माझ्या जीवनरुपी नौकेला पैलतीरी नेण्यासाठी
चंदनाप्रमाणे देह झिजविणारे व सतत
प्रगतीच्या सूर्योदयाची वाट दाखविण्यासाठी
प्रयत्नवादी असलेले माझे वडील
ति.तात्या व वात्सल्यमूर्ती
सौ.आई तसेच जीवन संतुलित
करण्यासाठी वस्तुनिरपेक्ष व परखड
शुध्द विचारांची संगत पुरविणाऱ्या
बहिण, भाऊ व इतर हितचिंतक
यांनाही विनम्र शोध
शब्दांजली

समर्पित

प्रकाश

ECONOMICS OF SHEEP REARING IN SCARCITY AREA OF SATARA DISTRICT

By

Prakash Namdeo Bhujbal

(Reg.No.96075)

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

2000

CANDIDATE'S DECLARATION

I hereby declare that this thesis or part thereof has not been submitted by me or any other person to any other University or Institute for Degree or Diploma

Place : MPKV,Rahuri
Dated : 12/07/2000

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This is to certify that the thesis entitled, "**ECONOMICS OF SHEEP REARING IN SCARCITY AREA OF SATARA DISTRICT**", submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra, in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE** (*AGRICULTURE*) in **AGRICULTURAL ECONOMICS**, embodies the results of a piece of *bona fide* research work carried out by **Shri. Prakash Namdeo Bhujbal**, under my guidance and supervision and that no part of the thesis has been submitted for any other degree, diploma or publication in any other form.

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

Place : MPKV, Rahuri
Dated : 12 /07/2000.

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Maharashtra State (INDIA)

CERTIFICATE

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S.S. Kadam

Place : MPKV, Rahuri (S.S. Kadam)

Dated : 17/07/2000.

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Place : MPKV, Rahuri (P.N. Bhujbal)

Date : 12/07/2000

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ABSTRACT

ECONOMICS OF SHEEP REARING IN SCARCITY AREA OF SATARA DISTRICT

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The present investigation was intended to depict the picture of costs and returns from sheep rearing and marketing of sheep and sheep products in relation to different size groups of flocks in scarcity area of Satara district in Maharashtra. The study was based on the primary data collected from ninety sample flock owners by survey method for the year 1996-97. For the purpose of analysis, sample flock owners were classified into three categories on the basis of flock size viz., small (less than 40), medium (41-80) and large (above 80).

The herd stock (90.21 per cent) was the important item of fixed investment followed by value of byre (8.63 per cent). Of the total labour used at the overall level, 86.81 per cent of labour was

required for grazing of sheep, 11.42 per cent for maintenance of lambs and byres and 1.77 per cent for shearing of sheep. Per sheep average cost of maintenance per annum worked out to Rs. 850.41, Rs. 608.41 and Rs. 538.85 in the case of small, medium and large size groups of flocks with an overall average of Rs. 616.68. It has therefore, indicated that per sheep cost of maintenance declined with an increase in the flock size. Of the total gross returns, income due to appreciation of stock shared 63.52 per cent while that of income from sheep folding accounted for 15.97 per cent. The next important sources of income were sale of sheep, manure and wool which shared 14.37, 4.36 and 1.19 per cent of gross returns respectively. Per sheep gross returns in the case of small, medium and large size groups were Rs. 802.31, Rs. 804.49 and Rs. 713.28 respectively. Per sheep returns over working and total cost, on an average, were Rs. 307.11 and Rs. 144.47 respectively. The output-input ratio at the overall level was 1.68 and 1.23 at the working and total costs respectively. The break even point analysis at the overall level indicated that the minimum size of flock should be 28 sheep. The regression analysis indicated that the role of flock size and veterinary aid in the sheep rearing was observed to be significant on the annual gross returns.

Abstract contd..... P.N. Bhujbal

The pattern of marketing of sheep and sheep products, indicated that a large number of sheep were sold in the nearby markets to slaughtermen while lambs were sold in the markets to the merchants. The bulk of wool was sold to the merchants both in the local and nearby markets. Per sheep cost of marketing was Rs. 9.29 and the marketing cost of one kilogram of wool was Rs. 1.78. The study suggested that there is a need to develop grazing lands or pastures on the public lands, establishment of veterinary centres for providing health cover against common diseases of sheep. It is suggested that sheep and sheep products should be brought under the orbit of regulated markets.

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INTRODUCTION

1. INTRODUCTION

1.1 General

The livestock is the backbone of Indian agriculture and plays major role in the national economy. Agriculture and livestock are complementary as well as supplementary to each other. According to All India Debt and Investment Survey (1981), over 73 per cent of India's rural households own livestock and derive supplementary income and employment. Livestock has remained as the key stone of Indian farming since time immemorial. Their utility for rural community is so high, that they are considered as embodiment of divinity and without them no cultivation is possible.

The domestic farm animals contribute man's major wealth and provide protective foods like milk, eggs and meat of high biological value. In addition, the FYM which is prepared by making use of dung of livestock also helps in improving the productivity of the land. The livestock contributes 17.98 per cent of total income from agriculture and 7 per cent of total income of the country (Swaminathan, 1989). At current prices, the gross value of the output from livestock sector has gone up from Rs. 42040 crores in 1990-91 to Rs. 82704 crores in 1995-96 accounting for 26 per cent of total agricultural output (Singhal, 1999). The gross value of livestock products in Maharashtra state as per current prices during 1996-97 was Rs. 8915 crores which was 29 per cent of total gross value from

agriculture sector (Anonymous, 1997-98). India's export earnings from the livestock sector rose from Rs. 691.22 crores in 1987-88 to Rs. 1930.00 crores in 1995-96 (Singhal, 1999). According to NSS estimates, the national investment in livestock is nearly 39 per cent of the total investment in all goods in the country.

India possesses 56.47 million sheep (FAO, 1997) constituting $1/20^{th}$ of the world sheep population. There are about 200 breeds of sheep in the world and 40 in India. According to Livestock Census Report of Maharashtra state for the year 1992, the population of cattle and buffalo was 191.23 lakhs and 53.18 lakhs respectively. Similarly the population of goat and sheep was 98.29 lakhs and 30.74 lakhs, respectively. About 76 per cent of total sheep population of Maharashtra state is in the jurisdiction of Mahatma Phule Krishi Vidyapeeth, Rahuri.

1.2 Importance of sheep rearing

Sheep are unique among domestic livestock as they are reared for variety of purposes and can be maintained under diverse environmental conditions. India has a very wide range of climatic conditions and Pastoral zone ranging from perennially snow-clad Himalayas to the hot arid parts of Rajasthan to the lush Alpine pasture of Kashmir. Sheep are capable of living in all kind of environment and thrive well in hot-arid tracts of Rajasthan as well as in cold mountainous areas in the Himalayas. More than 95 per cent of the sheep population is in dryland farming tracts (Marimuthu and Subbarayalu, 1987). Sheep raising has been wedged into agriculture,

mostly by grazing the animals on the stubble. Droughts are frequent in the dry areas and when the crops fail altogether, the farmer can still count on the income from the sale of wool and surplus stock of sheep.

Sheep farming is the oldest livestock industry in the arid and semi-arid areas of India as well as Maharashtra. Sheep are the most appropriate livestock species for utilizing sparse vegetation, tree tops and most of the weeds very efficiently into mutton and wool. Though these are small animals, they grow faster, do not need expensive housing system, are relatively cheap, flock can be multiplied rapidly due to their short gestation period. They also provide self and family employment to large population in hilly and drought prone areas of the country. In fact, there is no substitute for sheep as a class of livestock for utilising waste land or weeds for the land.

Sheep are unique among domestic animals because of their adaptability to the adverse conditions. Patel (1976) while describing the importance of sheep said, "Sheep was ship for many to swim in the ocean of poverty". Sheep farming is considered to be more suited to the millions of marginal and small farmers, agricultural and landless labourers and to the nomadic people, because they need minimum inputs and enable to generate self-employment opportunities and regular income throughout the year. Sheep farming promotes ancillary industries such as carpet wool,

leather and foot wears. Sheep farming is widely considered as one of the poverty alleviating enterprise (Dastagiri and Rao, 1990).

Ghule (1992) mentioned that nearly 70 per cent of shepherd's income is derived from sale of sheep, mostly sold for mutton purpose, 12 to 13 per cent from the sale of wool, 13 per cent from sheep folding and remaining 5 to 6 per cent from sheep manure. Sheep adds 0.5 to 0.7 tonnes of manure containing twice the quantity of phosphate and potassium present in the cattle manure.

At present, India gets 2.03 lakh M. tonnes of meat, 45.00 million kgs of wool, 51 million kgs skin from sheep (FAO, 1997).

India has about 5 per cent of the world's sheep population but its contribution to the world's wool production is only 1.81 per cent. The world average yield of wool from sheep is 4 kg, whereas that in India is only 1.2 kg per sheep per year. The average yield in Australia and New-Zealand is over 6 kg (Singhal, 1999). The bulk of wool produced in India is of coarse type and is used largely in manufacture of carpets, druggets and coarse blankets.

The productivity of Indian sheep in terms of mutton is also poor. The average weight of a sheep in our country varies from 25 to 30 kg. The exotic sheep weighs as much as three times of the Indian sheep. At present Indian sheep contributes only 2.72 per cent of worlds sheep meat production.

It clearly indicates that there is a vast potential for increasing production of wool and meat from sheep enterprise in India. The Government of India have established the 'Central Sheep

and Wool Research Institute' at Avikanagar (Rajasthan) in the year 1962. Later on, the Indian Council of Agricultural Research, New Delhi initiated research programme on sheep breeding in different agro-climatic zones of the country under one umbrella, i.e. All India Co-ordinated Research Project for Sheep. One of the centres of All India Co-ordinated Research Project on sheep breeding for mutton purpose is at Mahatma Phule Krishi Vidyapeeth, Rahuri which was started in 1977, wherein the native Deccani and exotic breeds Dorset and Merino were used. The project for sheep shearing, wool grading, marketing has been taken up in eight states with the assistance of United Nations Development Programme. The programmes like artificial insemination, vaccination etc., were carried out by the Animal Husbandry Department of various states while the research regarding feeding, growth, reproduction and other animal management and pasture land development was carried out at the various State Agricultural Universities and Government Sheep Development farms. These programmes are mostly concerned to increase the productivity of sheep in terms of wool and mutton.

1.3 The problem

There lies a good potential for the production of wool and other sheep products in Western Maharashtra. This is very much clear from the fact that this region accounts for about 76 per cent of the total sheep population. The backwardness of sheep rearing in the state has hindered the development of this activity on modern lines. However, under prevailing conditions of small holdings and

erratic behaviour of monsoon rains resulting into low yields in crop production, the sheep rearing is assuming importance in Western Maharashtra, particularly in the scarcity region. The region constitutes Solapur, Ahmednagar, Eastern part of Satara and Sangli districts where the sheep enterprise provides a source of income and employment to the shepherds throughout the year.

The sheep owners in this region possess either small or large size of flocks of sheep besides some agricultural land. They earn some income through the sale of lambs, mutton and wool. This provides a continuous flow of income to the flock owners. The need was felt to undertake scientific assessment of this enterprise to know its contribution for the development of economy of the shepherds in the region. The empirical data on economics of sheep rearing according to different size classes of flocks are also scanty. In view of this, it was decided to undertake the present problem viz., "Economics of Sheep rearing in Scarcity area of Satara District of Western Maharashtra" with the following objectives.

1.4 Objectives of the study

1. To estimate the cost of sheep rearing in different size groups of flocks.
2. To assess income from sheep rearing in different size groups of flocks.
3. To study factors influencing the returns from sheep rearing.
4. To study the marketing of sheep and sheep products.

1.5 Scope and utility of the study

The demand for sheep and sheep products is increasing due to the increase in population in the country. Sheep rearing is playing an important role in the economy of small and marginal farmers and agricultural labour families. Though it is an important activity, less attention has been paid so far towards this business. It is, therefore, essential to study the different aspects such as economics of sheep rearing, economical size of sheep flock and marketing of sheep and sheep products.

The scientific sheep management issues related to breeding, feeding, marketing and health care are very important. There are also a number of problems regarding financing and management. The results of the study will be useful to suggest appropriate measures to formulate policies and give feedback to the research workers and guide extension workers. In view of this, the study has utility for the policy makers, credit institutions and other related functionaries in the field of sheep husbandry. The results would also be useful to individual shepherds to improve his decision making ability so as to obtain maximum profit by improving management practices.

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

The investigation of any problem requires one to review the work done on similar topics by other research workers so as to conduct the work of investigation on proper lines. Moreover, the review of literature acts as a guide for conducting a study in a systematic way. It also helps to avoid pit-falls in completing the investigation process as well as in presenting the data and drawing conclusions.

In spite of multiple utility of this animal, it has remained neglected in the field of research. Some studies have been carried out to workout the economics of sheep enterprise in India and abroad. Studies were also undertaken to see the profitability of Indian sheep, to judge the feasibility of its improvement. The literature closely related to the present investigation has been grouped under following aspects.

2.1 Flock size in sheep rearing

2.2 Cost of sheep rearing

2.3 Returns from sheep rearing

2.4 Marketing of sheep and sheep products

2.1 Flock size of sheep rearing

Dwivedi (1978) carried out a survey in Malpura sub-division of Tonk district (Rajasthan) and found that 35.63 per cent

flock owners kept 51 to 100 sheep followed by 29.5 per cent kept 21 to 50 sheep in a flock.

Acharya (1982) showed that in Maharashtra, Deccani sheep flock size averaged as 26 and 54 sheep in stationary and migratory system, respectively. The average stationary flock contained 1 ram, 20 ewes, 5 young and the migratory flock had 2 rams, 42 ewes and 10 young.

Sharma (1983) in his study in Haryana observed that the average number of sheep in small, medium and large flocks was 40, 62 and 99 respectively. The average mortality rate was 10.86 per cent. The average wool yield per sheep per year was 1.28 kg.

Balkrishna *et al.* (1984) while surveying in five villages of Mahaboobnagar district (A.P.) observed that maximum number of the flock owners (38.19 per cent) possessed large size flock with more than 51 sheep with an average of 98 sheep while, 34.69 per cent of the sheep owners possessed small sized flocks with less than 21 sheep and 27.12 per cent of them possessed 22 to 50 sheep.

Oberoi *et al.* (1990) in their study on emerging problems of wool marketing in a Tribal area of Himachal Pradesh concluded that, the average size of a flock on small and large farms was 63 and 139 sheep respectively.

Padmanaban (1994) conducted study in Tamil Nadu to analyse the economics of sheep farming. He observed that, the average number of sheep tended by the farmers was 20.

Deoghare (1997) studied sustainability of on-farm income and employment through livestock production in Mathura district of Uttar Pradesh. He found that, the average number of livestock per household in goat farming was 5.98 goats. The overall average number of animals per household was observed to be 0.75 sheep and 1.41 buffalo.

Sankhyan et a. (1997) conducted experiment to evaluate the suitability and production performance of native and crossbred sheep on silvipasture in maintaining ewes round the year without concentrate supplementation at Central Sheep and Wool Research Institute, Avikanagar. They concluded that the silvipastoral system of range management could successfully maintain 4 ewes per hectare with followers round the year.

Bose *et al.* (1999) conducted survey in respect of the management practices and physical characteristics of Bengal sheep in their home tract of low-lying, saline, coastal area of Sundarban in West Bengal. They observed that, the flocks were stationary and small in, size. The average flock size of the breed was 5 which ranged between 2 to 16. Generally, the flocks did not contain adult male except medium or large size flock. The proportion of adult and young (below 7 months) in the flocks was 50:50. Majority of the farmers (70.63 percent) maintained small flocks (upto 5 animals) followed by 23.78 per cent farmers were holding medium size flock (6-10 animals) and rest 5.59 per cent farmers having large size flock (more than 10 animals).

It was reported that the average Magra (Bikaner) flock size was 150 sheep and a flock contained 2 adult males, 95 females and 35 young lambs (Anonymous, 1991).

The report on the survey about flock size indicated that the average Deccani flock size in the tahsils of Rahuri, Parner and Sangamner of Ahmednagar district was found 195, 287 and 98 sheep, respectively. Further the report indicated the range of flock size in Parner tahsil was 40 to 50 sheep in stationary flock while that of migratory was 100 to 150 sheep for short distance migration and 200-400 sheep for long distance migration in Konkan or Maval region (Anonymous, 1992-93).

It is thus, clear from the above reviews, that the size of sheep flock varied from region to region.

2.2 Cost of sheep rearing

Various studies on cost of sheep rearing have been conducted in India and abroad. The available literature having relevance to the present study have been reviewed as under.

Raut and Nadkarni (1974) worked out the cost of rearing of sheep under migratory and stationary conditions in Himachal Pradesh. They concluded that the average yearly cost of maintenance of a sheep in migratory flock was about Rs. 6.60 in Mandi district and Rs. 19.50 in Mahasu district. In case of stationary flocks, the corresponding figures for the districts were Rs. 26.50 and Rs. 16.50, respectively. Labour was the major component of cost accounting for 60 to 70 per cent of the total cost of maintenance.

Atchtha Kumar (1980) found out from his study on Nellore sheep in Andhra Pradesh that the maintenance cost for 20 ewes and one ram was Rs. 2667 per annum.

Kantharaju (1982) reported that for the maintenance of a flock of 100 sheep in Karnataka, the annual total expenditure on an average worked out to Rs. 7576.

Moorti et a. (1984) observed that in Himachal Pradesh on an average cost of rearing sheep was Rs. 5612 for a flock of 100 sheep and it was more in large size of flock.

Ranveer Singh (1986) reported that the average cost of rearing a sheep in Himachal Pradesh was Rs. 89.38 per annum. This figure was observed to be higher among large sized flock owners. Interest on the investment of fixed capital formed the major cost component which accounted for 48 per cent of the annual cost incurred on sheep rearing. The variable cost accounted for 35 per cent of the total cost. The major item of variable cost was labour which constituted about 24 per cent of the total cost. The losses due to death and thefts of sheep was sizable, accounting for 17 per cent of the total cost.

Waghmare (1988) studied economics of sheep rearing in Scarcity area of Pune district of Maharashtra. He observed that, the per sheep annual cost of maintenance was Rs. 232.59, Rs. 158.73 and Rs. 122.28 in case of small, medium and large sized flocks, respectively with an overall average of Rs. 155.59. The study also

revealed that per sheep cost of maintenance declined with an increase in the flock size.

Chand (1989) in his study on impact of financial inputs on sheep farming in Arid areas of Western Rajasthan revealed that, the beneficiaries incurred a total expenditure of Rs. 51.99 per sheep, whereas the non-beneficiaries spent Rs. 44.17 per sheep.

