AN ECONOMIC ANALYSIS OF STALL-FED SHEEP AND GOAT REARING IN EASTERN DRY ZONE OF KARNATAKA

MANJULA, C. N.

MBA 918

DEPARTMENT OF AGRICULTURAL MARKETING,
CO-OPERATION AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
BANGALORE – 560 065

2011

AN ECONOMIC ANALYSIS OF STALL-FED SHEEP AND GOAT REARING IN EASTERN DRY ZONE OF KARNATAKA

MANJULA C.N

MBA 918

Project Report submitted to the

University of Agricultural Sciences, Bangalore

in Partial fulfillment of the requirement of the degree of

MASTER OF BUSINESS ADMINISTRATION

(Agribusiness Management)

Bangalore August, 2011

Affectionately Dedicated

to My Beloved family and Friends

DEPARTMENT OF AGRICULTURAL MARKETING, CO-OPERATION AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
BANGALORE-560065

CERTIFICATE

This is to certify that Project Report entitled **"AN ECONOMIC ANALYSIS OF STALL-FED SHEEP AND GOAT REARING IN EASTERN DRY ZONE OF KARNATAKA"** submitted by **Ms. MANJULA, C. N., ID No. MBA 918** in partial fulfilment of the requirement for the degree of **MASTER OF BUSINESS ADMINISTRATION *(Agribusiness Management)*** to the University of Agricultural Sciences, Bangalore, is a record of *bonafide* research work done by her during the period of her study in this University, under my guidance and supervision and that no part of the project report has previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

Bangalore
August, 2011

Dr. C. P. GRACY
Major Advisor

Approved by:

Chairman : _____
(C. P. GRACY)

Members : 1. _____
(B. L. CHIDANANDA)

2. _____
(M. S. GANAPATHY)

3. _____
(H.S. SURENDRA)

4. _____
(LAKSHMIPRASAD)

ACKNOWLEDGEMENT

It is my heart's turn to express my deepest sense of gratitude to all of those who directly and indirectly helped me in this endeavour.

I deem it a great privilege to express my esteemed and profound sense of gratitude to ***Dr. C. P.GRACY****, Professor, Department of Agricultural Marketing, Cooperation and Business Management, UAS, GKVK, Bangalore and the Chairman of my Advisory Committee for her guidance and timely efforts, which helped me to do this quality work in the stipulated time period itself. I am fascinated by her practical approach and continuous valuable suggestions throughout the period of my research work and made me strive hard to achieve quality and excellence in my work.*

My sincere thanks to ***Dr. B. L. Chidananda,*** *Associate Professor, Department of Animal Science and Poultry, UAS, GKVK, Bangalore, for helpful criticisms, cooperation, valuable suggestions during my research work.*

I immensely thanks to ***Dr. M. S. Ganapathy,*** *Associate Professor, Department of Agricultural Marketing, Cooperation and Business Management, UAS, GKVK, Bangalore, who served as member of my Advisory Committee, for his encouragement, valuable suggestions and cordial cooperation and constant encouragement in analysis of my research study.*

I express my profound thanks to ***Mr. H. S. Surendra*** *Associate Professor, Department of Agricultural Statistics Computer Applications and Applied Mathematics, UAS, GKVK, Bangalore, for his constant valuable suggestions.*

I avail this opportunity to express my boundless pleasure, gratefulness and sincere thanks to ***Mr. Lakshmiprasad,*** *Business Analyst, HSBC Bank, Bangalore, for his generous gestures and valuable suggestions in planning and execution of this study.*

I would like to thank specially to ***Dr. G.N. Nagaraja*** *Professor and Head, Department of Agricultural Marketing, Cooperation and Business Management, UAS, GKVK, Bangalore, other members of the department for their kind support, fruitful suggestions and cordial co operation during my course work and project.*

I am also gratefully indebted to my parents ***Sri NARASARAJU & Smt. LAKSHMI,*** *husband* ***Mr. RAGHUNANDAN, K.R.*** *Younger brothers* ***Purushotham*** *and* ***Shashi,*** *Younger Sisters* ***Malathi, C.H., Lakshmi, Divya*** *and* ***Kalpana*** *for their endurance, abundant love and affection, moral encouragement, constant support and personal sacrifice during the academic carrier.*

I to express my heartfelt thanks to ***my dearest friend Navyasheree, my cousins Narendra, Veena, Ramesh, Kempa Raju,*** *for their help and cooperation during my study.*

My cordial thanks to my classmates ***Ravi Ambi, Malli, Arune, Tara, Geetha, Aparna and Padma*** *for their moral support and help they offered in time when I needed.*

Finally, I wish to thank all the farmers of sheep and goat rearers and my Special Thanks to ***Dr. Nagaraj,*** *Assistant Director of Veterinary Sciences, Sira for his kind cooperation in getting the relevant for the research purpose.*

Bangalore
August, 2011 ***(MANJULA, C.N.)***

An Economic Analysis of Stall-fed Sheep and Goat Rearing in Eastern Dry Zone of Karnataka

