net profit of ₹ 1892 during the crop period of 230 days i.e. 124 days of lactation period and 106 days of dry period.

Prabaharan and Thirunavakkarasu (1994) conducted a study in Tamil Nadu to assess the income and employment potential of goat rearing enterprise. They found that the cost of production per flock per annum was ₹ 1909, ₹ 4130 and ₹ 6457 for small (1-8 goats), medium (9-16 goats) and large (above 16 goats), respectively. In which labour cost accounted for 74, 66 and 59 per cent, respectively. Annual net income was ₹ 1200, ₹ 1879 and ₹ 6800 for small, medium and large flocks, respectively.

Deoghare and Khan (1998) work out the annual cost of rearing a Barberi goat in Uttar Pradesh. In small size flock was ₹ 490.15 whereas in medium and large size flocks it was ₹ 479.77 and ₹ 477.31, respectively. The net annual income per goat was greater in small size flock as compared to medium and large size flocks. The overall margin over cost-A (expenses including feed, fodder, hired labour miscellaneous

recurring expenses and depreciation), cost B (cost A plus interest on fixed capital), and cost-C (cost-B plus inputted value of family labour) was ₹ 705.09, ₹ 597.01 and ₹ 346.07, respectively. Net return per rupee of investment was ₹ 0.31.

The per annum per goat cost of rearing in groups of small, large and at the overall worked out to ₹ 2218, ₹ 1920 and ₹ 2027, respectively. He concluded that the cost of maintenance per goat decreases with an increase in the flock size.

Babar *et al.* (2001) determine economics of stall feeding of goats in western Maharashtra. A survey was conducted during 1997-1998 to estimate the maintenance cost and profitability of 10 stall fed goat farms under rainfed conditions in Western Maharashtra districts. The maintenance cost per farm and per goat was ₹ 121821.88 and ₹ 3045.55, respectively, while the cost of feed and fodder accounted for ₹ 1854.95 (60.9 %). The total fixed cost was estimated to be 23.45 per cent and the variable cost was 76.55 per cent. The profitability in per farm and per goat rearing amounted to ₹ 3303.96 and ₹ 258.41, respectively. It is reported that the goat rearing was a profitable enterprise in the rural area of Western Maharashtra.

Mahabir (2002) examine an economic analysis of sheep and goat rearing in Haryana. The data for study collected during the year 2000-01. Net annual profit for goat was ₹ 3780, ₹ 7430 and ₹ 10750 and for sheep it was ₹ 4050, ₹ 8305 and ₹ 12900, respectively on small, medium and large farms.

Yadav (2002) studied on economics of goat farming in Sangali district. It was revealed that the average cost of maintenance per goat per annum was ₹ 1167.98, ₹ 1175.46 and ₹ 1143.69 in group I, II and III, respectively. Per goat gross return was ₹ 1865.41, ₹ 2150.14 and ₹ 1953.23 in group I, II and III, respectively. The output input ratio at the overall level was 2.07.

Bhatia *et al.* (2005) work out the costs and returns from sheep and goat farming in Mahendergarh and Gurgaon district of Haryana in 2001-02. Tabular analysis was used to study the status of sheep and goat rearers, costs and returns from sheep and goat rearing. The annual average total cost per sheep farm was worked out to be ₹ 26,674 while on goat farm it was ₹ 12169. The average net returns from sheep and goat rearing was ₹ 4983 and ₹ 16605, respectively.

Patel *et al.* (2009) studied comparative analysis of different management system in arid goat breeds. For study one-year-old Marwari (15) and Parbatsari (18) goats were equally divided and allotted to extensive (control), semi-intensive and intensive (complete diet) systems. Lactating does gained significantly higher post-partum weight gain along with higher kidding rate and prolificacy under intensive system than those reared under semi-intensive and extensive system. Similarly, peak yield was recorded significantly higher in both the breeds under intensive and semi-intensive systems than control group. Economic analysis of these three systems reported that total return was maximum in intensive management system but input cost was also high in this system. Therefore, the net return was more in semi-intensive system. Higher incremental return per goat per year was ₹ 235.9 (Marwari goat) and ₹ 226.3 (Parbatsari goat) in semi-intensive system and comparative incremental return per goat per year was observed in intensive system (₹ 188, ₹ 108.2) for Marwari and Parbatsari goats, respectively. The total capital investment per goat for initiation of goat rearing was worked out to be ₹ 1425.95. Variable cost on labour, feed and fodder, treatment and prophylaxis constituted 56.17, 37.58 and 6.22 per cent, respectively. Total expenditure, which included fixed and variable cost per goat per year was ₹ 683.45. The income from sale of milk, surplus animals and manure constituted 50.64, 39.42 and 9.92 per cent of the total receipts. The gross income per goat per year was ₹ 911.30 and net income per goat was ₹ 227.85. It was concluded that goat rearing was reasonably remunerative providing ₹ 1.34 against every rupee invested.

Gupta *et al.* (2011) studied economics of sheep and goat rearing under semi-arid region of Rajasthan. Primary data were collected from 200 breeders spread over 12 villages from 2 tehsils of Ajmer district. The study found that the literacy rate of head of the small ruminant breeder household was 40 per cent. The average land holding was 2.77 hectares with less than one fifth of the area under irrigation. The average sheep and goat *sizes* were 52 and 16, respectively. The gross income from sheep farming was constituted by sale of animals (69.30 %), manure (16.60 %), milk (7.10 %) and wool (7.00 %) whereas the major return from goat farming to the breeder was from milk (59.70 %) followed by sale of animals (33.50 %) and manure (6.80 %). The rearing cost per unit of sheep and goat would be around ₹ 260 and ₹ 344, respectively. The corresponding net

return per sheep was ₹ 130.00 with the benefit-cost ratio of 1.50 and in goat it was ₹ 606.00 with benefit-cost ratio of 2.8, respectively.

Reviews related to costs and returns showed the concepts like variable cost and fixed cost were used. Few of them also showed concept of cost-A, cost-B and cost-C. Some of the reviews showed comparison between small, medium and large size of goat units. Goat rearing business was profitable and creates employment in rural area.

2.2 Marketing practices, marketing cost and price spread of goat marketing

Pawar and Thombre (1995) conducted the survey in 1992 on different goat rearing farms in Udgir of Latur district in Maharashtra. It is reported that the goat rearing farm which consisted of 11-12 goat flock gave maximum gross profit of ₹ 12149 and net profit of ₹ 1892.

Dixit and Shukla (1995) examine the efficiency of different marketing channels for goat in district of Uttar Pradesh. They selected 40 pairs of sellers and buyers randomly from each of the three markets. Out of 18 market and ten marketing channels were identified in relation to goat transaction in the area of study. Identifying marketing channels in terms of the producer's share, marketing cost and marketing margin were important aspects in the study. The farmer-itinerant trader-wholesaler trader-consumer was most efficient channel followed by farmer-itinerant trader-farmer and farmer cum-goat keeper-wholesaler trader. The first sellers share in the buyer's rupee ranged from about 52.00 to 99.00 per cent in different markets. Marketing cost and marketing margin per goat were found to be high in Eokdil market.

Glimp (1995) examine goat meat production and marketing. He concluded that goats meat are rarely the primary animal production enterprise in the United States but they are becoming increasingly important contributors to the income of many producers. Meat goat marketing is highly unstructured in the United States, yet prices are generally higher on per unit of weight basis than other red meat producing species. Efforts to organize marketing have only limited success. Over 90 per cent of the world goats are in the developing countries. Goats are increasingly important in these countries as subsistence food producers.

Kharse *et al.* (1997) examine economics of goat rearing in western Maharashtra and found that the per goat gross returns worked out to ₹ 3303.96 of this, the contribution of production was 71.14 per cent followed by value milk of 20.9 per cent and manure 8.88 per cent.

Bhatia *et al.* (2005) studied economic analysis of sheep and goat rearing in rainfed region of Haryana. A majority of sheep and goat farmer had small flock size and kaccha house were landless, illiterate up to 55 years of age. The annual returns to labour per sheep were worked out to be ₹ 303, ₹ 392, ₹ 372 and ₹ 303 in small, medium, large and overall average sample farms while for goat these were ₹ 439, ₹ 446, ₹ 462 and ₹ 449 respectively.

Pandit and Dhaka (2005) determine the marketing of goats in the four animal markets of Nadia and Hooghly districts of central alluvial plains of West Bengal. Data were collected from 30 sellers and 30 buyers, selected randomly from each market during 2001-2002. Five marketing channels were found in male goat marketing in the study area *viz*, channel-I (farmer to farmer), channel-II (farmer-butcher), channel-III (farmer to local trader to butcher), channel-IV (farmer to distant-Trader to farmer) and channel-V (farmer to distant trader to butcher). The majority of the goats were transacted through the channel-III. No broker was found in the marketing of goats in the study area.

Srivastava and Saraswat (2007) examine the marketing of Jamunapari goats in Jamunapur district of Eastern Uttar Pradesh in 2001-02. He found that the goat keepers frequently sold their goats for slaughter in the nearby weekly market. The market cost per goat was ₹ 66.80. It was indicated that the marketing cost per goat was negatively correlated with the size of flock.

Lavania and Singh (2008) studied goat marketing practices in Southern Rajasthan. The study was carried out in Udaipur-and Rajasamad districts of Southern Rajasthan and employed stratified random sampling technique to select goat keepers. The data for study were collected from total 240 households of 16 villages of 4 tehsils of 2 districts. The data pertaining to various aspects of goat marketing were gathered by employing a pretested interview schedule. They found that trade was not monopolistic and farmers did not complain about price fixing. The reason for selling was largely financial although sale was also done due to other reasons. Majority of the goat rearers in

the village sold their goats to petty traders. However, a small percentage of farmers sold their goats directly to rural and semi urban butchers. The income from goat rearing was mainly utilized to fulfil the family needs.

Singh *et al.* (2011) studied on marketing of animals and small ruminants in Western U.P. They collected primary data regarding to arrivals and sales pattern of livestock in various cattle fairs for the year 1999 were used in this study. They selected two districts and from these two districts six important cattle fairs. They found that the assembling and distribution of animals in marketing, wide variety of agencies were involved that were professional, breeders and cultivators. These two groups of producer's category and other were wholesale dealers, wanderer dealers and slaughter stock dealers. The market functionaries involved in marketing of animal were brokers, mela pramukh, registration certificate writer, cash dealer, contractor and other persons. The marketing cost of animals which was paid by purchaser was ₹ 40.00 per animal while for small ruminant it was 10.00 per animal.

2.3 Break-even point in different size of goat flocks

Waghmare (1988) revealed that the break- even point analysis at the overall level indicated that the minimum size of flock may be 29 sheep.

Vitnor (2000) determined that increase in the size of flocks by one goat, *ceteris paribus*, the annual gross income from goat rearing would increased by ₹ 1791.02, ₹ 2716.57 and ₹ 1088.64, in case of small, medium and large size flock, respectively. It can therefore be said that there existed a scope to increase annual gross returns from goat rearing by increasing size of flock in the area under study.

2.4 Constraints and suggestions for improving goat rearing

Rajiom *et al.* (1993) conducted study on goat and sheep production in Malaysia. They reported that major problems for production of goat and sheep include two major important diseases affecting on goat and sheep were Pneumonic Pasteurellosis and Haemonchosis. Other constraints were lack of land feed resource and breeding stock, ineffective health programme and poor marketing-and promotion of mutton.

Francis (1994) examined goat rearing challenges and opportunities. He revealed that different problem in goat rearing in India like the evaluation of the performance and selection within indigenous breeds, poor access to grazing land,

unavailability of crop residue to alternate uses, inadequate market facilities, low literacy of farmers, little co-operation among farmers, limited services, veterinary, agriculture and problem with credit servicing, cost of appreciation of potential goat, poor soils, shortage of water for irrigation.

Rekib (1996) reported that call for the formation of national body for goat production and marketing. He found that, there were many problems in goat enterprise. He reported the following problems on goat rearing enterprise low nutritional status, early slaughter of animal, shortage of breeding bucks and ram, migratory system of management, suggestions offered by him, goat and sheep breeding policy should be finalized on regional basis, more bucks and rams of improved breeds should be made available, artificial insemination (AI) should be followed using improved buck semen in every veterinary hospital, feed manufacture for compounded sheep and goat marketing should be encouraged, slaughtering of sheep and goat below ten to twelve months should be prevented through appropriate legislation.