Dastagiri *et al.* (1991) found that, the total cost of maintenance of 20 ewes and 1 ram in two mandals of Chinnagottigallu Taluka in Chittoor district of Andhra Pradesh was Rs. 9796.00. Of this total cost the fixed cost was Rs. 8593.44 accounting for 87.72 per cent, whereas the total operational cost accounted for only 12.28 per cent. High operational cost of Rs. 1991.69 was recorded on small (loan) farms and this decreased with increase in the flock size due to advantages of scale economy.

Chauhan (1992) in his study on wool production in Tribal area of Himachal Pradesh observed that the per sheep annual cost of maintenance was Rs. 62.46, Rs. 55.35 and Rs. 47.57 in case of small, medium and large farms, respectively. The per sheep cost of maintenance declined with an increase in the farm size. The net cost of production per kg of wool worked out to Rs. 33.92, Rs. 25.14 and Rs. 17.06 in case of small, medium and large sheep farms, respectively with an overall average of Rs. 27.68.

Padmanaban (1994) observed in Salem and Dharmapuri districts of Tamil Nadu that the average number of sheep tended by

the farmers was 20 and the average maintenance cost per farm was estimated at Rs. 1954.43.

Deoghare *et al.* (1995) studied economic analysis of sheep rearing in Mathura district of Uttar Pradesh. They worked out capital investment per sheep per year which was the highest (Rs. 772.29) on small farms followed by marginal farms (Rs. 763.17) and landless sheep keepers (Rs. 733.36). The margin of profit on small farm was much higher than that of landless sheep keepers and marginal farms. The overall returns over cost A (paid out expenses and depreciation) were Rs. 4146.62. The returns over cost B (cost A + interest on fixed capital) were Rs. 3203 and that over cost B + input of family labour were Rs. 902.05.

Rao *et al.* (1995) studied 100 sheep farming enterprises in Nellore district of Andhra Pradesh. The per unit of sheep total cost was calculated at Rs. 8567.10 on small farms, Rs. 6980.17 on medium sized farms and Rs. 6775.71 on large farms with an average Rs. 7292.82.

Soman (1997) studied growth performance of lamb under grazing vs feeding management systems at network project on sheep improvement, Mahatma Phule Krishi Vidyapeeth, Rahuri. He observed that the cost of rearing for per kg gain in body weight was significantly lower in grazing system (Rs. 33.12) than stall feeding system (Rs. 44.04) in Deccani sheep.

It is thus clear from the above reviews that the components of costs are labour charges, interest on investment in

sheep, fodder and grazing and health cover. It can be inferred from the studies that the different units were used for expressing the cost of sheep rearing. Some had used a unit of 20 sheep, while few others used a unit of 100 sheep and some studies used a single sheep as a unit for reporting the cost of rearing. The per unit cost of maintenance of sheep varied from place to place because of differentials in flock size, geographical conditions and rate of mortality.

2.3 Returns from sheep rearing

Atchtha Kumar (1980) reported that the shepherds with 20 ewes and one ram in Andhra Pradesh could earn gross income of Rs. 3430 and net income of Rs. 770 per annum.

According to Prabaharan (1985) the total income from rearing of 20 ewes and one ram was Rs. 9440 and the net returns were Rs. 5406. These estimates were quite higher than those estimated by Atchtha Kumar (1980) in Andhra Pradesh.

Sharma *et al.* (1982) in his study on sheep rearing in Haryana found that the average gross annual income from a sheep was Rs. 85.95 and it was more in small size (less than 51 sheep) of flock. The returns from sale of wool, sheep and manure accounted for about 25, 69 and 6 per cent of the total gross income respectively.

A study was conducted by the Centre for Management in Agriculture (CMA), IIM, Ahmedabad (1986) in Gujarat and Rajasthan. The study revealed that, the annual net income per sheep of the sample respondents of Gujarat was Rs. 45.89 and that of

Rajasthan was Rs. 65.75. The annual income from a flock of sheep was mainly from wool sales, sale of ram lambs and culled ewes, charges received for sheep folding and the sale of skins of dead animals.

Nageswara Rao *et al.* (1988) studied comparative economics of sheep farming of small loan and non-loan farms (20 + 1 sheep unit) in Andhra Pradesh. They found that, the gross returns were comparatively higher at Rs. 13,211.45 on non-loan farms as against Rs. 10341 on loan farms. The net returns were Rs. 2977.31 on non-loan farms as against Rs. 1948 on loan farms. The higher returns obtained to the non-loan farms were mainly due to maintaining better animals and adopting efficient management practices which reduced mortality and increased high lambing rates.

Moorti *et al.* (1990) studied the impact of sheep and goats on the economy and environment of high altitude areas of Himachal Pradesh . They noticed that the household income was dominated by income from sheep and goats which accounted for nearly 60 per cent of the total income

Oberoi *et al.* (1990) in the study of emerging problems of wool marketing in a tribal area of Himachal Pradesh observed that sheep enterprise accounted for 54.58 per cent of the total net income. As regards family labour income, the sheep enterprise accounted for 69.09 per cent of the total family labour income. The per cent returns on capital investment from sheep enterprise was estimated to be 15.82 as against 12.97 when the investment on crops, sheep and other

farm animals was taken into account. They revealed that, with the increase in the farm size the proportion of net income from sheep enterprise to the total farm income increased.

Chauhan *et al.* (1991) studied the influence of sheep farming on the income and employment levels of Gaddi tribe in Himachal Pradesh. They found that sheep contributed upto 43 per cent to the total household income on small farms and upto 66 per cent on all farms together. The employment levels on all categories of farm-size followed a cyclical trend with labour requirements being higher in April-May and October-November due to migration.

Ganai *et al.* (1991) observed that shearing twice in a year in Jammu and Kashmir increased the wool yield and maximized profits from sheep farming.

Rath (1992) found in his study on economics of sheep and goat rearing in Maharashtra that sheep farming was very uneconomic using loan funds, even with subsidy. While the income from goat keeping was not large, but more profitable than sheep keeping. This was mainly due to two reasons (i) The number of kids born per goat on an average was greater than the number of lambs born per sheep and (ii) the value of output per goat from milk was higher than the value of wool per sheep. There appears great scope for improving local breeds of goat through selection or bringing in better breeds from outside for cross breeding.

Rawat *et al.* (1993) studied the economic status of sheep farmers in Rajasthan. The sheep farmers were categorised into three

groups viz., marginal farmers (< 1 ha), small farmers (1-2 ha) and other farmers (> 2 ha). The results showed that the highest benefit cost ratio was found amongst small farmers. The combination of having mostly sheep, a few goats and a couple of bovine animals on 1-2 ha of land generated maximum net returns per sheep farmer in semi-arid area.

Iqubal *et al.* (1994) carried out study on production practices and potentials for small ruminants (sheep and goat) in Pakistan. They concluded that average income received by the farmers from the sale of animals and animal products was higher in zone-I (Kasaur, Lakhore, Sheikhupura and Toba Tek Singh districts) due to demand in the urban markets. There was more awareness and high economic status of the urban masses as compared to the rural livestock raisers in zone-II (Bhakkar, Dera Ghazi Khanand, Muzaffargarh districts).

Rao *et al.* (1995) studied 100 sheep farming enterprises in Nellore district of Andhra Pradesh. The net returns stood at Rs. 2656.82, Rs. 3362.39, Rs. 3615.58 and Rs. 3372.26 in small, medium, large and average farms, respectively. The major source of receipts was the value of the animals at the end of the year, which accounted for 75.13 per cent of the total income.

Vlacil (1996) studied economics of sheep farming in Slovakia. He concluded that 43.3 per cent of the total returns were from sale of meat.

Connolly (1997) in his study on financial returns from sheep production in the Irish Republic observed that an obvious route to increasing profits from sheep production was through improved technical performance by increased stocking rates and weaning percentage.

Deoghare (1997) studied sustainability of on farm income and employment through livestock production in Mathura district of Uttar Pradesh. He found that, the net income per household per year under crop, buffalo, goat and sheep farming indicate that under landless goat breeders, the highest net income was observed under goat farming (70.45 per cent), followed by buffalo farming (25.87 per cent) and sheep farming (3.68 per cent). The net income under crop farming increased as the size of land holding increased. On the farm of marginal, small, medium and large size, the maximum net income was through crop farming as compared to other farming. On an average, the highest income was under crop farming (73.31 per cent) followed by buffalo farming (14.66 per cent), goat farming (11.63 per cent) and sheep farming (0.40 per cent). Livestock farming provided 26.69 percent income to the farmers.

Lopez *et al.* (1998) worked out sheep production system in Spain and found that about 90 per cent of the income from sheep farming was from meat, 9 per cent from milk and 1 per cent from wool. They also suggested that milk and cheese production could be improved by introduction of mechanical milking of Merino ewes, production of various types of cheese according to time and

production system, more attention to hygiene and marketing through co-operatives.

To sum up the above reviews, it appears that the sheep rearing is a profitable enterprise. The major sources of income from sheep rearing are sale of sheep, wool, manure and the value added due to addition to the stock. However, the share of different items of income varied from region to region.

2.4 Marketing of sheep and sheep products

It appears from the literature that the studies on marketing of sheep and sheep products are scanty. However, an attempt has been made here to present some reviews which are relevant to the aspects under study.

Mirchandi (1967) stated that in India, marketing of livestock and livestock products is not developed to the extent as that of the agricultural commodities. The marketing activities had been confined to regulation of cattle markets and some extent to grading of livestock products. The animals were usually sold in the cattle fairs or hats where the prices were settled by negotiation through brokers. The system of sale of animals by open auction was rare. The animal products such as milk, butter, meat, wool, bones etc., were among the important livestock products that played a vital role in rural economy. Some of these products were exported and earned valuable foreign exchange for the country.

Anantha Ram (1984) in his study on economics of sheep rearing in arid Rajasthan opined that the agencies dealing with the

marketing of sheep were mostly private traders. The village merchants dealing in marketing of sheep trade ranged from 55 per cent to 67 per cent in different zones. Nearly 50 to 90 per cent of the breeders sold their stock to village merchants in different zones. The monopoly of private agencies in this trade deprived the shepherds their rightful due. In the case of wool also, private agencies handled 92 to 100 per cent in zones II and III. In zone I, on the other hand, Government agencies including co-operatives handled 61 per cent of trading in wool.

A study was conducted by the Centre for Management in Agriculture (CMA), IIM, Ahmedabad (1986) in Gujarat and Rajasthan. It indicated that there was no organised markets for wool. A substantial proportion of wool was purchased from the producers by village merchants or commission agents of big wool merchants or of woollen mills at ridiculously low rates (Anonymous, 1986).

Chauhan *et al.* (1987) observed in Himachal Pradesh that there were no organised marketing facilities to sell sheep and their products, hence the owners sold it to middlemen or visiting traders. About 89 per cent of the total wool and 33 per cent of the total flock was sold every year by the owners.

Campos *et al.* (1988) from his study on marketing of male lambs in Santiago concluded that for most of the animals, the marketing chain starts at the public auction, where they were purchased by large industrial concerns, who then slaughter and sell them in super markets.

Francis (1990) from his study of small ruminant marketing in South-West Nigeria, concluded that there was no evidence for market inefficiency or segregation, and that there were considerable market potential for increased local production of sheep and goats. In policy terms, the market efficiency implies that Government involvement beyond its present limited facilitative role would not be justified.

Oberoi *et al.* (1990) in his study on emerging problems of wool marketing in a Tribal area of Himachal Pradesh observed that local contractors accounted for major proportion of the transaction of wool. The 31.92 per cent of the total marketable surplus was sold to local contractors. The sale of wool to itinerant traders was higher on large farms (21.79 per cent) followed by small farms (17.02 per cent). On all farms, 14.14 per cent of the wool was sold directly to the consumers. The proportion of wool directly sold to consumers was higher on large farms (15.38 per cent) as compared to their counterparts (12.76 per cent). They also noted that, on an average 94.92 per cent of the marketable surplus was sold out.

Singh (1990) in his study on production and marketing of wool in Himachal Pradesh revealed that there exists no established system whereby shepherds can sell their products, and they rely heavily on local traders. The latter were well informed of the relevant market prices and trends and they exploited the shepherds, who were often ignorant of such information. It was concluded that, there was an immediate need for the state to develop organised wool

markets and impose regulations to ensure a consistently high standard of production. The proximity of markets to areas of production would be a great advantage as shepherds would have direct access, enabling them to be aware of changing market information. To avoid distress sales , credit facilities should be made available, perhaps in the form of co-operative societies. Such institutions would not only improve the producers cash flow but would also eliminate the various malpractices of rural money lenders.

Gopala Rao *et al.* (1991) in his study on marketing of livestock and livestock products in rural area observed that, cattle, sheep and goats were mostly marketed in livestock markets wherever they exist. The livestock markets were not available in several villages. The butchers or shepherds (farmers) or village merchants buy the required sheep and goat(s) from the individual villagers and shepherds. The middlemen play a limited role in village markets and in transactions involved between the buyers and the sellers, their role was insignificant to nil.

Sheep and goats were also sold either singly or in groups and whenever they were sold for meat they were mostly sold in groups. The local villagers who intend to slaughter sheep and goat also purchase from the individual farmers or shepherds where normally the role of middlemen was non-existing.

Wool was sold in rural areas mostly to the village merchants who in turn sell it to the big merchants or to wool

processors in towns. In some big villages wool was marketed in market places.

Mahmood *et al.* (1993) in their study on marketing and processing of small ruminants in highland Baluchistan (Pakistan) confirmed that, producers had little knowledge about market forces and quality of livestock, and this limited their ability to increase income. However, they incorporated live weight in their perception of livestock price per unit of weight. The average weight of sheep was 26.4 kg and that of goat was 21.8 kg, with estimated farm gate prices of Rs. 512 and Rs. 480. Average price paid by consumers was Rs. 750 for sheep and Rs. 682 for goat. Corresponding, services of intermediaries in the marketing chain represented 32 per cent and 30 per cent, respectively, of the price paid by consumers.

Taylor (1995) studied the farmers view of wool marketing in New Zealand. He noticed the lack of time with the sheep farmers for marketing activities. The disadvantages of the present auction system for selling wool were also listed. The use of technology to develop forward contract selling would also be of great advantage to the farmers. The wool marketing system sought by the modern sheep farmer would be easily attainable if the industry had a united, realistic and active approach.

Ray (1997) studied natural resources, organization and technology linkages case of wool based industry in Rajasthan. He observed that, the marketing of wool was the nodal point which affected the production of wool through the backward linkages and

the processing activities through its forward linkages. The market for wool was imperfect and the bargaining position of the sheep rearers vis-a-vis traders was very weak. The entry into the sector was difficult and the mercantile approach of the wool marketers makes the linkages with the processing sector tenuous.

✓ Bose *et al.* (1999) conducted survey in respect of the managemental practices and physical characteristics of Bengal sheep in their home tract of low lying, saline, coastal area of Sundarban in West Bengal and found that the villages closer to the township about 60 per cent sell their sheep directly to the butcher while in remote villages 70 per cent of the sale was made through middleman. The price varied from Rs. 300 to Rs. 600. A major factor affecting price was farmers need. During monetary distress of farmers, they are sold even at lower prices.

✓ Puthira Pratap *et al.* (1999) studied live sheep marketing in Tamil Nadu. They found that, Tamil Nadu having a high sheep population, lacks in efficient, organised market linkages, thereby ensuring an unfair deal to the primary producer. The study also revealed that middlemen carryout most of marketing operations, transportation of animals, is mostly on foot, tempo or trucks, negotiations take place both in secret and open fashion, malpractices do prevail and sex and anticipated meat weight mostly determine the price of a sheep.

To summarise the above reviews, it seems that there were no proper facilities for marketing of sheep and sheep products. Most

of the sheep and sheep products were handled by the private agencies. Due to absence of support price and marketing facilities the shepherds were exploited by the middlemen.

The present study deals with the economics of sheep rearing in the scarcity area of Western Maharashtra. It is intended to study the aspects such as costs and returns from sheep rearing together with marketing pattern of sheep and sheep products. It is proposed to attempt break-even point analysis to determine the minimum size of flock and also to study the factors influencing returns from sheep through regression analysis which would make the present study distinct than those reviewed in this chapter.

METHODOLOGY

3. METHODOLOGY

A scientific study of any problem requires the investigator to adopt appropriate methods and procedure in order to arrive at meaningful conclusion. Keeping in view the objectives of present study, the research methodology adopted in respect of selection of tract, sample for the study, collection of data and analytical procedure etc., are described below.

3.1 Selection of area

Nine districts of Western Maharashtra constituted 75.73 per cent of the total sheep population in Maharashtra (30.74 lakhs). The Satara district alone occupied 11.80 per cent of the states sheep population. Further, Man tahsil of Satara district constituted the highest sheep population i.e. 21 per cent of the total sheep population of Satara district. Therefore, Man tahsil of Satara district was selected purposively for the present study.

3.2 Sampling design

The sampling design adopted for the study was two stage random sampling with village as a primary sampling unit which are selected systematically. From these villages shepherd are selected randomly in proportion to the sheep population of a village.

3.3 Selection of villages

There are 102 villages in Man tahsil. However, it was noticed that the sheep population was in 94 villages. A list of 94

villages along with sheep population in the village was prepared. From this list, six villages having the higher sheep population were selected. It was planned to restrict the investigation to ninety sample shepherds along the selected six villages was made in proportion to sheep population per village.

The name of sample village together with sheep population and the number of sample shepherds against each selected village are given below.

Sr. No.	Selected village	Sheep population	No.of sample shepherds
1.	Andhali	5783	25
2.	Mardi	3613	16
3.	Pangari	3516	15
4.	Pingali	3148	13
5.	Dhuldev	2502	11
6.	Panvan	2333	10
	Total	20895	90

3.4 Selection of shepherds

From each of the selected villages a list of shepherds with their flock size was prepared. The shepherds were classified in three classes on the basis of flock size as follow.

Group	No. of sheep per shepherd
Small	Less than 40
Medium	41-80
Large	Above 80

From each size group it was proposed to select 30 shepherds randomly. However due to the non-availability of 30 shepherds from the large size group the sample size was restricted to 26 shepherds from this group. The number of shepherds selected from the small and medium size groups were 31 and 33 respectively. Thus the total sample comprised of 90 shepherds.

3.5 Method of collection of data

The data relating to general information of shepherds, itemwise cost of sheep rearing, returns from sheep enterprise marketing of sheep and sheep products were collected by the survey method with the help of questionnaire specially design for the purpose. The questionnaire was tested and data were collected by conducting personal interviews of the sample shepherds. The data pertained to the year 1996-97. The data thus collected were further processed, tabulated and analysed for presenting the results.