ABSTRACT

The research was undertaken in the Eastern Dry Zone of Karnataka during 2010-2011. Eastern dry zone spread across Bangalore rural, Tumkur and Kolar districts is particularly popular for stall-fed sheep and goat rearing. The primary data were collected from 14 Sheep and 16 goat units to assess the profitability, constraints and preference for stall-fed rearing. The majority of the sheep and goat rearers preferred stall-feeding over conventional rearing for obvious advantages like ease of managing animals for breeding, vaccination and ease of sale. The cost and returns analysis of more than 2 years old stall-fed units revealed that, the investment in sheep rearing was Rs.7, 33,998 for small (<150 sheep) rearers and Rs.14, 94,141 for large (>150 sheep) rearers. Similarly for goat rearing it was observed to be Rs.8, 19,682 for small (<100 goats) rearers and Rs.19, 78,104 for large (>100 goats) rearers. About 80 per cent of the rearers who have recently started stall-fed units made their investments by availing credit link back ended subsidized loans. In sheep rearing Variable cost constituted 66% to 70% of the total cost, whereas in goat rearing it constituted 75% to 82%. The feed cost constituting 23% in sheep rearing and 28 % in goat rearing units followed by labour was the major variable cost component. The annual total cost for pooled group of sheep units was Rs.4,99,121 and Rs.4,44,274 for goat units. The average Net returns was higher in goat units of Rs.1,33,726 compared to sheep units of Rs.82,577. Marketing of the breeds was easier as it was on farm gate sale.

Manjula, C.N.

Dr. C. P. GRACY
(Major Advisor)

ಕರ್ನಾಟಕ ಪೂರ್ವ ಬಯಲು ವಲಯದಲ್ಲಿ ಕೊಟ್ಟಿಗೆ ಪದ್ಧತಿಯಲ್ಲಿ ಕುರಿ ಮತ್ತು ಮೇಕೆ ಸಾಕಾಣಿಕೆಯ ಒಂದು ಆರ್ಥಿಕ ವಿಶ್ಲೇಷಣೆ

ಮಂಜುಳ ಸಿ.ಎನ್.

ಸಾರಾಂಶ

ಈ ಮೇಲ್ಕಂಡ ಕೊಟ್ಟಿಗೆ ಪದ್ಧತಿಯಲ್ಲಿ ಕುರಿ ಮತ್ತು ಮೇಕೆ ಸಾಕಾಣಿಕೆಯ ಸಂಶೋಧನೆಯನ್ನು **2010–11** ರಲ್ಲಿ ಕೈಗೊಂಡಿದ್ದು ಕರ್ನಾಟಕ ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ, ತುಮಕೂರು ಮತ್ತು ಕೋಲಾರ ಜಿಲ್ಲೆಗಳು ಯೋಗ್ಯ ಹಾಗೂ ಜನಪ್ರಿಯವಾಗಿದೆ. ಕೊಟ್ಟಿಗೆ ಪದ್ಧತಿಯಲ್ಲಿ ಆಗಬಹುದಾದ ತೊಡಕುಗಳು ಲಾಭದಾಯಕತೆ ಹಾಗೂ ಇದರ ಪ್ರಾದಾನ್ಯತೆ ಬಗ್ಗೆ ಸಂಶೋಧನೆಗಾಗಿ **14** ಕುರಿ ಸಾಕಾಣಿಕೆ ಘಟಕ ಹಾಗೂ **16** ಮೇಕೆ ಸಾಕಾಣಿಕೆ ಘಟಕಗಳಿಂದ ಪ್ರಾಥಮಿಕ ಮಾಹಿತಿಯನ್ನು ಸಂಗ್ರಹಿಸಲಾಯಿತು. ಕೊಟ್ಟಿಗೆ ಪದ್ಧಿಯಲ್ಲಿ **2** ವರ್ಷಕ್ಕೂ ಮೇಲ್ಪಟ್ಟ ಕುರಿ ಮತ್ತು ಮೇಕೆ ಸಾಕಾಣಿಕೆ ಘಟಕಗಳ ಲಾಭ ಮತ್ತು ನಷ್ಟದ ವಿಶ್ಲೇಷಣೆಯ ಪ್ರಕಾರ ಸಣ್ಣ ಪ್ರಮಾಣದ ಕುರಿ ಸಾಕಾಣಿಕೆದಾರರಿಗೆ (<**150** ಕುರಿಗಳು) ರೂ. **7,33,998**/– ಹಾಗೂ ದೊಡ್ಡಪ್ರಮಾಣದ ಕುರಿ (>**150** ಕುರಿಗಳು) ಸಾಕಾಣಿಕೆದಾರರಿಗೆ ರೂ. **14,94,141**/– ಬಂಡವಾಳ ಹೂಡಿಕೆಯಾಗಿತ್ತು. ಹಾಗೆಯೇ ಸಣ್ಣ ಪ್ರಮಾಣದ ಮೇಕೆ ಸಾಕಾಣಿಕೆ ದಾರರಿಗೆ (<**100** ಮೇಕೆಗಳು) ರೂ. **8,19,682**/– ಹಾಗೂ ದೊಡ್ಡಪ್ರಮಾಣದ ಸಾಕಾಣಿಕೆ ದಾರರಿಗೆ (>**100**) ಮೇಕೆಗಳು ರೂ. **19,78,104**/– ರೂಪಾಯಿಗಳ ಬಂಡವಾಳ ಹೂಡಿಕೆಯಾಗಿದೆ. ಕುರಿ ಸಾಕಾಣಿಕೆದಾರರಿಗೆ ರೂ. **4,99,121**/ ಹಾಗೂ ಮೇಕೆ ಸಾಕಾಣಿಕೆ ದಾರರಿಗೆ ರೂ. **4,44,274**/– ವಾರ್ಷಿಕ ವೆಚ್ಚ ತಗಲುತ್ತದೆ. ಆಹಾರ ವೆಚ್ಚ ಹಾಗೂ ಕೂಲಿಕಾರ್ಮಿಕರ ವೆಚ್ಚವು ಒಟ್ಟಾರೆ ಶೇಕಡ **40** ಕ್ಕಿಂತ ಹೆಚ್ಚು ವಾರ್ಷಿಕ ವೆಚ್ಚದ ಅಂಶಗಳಾಗಿವೆ. ಈ ಸಂಶೋಧನೆಯ ಪ್ರಕಾರ ಕುರಿ ಸಾಕಾಣಿಕೆಯು ಮೇಕೆ ಸಾಕಣಿಕೆಗಿಂತ ಲಾಭದಾಯಕವಾಗಿದ್ದು, ವರ್ಷಕ್ಕೆ ಮೇಕೆ ಸಾಕಾಣಿಕೆಯಿಂದ ಆಧಾಯವು ರೂ. **1,33,726**/– ಇದ್ದು ಕುರಿ ಸಾಕಾಣಿಕೆಯಿಂದ ರೂ. **82,577**/– ಆದಾಯ ಇರುತ್ತದೆ. ಕುರಿ ಮತ್ತು ಮೇಕೆಗಳಿಗೆ ಬೇಡಿಕೆ ಇದ್ದು ಇದರ ಮಾರಾಟವು ಸಾಕಾಣಿಕಾ ಘಟಕಗಳಲ್ಲೇ ಆಗುವುದರಿಂದ ಮಾರಾಟದ ಸಮಸ್ಯೆ ಕಂಡು ಬಂದಿಲ್ಲ. ಕುರಿ ಮತ್ತು ಮೇಕೆಗಳ ಉಸ್ತುವಾರಿಕೆಯು ಈ ಕೊಟ್ಟಿಗೆ ಪದ್ಧತಿಯಲ್ಲಿ ಸುಲಭವಾಗಿದ್ದು ಇದರಿಂದ ಸಾಕಾಣಿಕೆದಾರರು ಈ ಹೊಸ ಪದ್ಧತಿಯನ್ನು ಅಳವಡಿಸಿಕೊಂಡು ಹೆಚ್ಚಿನ ಲಾಭವನ್ನು ಹೊಂದಬಹುದಾಗಿದೆ.