Bhutekar (1997) examined economics of goat rearing in Osmanabad district of Marathwada region of Maharashtra. He studied the data were collected 90 goat rearers. The data were divided into small (5-10goats), medium (11-15goats) and large (above 16goats) flock-sizes, respectively. They found that, lack of grazing land was most severe problem which was expressed by 94 per cent followed by lack of credit facilities, lack of medicinal facilities; unavailability of regulated market was 92 per cent, 85 percent and 72 per cent, respectively. Inadequate selling facilities and lack of cross breed goat expressed 70 and 65 per cent, respectively. Goat rearers suggested provision of credit facilities (90 %), provision of medicinal facilities (80 %), development of regulated market (69 %), and transfer of stall feeding technology (67 %) and implementation of cross breeding programmes (61 %), respectively.

Sagar and Ojha (1998) studied in 1993 with 36 landless, 34 marginal, 20 small and 15 medium-large (n=105) randomly selected goat farmers from eight selected villages in the goat production technology transfer area of the Central Institute for Research on Goats, Parah Block of Mathura district, Uttar Pradesh, India. Major constraints hindering the organization of a goat cooperative society were reported to be waste of time (74.29 %), frictions among the goat keepers (44.76 %), dependency on

office bearers (40 %), inadequate working facilities (33.33 %) and no benefit from such a cooperative society (27.62 %). However, through cooperative society the farmers realized that they would get a remunerative price for their goats (52.38 %), provision of easily available credit (44.75 %), freedom from brokers (36.19 %), direct benefits for the goat keepers (30.48 %) and facilities for goat rearing (23.81 %).

Shivnarayan *et al.* (2000) conducted study on major constraints in the adoption process by small and marginal farmers of diversified farming in terms of sheep and goat rearing. The study was conducted in 4 villages of the 2 selected Mandal of Guntur, Andhra Pradesh, India. Respondents (n=60) from the selected category were taken on proportionate random sampling. The reasons for non adoption or practice of maintenance of crossbreds are the non availability, poor adoptability of crossbreds, hazards of diseases and no knowledge about crossbreds. It was suggested that the step to ameliorate the process of the existing system of diffusion and adoption process encourages the extension persons to concentrate their efforts to suitably provide redressed in an appropriate manner to the best of their abilities.

Wadkar (2007) examine constraint in goat rearing in Marathwada region of Maharashtra. It was observed that non-availability of veterinary services in the village in time (80.55 %) followed by costly veterinary services (76.38 %) inadequate and untimely loan supply (68.68 %) were major problem followed by inadequacy of government schemes for development of goat (56.94 %) lack of scientific knowledge about rearing of goat (51.39 %).

Gujar and Pathodiya (2008) studied constraints perceived by farmers in goat rearing in Mewar region of southern region of southern Rajasthan. Constraints perceived by goat rearers were recorded by a sample survey of 360 goats in districts Udaipur, Rajasamand, Chittorgarh and Bhilwara of Mewar region of southern Rajasthan in India. The lack of grazing area was found to be the most serious constraints faced by goat rearers followed by lack of improved breeding buck, lack of credit, lack of knowledge, about scientific goat rearing practices and illiteracy.

Todmal and Kadam (2008) determine constraints faced in adoption of goat management practices in Parbhani and Purna talukas of Parbhani district of Maharashtra state. Three villages from each talukas were selected. They revealed major

constraints faced by SHG members in adoption of goat management. Lack of adequate time for goat management due to engaged in other household activities and also engaged in agricultural operations, 99.16 per cent. About 95 per cent members of SHG faced the constraints of heavy mortality rate of kid during rainy season due to unhygienic conditions and inability to provide shelter for kids. About 79.16 per cent members of SHG faced the lack of market facility while 75.00 percent member faced the problem of lack of transportation facility. High prices of goat, non-availability of medical facility in village and lack of knowledge about feed management were found some other constraints faced by SHG members.

Wani *et al.* (2009) examine constraints in rearing Changthangi goats in cold arid region of Jammu and Kashmir. The present study was undertaken to investigate constraints faced by nomads in rearing Changthangi goats. The data were collected from 250 households revealed that breeding was the main constraint (81.43 %) followed by feeding (73.21 %), marketing (61.85 %) and socio-economic (55.04 %). The study also suggested prioritizing of research to address the constraints in rearing of Changthangi goats for economic security of the region through export earnings.

The reviews were related to constraints faced by goat rearers in production and marketing of goats. The reviews consists the corrective measure suggested by goat rearers.

The above reviews determined that the goat rearing requires less investment as compared to cattle. The cost of maintenance per goat decreases with an increase in flock size. The goat rearing was profitable business to support the income of marginal, small farmer and landless labours. The studies an economics of goat and sheep rearing revealed that goat is more profitable than the sheep. The marketing cost of goat is negatively correlated with size of flock. The price spread was much higher in cases where more middlemen and distance were involved. The problem in goat rearing include poor access to grazing land, unavailability of crop residue due to alternative use, inadequate marketing system, lack of appreciation of potential of goat, low social status of goat owner and inadequate support from social institutions etc.

3.A. METHODOLOGY

3.A.1 General

This chapter is devoted to a discussion on the methodology adopted in the present research study. The study of any research problem required to be conducted on scientific lines with the help of relevant examination method and systematic procedure to arrive at specific conclusion in order to fulfil the objective under study. The present chapter is therefore, deliberate to discuss brief plan of investigation particularly the selection of tract and sample for the study, collection of data and analytical procedure adopted in the present study

3.A.2 Selection of area

The Karjat, Shrigonda and Jamkhed tahsil from Ahmednagar district of the Maharashtra state were selected purposively. Because, it has the maximum goat population in the district.

3.A.3 Selection of villages

Two villages from each tahsil were selected on the basis of maximum population of goat. Thus, in all six villages were selected from three tahasils and 15 goats rearer households from each village.

3.A.4 Sampling design

Two stage random sampling technique was implemented for selection of goat rearing farmers. Village are considered as a primary unit and goat rearers as a ultimate unit of sampling. The sample of 90 goat rearing households which possesses three size classes mention below.

Small size : Upto 10 goats per household

Medium size : 11-20 goats per household

Large size : 21 and above goats per household

3.A.5 Collection of data

The primary data was collected by implementing survey method, with the help of schedule designed for the purpose. The general information of goat rearers was collected as per schedule as follows, items of cost in goat rearing, source of returns from goat rearing etc.

3.A.6 Method of analysis

The simple tabular method and regression analysis method were implemented for analysis of data in order to fulfil the objectives considered under study.

The total sample of 90 goat rearers was divided into three classes for analysis purpose, on the basis of flock size as given below.

Table 3.1 Distribution of flock size

Sr. No.	Group	Flock size	Range	Number of goat rearers
1	Small	Up to 10	4-10	30
2	Medium	11-20	11-20	30
3	Large	21 and above	21-40	30

3.A.6.1 Estimation of costs and returns from goat enterprise

For the purpose of calculating the economics of goat rearing, different items of costs were categorised into two groups such as (a) working costs and (b) fixed costs.

Working costs

Those cost which are paid directly and include of grazing and fodder, costs on account of hired labour and family labour, veterinary charges, costs on miscellaneous items and interest on working capital of the year were the working costs in goat rearing.

Fixed costs

Those costs which are not paid directly but they are to be considered while estimating the cost of goat rearing including interest on fixed capital comprising of investment on goat, byre, equipment, depreciation of byre and equipments and losses due to the death of goat considering the mortality, etc were the fixed costs in goat rearing.

a. Items of cost and their valuation

The different items of costs considering in computing the cost of goat rearing are as under.

I. Grazing

In the case of grazing the goat on owned farms, they were charged at the prevailing grazing charges. The charges for grazing goats on others fields would be taken as the actual paid by the goat rearers.

II. Fodder

In the case of green and dry fodder, the actual purchase price was taken into account while in the case of fodder raises on own farm, prevailing market prices were considered for evaluation. Here, feeding include about 90 per cent of stall feeding and 10 per cent of grazing mostly on own farms.

III. Labour

The labour is required for different activities to be performed in goat enterprise such as grazing, cleaning of byre, milking, maintenance of young stock, etc. In present examination it was revealed that the labour was used for goat rearing. On the basis of total wages paid to their both in kind and cash, the valuation of labour was done. While that of family labours were value at the prevailing wage rates for labour.

IV. Veterinary expenses

The total expenses incurred on purchase of medicines, vaccines and other veterinary requirements for the goat rearing enterprise by goat rearers were taken into account.

V. Depreciation

Straight-line method of depreciation was implemented for calculating depreciation of byres and equipments utilised in goat rearing enterprise. For those equipments which are lasting for one year, their total value was considered as the annual depreciation.

VI. Losses due to death

The losses which occur due to the death of goat in goat enterprise ,during the period under study were carefully computed and considered as the cost item in the study.

VII. Interest

The interest rate charged was different for working and fixed capital. The interest rate charged on working capital was at 13 per cent per annum. The interest rate

charged on fixed capital including initial value of the animal, byre and equipment were worked out at the rate of 10 per cent per annum.

b. Maintenance cost of goat flock

Maintenance cost was computed, per flock and per goat per year for different size classes by adding together the working cost and fixed cost.

c. Sources of returns from goat

The returns obtained from goat enterprise include income from different items viz. sale of goats, milk, manures, goat hides and goat meat (chevon) etc. The returns were computed per flock and per goat for the year, group wise by using prevailing prices of goat and goat products.

d. Net returns

Net returns were computed per flock and per goat for the year were derived by deducting total costs from total returns from goat rearing.

e. Output-input ratio

The output-input ratio is the ratio of the gross income to the total cost. The output-input ratio at working cost and total cost of maintenance was computed for goat enterprise.

3.A.6.2 Break-even point analysis

The break-even point is a point at which the total cost is equals to total revenue. The break-even point for different size goat flocks was calculated. The intersection point of total cost curve and total revenue curve gives the break-even point at which $TR=TC$ and number of goats required to attain the situation.

$$\text{Break - Even point} = \frac{\text{Fixed cost}}{\text{Selling price per unit} - \text{Variable cost per unit}}$$

3.A.6.3 Regression analysis

Returns obtained from goat enterprise were affected by various factors. Such factors were examined by using multiple regression equation of the following type.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + u$$

Where,

Y = Gross return in rupees per flock

X₁ = Flock size in number of goat

X_2	=	Feeding charges in rupees per flock
X_3	=	Grazing charges in rupees per flock
X_4	=	Human labour used in men days per flock
X_5	=	Concentrate charges in rupees per flock
X_6	=	Veterinary charges in rupees per flock
b_1 to b_6	=	Regression coefficient of respective variable
a	=	Intercept
u	=	Error term

3.A.6.4 Marketing cost and marketing margin

For obtaining the marketing cost the data were analysed for getting item wise absolute as well as in percentage values to the total marketing cost separately for sellers and buyers. Simple statistical tools such as arithmetic mean, percentage were used for the remaining aspects. Simple tabular analysis was implemented.

3.A.6.5 Total marketing cost

$$C = C_f + C_{m1} + C_{m2} \dots \dots \dots C_{mn}$$

Where,

C	=	Total marketing cost
C_f	=	Cost paid by the producer from the time the produce leaves the farm till he sells it
C_i	=	Cost incurred by i th middleman in the process of buying and selling the product

3.A.6.6 Marketing margin

$$MT = \sum (S_i - P_i) / Q_i$$

Where,

MT	=	Total marketing margin
S_i	=	Sale value of a product paid by i^{th} firm
P_i	=	Purchase value of a product paid by i^{th} firm
Q_i	=	Quantity of product handled by its firm

3.A.6.7 Price spread

Price Spread: Consumer's price - Price received by farmer

$$P_s = C_p - P_f$$

Where,

C_p = Consumer's price (₹)

P_f = Price received by farmer (₹)

3.A.6.8 Marketing Efficiency

Marketing efficiency was calculated by using the modified method as suggested by Acharya and Agarwal (2001).

$$MME = RP / (MC + MM)$$

Where,

MME = Modified measure of marketing efficiency

RP = Price paid by consumer or retailer sale price

MC = Total marketing cost

MM = Net marketing margin

3.A.6.9 Problems in goat rearing and marketing

The problems was presented with help of percentages.

3.B. ECONOMIC FEATURES OF THE AREA UNDER STUDY

General

The comprehension about the physical features and economic background about the selected tract gives better understanding of the problem tackle for the analytical study is important. Geographical condition of the selected area, transport facilities and soil types are also essential factors in economic sense. These factors affect the efficiency of farming and also responsible for bringing out vital changes in the farm economy. This chapter briefly explain the background information on resource position together with management practice in goat rearing followed in the area under study.