3.6 Analysis of data

The data so gathered were analysed in tabular form. The regression analysis was also carried out. The analysis of data was carried out according to size groups of flocks.

3.6.1 Estimation of costs and returns from sheep enterprise

The items of cost were categorised into two viz., a). working cost and b). fixed cost, to estimate the total cost.

The working cost included the cost of grazing and fodder, cost on account of human labour (hired and family), health cover and interest on working capital for the year.

The items of fixed cost included interest on fixed capital comprising of investment on sheep, byre, equipment, depreciation on byre and equipments and losses due to death of sheep.

a. Items of cost

The methodology adopted for valuation of different items of cost is discussed in the subsequent paragraphs.

1. Grazing

In the case of grazing the actual price paid for grazing on others farm was taken into account, while in the case of grazing on own farm, prevailing market prices were taken into consideration for evaluation.

2. Fodder

The actual price paid for the fodder was taken into account in the case of purchased fodder. In the case of fodder raised on own farm, it was charged at the prevailing market rates.

3. Human labour

It includes both hired and family human labour. The human labour is required for various activities such as grazing, tending, shearing, cleaning of byre, maintenance of lambs etc. In the present investigation, it was observed that most of the shepherds were using their own family labour and few of them using either permanent labour or casual labour for sheep rearing. The valuation of permanent labour was done on the basis of total wages paid to him both in kind and cash, while that of casual labour the actual wages

paid were considered. The family labour charges were valuated at the prevailing wage rates.

4. Health cover

The expenses incurred on purchase of medicines and other veterinary requisites by the shepherds were taken into account.

5. Depreciation

The depreciation of byre and equipments was worked out by adopting the straight line method of depreciation. In the case of equipments lasting for one year, its total value was considered as annual depreciation.

6. Losses due to death

The losses due to death of sheep during the period under study were carefully worked out and considered as the cost item in the study.

7. Interest

The interest on working capital was charged at the rate of 13 per cent per annum.

The interest on fixed capital such as initial value of the animals, byre and equipments was worked out at the rate of 10 per cent per annum.

b. Returns from sheep

The returns from sheep includes the income from various items viz., sale of sheep, wool, manure, sheep folding, skin and the value added due to the addition in stock. The returns per flock and

per sheep for the year were worked out by using prevailing prices of sheep and sheep products.

c. Net returns

The per flock and per sheep net returns for the year were obtained by deducting total costs from the total returns from sheep rearing.

d. Output - input ratio

The output-input ratio is the ratio of the gross income to the total cost. The output-input ratio was calculated at working cost and total cost of maintenance.

3.6.2 Break-even point analysis

The break even point is a point at which the total cost equals to the total revenue. The break even point at the overall level, was worked out by fitting the simple linear equation for total cost and total revenue. The intersection of these two straight lines indicated that break even point at which TR = TC and the number of sheep required to attain this situation. This approach had been followed by Pise (1975) and Raja (1981).

3.6.3 Regression analysis

To study the factors affecting returns from sheep rearing, the multiple linear regression analysis was carried out with the following equation

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \varepsilon$$

Where,

Y = Gross returns in rupees from sheep enterprise per flock

x_1 = Flock size in number of sheep

x_2 = Expenses on veterinary aid in rupees per flock

x_3 = Human labour use in man days per flock

bi's = Regression coefficients

a = Constant

ε = Error term

3.6.4 Marketing

The data on marketing of sheep and sheep products were tabulated suitably to examine their disposal patterns and also to estimate the marketing costs in the area under study.

GENERAL INFORMATION OF THE STUDY AREA

4. GENERAL INFORMATION OF THE STUDY AREA

4.1 General

This chapter deals with the physical features and economic background of the study area, the sample villages and sample shepherds. Geographical situation of the area, transport facilities and soil type are also important factors in economic sense. They not only affect the efficiency of farming but also are responsible for bringing about desirable changes in farm economy. Therefore, it is proposed to discuss in brief the background information on resource position in the study area. This knowledge would facilitate better understanding of the problems pertaining to the present investigation.

4.2 Location and geographical features of Satara district

Satara district lies between 17°5′ and 18°11′ north latitude and 73°33′ and 74°54′ east longitude. The total geographical area of the district is 10,484 sq.km. According to 1991 census there are 1573 villages and 1460 Grampanchayats in the district. The total population of the district, according to 1991 census is 24,52,000. The percentages of rural and urban population to the total population are 87.11 and 12.89 respectively. The rainfall is not uniform all over the district. It is very heavy in the Western region and it goes on decreasing towards eastern part. The extreme west part gets over 5000 mm rainfall, while the eastern part of the Sahyadri zones gets

the rainfall between 1200 mm to 2000 mm. The average annual rainfall of the district is 1349 mm. The district receives its rains mostly from the south -west monsoon during the middle of June to the end of September. A few erratic shower are received from north-east monsoon in the eastern part of the district. Average maximum and minimum temperatures of the district are 37.7^{0}C and 11^{0}C respectively. The soils of the district are observed to be of varied textures ranging from red laterites on Western ghat, medium to deep black alluvial in the central portion of the district and poor and shallow soils on eastern side.

4.3 Salient features of scarcity area

4.3.1 Location and geographical features

The present study was conducted in Man tahsil of Satara district in Maharashtra state. Man is the eastern most tahsil of Satara district. It is situated on the eastern part of West Deccan Plateau. This tahsil consists of 102 villages with its head quarter at Dahiwadi, which is situated on the bank of Manganaga river. The distance between district headquarter Satara and Dahiwadi is 60 km.

Topography of this tahsil is plain. However the boundaries are covered by off shoots of Sahyadri ranges. The total geographical area of the tahsil is 150800 hectares of which 53.18 per cent area is under cultivation. The tahsil is surrounded by Malshiras tahsil of Solapur district on the eastern side, by Atpadi tahsil of Sangli district on the southern side, while the western and northern

sides are bounded by Khatav and Phaltan tahsils of Satara district. Manganga is the only river flowing through this tahsil. It originates from the North-West Plateau of tahsil and flows from West to East through this tahsil for nearly 64 kilometers and thereafter ultimately joins the river Bhima near Pandharpur. The Manganga river goes dry during late winter and summer season.

4.3.2 Soils

The soils of the tahsil are observed to be of varied textures ranging from extremely poor to medium. The poor soils are brown in colour. A few strips of medium black soils are seen on the banks of the river Manganga. The soils along with the Mahadeo hill range are Shallow and major part of Mahadeo hill range in the tahsil is fallow and barren.

4.3.3 Climate and rainfall

The climate of Man tahsil is mainly dry. There are three main seasons viz., rainy, winter and summer. The winter season starts from December and continues upto mid February. Summer starts from March and continues upto mid of June. The rainy season starts from June and continues upto November. The average maximum temperature is 38.4^{0}C and minimum temperature is 11.6^{0}C. The monthwise rainfall during the years 1997 and 1998 is presented in Table 4.1.

Table 4.1 Rainfall distribution in Man tahsil (mm)

Month	Year	
	1997	1998
May	-	9.50
June	104.00	98.00
July	60.00	46.19
August	56.00	30.00
September	30.00	129.00
October	200.00	70.00
November	2.00	57.00
Total	452.00	439.69

(Source : Agricultural Division, Panchayat Samiti, Man)

The average annual rainfall of the tahsil is 462 mm. The rainfall is not certain. The major rainfall is received from the months of June to October. It is pointed out that the regular monsoon decides the prospects of agriculture since bulk of the area in the tahsil is unirrigated. Oftenly rainfall received is irregular and ill distributed creating scarcity conditions in this area.

4.3.4 Land utilization

The data on land use pattern of Man tahsil for the year 1996-97 is presented in Table 4.2.

Table 4.2. Land use pattern of Man tahsil (1996-97).

Sr. No.	Particulars	Area (ha)	Percentage to total area
1.	Total geographical area	150800	100.00
2.	Area under forest	13000	8.62
3.	Area not available for cultivation	25300	16.78
a.	Land put to non-agricultural use	2000	1.33
b.	Barren and uncultivable land	23300	15.45
4.	Other uncultivated land excluding fallow land	35800	23.74
a.	Cultivable waste	11500	7.63
b.	Permanent pastures and grazing land	24300	16.11
5.	Fallow land	7200	4.77
a.	Current fallow	-	-
b.	Other fallow	72.00	4.77
6.	Net sown area	69500	46.09
7.	Area sown more than once	10700	7.09
8.	Gross cropped area	80200	53.18
9.	Cropping intensity	-	115.39

(Source : Socio-economic Review and Statistical Abstract of Satara District 1998-99).

It is seen that the total geographical area of Man tahsil is 150800 hectares. The area under forest was hardly 8.62 per cent of the total geographical area. It is quite low as compared to the standard norm of 33.00 per cent. The barren and uncultivable land accounted for 15.45 per cent of the total geographical area. The land put to non-agricultural use was 2000 hectares whereas the cultivable waste land was 11500 hectares constituting 1.33 and 7.63 per cent respectively to

the total geographical area. The land under permanent pastures and grazing was 24300 hectares which formed 16.11 per cent of the total geographical area of Man tahsil. The land under forests, barren and uncultivable land, permanent pastures and grazing land constituting more than 40 per cent of the geographical area formed the source for sheep grazing since the sheep owners usually take their flocks to such lands for grazing. The proportion of fallow land was 4.77 per cent to the total geographical area and 8.98 per cent to the total cultivable area. The net sown area was 69500 hectares i.e. 46.09 per cent of the total geographical area in Man tahsil. Of the total net sown area 87.21 per cent was unirrigated area. The area sown more than once was 10700 hectares with the cropping intensity of 115.39 per cent during the year 1996-97.

The land use pattern shows the dominance of dry land agriculture as 87.21 per cent of the cultivable land was unirrigated in the area under study.

4.3.5 Cropping pattern

The study of cropping pattern gives an idea about the proportion of cash crops which provides a broad indication of the income level of the farming community in the tract. The area shares of major crops in Man tahsil are shown in Table 4.3 for the year 1996-97.

Table 4.3 Cropping pattern of Man tahsil (1996-97).

Sr. No.	Crops	Area under the crop (ha)	Percentage to G.C.A.
1.	Bajra	36943	46.50
2.	Jowar (Kharif and Rabi)	22909	28.84
3.	Wheat	1974	2.49
4.	Maize	798	1.00
5.	Other cereals	82	0.10
	Total cereals	62706	78.93
6.	Gram	947	1.19
7.	Tur	1905	2.40
8.	Green gram	7	0.01
9.	Kidney bean	6079	7.65
10.	Other pulses	7	0.01
	Total pulses	8945	11.26
	Total food grains	71651	90.19
11.	Groundnut	525	0.66
12.	Safflower	248	0.31
13.	Sunflower	230	0.29
14.	Other oilseeds	121	0.15
	Total oil seeds	1124	1.41
15.	Sugarcane	466	0.59
16.	Fruits	699	0.88
17.	Vegetables	2196	2.76
18.	Total fibre crops	2580	3.25
19.	Total fodder crops	727	0.92
	Gross cropped area (GCA)	79443	100.00

(Source : Socio-economic Review and Statistical Abstract of Satara District 1998-99)

It is observed that, the proportion of the area under food grain crops was 90.19 per cent of the gross cropped area and rest of area was under cash crops like vegetables (2.76 per cent), fibre crops (3.25 per cent), oil seeds (1.41 per cent) and other crops. The cereals accounted for 78.93 per cent and pulses 11.26 per cent of the gross cropped area. Bajara was the major crop among the cereals grown in the tahsil which occupied 46.50 per cent of the gross cropped area. Jowar was the next important cereal crops in the tahsil. The negligible area was allocated for sugarcane (0.59 per cent) and fruits (0.88 per cent). Thus the proportion of cash crops in the cropping pattern was very low adversely affecting the income from agriculture.

4.3.6 Population

The population data of Man tahsil are presented in Table 4.4.

According to 1991 census, the total population of Man tahsil was 1,84,000 consisting of 50 per cent males and 50 per cent females. The percentage of rural population was as high as 90.21 per cent indicating negligible urbanisation in the tahsil. The density of population in the tahsil was 128 while that of state was 257 persons per sq.km. The literacy percentage in the tahsil was 54.57.

Table 4.4 Population of Man tahsil

(Thousand)

Sr. No.	Particulars	Census year (1991)
1.	Population	
	Persons	184
	Males	92
	Females	92
2.	Urban population	18
3.	Rural population	166
4.	Percentage of urban population	9.79
5.	Percentage of rural population	90.21
6.	Density of population	128.0
7.	Literacy percentage	54.57

(Source : Socio-economic Review and Statistical Abstract of Satara District 1998-99)

4.3.7 Livestock population

Livestock forms an important capital asset on farms. The details of livestock population in the year 1992 and 1997 are presented in Table 4.5.

There has been an increase in the total livestock population from 2.40 lakhs to 2.56 lakhs during the period from 1992 to 1997. This increase was mainly on account of increase in the population of goats and buffaloes.

Table 4.5 Livestock population of Man tahsil

Sr. No.	Livestock	Census year 1992	Percentage to total livestock	Census year 1997	Percentage to total livestock
1.	Cattle				
a.	Males over 3 years	15575	6.47	12972	5.06
b.	Females over 3 years	13309	5.52	11707	4.57
c.	Young stock below 3 years	9306	3.86	9736	3.80
	Total cattle	38190	15.85	34.415	13.43
2.	Buffalo				
a.	Males over 3 years	274	0.11	160	0.06
b.	Females over 3 7ears	11029	4.58	12033	4.70
c.	Young stock below 3 years	6113	2.54	6404	2.50
	Total buffaloes	17416	7.23	18597	7.26
3.	Sheep	133718	55.51	120966	47.20
4.	Goats	50482	20.96	81235	31.70
5.	Other livestock	1095	0.45	1047	0.41
	Total livestock	240901	100.00	256260	100.00
6.	Poultry birds	201402	-	231147	-

(Source : Livestock Census Report, 1992 and 1997 District Statistics office, Satara)

According to 1992 census, the share of cattle and buffaloes to total livestock was 15.85 and 7.23 per cent respectively, while that of sheep and goats was 55.51 and 20.96 per cent, respectively. According to 1997 census, the share of cattle, buffaloes, sheep and goats to the total livestock was 13.43, 7.26, 47.20 and 31.70 per cent respectively. During these two census years the goat population increased from 20.96 to 31.70 per cent, while buffalo population changed from 7.23 to 7.26 per cent. The sheep population decreased from 55.51 to 47.20 per cent and cattle population decreased from 15.85 to 13.43 per cent to the total livestock. The

poultry production activity seems to have gained popularity among the farmers as the poultry population has increased from 2.01 lakhs to 2.31 lakhs during the period. The popular breed of sheep in the area under study is Deccani sheep.

4.4 Information of the selected villages

The location of village and its infrastrucural facilities will indicate background on which the sheep rearing activity is being undertaken in the villages. Such information of sample villages is given below. The location of sample villages is also shown in the map of Man tahsil (Fig. 1).

1. Andhali

The village is situated at the bank of Manganga river, 10 kms northern side to the tahsil head quarter, Dahiwadi. The village is divided into four parts locally called wadi. The village has Grampanchayat, primary school, secondary school and milk collection centre. There is a co-operative credit society which provides loan for sheep enterprise. There is no veterinary clinic facility in the village.

2. Mardi

The villages is situated 18 kms to eastern direction from Dahiwadi. The village has a Grampanchayat, primary school, secondary school, primary medical health centre, veterinary clinic. There is a co-operative credit society as well as shepherd's co-operative society which provides loan to the shepherds for sheep

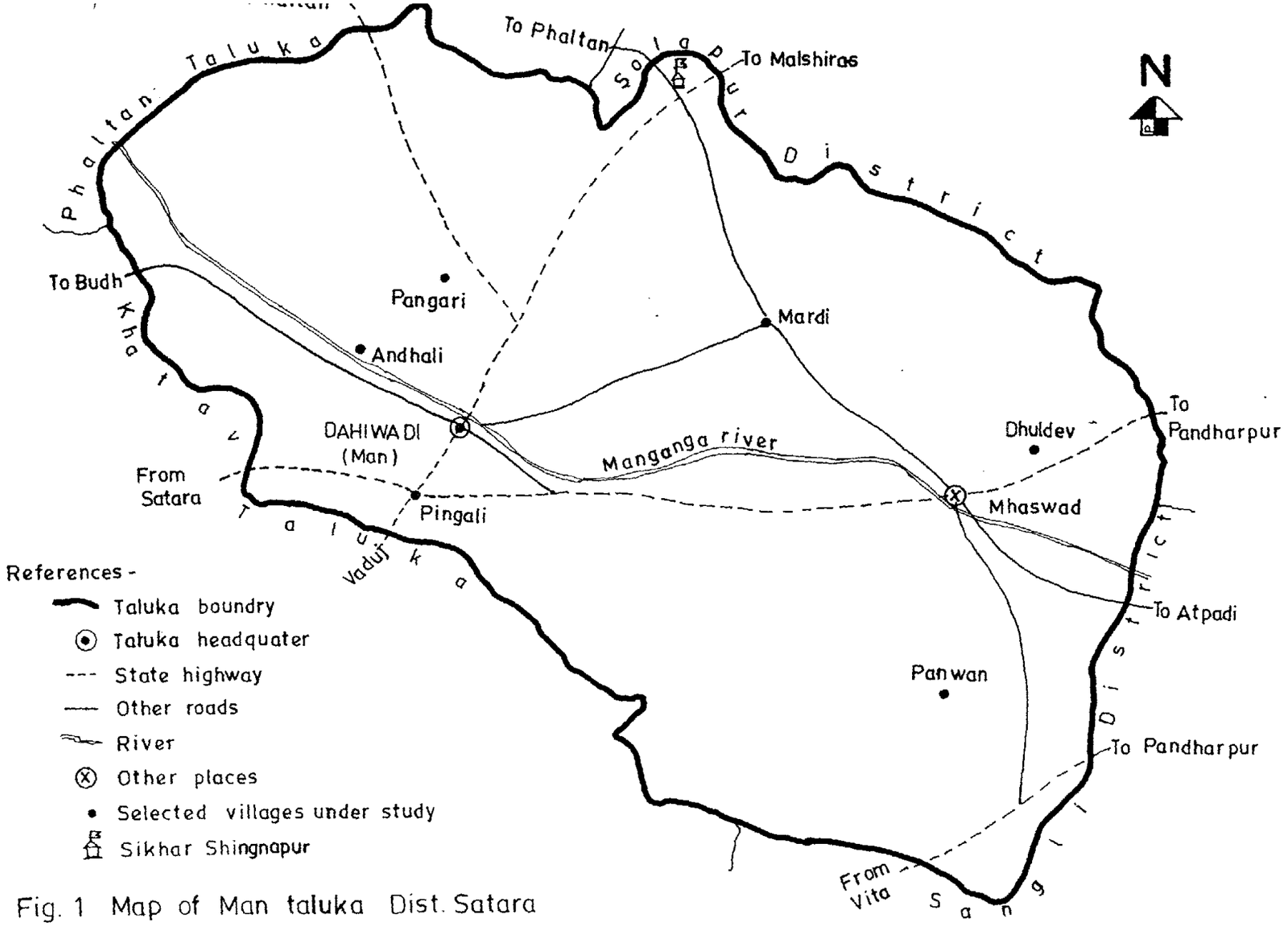

Fig. 1 Map of Man taluka Dist. Satara

enterprise. There are two milk collection centres in the village. The weekly bazar is held on every Friday. There is good transport facility. The village has also a branch of the Satara District Central Co-operative Bank and one Nationalised Bank viz., Bank of Baroda.