ಡಾ. ಸಿ.ಪಿ. ಗ್ರೇಸಿ
(ಮುಖ್ಯ ಸಲಹೆಗಾರರು)

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

Introduction

I CHAPTER
INTRODUCTION

Livestock sector plays a critical role in the welfare of India's rural population. Animal Husbandry is an inseparable component of agriculture sector. .In India according to Government reports, in the year 2008, the sector contributed about 5.3% of the total GDP and provided food, fiber, energy and medicine essential for human survival. This sector is emerging as an important growth leverage of the Indian economy. As a component of agricultural sector, its share in gross domestic product has been rising gradually, while that of crop sector has been on the decline. In recent years, livestock output has grown at a rate of about 5 percent a year, higher than the growth in agricultural sector. Distribution of livestock wealth is more egalitarian, compared to land. Hence, from the equity and livelihood perspective it is considered an important component in poverty alleviation programmes.

More than 70 per cent of India’s population lives in rural areas. The dwindling per capita land availability is likely to put more pressure on land in the years to come, threatening livelihood security of small and marginal farmers. Therefore, allied activities like animal husbandry will have to be viewed as effective instrument for supplementing farm income and providing food and livelihood security to weaker sections in rural areas. Livestock is popularly known as “live banks”, are the major contributors to national wealth and thus help in improving the living standards of rural people.

Sheep and goat rearing is traditional occupation of economically weaker sections of society, particularly in rain shadow areas. These two species have been a major source of economic sustenance and financial cushioning, especially for economically weaker section of society.

The world cattle population accounts for 1365 million, buffalo population accounts for 172 millions, sheep and goat population accounts for 1059 and 790 million. The gross value of output from livestock sector has increased from Rs.20,856 crores in 1950-51 to Rs.1,64,509 crores in 2003-04 (GOI, 2005). The world production of Sheep meat was 8.89 million tones and Goat meat was 5.14 million tones in 2007.

India has largest livestock population in the world. The total livestock population of India makes up a huge number of 929 million and India stands first in buffalo population (97m), second in cattle (185 m) and goats (126 m), third in sheep (65m and fifth in chickens (457 million). The sheep and goat population account for 6% and 14.6% of the total world cattle population. India ranked **seventh** in sheep and **second** in goat meat production. India's export of sheep/goat meat has been increased from Rs. 65.87 Crores in 2006-07 to Rs.134.10 Crores in 2007-08 (FAO STAT2008).