3.B.1 Location

The present investigation is confined to Karjat, Shrigonda and Jamkhed tahsils of Ahmednagar district of Maharashtra. Ahmednagar situated in the central part of the state in upper Godavari basin and partly in the Bhima basin. Karjat tahsil is situated to the South-East of Ahmednagar district, Shrigonda tahsil is situated to South of Ahmednagar district and Jamkhed tahsil is situated to South-East of Ahmednagar district. Karjat taluka is surrounded by Shrigonda tahsil to the west, Karmala tahsil of Solapur district to the South, Jamkhed tahsil to East and Ashti tahsil of Bid district to the North, it is also border by Baramati tahsil of Pune district. The river Bhima flows through South-West border of tahsil from West to East. The tahsil is clearly divided in to two parts irrigated tract and unirrigated tract. The total geographical area of the tahsil is 1503.61 Km². There is one co-operative sugar factories in the tahsil.

The Shrigonda tahsil is surrounded by clockwise tahsils is the North-East Ashti tahsil of Bid district, the East side Karjat, West side Shirur tahsil of Pune district and the south Baramati tahsil of Pune district. The river Bhima flows through southern part of tahsil from West to East. The total geographical area of the tahsil is 1603.81 Km². There is a well developed main market yard of the Agricultural produce Market. The warehousing facilities are also available at these market centres. There is one co-operative sugar factories in the tahsil.

The Jamkhed tahsil is surrounded by clockwise tahsils is the North-East Patoda tahsil of Bid district, the South-East side Bhum tahasil of Osmanabad district, West side Karjat tahsil and the Sout-West Karmala tahasil of Solapur district. The river

Sina flows through western part of tahsil from North to south. The total geographical area of the tahsil is 878.62 Km².

3.B.2 Climate

The climate of the tahsils characterised by a hot summer and general dryness expected South-West monsoon season. The year can be divided into four seasons. The cold season from December to February is followed by the monsoon season is from the second week of June till the end of September while October and November constitute the post monsoon or retreating monsoon season.

The succeeding period up to November is the post monsoon season. On an average, the humidity was reported of 65 per cent which is more up to 70-80 per cent during monsoon season.

3.B.3 Rainfall

The average annual rainfall of Karjat, Shrigonda and Jamkhed was 326.66 mm, 301.33 mm and 350.66 mm, respectively and therefore these tahsils comes under the Scarcity Zone of Maharashtra. Most of the rainfall is generally received during the four months of rainy season i.e. from June to September. The monthly rainfall of Karjat, Shrigonda and Jamkhed is given in table 3.2. It appears that the rainfall received was quite low during the years 2016 and 2017 as compared to the 2018 year. It may be pointed out that the regular mansoon decides the prospects of agriculture since bulk of the area in the tahsil is dry of ten times, rainfall received is irregular and poorly distributed creating scarcity conditions in this area.

Table 3.2 Rainfall distribution in Karjat, Shrigonda and Jamkhed Tahsils

(mm)

Sr. No.	Month	Karjat			Shrigonda			Jamkhed		
		Year			Year			Year		
		2016	2017	2018	2016	2017	2018	2016	2017	2018
1	June	69	85	86	75	88	90	86	91	86
2	July	78	80	88	80	90	88	98	88	98
3	Aug	48	52	67	48	62	66	72	65	68
4	Sept	16	26	35	18	26	33	43	43	45
5	Oct	21	35	25	22	34	22	33	32	26
6	Nov	13	36	20	16	28	18	26	24	28
	Total	245	314	321	259	328	317	358	343	351

(Source : Panchayat Samittee, Karjat, Shrigonda and Jamkhed)

3.B.4 Soils

The examination of soils in Karjat, Shrigonda and Jamkhed tahsils reveals that there are having higher proportion of shallow soils. The black soils observed in some part of Karjat and Shrigonda tahsils.

3.B.5 Land utilization

Table 3.3 presents the data on land utilization pattern of Karjat, Shrigonda and Jamkhed tahsils for the year 2018.

It is apparent that the total geographical area of Karjat, Shrigonda and Jamkhed tahsils were 150361.00, 160381.00 and 87862.0 hectares respectively. The area under forest were 13171.62, 15188.08 and 3804.42 hectares, respectively.

Table 3.3 Land utilization pattern of Karjat, Shrigonda and Jamkhed tahsils

Sr No	Particulars	Karjat		Shrigonda		Jamkhed	
		Area (in ha) year 2018	Proportion to TGA	Area (in ha) year 2018	Proportion to TGA	Area (in ha) year 2018	Proportion to TGA
1	Total geographical area	150361.00	100.00	160381.00	100.00	87862.00	100.00
2	Forest	13171.62	8.76	15188.08	9.47	3804.42	4.33
3	Area under cultivation	110244.68	73.32	110743.08	69.05	58252.50	66.30
4	Cultivated waste land	601.44	0.40	9061.52	5.65	7424.33	8.45
5	Land put to non-agriculture use	33304.96	22.15	2710.43	1.69	10719.16	12.20
6	Fallow	9517.85	6.33	8403.96	5.24	22229.08	25.30
7	Irrigated	27816.78	18.50	36615.00	22.83	14497.23	16.50
a.	Well	18398.00	66.14	27197.62	74.28	9168.04	63.24
b.	Lift	9418.76	33.86	9417.37	25.72	5356.72	36.95
8	Dry land	82427.9	54.81	74128.08	46.21	73184.77	83.29

Source : Statistical abstract of Ahmednagar district-2018

Note : Total Geographical Area (TGA)

The land put to non-agricultural uses were 33304.96, 2710.43 and 10719.16 and fallow land was 9517.85, 8403.96 and 22229.08 respectively. The land under forest and fallow waste land generally formed the source of grazing to the goat. Since the goat owners usually take their flocks to such lands for grazing. Importantly, the area under cultivation 110244.68, 110743.08 and 58252.50 ha in which irrigated area was

27816.78, 36615.00 and 14497.23 ha and dry area was 82427.9, 74128.08 and 73184.77 ha during the year 2019.

3.B.6 Cropping pattern

The cropping pattern of Karjat, Shrigonda and Jamkhed tahsils indicated in table 3.4

Table 3.4 Cropping pattern of Karjat, Shrigonda and Jamkhed tahsils

Sr. No.	Crops	Karjat		Shrigonda		Jamkhed	
		Area under the crop(ha)	Per cent to G.C.A	Area under the crop(ha)	Per cent to G.C.A	Area under the crop(ha)	Per cent to G.C.A
1	Jawar (Kharif & Rabi)	76586.97	69.47	83511.35	75.41	40421.40	69.39
2	Bajara	3483.73	3.16	2392.05	2.16	1112.62	1.91
3	Maize	1212.69	1.10	1853.21	1.67	1537.86	2.64
4	Wheat	8136.05	7.38	8283.58	7.48	2318.44	3.98
	Total cereals	89419.44	81.11	96040.19	86.72	45390.32	77.92
5	Gram	1212.69	1.10	1218.17	1.10	1823.30	3.13
6	Other pulses	2315.13	2.10	1247.45	1.12	1497.08	2.57
	Total pulses	3527.82	3.20	2465.62	2.22	3320.38	5.70
7	Groundnut	2778.16	2.52	2790.72	2.52	1223.30	2.10
	Total oil seeds	2778.16	2.52	2790.72	2.52	1223.30	2.10
8	Cotton	6614.68	6.00	1478.96	1.33	2737.86	4.70
9	Sugarcane	5589.40	5.07	5946.90	5.37	4427.19	7.60
10	Onion	2315.13	2.10	2020.69	1.82	1153.39	1.98
	Total non food crops	14519.21	13.17	9446.55	8.52	8318.44	14.28
	Gross cropped	110244.68	100	110743.08	100	58252.50	100

(Source: Agriculture division, Panchayat Samittee, Karjat, Shrigonda and Jamkhed tahsils)

Note: Gross Cropped Area (GCA)

It can be seen from the table 3.4 that 81.11 per cent, 86.72 per cent and 77.92 per cent of gross cropped area is occupied by cereals in Karjat, Shrigonda and Jamkhed tahsils respectively. The area was occupied by cash crops such as sugarcane, (5.07, 5.37 and 7.60 %) cotton (6.00, 1.33 and 4.07 %) and onion (2.10, 1.82 and 1.98 %) and rest is under pulse crops (3.20, 2.22 and 5.70 %) and oilseed crops(2.52, 2.52 and 2.10 %). The Jowar appears to be the major crop sharing 69.47, 75.41 and 69.39 per cent of the gross cropped area.

3.B.7 Population

The relevant population data in respect of Karjat, Shrigonda and Jamkhed tahsils are presented in table 3.5.

Table 3.5 Population of Karjat, Shrigonda and Jamkhed tahsils

Sr. No.	Particulars	Karjat	Shrigonda	Jamkhed
		Population ('000)	Population ('000)	Population ('000)
1	Total	235792	284841	158380
2	a) Male	123225	148296	82470
	b) Female	112567	136545	75910
3	Urban population	11659	11393.64	34017
4	Rural population	224133	273447.36	124363
5	Urban population (%)	4.95	4.00	21.48
6	Rural population (%)	95.05	96.00	78.52
7	Literacy Percentage	75.63	73.48	69.77

(Source: 2011 Census Reports of Ahmednagar district)

The total population of Karjat, Shrigonda and jamkhed are 235792, 284841 and 158380 ,respectively according to 2011 census. Comprising of 123225, 148296 and 82470 males respectively and 112567, 136545 and 75910 females respectively. The percentage of rural population in the Karjat, Shrigonda and Jamkhed tahsils was 95.05, 96.00 and 78.52 per cent, respectively. The percentage of urban population in the Karjat, Shrigonda and Jamkhed tahsils was 4.95,4.00 and 21.48 per cent, respectively. The literacy percentage in the Karjat, Shrigonda and Jamkhed tahsils was 75.63, 73.48 and 69.77, respectively.

3.B.8 Livestock population

Livestock production forms an important activity next to crop production in rural areas of the tahsils. The details of livestock population in the year 2019 is given in table 3.6.

The total livestock population in Karjat, Shrigonda and Jamkhed was 26165, 257507 and 124455, respectively. The total cattle population in Karjat, Shrigonda and Jamkhed was 115559, 104551 and 58891, respectively and in case of buffaloes population was 12398, 25942 and 16559 respectively. However in case of sheep population in these districts were 38705, 26442 and 2322, respectively. The total goat

population in Karjat, Shrigonda and Jamkhed was 95003, 100572 and 46683, respectively. The poultry population was 324000, 421000 and 226000, respectively.

Table 3.6 Livestock population of Karjat, Shrigonda and Jamkhed tahsils

Sr. No.	Livestock	Karjat	Shrigonda	Jamkhed
1	Cattle	115559	104551	58891
2	Buffalow	12398	25942	16559
3	Sheep	38705	26442	2322
4	Goats	95003	100572	46683
5	Total livestock	261665	257507	124455
6	Poultry birds	324000	421000	226000

(Source :Livestock Census Report, 2019)

3.B.9 General information of the selected villages

The location of village and its infrastructural facilities is indicate background on which the goat rearing activity is being undertaken in the villages such information of sample villages is given below. First two villages under Karjat, two villages under Shrigonda and other two under Jamkhed tahsil respectively. The sample was collected under these three tahsil shown in the map of Ahmednagar district (Fig. 1).

1. Kuldharan

The village is situated 16 km away from Karjat tahsil to West side. The village has a grampanchayat, primary school, secondary school, primary health centre and veterinary clinic centre. There is a co-operative credit society. The village has also a branch of Bank of Badoda. The village has also a milk co-operative society.

2. Dhalwadi

The village is situated 19 km away from Karjat toward West side. The village has a grampanchayat, primary school, secondary school and and Co-operative credit Society.

3. Bhavadi

It is situated about 15 km away from Shrigonda towards East. The village has a grampanchayat, Primary school and a co-operative credit society.

4. Kokangaon

The village is situated about 17 km away from Shrigonda towards East. The village has grampanchayat, primary school and village co-operative credit society and milk co-operative society centre.

5. Kharda

The village is situated 20 km away from Jamkhed tahsil to the west. The village has a grampanchayat, primary school, secondary school, primary health centre and veterinary clinic centre. There is a co-operative credit society.

6. Sarola

The village is situated 46 km away from Jamkhed toward West side. The village has a grampanchayat, primary school, secondary school and and Co-operative credit Society.

4. RESULT AND DISCUSSION

This chapter has been faithful to explain the results of data analysis in relation to the objectives under study. The chapter has been therefore designed consider the background information of sample goat rearers, capital investment in goat rearing, labour utilization, grazing and fodder expenses, item wise cost of maintenance of goat, returns from goat enterprise; break -even point analysis of the sample goat flocks. It must be designate that the results presented in the chapter pertain to the calendar year 2020-21.