3. Pangari

It is situated about 7 kms away from Dahiwadi on its northern side. The village has a Grampanchayat, primary school, secondary school, veterinary clinic. There is a co-operative credit society and also a shepherds co-operative society which provides loan to the shepherds for sheep enterprise. There is famous temple of "Beroba".

4. Pingali

The village is situated on Satara-Pandharpur state high way about 5 km West-South direction to Dahiwadi. The village has a Grampanchayat, Primary school, Secondary School, Veterinary Clinic. There is a co-operative credit society. The village has also a branch of the Satara District Central Co-operative Bank.

5. Dhuldev

It is situated 39 kms away from Dahiwadi on Satara-Pandharpur state highway to eastern side of Dahiwadi. The village has a Grampanchayat, Primary school, Secondary School and a Co-operative Society.

6. Panvan

It is situated about 76 kms away from Dahiwadi to the South-East direction. The village has a Grampanchayat, Primary school and a Village Co-operative Credit Society.

In all the selected villages in general, the proportion of unirrigated land varied from 70 to 90 per cent. The soils of the tahsil are shallow having 20-30 cm soil depth and hence cereals and millets are grown. The income from crop enterprise is low. Therefore, sheep enterprise has become an important activity providing a source of employment and income to the shepherds in these villages.

ECONOMICS OF SHEEP REARING

5. ECONOMICS OF SHEEP REARING

This chapter deals with the presentation of results of analysis of data concerning to the objectives under study. This chapter has been designed to deal with socio-economic features of sample shepherds, capital investment in sheep rearing, itemwise cost of maintenance of sheep, returns from sheep enterprise, break even point analysis of the sample sheep flocks. The results presented in the chapter pertain to the data for the year 1996-97.

5.1 Socio-economic features of sample shepherds

5.1.1 Family size

In the rural areas, family members are generally the helping hands both in agricultural production and subsidiary occupations. It would, therefore, be necessary to study the composition of family. In further discussion, the presentation is according to the size of sheep flocks. The information on per family number of adult males, adult females and children is given in Table 5.1.

It is observed that on an average the size of a family was 7.80 members consisting of 30.64 per cent males, 24.23 per cent females and 45.13 per cent children. The average size of a family was 6.19, 7.80 and 9.72 members in case of small, medium and large size groups of flock owners respectively. It is thus, clear that with the

increase in the number of members in a family the size of the flock increased.

Table 5.1 Average composition of a family

(Number)

Sr. No.	Group	Males	Females	Children	Total
1.	Small	1.77	1.45	2.97	6.19
		(28.59)	(23.43)	(47.98)	(100.00)
2.	Medium	2.33	1.90	3.57	7.80
		(29.87)	(24.36)	(45.77)	(100.00)
3.	Large	3.19	2.42	4.11	9.72
		(32.82)	(24.90)	(42.28)	(100.00)
	Overall	2.39	1.89	3.52	7.80
		(30.64)	(24.23)	(45.13)	(100.00)

(Figures in parentheses indicate percentage to the total family size)

5.1.2 Education

The information on the education level of sample shepherds is presented in Table 5.2.

Table 5.2 Distribution of sample shepherds according to their education

(Number)

Sr. No.	Level of education	Small	Medium	Large	Overall
1.	Illiterate	22	26	19	67
		(70.97)	(78.79)	(73.08)	(74.44)
2.	Upto 4th Std	6	5	6	17
		(19.35)	(15.15)	(23.07)	(18.89)
3.	Upto 7th Std.	3	2	1	6
		(9.68)	(6.06)	(3.85)	(6.67)
	Total	31	33	26	90
		(100.00)	(100.00)	(100.00)	(100.00)

(Figures in the parentheses indicate percentage to the total)

It is observed that majority of the shepherds (74.44 per cent) at the overall level were illiterate. The illiteracy was more than 70 per cent in the case of all the size groups of flock owners. It is thus clear that the number of shepherds who did not to receive any

education was quite high. The percentage of shepherds who took education upto 4th standard and 7th standard at the overall level was 18.89 and 6.67 per cent respectively.

5.1.3 Land use pattern

Land is the basic factor of production in agriculture. In Indian villages, the economic and social status is mostly dependent on the size of his land holding. It also reflects on the type of subsidiary occupations. The data on average land holding of sample shepherds are presented in Table 5.3.

Table 5.3 Average per family land holding

(hectares)

Group	Cultivable land		Total cultivable land	Un-cultivable land	Total holding
	Irrigated	Un-irrigated			
Small	0.38	1.78	2.16	0.51	2.67
	(17.59)	(82.41)	(80.90)	(19.20)	(100.00)
Medium	0.89	1.78	2.67	0.74	3.41
	(33.33)	(66.67)	(78.30)	(21.70)	(100.00)
Large	0.71	2.37	3.08	1.06	4.14
	(23.05)	(76.95)	(74.40)	(25.60)	(100.00)
Overall	0.66	1.95	2.61	0.76	3.37
	(25.29)	(74.71)	(77.45)	(22.55)	(100.00)

(Figures in the parentheses indicate percentages)

It is seen that the average per family size of holding at the overall level, worked out to 3.37 hectares. The proportion of cultivable land was 77.45 per cent leaving 22.55 per cent of the land as uncultivable. It was observed that the size of flock increased with the size of holding. It is further observed that proportion of irrigated area was more in the case of medium size class followed by large and small size classes of flock owners. This means that as far as land

resource is concerned, the medium size class had the advantage with more irrigated area than the other size classes.

5.1.4 Livestock

The average per family number of various types of livestock held by the sample shepherds have been given in Table 5.4.

Table 5.4 Average per family number of livestock possessed by the shepherds (Number)

Size group	Sheep	Goat	Local cow	Crossbred cow	Buffalo	Draft animals	Dog
Small	30.96	2.51	0.93	0.16	0.38	0.87	0.84
Medium	61.81	3.90	0.78	-	0.63	1.15	1.06
Large	102.30	4.61	0.27	-	0.42	0.54	1.46
Overall	62.89	3.63	0.69	0.05	0.49	0.88	1.10

It is seen that at the overall level, the livestock possessed by a shepherd family, comprised of 62.89 sheep, 3.63 goats, 0.69 local cows, 0.05 crossbred cows, 0.49 buffaloes and 0.88 draft animals. It was further observed that the large flock owners had relatively less number of local cows and draft animals than those of the small and medium flock owners. The number of buffaloes possessed by medium class of flock owners was relatively more followed by large and small size class of flock owners. This means that the small and medium class of flock owners had sheep rearing as the subsidiary enterprise. However, the large class of flock owners were dependent on sheep rearing as their main occupation. This is clear from the number of sheep maintained by them. The small, medium and large

size class of shepherds maintained on an average 30.96, 61.81 and 102.30 sheep respectively.

It is further noted that, at least a dog was maintained per flock for the security of herd. The number of goats per family at the overall level worked out to 3.63. The number of goats increased as the flock size of sheep increased.

5.1.5 Composition of sheep flock

The information on the number of lambs, ewes and rams possessed by the shepherds has been given in Table 5.5.

Table 5.5 Average composition of sheep flock maintained by the sample shepherds (Number)

Size group	Ewe	Lamb	Ram	Total
Small	21.57	8.37	1.02	30.96
	(69.67)	(27.03)	(3.30)	(100.00)
Medium	42.31	17.39	2.11	61.81
	(68.45)	(28.14)	(3.41)	(100.00)
Large	67.79	31.27	3.24	102.30
	(66.26)	(30.57)	(3.17)	(100.00)
Overall	42.53	18.30	2.06	62.89
	(67.63)	(29.10)	(3.27)	(100.00)

(Figures in the parentheses indicate percentage to the total)

It is observed that the average size of a flock including lambs was 30.96, 61.81 and 102.30 in the case of small, medium and large size classes of flocks respectively. The average size of a flock at the overall level was 62.89. It consisted of ewes, lambs and rams. The proportion of lambs, ewes and rams in different sized flocks did not show much variation. At the overall level, the proportion of lambs,

ewes and rams in a flock was 29.10, 67.63 and 3.27 per cent respectively.

5.2 Capital investment

The investment towards the sheep flock included different items, which influence the profitability of the business. Herd stock, byre and equipments are the major items of fixed capital investment in sheep enterprise.

5.2.1 Investment per flock

The data on per flock fixed capital investment for sheep enterprise are presented in Table 5.6.

Table 5.6 Average per flock fixed capital investment in sheep rearing (Rs.)

	Particulars	Small	Medium	Large	Overall
1.	**Herd stock**				
	Ewes	17984.21	35581.87	57042.21	35650.10
	Rams	851.42	1687.73	2544.03	1647.04
	Lambs	6712.74	13877.22	24530.52	14557.08
	Sub total	25548.37 (87.67)	51146.82 (89.66)	84116.76 (91.61)	51854.22 (90.21)
2.	Byre	3178.63 (10.91)	5248.48 (9.20)	6711.54 (7.31)	4958.19 (8.63)
3.	**Equipments**				
	Net	266.29	431.21	638.27	434.22
	Shearing scissors	60.38	93.18	204.80	114.13
	Axe	32.42	48.03	60.96	46.39
	Ghameli	16.93	9.09	20.38	15.05
	Basket	25.54	49.42	39.61	38.36
	Others	13.03	16.36	30.50	19.30
	Sub total	414.59 (1.42)	647.29 (1.14)	994.52 (1.08)	667.45 (1.16)
	Total	29141.59 (100.00)	57042.59 (100.00)	91822.82 (100.00)	57479.86 (100.00)

(Figures in the parentheses indicate percentage to the total)

It is revealed that the total fixed investment per flock at the overall level was Rs. 57479.86. The investment was the highest in large size group (Rs. 91822.82) which was followed by medium size class (Rs. 57042.59) and small size class (Rs. 29141.59). This was quite obvious because of more number of sheep and other assets with the larger size of flock owners.

The herd stock included the value of ewes, rams and lambs. The herd stock was dominant in capital investment which alone accounted for 90.21 per cent of the total fixed investment at the overall level. The investment in byre and equipments shared 8.63 and 1.16 per cent of the total investment respectively. The investment on byre in large size group was Rs. 6711.54 followed by Rs. 5248.48 in medium and Rs. 3178.63 in small size groups. It is also noted that the net, shearing scissors, and axe were the major items of equipments required for sheep rearing. The investment on equipments was the highest in large size group (Rs. 994.52) as compared to medium size group (Rs. 647.29) and small size group (Rs. 414.59).

5.2.2 Investment per sheep

The average investment per sheep is presented in Table 5.7.

Table 5.7 The average per sheep fixed capital investment in sheep rearing (Rs.)

	Particulars	Small	Medium	Large	Overall
1.	**Herd stock**				
	Ewes	580.88	575.67	557.59	566.86
	Rams	27.50	27.30	24.87	26.19
	Lambs	216.82	224.51	239.79	231.47
	Sub total	825.20	827.48	822.25	824.52
2.	**Byre**	102.67	84.91	65.61	78.84
3.	**Equipments**				
	Net	8.60	6.98	6.24	6.90
	Shearing scissors	1.95	1.51	2.00	1.81
	Axe	1.05	0.78	0.59	0.74
	Ghameli	0.55	0.15	0.20	0.24
	Basket	0.82	0.80	0.39	0.61
	Others	0.42	0.26	0.30	0.31
	Sub total	13.39	10.48	9.72	10.61
	Total	941.26	922.87	897.58	913.97

On examination of the Table 5.7, it is revealed that the capital investment per sheep was Rs. 941.26, Rs. 922.87 and Rs. 897.58 in case of small, medium and large size groups of flocks, respectively. The fixed capital investment per sheep at the overall level was Rs. 913.97. Even though per sheep fixed capital investment did not show much variation among the size groups of flocks, the investment in byre and equipments showed declining trend with an increase in the

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

5.3 Labour utilization

Labour is an important resource determinant of the cost of sheep rearing. The sources of supply of labour are two i.e. family and hired. It is said that sheep rearing increases the employment opportunities to the family members. The important items of work for labour in sheep enterprise are grazing and tending sheep, shearing, maintenance of lambs, cleaning of byres and miscellaneous work relating to sheep folding.

5.3.1 Average per flock labour use

The category wise data on labour utilized per flock per annum for different activities in sheep rearing according to size classes of flocks are presented in Table 5.8.

Natural grazing operation was predominant in sheep enterprise. It is observed that the per flock labour utilization for different activities such as grazing, shearing and maintenance of lambs and byres in the small, medium and large size groups of flocks was 397.9, 496.41 and 696.63 mandays respectively. The per flock labour utilization for different activities at the overall level was 520.31 mandays. It comprised of family labour of 411.16 male mandays, 54.84 female mandays and 3.58 children mandays besides the hired labour of 50.73 male mandays. Of the total labour use at the

Table 5.8 Average per flock labour use in sheep rearing

(Mandays)

Group	Grazing					Shearing			Maintenance of lambs and byre				Total				Total labour
	Family labour			Hired male	Total	Family male	Hired male	Total	Family		Hired male	Total	Family labour			Hired Male	
	Male	Female	Children						Male	Female			Male	Female	Children		
Small	322.42	7.50	4.82	9.90	344.64	3.06	2.03	5.09	12.80	35.37	-	48.17	338.28	42.87	4.82	11.93	397.90
					(86.61)			(1.28)				(12.11)					(100.00)
Medium	337.78	12.27	5.24	71.16	426.45	4.69	4.73	9.42	17.06	43.48	-	60.54	359.53	55.75	5.24	75.89	496.41
					(85.91)			(1.90)				(12.19)					(100.00)
Large	536.03	17.19	-	58.23	611.45	7.00	6.84	13.84	20.57	50.77	-	71.34	563.60	67.96	-	65.07	696.63
					(87.77)			(1.99)				(10.24)					(100.00)
Overall	389.76	12.05	3.58	46.32	451.71	4.79	4.41	9.20	16.61	42.79	-	59.40	411.16	54.84	3.58	50.73	520.31
					(86.81)			(1.77)				(11.42)					(100.00)

(Figures in the parentheses indicate percentage to the total labour in mandays in the respective size groups)

overall level, 86.81 per cent of labour was required for grazing of sheep, 11.42 per cent of labour for maintenance of lambs and byre and 1.77 per cent of labour was utilized for shearing of sheep. It is also noted that the total labour use per flock showed increase with the increase in the size of flock. Of the total labour use per flock, at the overall level, the share of family and hired labour was 90.25 and 9.75 per cent respectively. The operation wise average labour use in sheep rearing has also been graphically presented by way of pie-diagrams in Fig. 2.

It is seen that there was no variation in proportion of labour used for grazing of sheep in different size groups. However, the proportion of labour used for shearing of sheep showed increase with the increase in the size group of flocks. This is because the larger flock owners relied more on hired male labour for shearing of their sheep as compared to smaller flock owners.

5.3.2 Average per sheep labour use

The average flockwise labour presentation may not give clear idea of the labour utilization. It is therefore, felt necessary to work out per sheep labour required for small, medium and large size groups of flocks. Table 5.9 presents the information on average per sheep labour used per annum for different activities in sheep rearing.

It is noted that the per sheep total labour used was 12.85, 8.03 and 6.81 mandays in the case of small, medium and large size groups of flocks respectively with an average of 8.27 mandays. It is

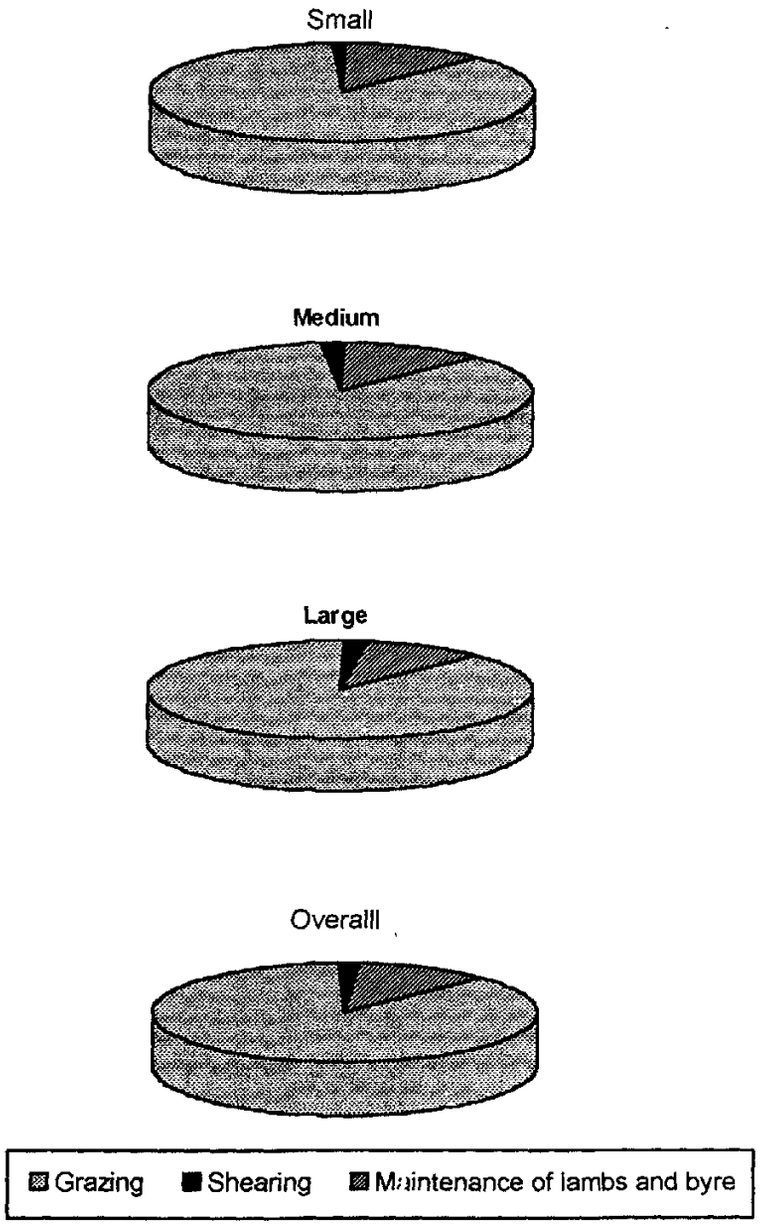

Fig. 2. Operation wise average labour use in sheep rearing

Table 5.9 Average per sheep labour use in sheep rearing

(Mandays)

Group	Grazing					Shearing			Maintenance of lambs and byre			Total				Total labour
	Family labour			Hired male	Total	Family male	Hired male	Total	Family labour		Total	Family labour			Hired Male	
	Male	Female	Children						Male	Female		Male	Female	Children		
Small	10.41	0.24	0.16	0.32	11.13	0.10	0.06	0.16	0.42	1.14	1.56	10.93	1.38	0.16	0.38	12.85
Medium	5.46	0.20	0.08	1.15	6.89	0.08	0.08	0.16	0.28	0.70	0.98	5.82	0.90	0.08	1.23	8.03
Large	5.24	0.16	-	0.57	5.97	0.07	0.07	0.14	0.20	0.50	0.70	5.51	0.66	-	0.64	6.81
Overall	*6.20*	*0.19*	*0.06*	*0.73*	*7.18*	*0.08*	*0.07*	*0.15*	*0.26*	*0.68*	*0.94*	*6.54*	*0.87*	*0.06*	*0.80*	*8.27*

thus clear that per sheep total labour use showed decline with an increase in the size group of flocks indicating the economies of scale in use of labour on sample flocks. It is observed that at the overall level, per sheep use of labour for grazing, shearing and maintenance of lambs and byres worked out to 7.18, 0.15 and 0.94 mandays respectively. This means that grazing of sheep is an important activity which alone required bulk of labour in sheep rearing.