Among the states, Andhra Pradesh stands first in sheep population (21m), followed by Rajasthan (10m) and Karnataka (7.2m). In goat population, West Bengal stands first (18m), followed by Rajasthan (16m) and Karnataka is in ninth position (4.4m). Rajasthan, Jammu, Kashmir, Uttar Pradesh, Gujarat, hilly regions of North and Eastern Himalays are the Indian regions with maximum livestock population.

According to provisional census, Government of Karnataka, 2007, Karnataka has livestock population of 9.54 million and stands seventh on all India basis. As per the 2007 census, the State had 15.50 lakh, 9.54 lakh and 15.81 lakh indigenous, CB and Buffaloes. The total breedable cows are 49.13 lakh and that of buffaloes is 28.81 lakh. There is a positive growth in cattle and buffalo population. The growth in CB cows in milk was 40 per cent between 2003 and 2007. Similarly, the

growth in goat population was 29.78 per cent and that of sheep 31.08 percent during 2003 to 2007. The poultry figures are not properly reported. As per 2007 Census, there is a sharp increase in goat population i.e. 37 per cent and similarly in the case of sheep, the growth in population was 31.05 per cent. The State has a sheep and goat breeding farm in Bellary district to provide breeding rams/ bucks to the farmers. In addition to that they are also providing training to the needy farmers in sheep/ goat husbandry.

Historically goat was the earliest ruminant to be domesticated. Sheep and goat have an inseparable identity with the farmers in India from time immemorial. They constitute an important component of agriculture and economy of the farming community in India, especially those of the weaker sections among agriculturists. In addition, they form substantially useful fraction if their total farm income particularly, when crops fail due to drought and other adverse conditions.

The Harappan toys included goats, which suggest that goats were domesticated in India as early as 2000 B.C. Goat has unique qualities like wide adaptability, utility, multiplicity, high fecundity and prolificacy, cheap maintainability and easy management. Goat can survive under adverse climatic conditions, such as extreme hot and cold and areas of deserts and mountains. The importance of goats has been realized in India for their meat and milk. The protein content of goat meat is 21.50 per cent. Goat milk is having high nutritive value, wholesome, easily digestible and possesses medicinal value. Hence goat is called as the “poor man’s cow” in India and “wet nurse of infants” in Europe. It is a multipurpose animal which provides milk, meat, hair and skin.

India has 20 discreet breeds of goats out of the globally identified 102 breeds. The Indian breeds are evolved through natural selection for adaptation of specific agro - ecological conditions. Important breeds like

Jamunapari and Barbari are reared in central parts of India**.** Black Bengal and White Bengal in Eastern regions and Sangamneri and Malabari in Deccan Plateau and Coastal areas. It is the only species that can be successfully farmed with any level of intensification**.**

World possesses 807m goats and India with 126 m stands second after China. Goat population in the country is poised to reach 170 million by 2025. Goats in India contribute 15.5 per cent of livestock population, 2 per cent to milk, 10.5 per cent of meat and 13 per cent of skins of the world and 23 per cent to population, 40 per cent to milk, 14per cent of meat and 16.5 per cent of skins of the Asian region. Dairy goats produce about 15.2 million metric tons (MT) of milk, accounting for about 2% of the world total amount of milk produced by livestock species (FAOSTAT, 2008). The developing countries produce approximately 83 per cent of the total amount.

Around 89 per cent of the goats around the world are reared primarily for meat. About 47.5 m goats (40%) are annually slaughtered for meat in the country. Value realization different goat products in India works out to over Rs.9350 crores per annum. The total amount of goat meat produced in 2008 was 4.9 million MT. The developing countries produced approximately 97% of this amount, reflecting the great importance of goat meat to feed millions of people in these countries.

The goat sector generates about 4 per cent rural employment and 20 million families in India are engaged in goat keeping. Per capita meat consumption in India is less than 5 kg per year as against 13.7 kg in Pakistan, 38.6 kg in China and 58.6 kg in Brazil. Estimated annual demand for meat is 7.7 m MT against the availability of 5.6 m MT. India exported 3 lakhs live goats, 280 MT goat meat and 25 MT goat skins and earned over 4 m US Dollars during 2003. A great export potential exists for live goats, goat meat, goat skins and their products. Around 250

commercial goat farms have been established in different parts of the country. Thus, the rapidly changing patterns of demand for livestock and livestock products point to goat production being an important component of the agricultural economies of India.

Goats are among the main meat-producing animals in India, whose meat (chevon) is one of the choicest meats and has huge domestic demand. Besides meat, goats provide other products like milk, skin, fiber and manure. Goats are important part of rural economy, particularly in the arid, semi-arid and mountainous regions of the country. With more than 126 million population, goats account for more than 25 per cent of the total livestock in the country and contribute Rs 1063 crores annually to the national economy. They provide food and nutritional security to the millions of marginal and small farmers and agricultural labourers. However, the productivity of goats under the prevailing traditional production system is very low (Singh and Kumar, 2007). It is because they are maintained under the extensive system on natural vegetation on degraded common grazing lands and tree lopping. Even these degraded grazing resources are shrinking continuously. Moreover, adoption of improved production technologies/ management practices in the farmers' flock is very low. Therefore, rearing of goats under intensive and semi-intensive system using improved technologies for commercial production has become imperative not only for realizing their full potential but also to meet the increasing demand of chevon (goat meat) in the domestic as well as international markets.