4.1 Background information of sample goat rearers

4.1.1 Family size

In the rural areas, family members are generally assist both in agricultural production and subsidiary occupations. It would, therefore, be necessary to study the composition of family and its details. The average number of adult males, adult females and children per family are given separately in Table 4.1. It is seen that on an average the size of family was 4.82 members consisting of 1.22 males, 1.32 females and 2.28 children. The average size of family was 4.69, 4.79 and 4.99 in the case of small, medium and large size groups of flock owners respectively. It is thus clear that the average size of family was a bit large in the case of medium class followed by large class and small size groups of flock owners.

Table 4.1 Family size and its composition

Sr. No.	Particulars	Small	Medium	Large	Overall
1	Adult male	1.17 (25.00)	1.20 (25.00)	1.30 (26.05)	1.22 (25.32)
2	Adult female	1.22 (26.00)	1.37 (28.60)	1.37 (27.46)	1.32 (27.38)
3	Children	2.30 (49.00)	2.22 (46.40)	2.32 (46.49)	2.28 (47.30)
	Total	4.69 (100.00)	4.79 (100.00)	4.99 (100.00)	4.82 (100.00)

(Figures in parentheses indicate percentage to total)

4.1.2 Education

It is noted that the percentage of illiterate goat rearer varied from 23.45 to 33.48 per cent with an overall of 27.65 per cent. It is thus clear that the number of goat rearer who did not receive any education was quite considerable. It is also seen that the

percentage of goat rearer who took education at overall level was 72.30 per cent. The percentage of up to primary literate goat rearer varied from 40.93 to 35.07 per cent with an overall of 37.75 per cent. The percentage of up to secondary literate goat rearer varied from 23.04 to 19.63. The percentage of up to degree literate goat rearer varied from 8.41 to 15.99 per cent with an overall level was 13.65 per cent. The important point which can be noted from this is that the literacy percentage was high in the case of sample goat rearer.

Table 4.2 Educational status of goat rearers

Sr. No.	Particular	Small	Medium	Large	Overall
1	Upto Primary	1.92 (40.93)	1.80 (37.57)	1.75 (35.07)	1.82 (37.75)
2	Upto Secondary	0.92 (19.63)	0.95 (19.83)	1.15 (23.04)	1.01 (20.95)
3	Upto degree level	0.75 (15.99)	0.80 (16.74)	0.42 (8.41)	0.66 (13.65)
4	Illiterate	1.10 (23.45)	1.44 (30.06)	1.67 (33.48)	1.33 (27.65)
	Total	4.69 (100.00)	4.79 (100.00)	4.99 (100.00)	4.82 (100.00)

(Figures in parentheses indicate percentage to total)

4.1.3 Land use pattern

Land is the basic factor of agriculture. In Indian villages the economic and social living of the individual is mostly dependent on the size of his land holding. The size of land holding refers to the number of hectares of land owned by farmers. The data on average land holdings of sample goat rearer have been presented in Table 4.3. It is seen that average size of holding at the overall level came to 0.73 hectares and of the total holding the proportion of un irrigated and irrigated land was 5.48 and 86.30 per cent, respectively. As regards size class wise land use pattern, it is noted that the average size of holding was larger i.e. 0.98 ha. in case of small size class followed by large (0.74 ha) and medium size class (0.46 ha) of flock owners. A point of interest is that of the proportion of irrigated area was more in the case of large size class followed by small and medium size of classes of flock owners it is seen that the average cropping intensity at the overall level worked out to 129.02 per cent.

**Table 4.3 Land use pattern according to size classes of sample goat rearers
(Area in ha/farm)**

Sr. No.	Particulars	Size Groups			
		Small	Medium	Large	Overall
1	Total land holding	0.98 (100)	0.46 (100)	0.74 (100)	0.73 (100)
2	Permanent fallow	0.08 (8.16)	0.04 (8.70)	0.07 (9.46)	0.06 (8.22)
3	Operational holding	0.90 (91.84)	0.42 (91.30)	0.67 (90.54)	0.67 (91.78)
a.	Irrigated	0.80 (81.63)	0.42 (91.30)	0.64 (86.49)	0.63 (86.30)
b.	Unirrigated	0.10 (10.20)	0.00 (0.00)	0.03 (4.05)	0.04 (5.48)
4	Net cropping Area	0.90 (91.84)	0.42 (91.30)	0.67 (90.54)	0.67 (91.78)
6	Gross crop area	1.17	0.56	0.86	0.86
7	Cropping intensity (%)	130.37	133.33	128.36	129.02

(Figures in parentheses indicate percentage to total)

Among the groups, cropping intensity was higher in case of medium size (133.33 %) class followed by small size class (130.37 %) and large size class (128.36 %) respectively.

4.2 Physical investment in goat enterprise

The information on the number of goats, possessed by the goat rearer according to their size classes has been given in table 4.4. It is seen that the average size of flock 7.60, 14.70 and 24.93 in case of small, medium and large size classes of flocks, respectively.

Table 4.4 Physical investment in goat rearing

Sr. No.	Particulars	(qty)			
		Small	Medium	Large	Overall
1	Goats	7.60	14.70	24.93	15.53
2	Byre	1.03	1.17	1.27	1.16
3	Ghameli/buckets	2.40	3.73	4.40	3.51
4	Axe	1.07	1.37	1.93	1.46
5	Sickle	1.67	2.10	2.23	2.00
6	Milk cans	0.50	0.93	1.30	0.91

The average size classes of flock at the overall level were 15.53. Other physical inputs are byre, ghameli/ bucket, axe, sickle and milk cans which is require highest number in large size group as compare to other small and medium class.

4.2.1 Investment per flock

The flock stock, byre and equipment are major item of fixed capital investment in goat enterprise.

Table 4.5 Fixed capital investment in goat rearing (Rs/flock)

Sr. No.	Particulars	Flock size			
		Small	Medium	Large	Over all
I	Herd stock	13200.00 (60.64)	16466.67 (61.12)	20833.33 (62.18)	16833.33 (62.03)
II	Byre	8066.67 (37.06)	9766.67 (36.25)	11766.66 (35.12)	9600.00 (35.37)
III	Equipment				
i)	Ghameli/bucket	291.67 (1.34)	361.00 (1.34)	527.33 (1.57)	393.33 (1.45)
ii)	Axe	67.67 (0.31)	123.33 (0.46)	76.67 (0.23)	89.22 (0.33)
iii)	Sickle	111.33 (0.51)	158.00 (0.59)	243.33 (0.73)	170.89 (0.63)
iv)	Milk can	31.67 (0.15)	67.00 (0.25)	59.67 (0.18)	52.78 (0.18)
	Subtotal (III)	502.34 (2.31)	709.33 (2.63)	907.00 (2.71)	706.22 (2.59)
	Total (I+II+III)	21769.01 (100.00)	26942.67 (100.00)	33506.99 (100.00)	27139.55 (100.00)

(Figures in parentheses indicate percentage to total)

The data on fixed capital investment per flock and per goat according to size of classes of flocks have been given the table 4.5 and 4.6. It is revealed that the total fixed investment per flock at the overall levels was ₹ 27139.55. The investment was the highest in large size group ₹ 33506.99 followed by medium size group ₹ 26942.67 and the small size group ₹ 21759.01.

The most important item of capital investment was the flock stock which alone accounted 62.03 per cent of the total fixed investment at the overall level. It was followed by the byre which shared 35.37 per cent of the total investment. The equipments, however, accounted for hardly 2.59 per cent of the total investment. In the

case of small goat group, the value of flock stock was 60.64 per cent of the total investment. In case of medium goat group, the value of flock stock was 61.12 per cent of the total investment.

However, the proportion of investment in byre was more in the case of small size class than the medium and large size group of flocks. It is also noted that the ghameli or basket and sickle were the major items of equipments required for goat rearing. The absolute investment in such equipments ranged from ₹ 502.34 in small group to ₹ 907.00 in case of large group of flocks.

4.2.2 Per goat investment

The per goat average investment is presented in table 4.6.

Table 4.6 Fixed capital investment in goat rearing

(Rs/goat)

Sr. No.	Particulars	Flock size			
		Small	Medium	Large	Over all
I	Herd stock	1736.84 (60.64)	1120.18 (31.31)	835.67 (32.75)	1083.92 (33.03)
II	Byre	1061.40 (37.06)	664.40 (18.57)	471.99 (18.50)	618.16 (18.84)
III	Equipment				
i)	Ghameli/bucket	38.38 (1.34)	24.56 (0.69)	21.15 (0.83)	25.33 (0.77)
ii)	Axe	8.90 (0.31)	8.39 (0.23)	3.08 (0.12)	5.75 (0.18)
iii)	Sickle	14.65 (0.51)	10.75 (0.30)	9.76 (0.38)	11.00 (0.34)
iv)	Milk can	4.17 (0.15)	4.56 (0.13)	2.39 (0.09)	3.40 (0.10)
	Subtotal (III)	66.10 (2.31)	48.25 (1.35)	36.38 (1.43)	45.47 (1.39)
	Total (I+II+III)	2864.34 (100.00)	3578.04 (100.00)	2551.94 (100.00)	3281.69 (100.00)

(Figures in parentheses indicate percentage to total)

It is revealed that the capital investment per goat was ₹ 2864.34, ₹ 3578.04 and ₹ 2551.94 in the case of small, medium and large size group of flocks, respectively. The per goat fixed capital investment at the overall level was ₹ 3281.69. Even though per goat fixed capital investment did not show much variation among the size group of flocks, the investment in byre and equipment showed declining trend with an increase in

the size group of flocks. To sum up, it can be said that the flock stock was the major item of fixed cost capital investment followed by the investment in byre and equipment in goat rearing.

4.3 Labour utilization

Labour is an important determinant of the cost of goat rearing. The supply of labour is from two sources like family and hired. It is generally said that the goat rearing increases the employment opportunities to the family members. The important items of work for labour in goat rearing are grazing and maintenance of kids, cleaning of byres and miscellaneous works relating to goat rearing.

The data on utilization of labour per flock per annum for different activities in goat rearing according to size classes of flocks are presented in table 4.7. It is revealed that the per flock labour utilization for different activities such as grazing, maintenance of kids and byre, at overall level was 162.92 days. It constituted labour of 30.36 male day and 132.57 female days. Of the total labour use at the overall level, 92.72 per cent of labour was required for grazing of goat, 7.28 per cent of labour for maintenance of kids and byre. This means that grazing of goat is an important activity which alone required bulk of labour in goat rearing. It is also noted that the total labour use per flocks showed increasing trends as the size group of flock increased as expected.

The total labour use per flocks, at the overall level, the share of female and male labour was 81.37 and 18.63 per cent respectively. The female labour had the highest share (81.37 %) in the total labour use per flock at the overall level. The male labour accounted for 18.63 per cent of the total labour use. As regards the proportion of labour used for different activities among the groups of flocks, it is seen that there was no variation in labour use required for grazing of goat and maintenance of kids and byre. Table 5.8 presents the information on average labour used per goat per annum for different activities in goat rearing. It is noted that the total labour used per goat was 25.13, 21.57 and 16.95 days in the case of small, medium and large size groups of flocks, respectively with an average of 19.70 days.

Table 4.7 Average labour used per flock and per goat in goat rearing

Group	Grazing		Total	Maintenance of kids		Total	Total		Total
	Female	Male		Female	Male		Female	Male	
Per flock									
Small	80.00	15.80	95.80 (92.32)	5.07	2.90	7.97 (7.68)	85.07 (81.98)	18.66 (17.79)	103.77 (100.00)
Medium	126.03	25.43	151.47 (93.27)	5.87	5.07	10.93 (6.73)	131.90 (81.22)	30.50 (18.78)	162.40 (100.00)
Large	171.73	34.20	205.93 (92.51)	9.00	7.67	16.67 (7.49)	180.73 (81.19)	41.87 (18.81)	222.60 (100.00)
Overall	125.92	25.14	151.07 (92.72)	6.64	5.21	11.86 (7.28)	132.57 (81.37)	30.36 (18.63)	162.92 (100.00)
Per goat									
Small	19.37	3.83	23.20 (92.32)	1.23	0.70	1.93 (7.68)	20.60 (81.98)	4.53 (17.79)	25.13 (100.00)
Medium	16.74	3.38	20.12 (93.27)	0.78	0.67	1.45 (6.73)	17.52 (81.22)	4.05 (18.78)	21.57 (100.00)
Large	13.08	2.60	15.68 (92.51)	0.69	0.58	1.27 (7.49)	13.76 (81.19)	3.19 (18.81)	16.95 (100.00)
Overall	15.23	3.04	18.27 (92.73)	0.80	0.63	1.43 (7.27)	16.03 (81.37)	3.67 (18.63)	19.70 (100.00)

(Figures in parentheses indicate percentage to the total)

It is thus clear that per goat total labour use showed decline with an increase in the size group of flocks indicating the economics of scale in use of labour for grazing and maintenance of kids and byres on an average came to 18.27 and 1.43 days, respectively.