5.4 Grazing and fodder expenses

The grazing lands play a vital role in the sheep enterprise. In the normal years of rainfall, the sheep flocks fully depend on grazing lands. The village common lands, river banks, the uncultivable lands and hillocks provide grazing material throughout the year. The shepherds also provide residue of harvested crops to the flocks and graze them in the harvested fields. The stubble grazing is available for one to two months period. They also graze their flocks on other farmer's fields in exchange of sheep folding or pay some amount to them. The sheep do not get adequate grasses for grazing during summer and hence most of the shepherds use dry fodder as a feed to the flocks in the evening when sheep are at the byre.

The information on per flock and per sheep annual expenses on grazing and fodder according to size classes of sample sheep flocks has been given in Table 5.10. It is revealed that per flock annual grazing charges in respect of small, medium and large size class of flocks were Rs. 2515.64, Rs. 3706.53 and Rs. 6567.77

Table 5.10 Per flock and per sheep expenses on grazing and fodder (Rs.)

Herd	Grazing			Fodder		
	On owned farm	On other farm	Total	Owned	Purchased	Total
Per flock						
Small	1006.73	1508.91	2515.64	775.27	1224.88	2000.15
	(40.02)	(59.98)	(100.00)	(38.76)	(61.24)	(100.00)
Medium	1297.29	2409.24	3706.53	1034.72	2629.52	3664.24
	(35.00)	(65.00)	(100.00)	(28.24)	(71.76)	(100.00)
Large	1494.83	5072.94	6567.77	810.97	3890.85	4701.82
	(22.76)	(77.24)	(100.00)	(17.25)	(82.75)	(100.00)
Overall	1254.27	2868.64	4122.91	880.72	2510.08	3390.80
	(30.42)	(69.58)	(100.00)	(25.97)	(74.03)	(100.00)
Per sheep						
Small	32.51	48.74	81.25	25.04	39.56	64.60
Medium	20.99	38.97	59.96	16.74	42.54	59.28
Large	14.61	49.59	64.20	7.93	38.03	45.96
Overall	19.95	45.61	65.56	14.01	39.91	53.92

(Figures in the parentheses indicate percentage to the totals of the respective groups)

respectively. The grazing charges per flock at the overall level came to Rs. 4122.91. Of the total grazing charges per flock, the proportion of grazing expenses on own farm and others farm on an average was 30.42 and 69.58 per cent respectively. The proportion of expenses of grazing on others farm was higher in the case of large flocks than the others since the owned land available with them for grazing sheep was limited.

As regards per flock per annum expenses on fodder, it is observed that on an average, the expenditure on fodder was Rs. 3390.80. The share of owned and purchased fodder was 25.97 and 74.03 per cent respectively. The proportion of expenses on purchased fodder was more in large flocks while that of owned fodder was more in small sized flocks. It appears that expenses of grazing on others farm and purchased fodder were the important items in all the size classes of flocks in sheep rearing. This is because these items had the larger share to the extent of 69.58 and 74.03 per cent in the total annual expenses on grazing and fodder respectively.

The per sheep expenses on grazing and fodder were also worked out. It is noted that on an average, the expenses on grazing and fodder came out to Rs. 65.56 and Rs. 53.92 respectively. It is further observed that per sheep annual grazing charges were the highest (Rs. 81.25) in small flock and it decreased to Rs. 59.96 in medium flock size. The annual fodder charges per sheep showed decline with an increase in the flock size.

5.5 Item wise cost of maintenance of sheep

The maintenance cost of sheep includes expenses on grazing and fodder, labour, veterinary aid, depreciation on byre and equipments, losses due to death of sheep, interest on working and fixed capital.

5.5.1 Per flock cost of maintenance of sheep

The data on item wise expenditure in sheep enterprise per flock per annum in different size groups are presented in Table 5.11.

It is seen that per flock total cost of sheep rearing, on an average was Rs. 38782.70 per annum. The per flock total cost of sheep rearing increased with increase in the flock size. The per flock average total cost of maintenance of sheep was Rs. 26328.84, Rs. 37606.35 and Rs. 55124.61 in respect of small, medium and large size groups of flocks. The working cost including grazing and fodder charges, labour, veterinary aid and interest on working capital shared 73.63 per cent while the fixed cost such as interest on fixed capital, depreciation on byre and equipments and losses due to death of sheep accounted for 26.37 per cent to the total cost.

Table 5.11 Average per flock cost of maintenance of sheep.

(Rs.)

Particulars	Small	Medium	Large	Overall
Working costs				
Grazing and fodder charges	4515.79 (17.15)	7370.77 (19.60)	11269.59 (20.44)	7513.71 (19.38)
Labour charges	13926.50 (52.90)	17374.52 (46.20)	24382.05 (44.23)	18211.26 (46.96)
Veterinary aid	600.93 (2.28)	1071.16 (2.85)	1684.88 (3.06)	1086.49 (2.80)
Interest on working capital	1237.81 (4.70)	1678.07 (4.46)	2426.87 (4.40)	1742.75 (4.49)
Total working cost	20281.03 (77.03)	27494.52 (73.11)	39763.39 (72.13)	28554.21 (73.63)
Fixed costs				
Interest on fixed capital	2914.16 (11.07)	5704.26 (15.17)	9182.28 (16.66)	5747.99 (14.82)
Depreciation on byre and equipments	771.72 (2.93)	1366.67 (3.63)	1850.80 (3.36)	1301.60 (3.36)
Losses due to death of sheep	2361.93 (8.97)	3040.90 (8.09)	4328.14 (7.85)	3178.90 (8.19)
Total fixed cost	6047.81 (22.97)	10111.83 (26.89)	15361.22 (27.87)	10228.49 (26.37)
Total cost	26328.84 (100.00)	37606.35 (100.00)	55124.61 (100.00)	38782.70 (100.00)

(Figures in the parentheses indicate percentages to the total expenditure in respective size groups)

The proportion of cost of labour was as high as 52.90 per cent in small size group followed by 46.20 per cent in medium size group and 44.23 per cent in large size group. The grazing and fodder charges was predominant in all size groups with proportion of 17.15, 19.60 and 20.44 per cent in small, medium and large size groups respectively. The proportionate share of interest on working capital

was the highest 4.70 per cent in small size group followed by 4.46 per cent in medium and 4.40 per cent in large size groups. Under fixed cost items interest on fixed capital was as high as 16.66 per cent in large size group followed by 15.17 and 11.07 per cent in medium and small size groups respectively. The proportion of losses due to death of sheep was high (8.97 per cent) in small size group followed by 8.09 and 7.85 per cent in medium and large size groups respectively.

It was revealed that the proportion of labour charges decreased with an increase in the size group of sheep enterprise due to the scale economy. The proportion of working cost in the total cost of maintenance showed decline with an increase in the size of sheep flock while that of fixed cost increased with an increase in the flock size. It is noted that the expenses on labour alone shared 63.77 per cent of total working cost while the share of grazing and fodder charges in the working cost was 26.31 per cent. The share of interest on fixed capital and losses due to death of sheep was 56.19 and 31.07 per cent in the total fixed cost at the overall level respectively.

5.5.2 Per sheep cost of maintenance on sample flocks

The average cost of maintenance of sheep would be more clear if we examine data on per sheep basis contained in Table 5.12.

It is noted that average per sheep total cost of maintenance per annum came to Rs. 850.41, Rs. 608.41 and Rs. 538.85 in the case of small, medium and large size groups of flocks respectively with an overall average cost of Rs. 616.68. This means

that the per sheep cost of maintenance showed clearly decline with an increase in the flock size. The components of total cost viz., working cost and fixed cost per sheep also indicated a decline over the increase in flock size. The main reason for this was that the major items of working cost such as labour, grazing and fodder and that of fixed cost such as losses due to death of sheep showed regular decline in per sheep maintenance cost over the increase in flock size indicating the economies of scale in sheep rearing.

Table 5.12 Average per sheep cost of maintenance on sample flocks

(Rs.)

Particulars	Small	Medium	Large	Overall
Working costs				
Grazing and fodder charges	145.86	119.25	110.16	119.48
Labour charges	449.82	281.09	238.34	289.57
Veterinary aid	19.41	17.33	16.47	17.28
Interest on working capital	39.98	27.15	23.72	27.71
Total working cost	655.07	444.82	388.69	454.04
Fixed costs				
Interest on fixed capital	94.13	92.29	89.76	91.40
Depreciation on byre and equipments	24.92	22.11	18.09	20.69
Losses due to death of sheep	76.29	49.19	42.31	50.55
Total fixed cost	195.34	163.59	150.16	162.64
Total cost	850.41	608.41	538.85	616.68

5.6 Lambing and mortality

The lambing and mortality rate of sheep in different size groups of flocks have been presented in Table 5.13.

Table 5.13 Lambing and mortality rate of sheep in different size groups of flocks (Per cent)

Sr. No.	Size group	Lambing rate	Mortality rate	
			Lamb	Sheep
1.	Small	80.64	6.03	4.69
2.	Medium	74.49	6.89	5.94
3.	Large	68.18	9.67	9.53
	Overall	74.78	7.60	6.81

It is noted that at the overall level lambing rate was 74.78 per cent. Amongst the groups of flocks, the lambing rate was 80.64, 74.49 and 68.18 per cent in small, medium and large flocks respectively. This indicates that lambing rate was the highest in small size group and was the lowest in large size group. This was mainly because of proper feeding and grazing of sheep in the small size groups of flocks. It must be added here that per sheep feeding and labour cost declined with an increase in the flock size.

The mortality rate of lambs and sheep at the overall level was 7.60 and 6.81 per cent respectively. The mortality rate of lambs and sheep was higher in large size group than that in other size

groups. The mortality rate in lambs was 6.03, 6.89 and 9.67 per cent while that in sheep was 4.69, 5.94 and 9.53 per cent in the case of small, medium and large size groups of flocks respectively.

5.7 Gross returns from sheep rearing

5.7.1 Returns in physical units

Gross returns in sheep rearing included the income from sale of sheep, wool, manure, sheep folding and skin. The returns in physical quantities have been assessed for different size groups of flocks. The data on gross returns in physical units in different size groups of flocks have been given in Table 5.14.

Table 5.14 Gross returns in physical units in different size groups of flocks

Size group	Sale of sheep (No.)	Wool (kg)	Manure (C.L.)	Sheep folding (days)	Skin (No.)
Per flock					
Small	4.64	15.82	4.73	248	1.39
Medium	9.27	30.47	8.79	241	1.83
Large	11.76	49.82	13.04	243	2.79
Overall	8.39	31.01	8.62	244	1.96
Per sheep					
Small	0.15	0.511	0.15	248	0.045
Medium	0.15	0.493	0.14	241	0.029
Large	0.11	0.487	0.13	243	0.027
Overall	0.13	0.493	0.14	244	0.031

It is seen that per flock sale of sheep, on an average was 8.39 sheep while that of wool was 31.01 kilograms. The quantity of manure obtained from sheep, at the overall level, was 8.62 cart loads while that of skin was 1.96 in numbers. The per flock sale of sheep, wool, manure and number of skin showed increase with an increase in the size of flock which is quite acceptable. It is also seen that per flock average sheep folding days in a year were 248, 241 and 243 days in the case of small, medium and large sheep flocks respectively. The sheep folding on other's farm was charged at the rate of RS. 50 per 100 sheep per night halt in the field. The sheep folding on others farm was also done in kind basis either in terms of supply of food grains to the shepherds or provision of grazing lands for the sheep.

On examination of data on per sheep basis, it is seen that the number of skin was higher in the case of small size class than that in other flocks. It was revealed that per sheep average annual production of wool was only 0.493 kg. On an average, manure obtained per sheep was 0.14 cart load per annum. Per sheep quantity of wool and manure was slightly higher in the case of small size class than that in other flocks.

5.7.2 Returns in monetary terms

The returns from sheep rearing have been worked out in monetary terms. It included value of sheep sold, wool, manure, skin, receipts due to sheep folding and income due to appreciation of

stock. The annual gross returns from the above sources per flock are presented in Table 5.15.

It is seen that annual gross returns from different sources in sheep rearing per flock came to Rs. 47868.62 at the overall level. Of the total gross returns, the income due to appreciation of stock shared 63.52 per cent while income due to sheep folding and sale of sheep accounted for 15.97 and 14.37 per cent respectively. The next important sources of income were manure (4.36 per cent), wool (1.19 per cent) and skin (0.59 per cent). The average per flock gross returns from all the sources were Rs. 24839.77, Rs. 49725.79 and Rs. 72968.94 in the case of small, medium and large size groups of sheep respectively. On examination of proportions of income from different sources amongst the size classes, it is revealed that the proportion of income received due to appreciation of stock in the total income was more or less same in different size groups. While that of income from sale of sheep was comparatively less and that of income due to sheep folding was maximum in the case of large size group. However, there were no much variation in proportion of income received from other sources among different size classes of sheep flocks. The per cent share of different sources in gross returns from sheep rearing has been graphically presented by way of pie diagrams in Fig. 3.

The picture of average annual income per sheep would be more clear if we examine the data on per sheep basis contained in Table 5.16.

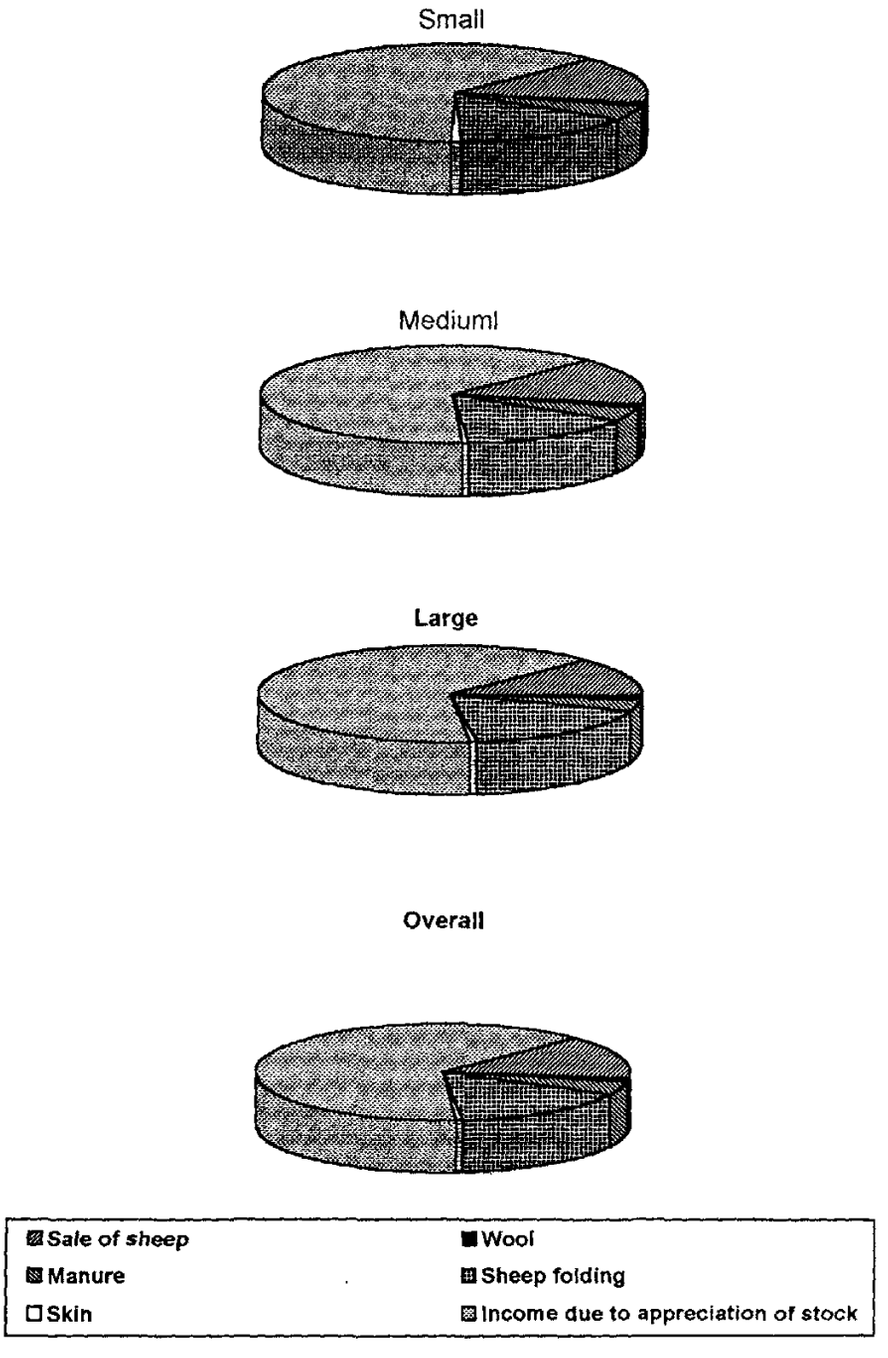

Fig. 3. Per cent share of different sources in gross returns from sheep rearing

Table 5.15 Source wise average annual income per flock in different size groups of flocks (Rs.)