Sectoral growth in animal husbandry and Dairy is currently at four per cent and the State has the potential for achieving a minimum of six per cent growth in the remaining period of XI Plan and to enhance the same to 8 per cent during XII Plan. Animal Husbandry and dairy sectors in Karnataka state have been an important component contributing

significantly to the state's economy. Contribution from these sectors is to the extent of 2.97 per cent of the state's overall GDP and 22 per cent of the agricultural GDP.

Sheep were domesticated as early as 11,000 years ago mainly for meat, skin and wool. Sheep meat is popular among non vegetarians and valued for quality mutton. It is rich in proteins (26-28 per cent), calories, minerals (phosphorous and iron) and vital vitamins (B1, B2, B12 and Niacin). Sheep dung is an important source of plant nutrients like Nitrogen (0.6 per cent), Phosphorous (0.5 per cent) and Potash (0.65 per cent). Sheep breeds have been evolved taking into consideration their milk, mutton and wool production. There are more than 200 breeds of sheep in the world.

There are more breeds of sheep than breeds of any other livestock species. Worldwide, there are more than one thousand distinct sheep breeds. There are more than 40 breeds in the United States. Breeds are classified according to their primary purpose (meat, milk, or wool), the type of fibers they grow (fine, medium, long or carpet wool; or hair), the color of their faces (black, white, red, or moddled), and/or by specific physical or production characteristics.

The most important product we get from sheep is meat. Meat is an important component of our diets, and lamb and mutton supply us with many of the vital vitamins and proteins we need for healthy living. Lamb is the meat (flesh) from a sheep that is less than one year old. Mutton is the meat from a sheep that is over one year of age.

While sheep meat only accounts for 6 percent of the world's meat consumption, it is the principle meat in regions of North Africa, the Middle East, India, and parts of Europe. The European Union is the

largest lamb consumer and number one importer of lamb, whereas 99 percent of the lamb imported originates from Australia and New Zealand.

India has nearly 40 breeds of sheep reared in different regions. The major breeds of southern region includes, Deccani, Bellary, Nellore, Mandya, Hassan and Kenguri. The Rambouillet sheep is one of the best-known breeds of fine-wooled sheep. The Rambouillet breed originated with Spain's famed Merino flocks, which were known from the earliest times as producers of the world's finest wool. Mature Rambouillet rams weigh between 250 and 300 pounds (113-135 kg), ewes range from 150 to 200 pounds (68-90 kg). Mature ewes will have a fleece weight of 8 to 18 pounds (3.6-8.1 kg) with a yield of 35 to 55 percent. The fleece staple length vary from two to four inches (5-10 cm) and range in fiber diameter from 18.5 to 24.5 microns or 60 to 80 for the numerical count.

Livestock farming is the most important branch of agriculture, which is true also for the area of research since animal husbandry is vital for income stability. However, the dwindling land base and labour scarcity has lead farmers to adopt new ways of sheep and goat management by way of stall feeding in the recent past. Stall fed sheep and goat rearing on commercial scale initiated in Tamil Nadu and Maharashtra has spread to neighbouring Karnataka since last five to six years. The research on economics of stall-fed sheep and goat production and evaluation of investment in rearing of these animals are scanty. Thus, the study was taken up with a general objective of economics of sheep and goat rearing in rain-fed regions of the state.

Objectives:

1. To compute costs and returns of stall-feeding
2. To analyze the forward and backward linkages
3. To identify the constraints in stall-fed sheep and goat rearing
4. To elicit preference for stall-fed sheep and goat rearing

Hypotheses

1. Rearing Stall-fed Sheep and goat is profitable.
2. Forward and backward linkages are weak for stall-fed units.
3. Marketing is a major constraint in stall-fed units.
4. Farmers prefer sheep compared to goat rearing.

Presentation of the study

The study has been presented in six chapters as indicated below:

Chapter-I deals with the nature and importance of the study and also the objectives of the study. Chapter-II describes comprehensively a review of the relevant research work done in the past related to the present study. Chapter III outlines the features of the study area, sampling design followed and analytical tools used in the study. Chapter IV denotes main findings of the study. In chapter V the results are discussed in the light of past research. Chapter VI provides summary of the whole study and also suggest the policy implications based on findings of the study. Last chapter on references provide the list of important references related to the present study.

Review of Literature

II CHAPTER

REVIEW OF LITERATURE

In this chapter an attempt is made to critically review the past literature that is relevant to the present study. The reviewed literature would help to keep the research on proper lines and to bring refinement in the study. The research work carried out by various researchers related to the problem under study has been reviewed under the following heads.