4.4 Cost of maintenance of goat

The maintenance cost of goat includes expenses on labour, fodder/ grazing, veterinary aids, depreciation of byre and equipments, interest on working and fixed capital, losses due to death of goat and miscellaneous charges. The data on average total cost of goat rearing per flock and per goat in different size groups are worked out and presented in table 4.8 and 4.9. It can be seen from table 4.8 that per flock cost of goat rearing was ₹ 65801.07 at the overall level per annum.

Table 4.8 Cost of maintenance of goat

Sr No.	Particulars	Size of flock			
		Small	Medium	Large	Over all
1	Depreciation on goat	2015.08 (6.01)	3423.14 (4.74)	3892.71 (4.19)	3110.31 (4.73)
2	Depreciation on shed	655.11 (1.95)	881.92 (1.22)	1189.21 (1.28)	908.74 (1.38)
3	Depreciation on equipment	90.63 (0.27)	135.48 (0.19)	170.58 (0.18)	132.56 (0.20)
4	Interest on fixed capital	2176.90 (6.49)	2694.26 (3.73)	3350.69 (3.61)	2713.95 (4.12)
A	Fixed cost (1 to 4)	4938.44 (14.73)	7134.80 (9.88)	8603.19 (9.27)	6865.56 (10.43)
5	Green & dry fodder	3195.61 (9.62)	6533.66 (9.95)	7748.01 (9.10)	5824.75 (8.87)
6	Concentrate	200.00 (0.60)	400.00 (0.55)	700.00 (0.75)	433.36 (0.66)
7	Human labour	22806.50 (68.02)	55128.33 (76.36)	71050.75 (76.52)	49661.86 (75.47)
8	Medicine	83.60 (0.25)	132.30 (0.18)	186.90 (0.20)	134.27 (0.20)
9	Miscellaneous expenditure	129.95 (0.39)	171.00 (0.24)	201.00 (0.22)	167.31 (0.25)
10	Interest on working capital	2176.90 (6.49)	2694.27 (3.73)	4357.40 (4.69)	2713.96 (4.12)
B	Variable Cost (5 to 10)	28592.56 (85.27)	65059.56 (90.12)	84244.06 (90.73)	58935.51 (89.57)
	Total Cost (A+B)	33531.00 (100.00)	72194.36 (100.00)	92847.25 (100.00)	65801.07 (100.00)

(Figures in parentheses indicate percentage to total)

It is quite obvious that per flock total cost of goat rearing increased with an increase in flock size. Per flock average total cost of maintenance of goat was ₹ 33531.00, ₹ 72194.36 and ₹ 92847.25 in respect of small, medium and large group of flocks, respectively of the total cost of maintenance of goat at the overall level. The working cost includes the human labour charges, fodder/grazing charges, veterinary aids, miscellaneous charges and interest on working capital shared 89.57 per cent of the total cost while the fixed cost such as interest on fixed capital, depreciation on goat, byre and equipments accounted for 10.43 per cent. The proportion of working cost to the total cost of maintenance is higher in large size flocks and lower in small size flocks. While that of fixed capital is lower in small size flocks and higher in large size flocks. It is important to point out that the expenses on labour grazing and fodder were the major items of working

cost. While the interest on fixed capital and depreciation on goat and byre, were the important items of fixed cost in goat rearing. It is noted that on an average the expenses on labour alone share 75.47 per cent of total working cost while the share of grazing and foddors in the working cost came to 8.87 per cent similarly, the share of depreciation on goat, depreciation on byre, depreciation on equipment and interest on fixed capital cost in the fixed cost at the overall level was 4.73, 1.38, 0.20 and 4.12 per cent, respectively. The picture of average cost of maintenance of goat would be more clear if we examine data on per goat basis contained in table 4.9.

Table 4.9 Cost of maintenance of goat

Sr No.	Particulars	Size of flock			
		Small	Medium	Large	Over all
1	Depreciation on goat	265.14 (6.01)	232.87 (4.74)	156.15 (4.19)	200.28 (4.73)
2	Depreciation on shed	86.20 (1.95)	59.99 (1.22)	47.70 (1.28)	58.52 (1.38)
3	Depreciation on equipment	11.93 (0.27)	9.22 (0.19)	6.84 (0.18)	8.54 (0.20)
4	Interest on fixed capital	286.43 (6.49)	183.28 (3.73)	134.40 (3.61)	174.76 (4.12)
A	Fixed cost (1 to 4)	649.79 (14.73)	485.36 (9.88)	345.09 (9.27)	442.08 (10.43)
5	Green & dry fodder and grazing	420.48 (9.62)	444.47 (9.95)	310.79 (9.10)	375.06 (8.87)
6	Concentrate	26.32 (0.60)	27.21 (0.55)	28.08 (0.75)	27.90 (0.66)
7	Human labour	3000.86 (68.02)	3750.23 (76.36)	2850.01 (76.52)	3197.80 (75.47)
8	Medicine	11.00 (0.25)	9.00 (0.18)	7.50 (0.20)	8.65 (0.20)
9	Miscellaneous expenditure	17.10 (0.39)	11.63 (0.24)	8.06 (0.22)	10.77 (0.25)
10	Interest on working capital	286.43 (6.49)	183.28 (3.73)	174.79 (4.69)	174.76 (4.12)
B	Variable Cost(5 to 10)	3762.18 (85.27)	4425.82 (90.12)	3379.22 (90.73)	3794.95 (89.57)
	Total Cost (A+B)	4411.97 (100.00)	4911.18 (100.00)	3724.32 (100.00)	4237.03 (100.00)

(Figures in parentheses indicate percentage to total)

It is noted that per goat average total cost of maintenance per annum come to ₹ 4411.97, ₹ 4911.18 and ₹ 3724.32 in the case of small, medium and large group of flocks respectively. This was ₹ 4237.03 at over all level.

4.5 Gross returns from goat rearing

4.5.1 Return in physical units

Gross returns in goat rearing included the income from sale of goat, manure and milk. At first the returns in physical quantities have been assessed for different size group of flocks. The annual returns under these items have been presented in table 4.10

Table 4.10 Gross return in physical units in different size groups of flocks

Sr. No.	Particulars	Flock size			
		Small	Medium	Large	Over all
	Per flock				
1	Sale of goats (No.)	10.03	12.43	16.53	13.00
2	Manure (kg.)	913.33	1436.67	1453.33	1267.78
3	Milk (lit.)	64.87	130.66	189.37	128.30
	Per goat				
1	Sale of goats (No.)	1.32	0.85	0.66	0.84
2	Manure (kg.)	120.18	98.40	58.30	81.63
3	Milk (lit.)	8.54	8.95	7.60	8.26

It is seen that at an overall level per flock sale of goat was 13.00 goats. The quantity of manure obtained from goat, was 1267.78 kg at over all level and while that of milk was 128.30 lit. Per flock sale of goat, manure and milk showed increase with an increase in size of flock which is quite acceptable. On examination of data on per goat basis, it is seen that average annual production of milk was 8.26 litters.

However, the goat wise milk yield varies from 8.54 lit. (small), to 7.60 lit. (large). It was due to higher feeding to kids in view to obtain fast growth. On an average, manure obtained per goat was 81.63 kg per annum and sale of goat was 0.84 in numbers and per goat quantity of milk is decreased with an increase in the flock size.

4.5.2 Returns in monetary terms

The returns from goat rearing have been worked out in monetary terms. It included value of goat sold, manure and milk. The annual gross returns from the above sources per flock and per goat are presented in table 4.11.

Table 4.11 Source wise average annual income (Rs)

Sr. No.	Particulars	Flock size			
		Small	Medium	Large	Over all
	Per flock				
1	Sale of goat	64250.00 (93.84)	98283.33 (92.62)	156866.67 (92.88)	106466.67 (92.99)
2	Manure	2271.67 (3.32)	3906.67 (3.68)	6311.67 (3.74)	4163.33 (3.64)
3	Milk	1948.33 (2.85)	3926.67 (3.70)	5710.00 (3.38)	3861.67 (3.37)
4	Gross return	68470.00 (100.00)	106116.67 (100.00)	168888.33 (100.00)	114491.67 (100.00)
	Per goat				
1	Sale of goat	8453.95 (93.84)	6685.94 (92.62)	6292.28 (92.88)	6855.00 (92.98)
2	Manure	298.90 (3.32)	265.76 (3.68)	253.17 (3.74)	268.08 (3.63)
3	Milk	256.36 (2.85)	267.12 (3.70)	229.04 (3.38)	248.66 (3.37)
4	Gross return	9009.21 (100.00)	7218.82 (100.00)	6774.50 (100.00)	7372.29 (100.00)

(Figures in parentheses indicate percentage to total)

It is apparent that annual gross returns from different sources in goat rearing per flock at over all level came to ₹ 114491.67, of the total gross returns, the sale of goat shared 92.99 per cent, while that of milk shared 3.37 per cent. This indicates that sale of goat is the major sources of income in goat rearing. The next an important sources of income were manure 3.64 per cent. The gross returns from different sources were ₹ 68470.00, ₹ 106116.67 and ₹ 168888.33 in the case of small, medium and large size group of goat, respectively. On examination of proportions of income from different sources amongst the size classes, it is observed that the percentage of income received from sale of goat was maximum in large size class followed by medium and small size class. However, in the case of other sources of income, there were no much variations in proportions of income received among different size classes of goat flocks.

It may give better view if we examine the sources wise average annual income per goat in different size of classes of flocks presented in Table 4.11 the per goat gross returns from different sources, at overall level were ₹ 7372.29. Per goat gross return were ₹ 9009, ₹ 7218.82 and ₹ 6774.50 in the case of small, medium and large size classes

of flocks, respectively indicating that per goat gross returns were maximum in the case of small size group. As indicated earlier, the sale of goat were major source of income in goat rearing. The receipts due to sale of goat are maximum for small size of flocks. The result were conformity with the result obtained by Prabakaran and Thirunavakkarasu (1994) with net income.

4.6. Flock efficiency measures

4.6.1 Profitability

The profitability in goat rearing was worked out by estimating the returns both at working cost and total costs. The relevant data in this regard presented in table 4.12.

It is noted that per flocks net profit over total cost were ₹ 34939.00, ₹ 33922.31 and ₹ 76041.08 in the cases of small, medium and large size classes of goat respectively, with an overall average of ₹ 48690.60. On examination of per goat net returns over total costs, were ₹ 4597.24, ₹ 2307.87 and ₹ 3050.18 in the cases of small, medium and large size classes of goat respectively, with an overall average of ₹ 3135.26.

Table 4.12 Gross and Net profit from goat rearing (Rs)

Sr. No.	Particulars	Flock size			
		Small	Medium	Large	Over all
	Per flock				
1	Gross return	68470.00	106116.67	168888.33	114491.67
2	Variable cost	28592.56	65059.56	84244.06	58935.51
3	Fixed cost	4938.44	7134.80	8603.19	6865.56
4	Total cost	33531.00	72194.36	92847.25	65801.07
5	Operating income	39877.44	41060.44	84644.27	55556.16
	Net profit	34939.00	33922.31	76041.08	48690.60
	Per goat				
1	Gross return	9009.21	7218.82	6774.50	7372.29
2	Variable cost	3762.18	4425.82	3379.22	3794.95
3	Fixed cost	649.79	485.36	345.09	442.08
4	Total cost	4411.97	4911.18	3724.32	4237.03
5	Operating income	5247.03	2793.23	3395.28	3577.34
	Net profit	4597.24	2307.87	3050.18	3135.26

It is observed that the goat maintenance cost was quite higher because of relative more expenses towards labour, concentrate and fodder charges in the medium size flocks which were the reason for getting minimum returns over total cost.

4.6.2 Output-input ratio

The efficiency of operating the goat enterprise has been examined by comparing the output-input ratios in different size groups of flocks. The ratios are given in table 4.13 at the overall level, the output-input ratio was 1.94 and 1.74 at the working and total cost, respectively. The output-input ratio at working cost was 2.30, 1.63 and 2.00 in the case of small, medium and large size classes of flocks respectively. This ratio at the total cost however was 2.04, 1.46 and 1.82 in the small, medium and large size classes of goat, respectively. The output-input ratio has less in medium size flocks and higher in small size flocks.