Size group	Source of income						Income due to appreciation stock	Gross returns
	Sale of sheep	Wool	Manure	Sheep folding	Skin	Total		
Small	3790.74	291.25	1230.37	3839.04	208.50	9359.90	15479.87	24839.77
	(15.26)	(1.17)	(4.95)	(15.46)	(0.84)	(37.68)	(62.32)	(100.00)
Medium	7732.94	558.82	2238.64	7448.11	263.85	18242.36	31483.43	49725.79
	(15.55)	(1.12)	(4.50)	(14.98)	(0.53)	(36.68)	(63.32)	(100.00)
Large	9481.73	915.19	2918.13	12429.45	392.47	26136.97	46831.97	72968.94
	(12.99)	(1.26)	(4.00)	(17.03)	(0.54)	(35.82)	(64.18)	(100.00)
Overall	6880.28	569.61	2087.64	7644.04	281.94	17463.51	30405.11	47868.62
	(14.37)	(1.19)	(4.36)	(15.97)	(0.59)	(36.48)	(63.52)	(100.00)

(Figures in the parentheses indicate percentage to the gross returns of the respective size groups)

Table 5.16 Source wise average per sheep annual income in different size groups of flocks

(Rs.)

Size group	Source of income						Income due to appreciation stock	Gross returns
	Sale of sheep	Wool	Manure	Sheep folding	Skin	Total		
Small	122.44	9.41	39.74	124.00	6.73	302.32	499.99	802.31
Medium	125.11	9.04	36.21	120.50	4.27	295.13	509.36	804.49
Large	92.68	8.95	28.52	121.50	3.84	255.49	457.79	713.28
Overall	109.40	9.06	33.19	121.55	4.48	277.68	483.47	761.15

The annual gross returns from different sources per sheep on an average, were Rs. 761.15. The per sheep gross returns were Rs. 802.31, Rs. 804.49 and Rs. 713.28 in the case of small, medium and large size classes of flocks respectively indicating that per sheep gross returns were maximum in the case of medium size groups. As indicated earlier, the income due to appreciation of stock, the sale of sheep and income from sheep folding were the major sources of income in sheep rearing. The income from sheep folding was little higher in the case of small size class than that in other size groups. The receipts due to appreciation of stock and sale of sheep were maximum in the case of medium class of flocks. This resulted in higher annual gross returns per sheep in the case of medium and small size classes of flocks as compared to that in large in large size class of flocks.

5.8 Flock efficiency measures

5.8.1 Profitability

The profitability in sheep rearing was worked out by estimating the returns both at working and total costs. The relevant data in this regard are presented in Table 5.17.

It is seen that per flock returns over working cost were Rs. 4558.74, Rs. 22231.27 and Rs. 33205.55 in the case of small, medium and large size classes of sheep flocks respectively with an overall average of Rs. 19314.41. Importantly small size of sheep flock was in loss to the extent of Rs. 1489.07 over the total cost, while the

medium and large size classes of flocks had obtained the net returns of Rs. 12119.44 and Rs. 17844.33, respectively.

Table 5.17. Gross returns from sheep rearing (Rs.)

Size group	Working cost	Total cost	Gross returns	Returns over	
				Working cost	Total cost
Per flock					
Small	20281.03	26328.84	24839.77	4558.74	-1489.07
Medium	27494.52	37606.35	49725.79	22231.27	12119.44
Large	39763.39	55124.61	72968.94	33205.55	17844.33
Overall	28554.21	38782.70	47868.62	19314.41	9085.92
Per sheep					
Small	655.07	850.41	802.31	147.24	-48.10
Medium	444.82	608.41	804.49	359.67	196.08
Large	388.69	538.85	713.28	324.59	174.43
Overall	454.04	616.68	761.15	307.11	144.47

It is seen that all the size classes of flocks could get returns over the working cost on per sheep basis. At the overall level per sheep returns over working cost were Rs. 307.11. However, per sheep net returns over the total cost were Rs. 144.47. The per sheep net returns over total cost were negative to the extent of Rs. 48.10 in the small size class, while the same were positive to the extent of Rs. 196.08 and Rs. 174.43 in case of medium and large size classes of flocks. This means that the small size class of flock could not secure returns over total cost while the other two viz., medium and large size classes of sheep secured returns over total cost. It is revealed that

per sheep maintenance cost was quite high because of relative more expenses towards labour, grazing and fodder charges, in case of small flocks which was the reason for getting negative returns over the total cost. The levels of per sheep costs, returns and profit or loss have been graphically indicated for different size classes of flocks in Fig. 4.

5.8.2 Output - Input ratio

The efficiency of operating the sheep enterprise has been examined by comparing the output-input ratios in different size groups of flocks. The ratios are given in Table 5.18.

Table 5.18 Output -input ratios in sheep rearing in different size groups of flocks

Size group	Output-Input ratios at	
	Working cost	Total cost
Small	1.22	0.94
Medium	1.81	1.32
Large	1.83	1.32
Overall	1.68	1.23

At the overall level output - input ratio was 1.68 and 1.23 at the working and total cost respectively. The output-input ratio at working cost was 1.22, 1.81 and 1.83 in the case of small, medium and large size classes of flocks respectively. This ratio at the total cost, however, was 0.94, 1.32 and 1.32 in the small medium and large size

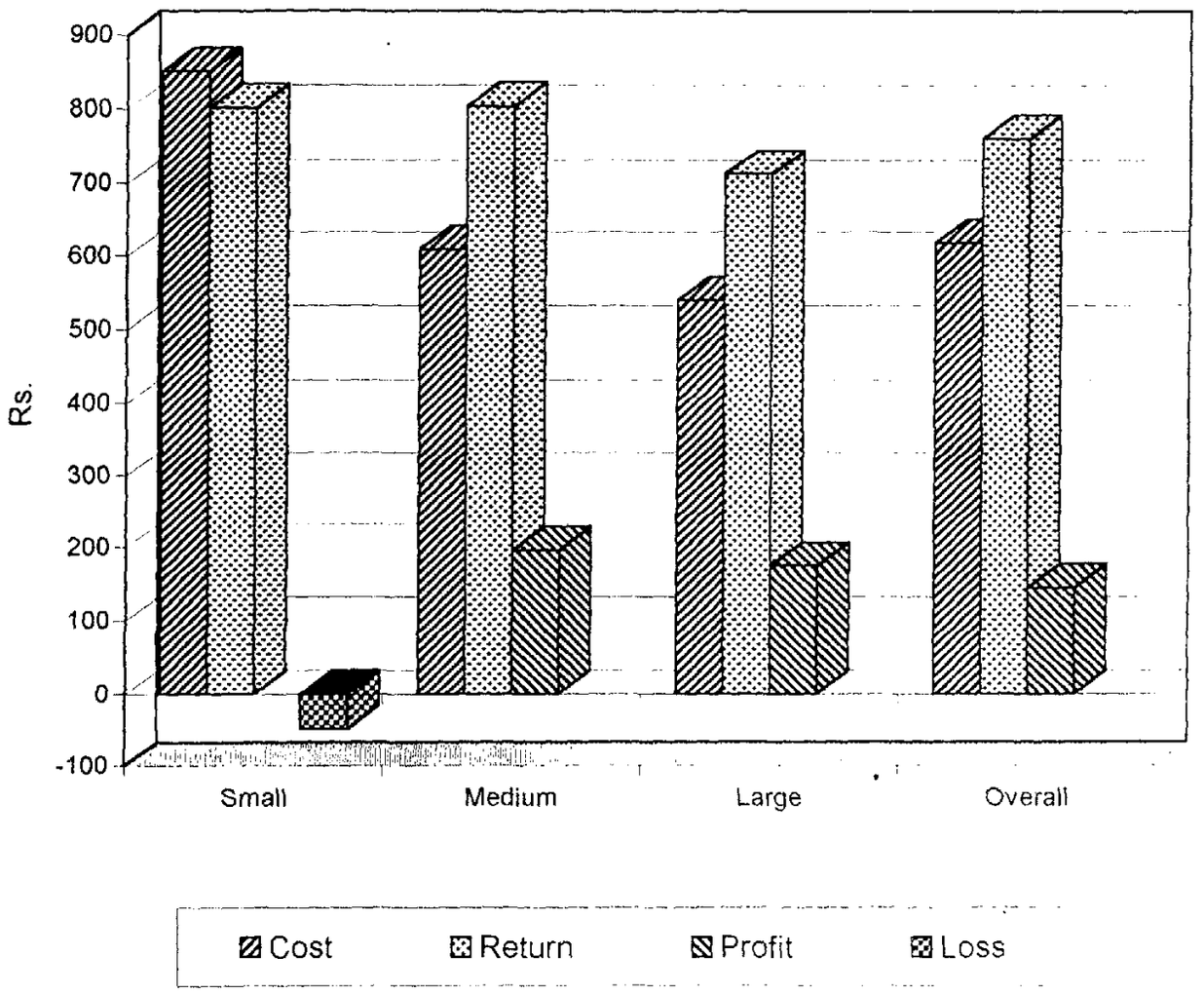

Fig. 4. Per sheep levels of costs, returns, profit or loss in different size groups of flocks

classes of flocks respectively. The small size class was in loss since the ratio was less than one. The output-input ratio at working cost showed increase with an increase in the size of sheep flocks indicating the returns to scale.

5.9 Break-even point analysis

Break-even analysis is a technique which is principally concerned with cost-volume-profit (CVP) analysis. The break even point 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 a 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.

In the present study, the break even analysis was carried out at the overall level by fitting the simple linear equations to the data on total cost and total revenue and the intersection of these two straight lines was considered as the break even point. The relevant diagram has been shows in Fig. 5.

It is clear 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 sheep is 28. This indicates that the sample flock owners, by and large, must keep 28 sheep as the minimum number simply to cover the cost of maintenance. In order to secure profit from the sheep rearing, the shepherds however, should maintain more than 28 sheep.

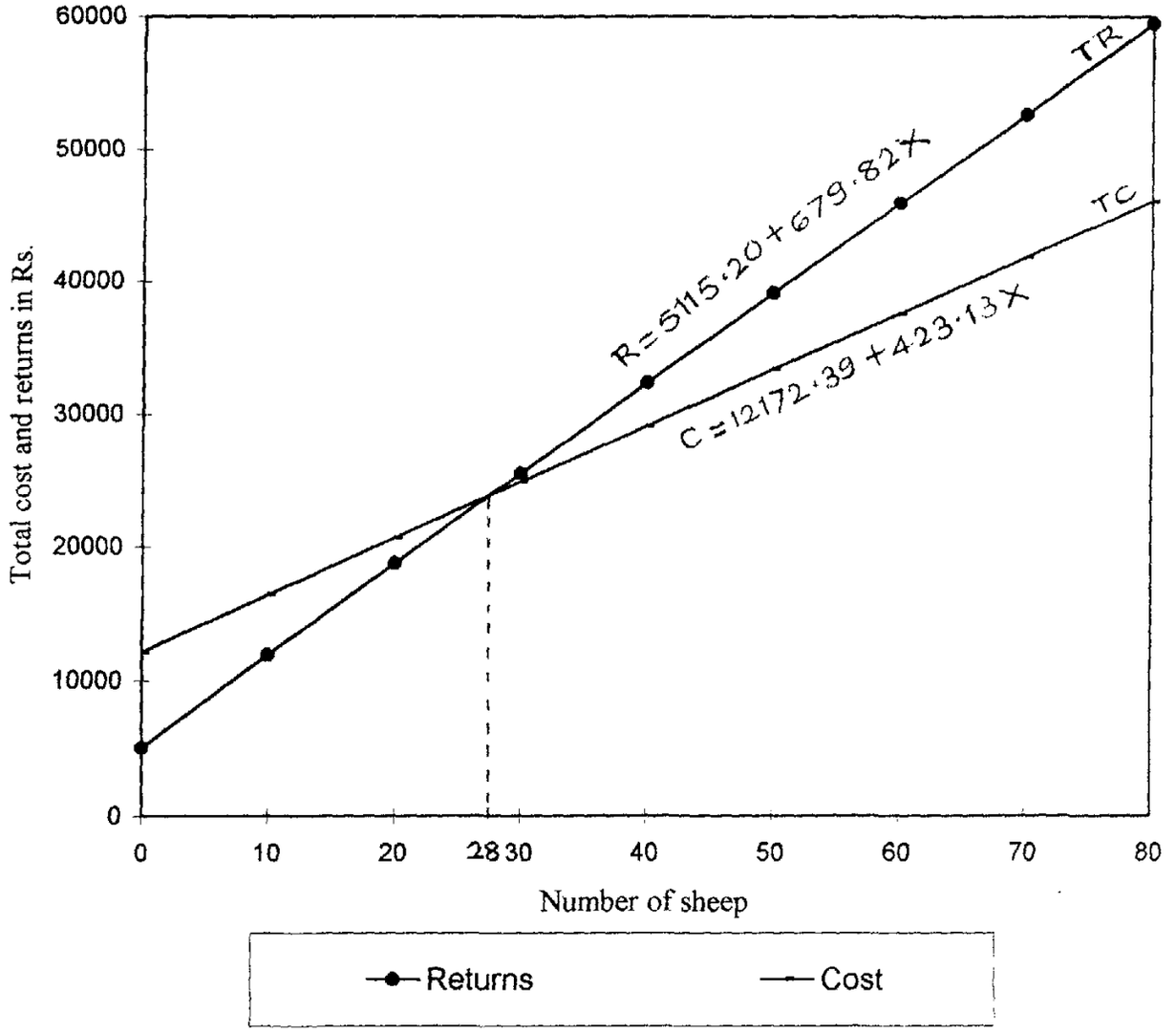

Fig. 5. Break even point analysis in sheep rearing

5.10 Functional analysis

In order to establish the input-output relationship, the multiple linear regression equation was fitted for input-output data relating to sheep rearing. The multiple regression equation of the following form was fitted.

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \varepsilon$$

Where,

Y = Gross returns from sheep rearing in Rs.

a = Constant

x_1 = Flock size of sheep in number

x_2 = Per flock expenses on veterinary aid in rupees

x_3 = Per flock human labour in mandays

b_i's = Regression coefficients

ε = Error term

The data regarding relationship between different independent variables such as flock size, expenses on veterinary aid in rupees human labour in mandays and gross returns are presented in Table 5.19.

Table 5.19 Correlation matrix

Variables	Y	X_1	X_2	X_3
Y	1	0.9645***	0.5109***	0.7585***
X_1		1	0.4881***	0.7654***
X_2			1	0.3245***
X_3				1

*** Significant at 1 per cent level

It is seen that three variables selected for study were observed to be positively and significantly related to gross returns for sheep rearing. The computed correlation coefficient of flock size, expenses on veterinary aid in rupees and human labour in mandays were found statistically highly significant at 1 per cent level of significance and hence the regression analysis results indicated in Table 5.20 have been accepted for interpretation.

Table 5.20 Income function in sheep rearing : Regression coefficients and tests of their significance

Independent variables	Regression coefficient	Standard error	't' value	Remarks
X_1	669.9350	32.5715	20.5681	***
X_2	0.7889	0.2954	2.6707	***
X_3	-0.3110	2.1934	-0.1418	NS

N = 90 Constant = 5032.964 R^2 = 0.9548

F ratio = 189.07*** *** = Significant at 1 per cent level

NS = Non significant

It is seen that regression coefficient of the variable X_1 viz., flock size is 669.93 which is observed to be highly significant at 1 per cent level. It is therefore concluded that there existed a scope to increase annual gross returns from sheep rearing by increasing the size of flock in the area under study.

The regression coefficient of veterinary aid (X_2) is 0.78 which is observed to be highly significant at 1 per cent level. This means that there existed a scope to increase annual gross returns from sheep rearing by extending veterinary aid in the area under

study. The regression coefficient of per flock human labour use in mandays (X_3) were non-significant.

To sum up, the flock size and veterinary aid are the important variables influencing the annual gross returns from sheep rearing to a greater extent. The coefficient of determination (R^2) was 0.95 which implies that the above mentioned independent variables jointly explained 95 per cent of variation in the annual gross returns from sheep rearing in the area under study. The value of `F' ratio is observed to be highly significant indicating the overall significance of fitted multiple linear equation.

MARKETING OF SHEEP AND SHEEP PRODUCTS

6. MARKETING OF SHEEP AND SHEEP PRODUCTS

6.1 General

This chapter deals with the presentation and interpretation of the results of data analysis. Markets and marketing assume greater importance when the subsistence economy transforms into commercial one. Therefore, the market for meat and wool is very important for sheep enterprise. The absence of meat processing and marketing industry in the area has resulted into large scale disposal of live animals to distant places. But the agencies dealing with this business are mostly private traders and their agents operate within the villages.

The present chapter has been therefore designed to discuss the results relating to marketing of sheep and sheep products in the study area.

6.2 Disposal of sheep

In the marketing of sheep, shepherds normally depend on merchants and slaughterman. The distribution of shepherds according to the pattern of disposal of sheep in the area under study is presented in Table 6.1.

It is seen that, at the overall level, about 74 per cent of the total sample shepherds sold their sheep in the market and the rest 26 per cent of the shepherds sold the sheep in the villages itself. The

Table 6.1 Distribution of shepherds according to the pattern of disposal of sheep (Number)

Place of disposal	Agencies to whom sold		Total
	Merchant	Slaughterman	
Small			
Local	2	5	7
	(6.45)	(16.13)	(22.58)
Market	18	6	24
	(58.06)	(19.36)	(77.42)
Total	20	11	31
	(64.52)	(35.48)	(100.00)
Medium			
Local	3	5	8
	(9.09)	(15.15)	(24.24)
Market	20	5	25
	(60.61)	(15.15)	(75.76)
Total	23	10	33
	(69.70)	(30.30)	(100.00)
Large			
Local	2	6	8
	(7.69)	(23.08)	(30.77)
Market	13	5	18
	(50.00)	(19.23)	(69.23)
Total	15	11	26
	(57.69)	(42.31)	(100.00)
Overall			
Local	7	16	23
	(7.78)	(17.78)	(25.56)
Market	51	16	67
	(56.66)	(17.78)	(74.44)
Total	58	32	90
	(64.44)	(35.56)	(100.00)

(Figures in the parentheses indicate the percentage to the total shepherds in the respective size groups)

proportions of sale of sheep in the villages and markets did not show much variation among size classes.

As regards the agents to whom the sheep were sold, it is observed that, at the overall level, 64.44 and 35.56 per cent of shepherds sold their sheep to the merchants and slaughtermen respectively. Among the size classes, the proportion of sale of sheep to the merchants was more in the case of medium size class followed by small and large size classes. As regards the sale of sheep to the slaughtermen, the proportion of sale of sheep to the slaughtermen was more in the large size class followed by small and medium size classes of flock owners.