2.1 Costs and returns in rearing sheep and goat rearing

Ramesh (1990) conducted a research study on the economics of sheep rearing in Bangarupet taluk of Kolar district of Karnataka. He found that the total costs in small (No $\leq$ 20) and large (No $\geq$ 20) flocks were Rs.3611.15, Rs.5703.19 and corresponding gross returns were Rs.4410.12 and Rs.7071.50 respectively.

Rath (1992) studied the economics of sheep and goat rearing in Maharashtra state. He observed the economics of a flock of 20 ewes and a ram costs Rs. 9000 and Rs. 600 respectively and the total earnings come to Rs. 2,914. And also observed for 2 years that doe goat costs Rs. 450, the total capital cost of 5 does was Rs.2250 and the return Rs. 700 from sale of kids in the first year and Rs. 1,150 from the sale of kids in the second year.

Deoghare and Bhattacharya (1993) studied the costs and returns of goat keeping (in 1990-91). Data were collected from 80 goat-rearing households in Mathura, UP. The income from milk, sale of animals, value of manure and stock acceleration was analyzed. Large flocks (>10 goats), medium flocks (6-10 goats) were better managed than small flocks (2-5 goat). Capital investment per goat was Rs. 813, Rs. 732 and Rs.780 for

small, medium and large flocks respectively. The net income from small, medium and large flock was Rs.146, Rs.296 and Rs.616 respectively.

Padmanaban (1994) analysed sheep farming in Tamil Nadu. It was revealed that number of ewes at the start of the year was 12. The average income from sheep per farm was 2,699.97 which include 77.95 percent from manure. The income from wool was negligible at 0.34 percent. The annual average income and net income per sheep would be Rs. 222.23 and Rs. 64.36 respectively.

Francis (1994) studied the goat rearing challenges and opportunities at the state bank institute of rural development, Hyderabad. Goat rearing under stalled conditions may be encouraged as it is not only sustainable in nature but also provides income and self employment. He estimated total investment of Rs.58,600 which comprised investment on goats, shed and equipments. The total recurring expenses per year per goat would be Rs.50,900. The gross profit and net profit were calculated at Rs 19,220 and Rs.10, 137 per year in that order.

Roberts (1994) compared the costs, returns and technical efficiency of three types of egg production system (battery, free range and perchery unit based on 1992 financial survey carried out in England. It also considers the benefits associated with producers marketing their own output. The poor financial performance of smaller battery packing, suppliers, were observed in the industry.

Prabaharan and Thirunavakkarasu (1995) conducted a study in Tamil Nadu to assess the income and employment potential of goat rearing enterprise. They observed that the cost of production per herd per annum was Rs.1,909, Rs.4,130 and Rs.6,457 for small (1-8 goats), medium (9-16 goats) and large (above 16 goats) respectively, of which

labour cost accounted for 74 per cent, 66 per cent 59 per cent respectively. Annual net income was Rs.1,200, Rs.1879 and Rs.6,800 for small, medium and large herds, respectively.

Shah and Singh (1995) studied costs and returns in crossbred cows in rural and urban area of Barielly district of Uttar Pradesh. It is evident from the study that the total cost per cow in one complete lactation was Rs.5, 403.39, with a total return of Rs. 8,288.02 and net profit of Rs. 2,884.63 in the rural area. The results further revealed that the total cost, total return and net profit in urban area were Rs. 5,760.74, Rs. 9,295.85 and Rs. 3,535.09 respectively. Thus it is clear from the study that the net profit was not only higher, but also the total costs as well as total returns also much higher in urban area as compared to rural area.

Tripathi (1997) studied the costs and returns of Angora rabbit rearing in high-hills of Uttar Pradesh. He found that the cost of rabbit rearing was Rs.32,344.6 per unit (18 angora rabbits). The highest share of the total cost of rabbit rearing was on feed which accounted for about 71 per cent of total cost followed by overhead cost (about 18%) and the labour cost accounted for 11 per cent of the total cost. They also noticed that the gross returns from the enterprise was Rs.57,525.46 per unit per year. The average net income was Rs.25, 180.80 per unit per year.

Verma and Singh (1997) studied the effect of farmer size, educational level and occupational status of entrepreneurs on the economics of egg production in Haldwani area of Nainital district. The total cost per bird was Rs. 381.59. The average gross return per bird was Rs. 399.49. Income from the sale of eggs, culled birds and manure accounted for 87.33 per cent, 10.7 per cent and 1.97 per cent respectively.

Rahman *et al.* (2003) studied the economics of dairy farming in 6 divisions of Bangladesh during 2000-01. Tabular analysis was carried out to work out cost and returns from milk. Annual rearing cost per animal accounted to TK 14,667.74 in group 1 (5-10 cows), TK 18,559.09 in group-2 (11-25 cows) and the annual gross returns per farm per animal and net returns per milk cow were TK 18,899.77 and TK 25.99 respectively.

Aslam and Khaushk (2004) analyzed the economics of buffalo dairy farms in Sindh district of Pakistan. They concluded that the total costs of dairy farms were estimated as Rs.2,64,938, Rs.10,94,658 and Rs.27,91,760 for small, medium and large farms, respectively. The net return of selected dairy farms were analyzed and found that average net return were Rs.67,134, Rs.39,0482 and Rs.13,46,580 per year respectively for small, medium and large farms.