Table 4.13 Output-input Ratio in goat rearing

Sr. No.	Particulars	Flock size			
		Small	Medium	Large	Over all
	Per flock				
1	Working cost	2.30	1.63	2.00	1.94
2	Total cost	2.04	1.46	1.82	1.74
	Per goat				
1	Working cost	2.30	1.63	2.00	1.94
2	Total cost	2.04	1.46	1.82	1.74

This ratio at the total cost however was 2.04, 1.46 and 1.82 in the small, medium and large size classes of goat, respectively. The output-input ratio has less in medium size flocks and higher in small size flocks.

4.7 Price spread and marketing channels in goat marketing

In the marketing channels of goat many intermediaries are involved to perform various functions. By considering the costs and margins at a various level, price spread in different channels has been estimated as follows.

4.7.1 Production, retention and marketed surplus of goat

Production, retention and marketed surplus of produced goats through different channels and different groups were calculated and are presented in table 4.14.

**Table 4.14 Production, retention and marketed surplus of young goat
(No/goat unit)**

Sr. No.	Particulars	Flock size			
		Small	Medium	Large	Over all
1	Young kids	16.20 (100.00)	25.30 (100.00)	37.17 (100.00)	26.21 (100.00)
2	Retention for own rearing	3.93 (24.26)	6.60 (26.09)	10.83 (29.15)	6.86 (26.16)
3	Marketed surplus in channel-I (Producer - consumer)	2.03 (12.53)	2.00 (7.91)	2.60 (7.00)	3.07 (11.70)
4	Marketed surplus in channel-II (Producer- Village merchant-GR)	4.37 (26.98)	6.33 (25.02)	4.87 (13.09)	5.19 (19.80)
5	Marketed surplus in channel-III (Producer- Village merchant-City Butcher-consumer)	5.83 (35.99)	7.80 (30.83)	18.87 (50.76)	11.10 (42.35)
6	Total marketed surplus of young goats	12.23 (75.49)	18.70 (73.91)	26.33 (70.85)	19.36 (73.84)

(Figures in parentheses indicate percentage to total)

In regards to small size of goat unit, total share of retention for own rearing constitute 24.26 per cent and 35.99 per cent goats sold through channel-III followed by 26.98 per cent through channel-II, 12.53 per cent through channel-I, respectively. It is implied that the higher quantity of goats were sold through channel-III followed by channel-II, channel-I.

In regards to medium size of goat unit, total share of retention for own rearing constitute 26.09 per cent. The goat sold through channel-III 30.83 per cent, followed by 25.02 per cent, and 7.91 per cent through channel-II, and channel-I, respectively. It implied that the higher quantity of goat in this group sold through channel-III.

In regards to large size of goat flock, total share of retention for own rearing institute 29.15 per cent, 50.76 per cent goat sold through channel-III, followed by 13.09, and 7.00 per cent goat through channel-II, and channel-I, respectively. It inferred that higher quantity in this group was sold through channel-III.

In overall size of goat unit, total share retention for own rearing constitute 26.16 per cent. About 42.35 per cent goat sold through channel-III followed by 19.80, and 11.70 per cent through channel-II and channel-I, respectively. It implied that higher quantity of goat in this group was sold through channel-III. Total marketed

surplus was 75.49, 73.91, 70.85 and 73.84 per cent in small size of goat unit, medium size of goat unit, large size of goat and overall size of goat units, respectively.

4.7.2 Cost incurred by producer in marketing of young goat

Cost incurred by producer in marketing of young goat was calculated and is presented in table 4.15. The results revealed that, cost incurred by producer for one was higher in channel-I ₹ 29.37 as compared to channel-III ₹ 21.88, and channel-II ₹ 20.88

In regards to channel-I, proportionate of expenditure on labour charge was 48.01 per cent followed by other charges 39.39 per cent and so on.

Table 4.15 Cost incurred by producer in marketing of goat

Sr. No.	Particulars	(Rs/goat unit)		
		Channel-I	Channel-II	Channel-III
1	Labour charge	14.10 (48.01)	15.55 (74.47)	16.58 (75.78)
2	Weighing charge	3.70 (12.60)	0.00 (0.00)	0.00 (0.00)
3	Other	11.57 (39.39)	3.98 (19.06)	5.30 (24.22)
4	Cost incurred by producer	29.37 (100.00)	20.88 (100.00)	21.88 (100.00)

(Figures in parentheses indicate percentage to total)

Channel-I : Producer - Consumer

Channel-II : Producer - Village merchant – Goat rearer

Channel-III : Producer - Village merchant - City Butcher-Consumer

In channel-II, proportionate of expenditure on labour charge was 74.47 per cent followed by other 19.06 per cent and so on. In channel-III, proportionate of expenditure on labour charge was 75.78 per cent followed by other 24.22 per cent.

4.7.3 Cost incurred by butcher in marketing of young goat

Costs of marketing of goat incurred by butcher were calculated and are presented in table 4.16.

The results revealed that, in regards with channel-III, total marketing cost was ₹ 266.30 per goat. Proportionate share of expenditure is maximum on labour charge was 51.72 per cent followed by transportation charge 27.74 per cent, fodder 8.24 per cent, packaging charge 4.98 per cent, water charge 3.91 per cent and weighing charge

3.41 per cent. 15.00 kg chevon (goat meat) was obtained from a young goat. Hence, per kg total cost of butcher in this channel was ₹ 17.40.

Table 4.16 Cost incurred by butcher in marketing of goat

Sr. No.	Particulars	Rs/goat	Rs/kg	Per cent
A.	BUTCHER CHANNEL-III			
1.	Labour charge	135.00	9.00	51.72
2.	Transport charge	72.40	4.83	27.74
3.	Weighing charge	8.90	0.59	3.41
4.	Packaging charge	13.00	0.87	4.98
5.	Fodder	21.50	1.43	8.24
6.	Water	10.20	0.68	3.91
7.	Total cost	266.30	17.40	100.00

4.7.4 Cost of marketing of goat incurred by merchant

The cost of marketing of goat incurred by merchant were calculated and presented in table 4.17.

Table 4.17 Cost of marketing of goat incurred by merchant

Sr. No.	Particulars	Rs/goat	Per cent
A	MERCHANT (channel-II)		
1	Labour charge	84.30	43.71
2	Transport charge	76.70	39.77
3	Market fee	5.00	2.59
4	Fodder	11.70	6.07
5	Water	4.40	2.28
6	Other	10.75	5.57
	Cost incurred by Merchant in Channel-II	192.85	100.00
B	MERCHANT (channel-III)		
1	Labour charge	85.90	48.75
2	Transport charge	61.10	34.68
3	Market fee	5.00	2.84
4	Fodder	10.35	5.87
5	Water	4.00	2.27
6	Other	9.85	5.59
	Cost incurred by Merchant in Channel-III	176.20	100.00

(Figures in parentheses indicate percentage to total)

The results revealed that, in regards with the merchant in channel-II, marketing cost incurred by Merchant was ₹ 192.85 per goat, constitute expenditure on labour charges 43.71 per cent, transportation charge was 39.77 per cent, fodder charges 6.07, other charges 5.57 per cent, market fee 2.59 per cent, and water 2.28 per cent. In Channel-III, marketing cost incurred by village merchant was ₹ 176.20 per goat proportionate of expenditure on labour charge was ₹ 48.75 per cent followed by transportation charge 34.68 per cent, fodder charges 5.87 per cent, other charges 5.59 per cent, market fee 2.84 per cent and water 2.27 per cent.

4.7.5 Price spread in different channels of goat marketing

Marketing cost, marketing margin and price spread by various intermediaries in channels were calculated and are presented in table 4.18. The results including, purchase price of consumer was ₹ 5504.37 in channel-I. Cost incurred and received by produce was ₹ 26.28 and ₹ 5475.00, respectively. In the channel-I price spread was ₹ 26.28 for one purchased goat. In channel-II, purchase price of village merchant was ₹ 4995.88. Cost incurred by producer was ₹ 20.88. Hence net price received by producer was ₹ 4975.00. Cost incurred and margin of village merchant ₹ 192.85 and ₹ 261.00, respectively. Purchase price by consumer was ₹ 5701.00 for one goat. Marketing cost was ₹ 213.73 and marketing margin was ₹ 461.00. Ultimately, price spread was ₹ 674.73 for one live goat.

In channel-III, purchase price of village merchant was ₹ 5226.88. Cost incurred by producer was ₹ 21.88. Hence, net price received by producer was ₹ 5205.00. Cost incurred and margin of village merchant was ₹ 176.20 and ₹ 305.00, respectively.

Purchase price by consumer was ₹ 6262.38 per goat, marketing cost in this channel was ₹ 464.38 and marketing margin was ₹ 593.00. Price spread was ₹ 1057.38 for one live goat.

It was observed that net price received by producer in channel-I was high as compared to other channels. Hence, producer in channel-I was benefited because this is direct channel. Net price received by producer in channel-II and channel-III was low as compared to channel-I because the goats sold by producers in these were not have good quality so, there value also low. The results were given scientifically by Dixit and Shukla (1995) with respect to marketing channel.

Table 4.18 Price spread in different channels in goat marketing (Rs/Goat)

Sr. No.	Particulars	Channel		
		I	II	III
1	Price received by Producer	5475.00 (99.47)	4975.00 (88.00)	5205.00 (83.12)
2	Cost incurred by producer	29.37 (0.53)	20.88 (0.40)	21.88 (0.35)
3	Price paid by Merchant	0.00 (0.00)	4995.88 (88.00)	5226.88 (83.46)
4	Cost incurred by Merchant	0.00 (0.00)	192.85 (3.40)	176.20 (2.81)
5	Margin of Merchant	0.00 (0.00)	461.00 (8.10)	305.00 (4.87)
6	Price paid by Butcher	0.00 (0.00)	0.00 (0.00)	5708.08 (91.15)
7	Cost incurred by Butcher	0.00 (0.00)	0.00 (0.00)	266.30 (4.25)
8	Margin of Butcher	0.00 (0.00)	0.00 (0.00)	288.00 (4.60)
9	Price paid by consumer	5504.37 (100.00)	5701.00 (100.00)	6262.38 (100.00)
10	Marketing cost	26.28 (0.48)	213.73 (3.75)	464.38 (7.42)
11	Marketing margin	0.00 (0.00)	461.00 (8.09)	593.00 (9.47)
12	Price Spread (10-11)	26.28 (0.48)	674.73 (11.84)	1057.38 (16.88)

(Figures in parentheses indicate percentage to total)

4.7.6 Marketing efficiency

Marketing efficiency was worked out by using the modified method as suggested by Acharya and Agarwal in table 4.19.

From the table, it is observed that marketing efficiency was maximum for channel-I i.e., 209.45, while it was minimum for the channel-III i.e. 5.92.

Table 4.19 Marketing efficiency

Sr. No.	Marketing channels	PRP	PPC	MC	MM	MC + MM	MME
1	Channel-I (P-C)	5475.00	5504.37	26.28	0.00	26.28	209.45
2	Channel-II (P-VM-C)	4975.00	5701.00	213.73	461.00	674.73	8.45
3	Channel-III (P-VM-CBC)	5205.00	6262.38	464.38	593.00	1057.38	5.92

- Channel-I** : Producer - Consumer
Channel-II : Producer - Village merchant – Goat rearer
Channel-III : Producer - Village merchant - City Butcher-Consumer

4.8 Break-even point analysis

Break-even analysis is such a technique which is principally concerned with cost-volume-profit (CVP) analysis. It may be defined as the level of volume of business at which the total revenue equals to total cost and the net income is zero. It is balancing point-a point of no profit no loss. It is equally known as loss ceases and profit begins or profit ceases and loss begins in a particular enterprise. The table 4.20 pertains that the break-even point where the total cost and total revenue lines intersect to each other is at a point where the number of goat is 6, 11 and 23 in case of small, medium and large size classes, respectively.

Table 4.20 Break- even point in goat rearing (No. goat/flock)

Sr. No.	Group	Existing average size	As per break-even Analysis
1	Small	7.6	6
2	Medium	14.70	11
3	Large	24.93	23

This indicates that the sample flocks owners of small, medium and large size groups must keep 6, 11 and 23 goat as the minimum number simply to cover the cost of maintenance. In order to secure profit from the goat rearing the sample flocks however, should maintain higher than 6, 11 and 23 goat in case of small, medium and large size flocks, respectively.

In the present study, the break even analysis was carried out at the break-even point formulae. And the data of total revenue and total cost fitting in simple linear equations in which they are intersect each other of two straight lines was considered as the break-even point. There event diagram has been shown in Fig 4.3, 4.4 and 4.5.