The average per flock disposal of sheep according to place and agency by the sample shepherds has been presented in Table 6.2.

It is seen that, at the overall level a large number sheep i.e. 63.17 per cent were sold to the slaughtermen. The proportion of sheep locally sold to the merchants was low. Among the size classes, the proportion of sale of sheep to the slaughtermen was more (70.92 per cent) in the case of large size class followed by small (60.56 per cent) and medium (55.99 per cent) size classes. As regards the sale of sheep to the merchants, it was observed that the proportion of sale of sheep to the merchants was more (44.01 per cent) in medium size class followed by small and large size classes of flock owners. It is observed that, sample shepherds preferred in dispose of their sheep

Table 6.2 Average per flock disposal of sheep according to place and agency by the sample shepherds

(No.of sheep)

Place of disposal	Agencies to whom sold		Total
	Merchant	Slaughterman	
Small			
Local	-	0.84	0.84
		(18.10)	(18.10)
Market	1.83	1.97	3.80
	(39.44)	(42.46)	(81.90)
Total	1.83	2.81	4.64
	(39.44)	(60.56)	(100.00)
Medium			
Local	0.64	0.87	1.51
	(6.90)	(9.37)	(16.29)
Market	3.44	4.32	7.76
	(37.11)	(46.60)	(83.71)
Total	4.08	5.19	9.27
	(44.01)	(55.99)	(100.00)
Large			
Local	0.78	1.19	1.97
	(6.63)	(10.12)	(16.75)
Market	2.64	7.15	9.79
	(22.45)	(60.80)	(83.25)
Total	3.42	8.34	11.76
	(29.08)	(70.92)	(100.00)
Overall			
Local	0.48	0.93	1.41
	(5.72)	(11.09)	(16.81)
Market	2.61	4.37	6.98
	(31.11)	(52.08)	(83.19)
Total	3.09	5.30	8.39
	(36.83)	(63.17)	(100.00)

(Figures in the parentheses indicate the percentage to the total sheep sold in the respective size groups)

to slaughtermen in the market rather than to sell sheep to the merchants.

Table 6.3 indicates average disposal of lamb per flock according to place and agency by the sample shepherds.

It is seen that, at the overall level, 80 per cent of the total lambs were sold in the market and the rest 20 per cent were sold in the village itself. The proportion of lambs sold in the markets ranged between 75 per cent in case small size flock to 82 per cent in large size flock. As regards the agents to whom the lambs were sold, it is observed that, at the overall level, 76 per cent of lambs were sold of to the merchants and remaining 24 per cent were sold to the slaughtermen. The proportion of sale of lambs to the merchants in the case of small, medium and large size classes was 70.05, 78.96 and 76.38 per cent respectively. Among the size classes, the proportion of sale of lamb to slaughtermen was more in small size class followed by large and medium size classes of flocks.

The average per sheep price realised according to place and agency by the sample shepherds has been presented in Table 6.4.

It is observed that per sheep average price received at the overall level was Rs. 820.06. The per sheep average price received was Rs. 816.97, 834.19 and 806.27 in case of small, medium and large size classes of flocks, indicating that per sheep price received was more in case of medium size class. It is also seen that per sheep average price received in the local place was higher than that in the

Table 6.3 Average per flock disposal of lamb according to place and agency by the sample shepherds

(No. of lambs)

Place of disposal	Agencies to whom sold		Total
	Merchant	Slaughterman	
Small			
Local	3.29	0.87	4.16
	(19.79)	(5.23)	(25.02)
Market	8.36	4.11	12.47
	(50.26)	(24.72)	(74.98)
Total	11.65	4.98	16.63
	(70.05)	(29.95)	(100.00)
Medium			
Local	4.21	2.89	7.10
	(12.67)	(8.70)	(21.37)
Market	22.03	4.10	26.13
	(66.29)	(12.34)	(78.63)
Total	26.24	6.99	33.23
	(78.96)	(21.04)	(100.00)
Large			
Local	4.69	4.38	9.07
	(9.15)	(8.54)	(17.69)
Market	34.48	7.73	42.21
	(67.23)	(15.08)	(82.31)
Total	39.17	12.11	51.28
	(76.38)	(23.62)	(100.00)
Overall			
Local	4.04	2.61	6.65
	(12.34)	(7.98)	(20.32)
Market	20.90	5.17	26.07
	(63.88)	(15.80)	(79.68)
Total	24.94	7.78	32.72
	(76.22)	(23.78)	(100.00)

(Figures in the parentheses indicate the percentage to the lamb sold in the respective size groups)

Table 6.4 Average per sheep price realised according to place and agency by the sample shepherds (Rs.)

Place of disposal	Agencies to whom sold		Overall
	Merchant	Slaughterman	
Small			
Local	-	831.78	831.78
Market	820.34	807.54	813.70
Average	820.34	814.78	816.97
Medium			
Local	843.67	860.76	853.52
Market	837.36	824.91	830.43
Average	838.35	830.92	834.19
Large			
Local	817.78	812.24	814.43
Market	805.05	804.47	804.63
Average	807.95	805.58	806.27
Overall			
Local	828.00	834.61	832.36
Market	819.47	816.44	817.57
Average	820.79	819.63	820.06

nearby markets in all the size classes of flocks. Similarly, per sheep average price received from merchants was slightly higher than that received from the slaughters at the overall level.

Table 6.5 indicates average price realised per lamb according to place and agency by the sample shepherds.

It is observed that, at the overall level, per lamb average price received was Rs. 929.25. The per lamb average price received was Rs. 930.84, Rs. 947.44 and Rs. 913.26 in the case of small, medium and large size classes of flocks, respectively indicating that the per lamb price received was more in the case of medium size class. It is also seen that per lamb average price received in the local place was higher than that in the nearby markets in the case of small and large size classes of flocks.

It is seen that, per lamb price received from merchants and slaughtermen, at the overall level did not show variation. Among the size classes, per lamb average price received from the merchants was slightly more than that received from the slaughtermen in case of small and medium size classes of flocks.

6.3 Disposal of wool

Wool is the valuable sheep product and gives some returns to the shepherds. The returns from wool depends on the place of market. Table 6.6 gives the information on the distribution of shepherds on the basis of pattern of disposal of wool.

Table 6.5 Average per lamb price realised according to place and agency by the sample shepherds (Rs.)

Place of disposal	Agencies to whom sold		Overall
	Merchant	Slaughterman	
Small			
Local	945.23	947.90	945.55
Market	932.51	912.31	925.85
Average	936.10	918.33	930.84
Medium			
Local	939.78	959.63	947.86
Market	950.21	932.08	947.36
Avreage	948.53	943.47	947.44
Large			
Local	920.67	926.57	923.52
Market	912.88	902.90	911.05
Average	913.81	911.46	913.26
Overall			
Local	936.72	940.07	938.04
Market	927.66	924.36	927.00
Average	929.13	929.63	929.25

Table 6.6 Distribution of shepherds on the basis of pattern of disposal of wool (Number)

Place of disposal	Agencies to whom sold		Total
	Merchant	Weaver	
Small			
Local	10 (32.26)	9 (29.03)	19 (61.29)
Market	8 (25.81)	4 (12.90)	12 (38.71)
Total	18 (58.06)	13 (41.94)	31 (100.00)
Medium			
Local	6 (18.18)	9 (27.27)	15 (45.45)
Market	13 (39.40)	5 (15.15)	18 (54.55)
Total	19 (57.58)	14 (42.42)	33 (100.00)
Large			
Local	10 (38.46)	5 (19.23)	15 (57.69)
Market	8 (30.77)	3 (11.54)	11 (42.31)
Total	18 (69.23)	8 (30.77)	26 (100.00)
Overall			
Local	26 (28.89)	23 (25.55)	49 (54.44)
Market	29 (32.22)	12 (13.34)	41 (45.56)
Total	55 (61.11)	35 (38.89)	90 (100.00)

(Figures in the parentheses indicate the percentage to the total shepherds in the respective size groups)

It is noted that 54.44 per cent of the shepherds sold their wool in the village itself while the remaining 45.56 per cent of the shepherds sold wool in the nearby markets. About 61 per cent of the shepherds sold wool to the merchants while the rest of them (39 per cent) sold wool to the ultimate consumers i.e. weavers. It is further observed that number of shepherds selling wool to the merchants was relatively more both at the local and the market places.

As regards the quantity of wool sold both at the local place and in the nearby markets to weavers and the merchants it is noted from Table 6.7 that on an average 54 per cent of total wool was sold in the villages while 46 per cent of wool was disposed of in the nearby markets. Of the total wool sold at the overall level, 61 per cent was sold to the merchants and the remaining quantity of 39 per cent of wool was sold to the weavers. Among the size classes relatively more wool (67.44 per cent) was sold to the merchants by the large size class of shepherds. However, the proportion of disposal of wool in the local place in case of small, medium and large sized classes was 59.86, 46.80 and 56.70 per cent respectively. Thus the proportion of sale of wool in the market place was more in medium size class.

The prices of wool are very important since the part of wool is exported outside the country and there is some demand for wool from wool industries in Punjab and Haryana. In the light of demand and supply outside the place of production, the prices of wool affects the local consumption for making the blankets. Table 6.8

Table 6.7 Per flock disposal pattern of wool according to place and agency (Kg)

Place of disposal	Agencies to whom sold		Total
	Merchant	Weaver	
Small			
Local	5.21	4.26	9.47
	(32.93)	(26.93)	(59.86)
Market	4.19	2.16	6.35
	(26.49)	(13.65)	(40.14)
Total	9.40	6.42	15.82
	(59.42)	(40.58)	(100.00)
Medium			
Local	5.54	8.72	14.26
	(18.18)	(28.62)	(46.80)
Market	11.59	4.62	16.21
	(38.04)	(15.16)	(53.20)
Total	17.13	13.34	30.47
	(56.22)	(43.78)	(100.00)
Large			
Local	18.28	9.97	28.25
	(36.69)	(20.01)	(56.70)
Market	15.32	6.25	21.57
	(30.75)	(12.55)	(43.30)
Total	33.60	16.22	49.82
	(67.44)	(32.56)	(100.00)
Overall			
Local	8.87	7.93	16.80
	(28.60)	(25.57)	(54.17)
Market	9.91	4.30	14.21
	(31.96)	(13.87)	(45.83)
Total	18.78	12.23	31.01
	(60.56)	(39.44)	(100.00)

(Figures in the parentheses indicate the percentage to the total quantity of wool sold in the respective size groups)

Table 6.8 Average price realised per kilogram of wool according to place and agency (Rs.)

Place of disposal	Agencies to whom sold		Overall
	Merchant	Weaver	
Small			
Local	17.21	19.17	18.09
Market	18.24	20.15	18.89
Average	17.67	19.50	18.41
Medium			
Local	17.59	18.00	17.84
Market	19.46	17.08	18.78
Average	18.85	17.71	18.34
Large			
Local	18.02	19.76	18.63
Market	17.52	19.28	18.03
Average	17.79	19.58	18.37
Overall			
Local	17.81	19.57	18.64
Market	18.46	17.11	18.05
Average	18.15	18.70	18.37

gives the average price realised per kilogram of wool at the local place and nearby market quoted by the merchants and weavers.

It is observed that the average price realised for wool by the shepherds at the overall level was Rs. 18.37 per kg. There was negligible variation in the per kg price realised by the shepherds from different size groups. The price received from the weavers at the overall level was slightly higher (Rs. 18.70 per kg) than that from the merchants (Rs. 18.15 per kg). This is because the weavers purchased the wool for making the handloom carpets. It is further observed that the average price realised for one kilogram of wool at the local place (village) was higher than that the nearby markets, at the overall level. The average price realised per kilogram of wool by small size class of shepherds was Rs. 18.41 which was slightly higher than that of the large and medium size classes of flocks.

6.4 Disposal of sheep manure

Sheep manure is perhaps the most valuable organic manure applied to soil. The pattern of disposal of sheep manure by the shepherds in the study area is presented in Table 6.9.

It is observed that, the per flock average total quantity of sheep manure available with the shepherds was 4.73, 8.79 and 13.04 cart loads in the case of small, medium and large size classes of flocks respectively. At the overall level, per flock quantity of sheep manure produced during the year was 8.62 cart loads.

Table 6.9 The pattern of disposal of sheep manure by the sample shepherds

Groups	Used on own farms		Sold		Total	
	No.of shepherds	Quantity (C.L.)	No.of shepherds	Quantity (C.L.)	No.of shepherds	Quantity (C.L.)
Small	19	1.94	12	2.79	31	4.73
	(61.29)	(41.01)	(38.71)	(58.99)	(100.00)	(100.00)
Medium	23	5.71	10	3.08	33	8.79
	(69.70)	(64.96)	(30.30)	(35.04)	(100.00)	(100.00)
Large	7	4.10	19	8.94	26	13.04
	(26.92)	(31.44)	(73.08)	(68.56)	(100.00)	(100.00)
Overall	49	3.95	41	4.67	90.00	8.62
	(54.44)	(45.82)	(45.56)	(54.18)	(100.00)	(100.00)

(Figures in the parenthesis indicate the percentage to the respective totals of the respective size groups)

The pattern of disposal of sheep manure was examined among the size classes of sheep, it is noted that 61 per cent of small shepherds used sheep manure on their own farms while 39 per cent of shepherds sold sheep manure to other farmers in the case of small size class. In case of large size group only 27 per cent of the shepherds used the manure on their own farms and 73 per cent shepherds sold the manure. While in case of medium size class, 70 per cent of the shepherds used manure on their own farms, while 30 per cent of the shepherds sold the manure. This is because of larger holding with irrigation facilities in the case of medium size class of shepherds.

At the overall level, the 46 per cent sheep manure was used on own farms and remaining 54 per cent manure was sold. The proportion of use of manure on own farms was also higher (65 per cent) in case of medium size class of flocks.

6.5 Marketing cost of sheep

The cost of marketing of sheep includes cost of labour to handle the animal, transportation charges and marketing charges as explained below.

6.5.1 Items of marketing cost

a. Labour

Labour is required for handling the animal to the market and attending the same in the market. Usually, owner acts as an attendant in the process of marketing of his animal. For imputing the

value of owned labour, the prevailing wage rates in the area for non-farm work were considered.

b. Transportation cost

Generally, sheep are brought to the market by Tempo. If the distance is not more, then the sheep are brought to the market by walk on roads which involves the least cost in transportation.

c. Market fee

Market charges are prescribed by the respective market committees and have to be paid by the shepherds.

The item wise details regarding cost of marketing of sheep according to size classes of flocks are given Table 6.10.

Table 6.10 Average per sheep item wise cost of marketing according to size classes of flock (Rs.)

Group	Labour charges	Transportation cost	Market fee	Total marketing cost
Small	4.93	5.00	1.00	10.93
	(45.10)	(45.75)	(9.15)	(100.00)
Medium	3.53	4.98	1.00	9.51
	(37.12)	(52.36)	(10.52)	(100.00)
Large	2.86	4.56	1.00	8.42
	(33.97)	(54.16)	(11.87)	(100.00)
Overall	3.43	4.86	1.00	9.29
	(36.92)	(52.32)	(10.76)	(100.00

(Figures in the parentheses indicate the percentage to the total of the respective size groups)

It is observed that on an average per sheep cost of marketing worked out to Rs. 9.29. The share of labour cost, transportation cost and market fee in the total cost was 36.92, 52.32

and 10.76 per cent respectively. This means that transportation and labour were the major items in the cost of marketing of sheep in the area under study. It is noted that the shepherds generally dispose of their sheep in the nearby markets viz., Dahiwadi, Gondawale and Mhaswad. Per sheep cost of marketing was Rs. 10.93, Rs. 9.51 and Rs. 8.42 in the case of small, medium and large size groups of flocks respectively. This indicates that the marketing cost declined with an increase in the size class of flocks.

6.6 Marketing cost of wool

The average cost of marketing of one kilogram of wool in the nearby markets such as Dahiwadi and Mhaswad is presented in Table 6.11.

Table 6.11 Average cost of marketing of one kilogram of wool

(Rs.)

Group	Labour charges	Transportation cost	Packing charges	Other	Total cost
Small	1.90	0.38	0.16	0.06	2.50
	(76.00)	(15.20)	(6.40)	(2.40)	(100.00)
Medium	1.31	0.29	0.12	0.05	1.77
	(74.01)	(16.39)	(6.78)	(2.82)	(100.00)
Large	1.20	0.22	0.09	0.04	1.55
	(77.42)	(14.19)	(5.81)	(2.58)	(100.00)
Overall	1.35	0.27	0.11	0.05	1.78
	(75.84)	(15.17)	(6.18)	(2.81)	(100.00)

(Figures in the parentheses indicate percentage to the total in the respective size groups)

It was observed from Table 6.6 that 54 per cent of the shepherds sold their wool in the village itself while 46 per cent shepherds sold the wool in the market.

It is seen from Table 6.11 that on an average the marketing cost of one kilogram of wool worked out to Rs. 1.78. Of the total cost, the labour charges alone shared 75.84 per cent followed by transportation cost (15.17 per cent), packing charges (6.18 per cent) and other expenses such as weightment charges, market fee etc. (2.81 per cent). This means that the labour cost was the major item of cost in the marketing of wool. It is also seen that marketing cost per kilogram of wool was Rs. 2.50, Rs. 1.77 and Rs. 1.55 in the case of small, medium and large size classes of sheep respectively indicating that the marketing cost per kilogram of wool declined, with an increase in the size classes of sheep.

SUMMARY AND CONCLUSIONS

7. SUMMARY AND CONCLUSIONS

The livestock is the backbone of Indian agriculture and plays major role in the national economy. India possesses 56.47 million sheep (FAO, 1997) constituting 5 per cent of the world's sheep population, but its contribution to the world's wool production is only 1.81 per cent. At present, India gets 2.03 lakh M.tonnes of meat, 45.00 million kgs of wool, 51 million kgs skin from sheep (FAO, 1997). The gross value of livestock products in Maharashtra state at current prices during 1996-97 was Rs. 8915 crores which was 29 per cent of the total gross value from agricultural sector (Anonymous, 1997-98). Sheep population of Maharashtra state was 30.74 lakhs (1992). About 76 per cent of the total sheep population is in the jurisdiction of Mahatma Phule Krishi Vidyapeeth, Rahuri.

In view of the above background, the need was felt to undertake scientific assessment of this enterprise to know its contribution in the development of economy of the shepherds in the region.

An attempt has been made in this investigation to present a clear picture of economics of sheep rearing. The study was conducted with the following specific objectives.

1. To estimate the cost of sheep rearing in different size groups of flocks.

2. To assess income from sheep rearing in different size groups of flocks.
3. To study factors influencing the returns from sheep rearing.
4. To study the marketing of sheep and sheep products.