Arun and Dhaka (2005) studied the marketing of goats in the four animal markets of Nadia and Hooghly districts of central alluvial plains of West Bengal. Data were collected from 30 sellers and 30 buyers, selected randomly from each market during 2001- 2002. Five marketing channels were found in male goat marketing in the study area viz, channel –1 farmer to farmer, channel –II farmer to butcher, channel-III farmer to local trader to butcher, channel-IV farmer to distant trader to farmer and channel-V farmer to distant trader to butcher. The majority of the goats were transacted through the channel III. No broker was found in the marketing of goats in the study area.

Dwaipayan *et al.* (2005) studied the economics of buffalo milk production in Tarai area of Maharashtra which covers two blocks Udham Singh Nagar and Rudrapur block and five villages from each block which were selected randomly. It was revealed that returns occurred mainly from the sale of milk (97%) and sale of manure (3.31%). The total cost of

milk production was more in case of large farmers (4&>4 ha of land) i.e. Rs.21,053.56/ha, followed by medium farmers (2 to 4 ha) small farmers (1 to 2), landless (having no land) and marginal farmers (<1 ha) Rs.20,849/ha, rs.19,773/ha, Rs.19,047/ha and Rs.17,071/ha respectively. And the total returns obtained was more in large farmers (Rs.20,237/ha) followed by small farmers (Rs.19,513/ha), medium farmers (Rs.19,144/ha), marginal (Rs.17,225/ha) and landless (Rs.18,338/ha).

Jitender *et al.* (2005) studied the costs and returns from sheep and goat farming in Mahendergarh and Gurgaon district of Haryana in 2001-02. Tabular analysis was used to study the status of sheep and goat rearers, costs and returns from sheep and goat rearing. The annual average total cost per sheep farm was worked out to be Rs. 26,674 while on goat farm it was Rs.12,169. The average net returns from sheep and goat rearing were Rs. 4,983 and Rs. 16,605 respectively.

Hossain *et al.* (2005) studied the small scale dairy farming practice in selected area of Bangladesh. The study conducted during 1999 revealed that the cost of rearing of dairy cow was 67.5 taka per cow per day and the net return was 17.7 taka per cow per day for crossbred cow.

Singh *et al.* (2005) studied the resource use efficiency of milk production in Pusa block of Samastipur district. The study showed that the labour cost per day per cow in crossbred was comparatively higher than local cows. Feed was found to be the most important item amounting to 47 per cent of the total maintenance cost followed by labour (34%). Costs and returns structure of poultry farms have been analyzed in Andaman and Nicobar islands during 2003-04 by Ganesh and Rai (2006). They observed that the total costs involved in broiler poultry farm were Rs.20,653, Rs.59,261 and Rs.94,612 for small (300 birds), medium (900 birds) and large (1500 birds) units respectively.

Similarly the net returns obtained were Rs.2,507, Rs.10,279 and Rs.21,188 in that order. They inferred that the profit increases as the size of the unit increases.

Srivastava and Saraswat (2006) studied the marketing of Jaunpuri goats in Jaunpur district of eastern Uttar Pradesh in 2001-02. They concluded that goat keepers frequently sold their goats for slaughter and goat owner carry their goats for sale in the nearby weekly market. On an average, the market cost per goat was Rs.66.80. It was indicated the marketing cost per goat was negatively correlated with the size of flock.

Shalander (2007) studied the status, economics and prospects of commercialization of goat production in the country have been analyzed using primary data from 18 commercial goat farms in different states. It has been revealed that several large and progressive farmers, businessman and industrialists have adopted commercial goat farming. The entry of large farmers, who have better access to technical knowledge, resources and market, into this activity would help in realizing the potential of goat enterprise. A majority of commercial goat farms have been found operating with positive net returns. Goat rearing has been found equally rewarding under both intensive and semi-intensive systems of management. Intensification and commercialization of goat enterprise has been recorded important because of shrinking of resources for extensive grazing. Commercialization would help in increasing the goat productivity and bridging the demand-supply gap. However, use of improved technologies, particularly prophylaxis, superior germplasm, low cost feeds and fodders, and innovative marketing of the produce would be the pre-conditions for successful commercial goat production.

2.2 Forward and backward linkages in goat and sheep rearing

Markets are important for agricultural growth and sustainable development. Lack of markets, or poor access to those markets that exist, not only affects farmers and livestock herders locally in rural areas, but is a drain on the potential of the entire country. Creating local and national markets and improved access to them, allows specialization and diversification into new agricultural products that make profits for rural households and decrease poverty and hunger. Marketing channel describes the movement of a product or commodity from the site of production to the place of consumption. It may include transportation, handling and storage, ownership transfers, processing, and distribution (Pinkerton, 2002).

For the period from 1998 to 2020, The International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) predicts developing countries aggregate consumption growth rates of meat and milk to be 3.0 and 2.9% per year respectively, compared to 0.8 and 0.6%, respectively in developed country. Aggregate meat consumption in developing countries is projected to grow by 72 million metric ton between 2003 and 2020, whereas, the corresponding figure for developed countries is 9 million metric ton (Delgado, 2005). The study also revealed, based on empirical data, that population growth, urbanization and income growth in developing countries are fuelling a massive increase in demand for food of animal origin. These changes in the dietary pattern of billions of people could significantly improve the well being of many poor people in rural areas (Ehui *et al.,* 2003).