4.9 Income function in goat rearing

An attempt to study income function in goat rearing has been made by fitting the multiple regression equation for the data of each 30 farmers of small, medium and large size of flocks. To establish functional relationship, the multiple regression equation of the following form was fitted for input -output data in goat rearing.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + u$$

Where,

Y = Gross return in rupees per flock

X₁ = Flock size in number of goat

X₂ = Feeding charges in rupees per flock.

X₃ = Grazing charge in rupees per flock

X₄ = Human labour used in men days per flock

X₅ = Concentrate charge in rupees per flock

X₆ = Veterinary charge in rupees per flock

a = Intercept

u = Error term N (0, σe^2)

b_i's = Regression coefficient for the ith character.

The resulted regression analysis was presented in table 4.21. The six independent variables which have been accepted for interpretation *viz.*, flock size (X₁), feeding charges (X₂), grazing charge (X₃), human labour (X₄), concentrate charge (X₅), and veterinary charge (X₆). It is seen that the co-efficient of multiple determination was estimated 0.94 at overall level. The value of co-efficient of multiple determination thus indicated that the six resources together explained 94 per cent variation in the annual gross returns from goat rearing at overall level.

The regression coefficient of flock size (X₁) was observed to be significant at 1 per cent level at the overall level. This means that increase in the size of flocks by one goat, the annual gross income from goat rearing would increased by ₹ 3123.84 at overall level. It can therefore be said that there existed a scope to increase annual gross income from goat rearing by increasing size of flock in certain level in area under study.

The regression coefficient of concentrate charge (X₅) was observed to be significant at 10 per cent level at the overall level. This means that increase in the concentrate charge by one rupee, the annual gross income from goat rearing would increased by ₹ 54.64 at overall level. It can therefore be said that there existed a scope to increase annual gross income from goat rearing by increasing concentrate charge in certain level in area under study.

The regression coefficient of veterinary charge (X_6) was observed to be significant at 10 per cent level at the overall level. This means that increase in the veterinary charge by one rupee, the annual gross income from goat rearing would increased by ₹ 235.92 at overall level. It can therefore be said that there existed a scope to increase annual gross income from goat rearing by increasing veterinary charge in certain level in area under study.

Table 4.21 Income functions in goat rearing

Sr No	Particulars	Unit	Regression coefficient			
			Small	Medium	Large	Overall
1	Flock size	₹	2225.43** (835.78)	3940.50** (1484.93)	15016.3 (163653.1)	3123.84*** (1046.32)
2	Fodder	₹	3.44 (6.06)	2.12 (1.32)	694.01* (389.49)	1.56 (2.02)
3	Grazing charge	₹	1.19 (5.49)	0.62 (0.36)	-65.42 (54.38)	-0.36 (0.29)
4	Human labour	Days	-67.47 (86.62)	258.25*** (88.98)	250.88 (157.17)	16.88 (61.85)
5	Conc. charge	₹	-10.13 (35.79)	10.08 (29.27)	7652.67* (4311.93)	54.64* (30.25)
6	Veter. charge	₹	188.86 (1517.07)	-36.26 (96.49)	5429.61 (7745.87)	235.92* (126.35)
	R^2		0.91	0.88	0.58	0.94

*, ** and *** denote Significance at 10, 5 and 1 per cent level of significance

Among the size of flock, in case of small size of flock the regression coefficient of the flock size (X_1) is positive and significant at 5 per cent level of significance. This means that increase in the size of flocks by one goat, the annual gross income from goat rearing would increased by ₹ 2225.43.

The regression coefficient of human labour (X_4), concentrate charge (X_5) was negative and non-significant. There is no scope to increase human labour. However feeding charges (X_2) and veterinary charge (X_6) were non-significant but positive, it indicate that they have positive impact on output.

In case of medium size of flock the regression coefficient of the flock size (X_1) and human labour (X_4) is positive and significant at 5 per cent and 1 per cent level of significance. This means that increase in the size of flocks by one goat and human labour by one unit, the annual gross income from goat rearing would increased by ₹ 3940.50 and 258.25 respectively.

The regression coefficient of veterinary charge (X_6) was negative and non-significant. There is no scope to increase veterinary charge. However feeding charges (X_2), grazing charge (X_3), and concentrate charge (X_5) were non-significant but positive, it indicate that they have positive impact on output.

In case of large size of flock the regression coefficient of the flock size (X_1) and concentrate charge (X_5) is positive and significant at 10 per cent level of significance. This means that increase in the size of flocks by one goat and concentrate charge by one rupee, the annual gross income from goat rearing would increased by ₹ 15016.30 and 7652.67 respectively.

The regression coefficient of grazing charge (X_3), was negative and non-significant. There is no scope to increase grazing charge (X_3). However feeding charges (X_2), human labour (X_4) and veterinary charge (X_6) were non-significant but positive, it indicate that they have positive impact on output.

To sum up, the flock size are important variables influencing the annual gross returns from goat rearing to a greater extent. It is important to point that the value of R^2 is within the range of 0.58 to 0.91 in the case of small, medium and large size groups of flocks respectively, which implies that the independent variables mentioned above jointly explained 58 to 91 per cent of variation in the annual gross returns from goat rearing in the area under study

4.10 Constraints in goat rearing

Constraints encountered by the goat rearers in study area were grouped into sub-heads like grazing land, fodder, milk marketing of young stock and goat and veterinary clinic and are presented in table 4.22.

It was observed that the shrinkage of grazing land was felt by 80.00, 83.33 and 93.33 per cent of small, medium and large flock owners respectively. The shrinkage of grazing land at the overall level was 85.55 per cent. This is evident from the fact that the private as well as Government grazing land are reducing day by day. These lands are being taken for crop cultivation or used for non-agriculture purposes. The second constraint in goat rearing is shortage of green fodder was opined by 43.33, 60.00 and 66.70 per cent of small, medium and large flock goat rearers, respectively. And in case of shortage of dry fodder was opined by 26.66, 30.00 and 30.00 per cent in small,

medium and large flock goat owner, respectively. The problem of fodders at the overall level was 85.54 per cent. Lacks of marketing facilities were expressed by 76.66, 89.99 and 90.00 per cent in small, medium and large flock goat rearers respectively. At the overall level 85.54 per cent rearer faced problem in the marketing of young stock.

Table 4.22 Constraints faced by goat rearers

(No of goat rearers)

Sr. No.	Problems	Flock size			
		Small (N=30)	Medium (N=30)	Large (N=30)	Overall (N=90)
I	Grazing land	(80.00)	(83.33)	(93.33)	(85.55)
1	Shrinkage of grazing land	24 (80.00)	25 (83.33)	28 (93.33)	77 (85.55)
II	Fodder	(69.99)	(90.00)	(96.70)	(85.54)
1	Shortage of green fodder	13 (43.33)	18 (60.00)	20 (66.70)	51 (56.66)
2	Shortage of dry fodder	8 (26.66)	9 (30.00)	9 (30.00)	26 (28.88)
III	Marketing	(76.66)	(89.99)	(90.00)	(85.54)
1	Marketing malpractices	10 (33.33)	11 (36.66)	12 (40.00)	33 (36.66)
2	Low prices of goat	7 (23.33)	10 (33.33)	9 (30.00)	26 (28.88)
3	Less availability of transport facility	6 (20.00)	6 (20.00)	6 (20.00)	18 (20.00)
IV	Veterinary clinic	(53.33)	(50.00)	(50.00)	(51.11)
1	Less availability of medical facility	16 (53.33)	15 (50.00)	15 (50.00)	46 (51.11)

(Figures in parentheses indicate percentage to total)

Timely treatment to goats against diseases was not available in the village which was also expressed by 53.33, 50.00 and 50.00 per cent in small, medium and large goat flock owners, respectively. At the overall level 51.11 per cent goat rearers faced the problem of lack of medicine.

4.11 Suggestions given by goat rearers

Suggestions given by goat rearers determined and are presented in table 4.23.

Table 4.23 Suggestions given by goat rearers

(%)

Sr. No.	Suggestions	Flock size			
		Small	Medium	Large	Overall
1	Supply of adequate fodder	63.33	66.67	70.00	66.67
2	Upgradation of grazing land	80.00	83.33	86.67	83.33
3	Provision of co-operative marketing	73.33	76.67	80.00	76.67
4	Provision of credit facilities	76.67	80.00	83.33	80.00
5	Availability of veterinary services	70.00	66.67	60.00	64.44

The non-availability of green fodder, grasses was one of the constraint faced by the goat rearers, at overall by 66.67 per cent of goat rearers. This was observed in 63.33, 66.67 and 70.00 per cent small, medium and large flock goat rearers, respectively.

The respondents put forth the suggestions that the fodder must be made available at local markets at cheaper rates. The shrinkage of grazing land, was one of the main constraints faced by the goat rearers, at over all by 83.33 per cent of goat rearers. This was observed in 80.00, 83.33 and 86.67 per cent small, medium and large flock goat rearers, respectively.

The respondents put forth the suggestions that there is a need of upgrading of grazing lands or pastures on the public lands which could be subsequently made available to the goat rearers on rent basis.

Provision of a co-operative system of marketing was felt necessary by 73.33 per cent of small, 76.67 per cent of medium and 80.00 per cent of large flock goat rearers in order to curb the clutches of middleman and check the malpractices in price fixation. At the overall 80.00 per cent of goat rearers have expressed credit facilities should be provided intensively for establishment of goat enterprises through district rural development agencies, State Bank of India and other commercial bank. Necessity of veterinary services was suggested by 70.00, 66.67 and 60.00 per cent small, medium and large flock of goat rearers, respectively, now a days goat rearers know the importance of cross breeding in goat as well as importance of stall feeding of goat and therefore there is necessity of transfer of such techniques through training and visit systems and other agencies for the benefit and development of goat rearing industry in the state.

5. SUMMARY AND CONCLUSIONS

In India, mixed farming involving crops and livestock integration has been a way of life since the dawn of cultivation. It is widely realised that in Indian agrarian economy, livestock production is an important allied sector of crop production, providing additional remuneration and employment to the small farmers and landless labourers.

India has the largest goat population in the world with 148.88 million goats. Out of 20 popular breeds of goat, Jamunapari and Barbari are the important milch breeds. The goats with low cost of maintenance, short term returns, low risk capital investment etc. by which it has been described as "poor man's cow".

The basic objectives of the present investigation was to study the maintenance cost and return from goat rearing in relation to different size of groups of flocks. Besides, it was also intended to study the factors influencing the returns from goat rearing. The aspect of constraints in goat rearing has also been studied. The specific objectives of the study were:

1. To estimate per flock and per animal maintenance costs and return in goat rearing.
2. To study the marketing practices, marketing cost and price spread of goat marketing.
3. To determine the break- even point in different size of goat flocks.
4. To study the constraints in goat rearing.

The study was exclusively based upon the primary data collected from the sample flock owners by survey method for the calendar year 2018-2019. The selection of Karjat, Shrigonda and Jamkhed tahsils from Ahemdnagar districts of Maharashtra state was done purposively. Since, it has maximum goat population in the district. In all 90 goat rearers were selected for the study. For the purpose of analysis and presentation sample flocks owners were classified in to three categories on the basis of flock size viz., small (up to 10 goat), medium (11 to 20 goat) and large (21 and above goat). The tabular method of analysis as well as regression analysis was adopted for the present study. The break-even point analysis was carried out to find out the minimum number of goat in a flock at the overall level. The role of a flocks viz., flock size (X_1), feeding charges (X_2), grazing charge (X_3), human labour (X_4), concentrate charge (X_5), veterinary charge (X_6)

was assessed on the gross returns from goat rearing by way of multiple linear regression analysis

5.1 Summary

The findings of the present investigation are briefly summarised as below

1. It is observed that the average size of flocks was 7.6, 14.70 and 24.93 in case of small, medium and large size classes of flocks, respectively, with an overall size of 15.53 goats.
2. The average family size of sample goat rearers was 3.49. The family size ranged from 3.59 to 3.32 among the three size group of goat rearers.
3. Average education level of sample goat rearers was 4.82. The education levels ranged from 4.69 to 4.99 among the small, medium and large size groups of goat rearers.
4. The average size of land holding of goat rearers was 0.73 hectares. The average size of land holding in different flock size groups was 0.98, 0.46 and 0.74 hectares for small, medium and large size groups, respectively. The average irrigated area per sample house hold was 0.63 hectares and unirrigated area was 0.04 hectares. The cropping intensity was highest in the case of medium group (133.33 %) followed by small (130.37 %) and large size group(128.36 %).
5. The per flock average fixed capital investment was ₹ 27139.55. The fixed capital investment was the highest in large size class ₹ 33506.99 followed by medium size ₹ 26942.67 and small size class of flocks ₹ 21759.01.
6. The value of the flock stock was the major item of fixed investment (62.03 %) which was followed by the value of byre (35.37 %) at the overall level. The per goat fixed capital investment was ₹ 3281.69 at the overall level. Per goat capital investment in the case of small, medium and large size groups of flocks was ₹ 2864.34, ₹ 3578.04 and ₹ 2551.94, respectively.
7. In goat rearing the human labour utilization for attending activities such as grazing and maintenance of kids and byre at the overall level was 162.92 days per flocks per annum. It constituted female labour of 132.57 human labour days and male labour of 30.36 days, of the total labour used at the overall level 92.72 per cent of labour was required for grazing of goat, 7.28 per cent for maintenance of

kids and byre. The total labour used per goat per annum worked out to 19.70 days. It is revealed that per goat total labour used showed decline with an increase in the size of the group of flocks.