The study was exclusively based upon the primary data collected from the sample flock owners by survey method for the year 1996-97. Man tahsil of Satara district which constituted the highest sheep population was purposively selected for the study. Six villages from Man tahsil having the higher sheep population were selected. The total sample for the present study consisted of ninety shepherds selected from six villages in proportion to sheep population in each village. The sampling design adopted for the present study was two stage random sampling with village as a primary sampling unit and sheep flock owners as an ultimate sampling unit. For the purpose of analysis and presentation, sample flock owners were classified into three classes on the basis of flock size viz., small (less than 40 sheep), medium (41-80 sheep) and large (above 80 sheep).

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 sheep to be reared. The role of factors viz., flock size (X_1), expenses on veterinary aid in rupees (X_2) and human labour in mandays (X_3) on

the gross returns from sheep rearing was assessed by way of multiple linear regression analysis.

7.1 Summary

The findings of the present investigation are briefly summarised as below.

1. It is observed that the average size of a family was 7.80 members consisting of 30.64 per cent males, 24.23 per cent females and 45.13 per cent children. Among the different groups, the average size of family was 6.19, 7.80 and 9.72 members in the case of small, medium and large size groups of flock owners, respectively.
2. It is revealed that the average size of a flock was 30.96, 61.81 and 102.30 in case of small, medium and large size classes of flocks respectively with an overall average of 62.89.
3. The average size of land holding of the sheep owners at the overall level worked out to 3.37 hectares. The proportion of cultivable and uncultivable land was 77.45 and 22.55 per cent, respectively. The average irrigated area per sample holding was 0.66 hectares (19.59 per cent). The average size of land holding in different size groups was 2.67, 3.41 and 4.14 hectares for small, medium and large categories respectively.
4. A large number of shepherds (74.44 per cent) were illiterate. About 18.89 per cent shepherds had the education upto

primary level only and 6.67 per cent shepherds had education upto 7th standard, at the overall level.

5. The livestock possessed by a shepherd family at the overall level, comprised of 62.89 sheep, 3.63 goats, 0.69 local cows, 0.05 crossbreds cows, 0.49 buffaloes and 0.88 draft animals. It was further observed that the large flock owners had less number of local cows and draft animals than that of the small and medium flock owners.

6. The average composition of a sheep flock was 62.89 sheep comprising of 42.53 ewes, 18.30 lambs and 2.06 rams. The proportion of lambs, ewes and rams in different size groups did not show much variation.

7. At the overall level, the average fixed capital investment per flock was Rs. 57479.86. The value of the herd stock was the major item of fixed investment (90.21 per cent) followed by the value of byre (8.63 per cent) at the overall level. The fixed investment was the highest in large size class (Rs. 91822.82) followed by medium size (Rs. 57042.59) and small size class of flocks (Rs. 29,141.59).

The fixed capital investment per sheep at the overall level was Rs. 913.97. Per sheep capital investment in the case of small, medium and large size groups of flocks was Rs. 941.26, Rs. 922.87 and Rs. 897.58 respectively.

8. The human labour utilization for attending activities such as grazing, shearing and maintenance of lambs and byres at the overall level was 520.31 mandays per flock per annum consisting of 469.58 family labour mandays and 50.73 hired labour mandays.

At the overall level, 86.81 per cent of labour was required for grazing of sheep, 11.42 per cent for maintenance of lambs and byres and 1.77 per cent was utilized for shearing of sheep. Of the total labour used per flock, the share of family and hired labour was 90.25 and 9.75 per cent, respectively indicating that the sheep rearing activity was mainly attended by the family members and therefore it is an employment generating activity.

The total labour use per sheep per annum worked out to 8.27 mandays at the overall level. The average per sheep per annum labour use was the highest in small size class (12.85 mandays) followed by medium size (8.03 mandays) and large size class of flocks (6.81 mandays). It was observed that the per sheep total labour showed decline with an increase in the size group of flocks.

9. At the overall level, the average per flock grazing charges were Rs. 4122.91 per annum. Of these, the proportion of grazing expenses on owned farm was 30.42 per cent while the rest 69.58 per cent was on account of grazing on others farm. In addition to grazing of sheep, the shepherds had to spend on fodder for

the sheep. The average per flock per annum expenditure on fodder was Rs. 3390.80.

The average per sheep expenses on grazing and fodder worked out to Rs. 65.56 and Rs. 53.92 respectively. It is further observed that per sheep annual grazing charges were the highest (Rs. 81.25) in small flock and it decreased to Rs. 59.96 in medium flock size. The annual fodder charges per sheep showed decline with an increase in the flock size.

10. At the overall level, the average total cost of sheep rearing per flock worked out to Rs. 38782.70 per annum. Of the total cost the working and fixed cost constituted 73.63 and 26.37 per cent respectively. The major items in the total cost were labour charges (46.96 per cent), grazing and fodder charges (19.38 per cent) and interest on fixed capital (14.82 per cent). The cost on account of losses due to death of sheep was also considerable to the extent of 8.19 per cent.

The total per flock cost of sheep rearing in case of small, medium and large flock size groups worked out to Rs. 26328.64, Rs. 37606.35 and Rs. 55124.61 respectively. The proportion of working cost in the total cost was the highest i.e. 77.03 per cent in case of small flock size and it decreased with an increase in the flock size.

The average per sheep cost of maintenance per annum worked out to Rs. 850.41, Rs. 608.41 and Rs. 538.85 in the case of small, medium and large size groups of flocks with an overall

average of Rs. 616.68. Thus, it indicated that per sheep cost of maintenance declined with an increase in the flock size. The components of total cost viz., working cost and fixed cost also indicated a decline with an increase in flock size.

11. At the overall level, the lambing rate was observed to be 74.78 per cent. The lambing rate in case of small, medium and large size groups was 80.64, 74.49 and 68.18 per cent respectively.

The mortality rate of lambs and sheep, at the overall level, was 7.60 and 6.81 per cent respectively. The mortality in lambs was 6.03, 6.89 and 9.67 per cent while that of sheep was 4.69, 5.94 and 9.53 per cent in the case of small, medium and large size groups of flocks respectively.

12. The gross returns from sheep rearing include the income from sale of sheep, wool, manure, sheep folding and skin. On an average, per flock, sale of sheep was 8.39 sheep and 31.01 kilograms of wool. On per sheep basis, the average annual production of wool was 0.493 kg. While the manure obtained was 0.14 cart load per annum.

At the overall level, the annual gross returns from sheep rearing worked out to Rs. 47868.62 per flock. Of the total gross returns, the income due to appreciation of stock shared 63.52 per cent, income from sheep folding 15.97 per cent and sale of sheep accounted for 14.37 per cent. The other sources of income were

manure, wool and skin which shared 4.36, 1.19 and 0.59 per cent to the gross returns respectively.

The average per sheep annual gross returns from different sources came to Rs. 761.15. The per sheep gross returns in the case of small, medium and large size groups were Rs. 802.31, Rs. 804.49 and Rs. 713.28 respectively.

13. The per flock returns over working cost were Rs. 4558.74, Rs. 22231.27 and Rs. 33205.55 in the case of small, medium and large size groups of flocks with an overall average of Rs. 19314.41. In case of small size group, there was a loss in sheep rearing to the extent to Rs. 1489.07 per flock per annum at the total cost. While the medium and large size classes of flocks gained the net returns of Rs. 12119.44 and Rs. 17844.33 per flock per annum respectively. On an average, the net returns over the total cost were Rs. 9085.92 per flock per annum.

    The per sheep returns over working cost and total cost at the overall level were Rs. 307.11 and Rs. 144.47 respectively The small size class of shepherds sustained a loss of Rs. 48.10 per sheep per annum but could secure profit over the working cost. The medium and large size classes of shepherds were in profit both at working and total costs.

14. The output-input ratio at the overall level was 1.68 and 1.23 at the working and total costs respectively. The output-input ratio showed increase with an increase in the size of sheep flocks.

15. The break-even point analysis indicated that the minimum size of a flock should be 28 at which the flock owners would have no loss as well as no profit.

16. The regression analysis indicated that the three selected independent variables viz., flock size (X_1), expenses on veterinary aid in rupees (X_2) and human labour in mandays (X_3) jointly explained 95 per cent variation in the gross returns in sheep rearing. The regression coefficients of the factor viz., flock size of sheep (X_1) and expenses on veterinary aid (X_2) were statistically highly significant indicating that there existed a scope to increase annual gross returns by increasing the flock size and expenses on veterinary aid in the area under study. The regression coefficient of per flock labour use in mandays (X_3) were non-significant.

17. As regards the disposal of sheep, it was noticed that, at the overall level, about 74 per cent of the sample shepherds sold their sheep in the markets and the rest 26 per cent sold sheep in the village itself. These proportions among the size classes of flocks did not show much variation.

As regards the agents to whom the sheep were sold, it was observed that at the overall level, 64.44 per cent of the shepherds sold their sheep to the merchants and remaining 35.56 per cent shepherds sold sheep to the slaughtermen.

At the overall level, the disposal of sheep was 8.39 sheep per flock per annum. The average disposal of sheep per flock of small, medium and large size groups was 4.64, 9.27 and 11.76 sheep respectively.

Of the total disposal of 8.39 sheep per flock 83.19 per cent sheep were sold in the nearby markets while the rest 16.81 per cent were sold in the village itself. The similar trend was observed among the three size groups of flocks.

The average disposal of lambs per flock at the overall level was 32.72 lambs per annum of which 76.22 per cent were sold to the merchants and rest 23.78 pre cent were sold to the slaughtermen. The average disposal of lamb per flock of small, medium and large size groups was 16.63, 33.23 and 51.28 lambs respectively.

18. The average price received by the shepherds was Rs. 820.06 per sheep at the overall level. The per sheep average price received was Rs. 816.97, Rs. 834.19 and Rs. 806.27 in case of small, medium and large size classes of flocks respectively. The average price received at the local place from the slaughtermen was higher (Rs. 834.61/sheep) as compared to that of merchants (Rs. 819.47/sheep) in the nearby markets.

Per lamb average price received at the overall level was Rs. 929.25. The average per lamb price received by the shepherds was Rs. 930.84, 947.44 and Rs. 913.26 in the case of small, medium and large size classes of flocks respectively.

19. At the overall level, per sheep wool production was 0.493 kg per annum and per flock wool production was 31.01 kg. The sample shepherds sold 54.17 per cent of the total wool in the village itself. While the remaining 45.83 per cent of the wool was sold in the nearby markets. It was further observed that 60.56 per cent of the total wool was sold to the merchants while the remaining 39.44 per cent of the wool was sold to the ultimate consumers i.e. weavers. The average price realised by the shepherds for wool at the village and at the nearby markets did not show much variation.

20. On an average, per flock quantity of sheep manure produced during the year was 8.62 cart loads. The sample shepherds used 45.82 per cent of the total sheep manure on their own farms while 54.18 per cent was sold out.

21. The average per sheep marketing cost was Rs. 9.29. The proportion of transportation cost, labour charges and market fee in the total marketing cost was 52.32, 36.92 and 10.76 per cent respectively.

    The per sheep marketing cost in case of small, medium and large size groups of flocks was Rs. 10.93, Rs. 9.51 and Rs. 8.42 respectively.

22. The marketing cost of one kilogram of wool at the overall level worked out to Rs. 1.78. The marketing cost per kilogram of wool declined with an increase in the size class of sheep flccks.

7.2 Conclusions

1. The activity of sheep rearing was observed to be a gainful enterprise. At the overall level, per sheep cost of maintenance worked out to Rs. 616.68 and the gross returns were Rs. 761.15. The cost of maintenance of sheep declined with an increase in the size of flocks.
2. The flock size increased with increase in the number of members in a family.
3. The break even point of the size of sheep flock came to 28 sheep where there would be neither loss nor profit in sheep rearing.
4. The regression analysis indicated that the role of flock size in sheep rearing was observed to be significant on the annual gross returns.
5. As regards the pattern of marketing of sheep and sheep products, it is concluded that, there are no organised markets.

7.3 Policy implications

The implications and suggestions of this study are as follows.

1. To prevent mortality of sheep and lambs, the veterinary aid need to be extended.
2. In order to make economically viable unit, the size of a flock need to be more than 28 sheep. The financial assistance need to be provided to the shepherds to purchase sheep.

3. There is a need to develop grazing lands or pastures on the public lands which could be subsequently made available to the shepherds on rent basis.
4. There is a need to develop infrastructure and marketing facilities for disposal of sheep and sheep products. It is suggested that the sheep and wool may be brought under the orbit of regulated market.

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*** Originals not seen**

APPENDIX

9. APPENDIX

QUESTIONNAIRE FOR STUDYING ECONOMICS OF SHEEP REARING IN SCARCITY AREA OF SATARA DISTRICT

1. Name of the shepherd

   Age Education

   Caste Village

2. Occupation

   Main : Secondary

   Other

3. Information of other family members

Sr. No.	Name	Age	Education	Relation with head	Occupation

4. Annual family income

a. Sheep :

b. Land (crop production) :

c. Draft animals :

d. Milch animals :

e. Wages :

f. Service :

g. Business :

5. Land holding

Sr. No.	Survey No.	Total land (ha)	Cultivable land (ha)		Un cultivated (ha)	Land revenue (Rs.)
			Irrigated	Rainfed		

6a. Particulars of animals

Sr. No.	Type	Breed	No. of animals			Year of purch-sing	Present value (Rs.)
			Total	No. owned	Purch-ased		
1.	Sheep						
2.	Goat						
3.	Local cow						
4.	Cross breed cow						
5.	Buffaloes						
6.	Bullock						
7.	Dog						
8.	Others						

b. No of sheep according age and weight

Age	Number	Average weight (kg)	Present value (Rs.)
3 months 6 months 12 months After one years			

7. Byre

Construction type	Size	Construction price (Rs.)	Present value (Rs.)	Remaining life

8. Equipments

Sr. No.	Name of equipments	No.	Year of purchase	Purchase price (Rs.)	Present value (Rs.)	Remaining life
1.	Net					
2.	Shearing scissors					
3.	Axe					
4.	Ghameli					
5.	Baskets					
6.	Others (Specify)					

9a. Medicine/Veterinary Expenditure

Sr. No.	Month	Item	Price (Rs.)	Total value (Rs.)

9b. Miscellaneous expenditure

Sr. No.	Item	Expenditure (Rs.)

10a. Feeds, fodders and concentrates during the year

Sr. No.	Season	Fodder						Concentrates						Total value (Rs.)
		Own farm produced			Purchased			Owned			Purchased			
		Type	Qty.	Value (Rs)	Type	Qty.	Value (Rs.)	Type	Qty.	Value (Rs.)	Type	Qty.	Value (Rs.)	

10b. Feeding (Grazing) during in exchange of sheep folding

Season/ month	No.of sheep	No.of days	Name of crop residue	Amount changed by the shepherd per day				Total charges paid per day
				Cash	Kind			
					Type	Qty.	Value (Rs.)	

11a. Labour requirement for maintaining sheep during the year

(Mandays)

Type of work	Family labour			Casual labour			Attach labour		
	Male	Female	Children	Male	Female	Children	Male	Female	Children
Total labour required									
Grazing									
Feeding (including maintenance of lambs)									
Shearing									
Cleaning of byres									

11b. Payment of attached farm servant (For sheep)

Payment made : Monthly/Annually/Otherwise

Cash (Rs.)	Food grains		Cloths		Meal		Others		Total
	Qty.	Value (Rs.)	Specify	Value (Rs.)	Specify	Value (Rs.)	Specify	Value (Rs.)	

12. Purchase and sale of sheep

a. Sheep purchased

Season	Age	Number	Purchase cost	Place of purchase	Distance (Km)
Summer Rainy Winter					

b. Sheep sold

Category	No. of sold	Value	Place of sale	Distance (Km.)	To whom sold
Lambs Sheep					
Total					

c. Consumed at home during the year

Sheep	Number	Value (Rs.)	Total (Rs.)
Lamb Sheep			

d. Sheep losses

Season	Number		Losses due to			Value
	Sheep	Lamb	Death	Stolen	Eaten by wolf	
Summer Rainy Winter						

12e. No. of Sheep before and end of the year

Category	Starts of year		End of the year		Reasons of Increase/ Decrease
	No.	Value	No.	Value	
Sheep					
a. Males					
b. Female					
Lambs					
a. Male					
b. Female					

12f. Marketing of sheep

Place of sale	Distance (km)	No. of sheep	Transpo ration cost (Rs.)	Market fee (Rs.)	Octri charges (Rs.)	Other expenses (Rs.)	Total expenses (Rs.)

13. Annual income of sheep and sheep products

a. Manure

Manure produced while sheep at the byre		Disposal						Total value (Rs.)
		Sold		Used on own farm		Balance		
Qty.	Value (Rs.)	Qty.	Value (Rs.)	Qty.	Value (Rs.)	Qty.	Value (Rs.)	

b. Sheep foliding

On owned farm			On other farm			Total value (Rs.)
No.of sheep	Days	Value (Rs)	No.of sheep	Days	Value (Rs.)	

c. Milk

No.of sheep	*Milk produced*	
	Quantity total (lit.)	Value (Rs.)

d. No. of lambs born in a year

Total sheep in flock	No.of lambs borned	No.of lambs survived	No.of lamb end of year and value (Rs.)

13e. Wool

Month/ season	Total wool			Wool sold						Marketing cost of wool				Total cost
	No.of sheep	Qty	Value (Rs)	At the byre		In the market		Name of market	To whom sold	Labour	Transport charges	Packing	Other expenses	
				Qty	Value (Rs)	Qty	Value (Rs)							

f. Skin

Total sheep	Quantity	Where sold	To whom sold	Value (Rs.)

14. Information about owned and borrowed capital

a. Owned capital : Rs.

Present capital : Rs.

b. Borrowed capital :

Agency of loan	Year of loan taken	Term of loan	Amount (Rs.)	Rate of interest	Amount repaid during the year	Amount out standing
Bank						
Money lenders						
Friends						
Others						

14. General questions

i. Since when you are running this business ? Year :

ii. Why did you start this business

What are specified aims (like earning money or to get employment for family)

iii. Whether you inseminate your animal (i.e. A.I.)

iv. Have you got any new ideas for improvement in present business for near future ? What are they ?

v. Whether there is any scope for expansion of your business ? Why are you not expanding your business ? Any difficulties.

vi. What Govt. should do for making the business more profitable ?

vii. What are your general problem/difficulties in this enterprise ? How can over come these ?

a. Grazing

b. Vet. aid

c. Marketing

VITA

10. VITA

Prakash Namdeo Bhujbal

A candidate for the degree

of

MASTER OF SCIENCE (AGRICULTURE)

2000

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