8. Per flock total cost of maintenance in goat rearing was worked out to ` 65801.07 per annum at an overall level. Of this working cost and fixed cost contributed 89.57 and 10.43 per cent, respectively. The major items of working cost were labour (75.47 %), grazing or fodder (8.87 %) and concentrate charges (0.66 %) and interest on working capital (4.12 %) and interest on fixed capital (4.12 %). The cost of goat rearing on small, medium and large size was ₹ 33531.00, ₹ 72194.36 and ₹ 92847.25, respectively. The proportion of working cost was the highest i.e. 90.73 per cent in large flock size followed by medium 90.12 per cent and small flock size 85.27 per cent.
9. Per goat average cost of maintenance came to ₹ 4411.97, ₹ 4911.18 and ₹ 3724.32 per annum in the case of small, medium and large size groups of flocks with an overall of ₹ 4237.03. Thus per goat cost of maintenance was highest in medium size flock followed by small and large size group of flocks. Gross returns in goat rearing include income from sale of goat, manure and milk. Per flock sale of goat was 13.00 goats at an overall level. On flock basis, the average annual production of milk was 128.30 litres. While the manure obtained from flock was 1267.78 kg per annum. Per flock annual gross returns from different sources in goat rearing came to ₹ 114491.67 at overall level. Of the total gross return, the sale of goat shared 92.99 per cent while that of income due to milk accounted for 3.67 per cent. The next important sources of income manure which shared 3.64 per cent, respectively. The per goat annual returns from different sources were observed to be ₹ 7372.29 at an overall level. Per goat gross returns in the case of small, medium and large size groups were ₹ 9009.21, ₹ 7218.82 and ₹ 6774.50, respectively.
10. At an overall the net returns over total cost were ₹ 48690.60 per flock per annum and per goat net returns over total cost at an overall level ₹ 3135.26 respectively.
11. The output-input ratio at the overall level was 1.94 and 1.74 at the working and total cost, respectively.

12. The break-even point analysis indicated that the minimum size of flock should be 6, 11 and 23 goat in case of small, medium and large size flocks, at which the flock owners should have no loss, no profit.
13. The regression analysis indicated that the six selected independent variables viz; flock size (X_1), feeding charges (X_2), grazing charge (X_3), human labour (X_4), concentrate charge (X_5), veterinary charge (X_6) jointly explained 58 to 91 per cent variation in case of small, medium and large size group of flocks in the gross returns in goat rearing. It is seen that regression coefficient of the variable viz., flock size (X_1) is ₹ 2225.43 and ₹ 3940.50 in case of small and medium size flocks, respectively, which is observed to be highly significant at 5 per cent level of significance. This means that increase in the size of flocks by one goat, the annual gross income from goat rearing would increased by ₹ 2225.43 and ₹ 3940.50 in case of small and medium size flock, respectively.
14. In regards with marketing of goats and total share of retention for own rearing was highest in large flocks as compare to small and medium size flock.
15. In case of price spread lowest price spread in channel-I and highest in channel-III.
16. It was conclude that producer's share in consumer's rupee was higher in channel-I followed channel-II and channel-III.
17. The number of problems was faced by the goat rearers. On an average shrinkage of grazing land was felt by 85.55 percent of sample goat rearers. In case of small, medium and large size groups of flock is 80.00, 83.33 and 93.33 per cent, respectively. The shortage of green fodder was opined by 43.33, 60.00 and 66.70 per cent of flocks goat rearers and in case of shortage of dry fodder was opined by 26.66, 30.00 and 30.00 per cent in small, medium and large size flock goat owners, respectively. The problem of fodder at the overall level was 85.54 per cent.
18. Lack of marketing facilities was expressed by 76.66, 89.99 and 90.00 per cent in small, medium and large size flock goat rearers, respectively. At the overall level 85.54 per cent goat rearers faced by the marketing of young stock. Veterinary aid constraints expressed by 53.33, 50.00 and 50.00 per cent in small medium and

large goat flock owners, respectively. At the overall level 51.11 per cent goat rearers faced by lack of medicine.

19. In order to improve the goat rearing in the area, and supply of adequate fodder was suggested by 66.67 per cent goat rearer at overall level. Establishment of co-operative marketing societies was suggested by 76.67 per cent goat rearers at overall level. At the overall level 80.00 per cent and 64.44 per cent of the goat rearers have expressed the necessity of credit facilities and veterinary services for ease of goat rearing.

5.2 Conclusions

1. Fixed capital investment per flock was observed to be ₹ 27139.55 and per goat was observed to be ₹ 3281.69 at overall level. The flock stock (33.03 %) was the major item of fixed capital investment in goat rearing.
2. The activity of goat rearing was observed to be gainful enterprise. At the overall level, per flock cost of maintenance worked out to ₹ 65801.07 and per goat cost of maintenance worked out to ₹ 4237.03 and gross return per flock per annum came to ₹ 114491.67 and per goat per annum came to ₹ 7372.29. The net returns per flock per annum therefore came to ₹ 48690.60 and per goat ₹ 3135.26.
3. The break-even point of small, medium and large size of flocks came to 6, 11 and 23 goat, respectively where there would be neither loss nor profit in goat rearing.
4. The regression analysis indicated that the factors viz., flock size, labour, fodder charges and concentrate together explained 58 to 91 per cent of variation in the gross returns from goat rearing. The role of flock size and concentrate in goat rearing was observed to be significant on the annual gross returns.
5. A large number of problems were faced by goat rearers of which, less availability of grazing land, shortage of green fodder and dry fodder, marketing of young stock, milk marketing and veterinary clinic were the major problems in goat rearing. In order to improve the goat rearing, the goat rearers suggested the development of village grazing lands, supply of adequate fodder, establishment of co-operative marketing societies, credit facilities, transfer of stall feeding technology and necessity of veterinary services, which needs to be given thought by the policy makers.

5.3 Policy implications

The implications and suggestions emerged out from this study are as follows.

1. To have an economic viable unit of small, medium and large size of flock may be more than 6, 11 and 23 goats, respectively. This will help to secure returns from goat enterprise.
2. There is a need to upgrading of grazing lands or pastures on the public lands which could be subsequently made available to the goat rearers on rent basis. This is because inadequacy of grazing lands is a severe problem in goat rearing.
3. Adequate infrastructure may be strengthened for providing dependable health cover against common diseases of goat, technical knowhow to goat rearers for better care and management of their flock, supply of bucks and doe of superior breeds, etc in order to develop this enterprise in the scarcity area of the state.
4. The landless agricultural labourer, small and marginal farmers may be given incentives for maintaining goat activity as a supplementary enterprise by providing them with loan at a minimum rate of interest. This will help them to generate additional source of income and employment from their own activity.
5. There is a need to develop market infrastructure for disposal of goat and goat products in the area under study. It is suggested that the goat and milk may be brought under the orbit of regulated markets to avoid malpractices.

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3. Land holding:
(ha)

Sr. No.	Total land	Land not suitable for cultivation	Grazing land	Area under cultivation	Net area under cultivation	
					Dry	Irrigated
1.						
2.						

4. Cropping pattern:

Sr. No.	Season	Name of crop	Dry		Irrigated	
			Area (ha)	Income (₹)	Area (ha)	Income (₹)
a.	Kharif					
1.						
2.						
3.						
b.	Rabi					
1.						
2.						
3.						
c.	Summer					
1.						
2.						
3.						

5. Buildings:

Sr. No.	Name	Type of construction	Area (Sq. m.)	Year of construction	Present cost (₹)	Repairing cost (₹)	Remaining life
1.	Residential						
2.	Farm building						
3.	Shed for goat						
4.	Other						

6. Machinery, implements (specifically for goat rearing):

Sr. No.	Particulars	No.	Purchase value (₹)	Present Value (₹)	Repairing cost (₹)	Remaining life
1.	Ghameli					
2.	Zadu					
3.	Net					
4.	Rope					
5.	Brush					
6.	Sickle					
7.	Milk can					
8.	Bucket					
9.	Axe					
10.	Other					

7. Livestock inventory:

Sr. No	Name	Breed	No.	Age	Purchase value (₹)	Present value (₹)	Year of Purchase	Remaining life
1.	Milch							
a.	Cow							
b.	Buffaloes							
2.	Dry							
a.	Cow							
b.	Buffaloes							
3.	Draft							
a.	Bullocks							
b.	He- buffaloes							
4.	Goat							
5.	Sheep							
6.	Calves							
7.	Hens							

8. Maintenance cost of goat:

No. of goats:

Breed:

Sr. No.	Particulars	Name	Qty	Rate	Value	Labour requirement (days/year)				Total expenditure
						Family labour		Rate		
						Female	Male	Female	Male	
1.	Green Fodder									
2.	Dry fodder									
3.	Conc.									
4.	Medicine									
5.	Grazing charges									
6.	Cleaning of byre									
7.	Other									

9. Returns from goat rearing:**A. Goat sold**

Sr. No.	Category	Numbers	Value (₹)	Place of sale	Distance of sale	To whom sold whole saler/Retailer
1.	Buck					
2.	Doe					
3.	Total					

B. Milk consumption / sold:

Sr. No.	Particulars	Rate	Quantity (Lit.)	Value (₹)
1.	Home consumption			
2.	Milk sold			
3.	Total			

C. Farm manures:

Sr. No.	Manure produced at byre		Sold quantity (qt.)	Value (₹)
	No. of days	Quantity (qt.)		
1.				
2.				

D. Consumed during the year:

Sr. No.	Particulars	Numbers	Value (₹)
1.	Buck		
2.	Doe		
3.	Total		

E. Goat losses:

Sr. No.	Season	Numbers	Losses due to			Value (₹)
			Death	Stolen	Eaten by wolf	
1.	Summer					
2.	Rainy					
3.	Winter					
	Total					

10. Information about the invested capital:

a. Owned capital (₹):

b. Borrowed capital (₹):

Sr. No.	Agency of loan	Year of the loan taken	Term of loan (Yr.)	Amount (₹)	Rate of interest	Amount repaid (₹)	Amount out-standing
1.	Bank						
2.	Money lender						
3.	Friend						
4.	Others						

11. Annual Family income:

a. From goat :

b. From land :

c. From draft animal :

d. From milch animal :

12. Do you aware about the following recommended management practices of goat rearing?

a. Cleaning of shed

b. Watering

c. Feeding

1. Dry matter - More or less than 6 to 11 %of their body wt.

2. Green fodder - More or less than 2 to 3 kg

3. Concentrates: More or less than 0.2 to 0.5 kg

d. Disbudding / dehorning (5-7 day old kid)

e. Tattooing

f. Hoof trimming

g. Vaccination

1. Foot & mouth disease

3. P. P. R.

2. Rinder pest

h. Dipping

i. Deworming 2 times in year.

13. General question:

1. When did you start this enterprise?

2. Why did you start this enterprise?

3. What are simplified aims? (Live causing money, or to get employment for family)

4. Whether you inseminate your animals?

Yes / No. If yes how?

5. Whether there is any scope for expansion of your enterprise?

Y / N. If No, What are difficulties?

6. What your general problems in this enterprise?

a. Grazing:

b. Veterinary aids:

c. Feed availability:

d. Good breeding buck:

e. Disease

7. Problems in goat rearing?

1. Low price

2. Market distance is long

8. What are your suggestion for improvement in goat rearing?

9. Do you feed concentrates to goat:

Yes / No.

If yes at what time.

a. Pregnancy period:

b. Milking period:

10. Where do you sell your goat?

Through: Broker / At home / In market / Selling of chevon

12. During summer what type of roughages are available?

Green fodder: Maize / Shevari, etc.

Yes / No.

13. Duration of first kidding?

14. How many days you feed milk to kid?

15. Yield of goat milk (After feeding kid)

8. VITAE

Miss. Gund Priyanka Himmat
MASTER OF SCIENCE (AGRICULTURE)

in

AGRICULTURAL ECONOMICS

2020

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