The potential of crop residues as livestock feed increases with rising population density, while the demand for them depends on the livestock population density and the alternative functions of crop residues in the farming system. At the village level, stocking rates differ

greatly between individual farmers. Stock-poor farmers may have excess to feed, while stock-rich farmers, despite having more cropland and higher crop yields, may be short of feed. In mixed cropping systems with long growing seasons, intercropping may restrict the access of livestock to crop residue, such that the residues of early-maturing crops may decompose *in situ* without beinggrazed (Leeuw, 2003).

Increased livestock holdings will stimulate mono cropping or the intercropping of crops of similar cycle length. In the future, rising demand for locally grown crops and for livestock products may lead to higher use of inputs, resulting in higher crop and crop residue yields, feed budgeting and the allocation of feeds to different classes of stock ranked according to their revenue-earning capacity. New cropping patterns may evolve that allocate larger shares of land to grain legumes and roots/tubers. This will diversify and enhance crop residue quality, a process that can be further promoted through the inclusion of by-products in feeds (Leeuw, 2003).

Total feed demand depends on the overall local stocking rate, but the ratio of supply to demand varies across seasons and years as well as between individual farms. Variability in ratios between farms is greatest where communal grazing land is scarce, as for example in the Ethiopian highlands, Rwanda and Kenya. Where access and use of feed is entirely farmer-controlled, benefits from intensification of the crop subsystem can translate directly into higher livestock, modest increments in input levels can double the output of cereal crop residue, which, having full control, the farmer can manipulate and manage so as to increase feed supplies and effective use by livestock. When farmers perceive the true value of their crop residues they often reassess them as a marketable commodity and start to engage in trade in feeds. This allows stock-poor

producers to extract added value when intensifying their own cropping enterprises (Leeuw, 2003).

Livestock feed scarcity is often the major cause of livestock mortality during drought in the Enset (*Enset ventricosum*)-livestock mixed farming systems in the Kokossa district of the Bale highlands in southeastern Ethiopia (Desta, 2004). Livestock mortality associated with feed scarcity was investigated in the livestock-enset, enset-livestock and enset-livestock-cereals production systems of the Ararso, Jafaro and Bokore sub districts of Kokossa, respectively, using farmers' perceptions during a drought year in 1998, an average rainfall year in 1999 and a wet year in 2000. Livestock mortality was variable between years and between farming systems. Greater livestock mortality occurred during the drought than in an average or wet year. Generally, mortality was greater in the livestock-enset and least in the enset-cereals-livestock production system. Among livestock, cattle experienced greater mortality than small ruminants and equines (Desta and Oba, 2004).

Forage legumes could be established under maize without reducing the grain or stover yield. Leaf defoliation up to 50% did not affect the grain or stover yield components or the yield of under sown legume (AFRC, 2004). In the highlands, where common grazing areas have been declining due to population pressure, crop thinning and weeds from the cultivated land provide a large part of supplementary feed available to the goats. Thus, the size of cultivated area has to be considered as a limiting factor. However, there is no evidence to show that land is any more limited to the total flock output than the total labor at the disposal of the household than the biomass of goats to be maintained (Workneh, 2004).

The effect of different feeding systems was conducted using Somali and Arsi Bale goats' It was found that Somali goats managed under semi-

intensive system returned a higher profit margin than the goats managed under extensive and intensive systems (Getahun *et al.*, 2006).

These authors suggested combining grazing with concentrate supplementation is potentially more profitable than either grazing without concentrate supplementation or pen feeding with no grazing. On the other hand, the marginal rate of return for Arsi-Bale goats was negative in all the three systems. The loss of money encountered in goats managed under the extensive system was relatively lower than the goats under other treatments. The additional income from supplementation of concentrates does not justify the additional cost accompanied with it for these goats. Grazing seems the only viable option for Arsi-Bale goats during the dry season. Repeating this experiment during the wet season to generate data for the whole year would gave more conclusive result since the availability and quality of feeds, cost of variable inputsand prices of the animals varied from season to season (Getahun *et al.*,, 2006).

According to a study conducted in Belessa (Amhara region of Ethiopia) the feed available in *Kola* agro-ecology is good compared to *Dega* agro-ecology. The critical feed shortage season in Belessa Woreda is from January to the end of June, depending on the onset of rainfall. If the rain starts early in the season (May), all the private and communal grazing land as well as forest and shrub are a good source of feed so that livestock will not face feed shortage. However, during drought years or delays in the start of rainfall, feed and water shortage are major problems and high livestock mortality is common. The study conducted in Amhara region found that ownership of various types of livestock has declined, and there has been a significant change in utilization of feed resources: while use of communal grazing lands, private pastures, woodlots and forest areas as feed sources has declined, the proportion of

households using crop residues and purchased feed has increased. In addition, the proportion of households with better access to *woreda* towns significantly improved ownership of oxen and goats, while improvement in access to all-weather roads reduced ownership of oxen (Benin *et al.,* 2002).

Getahun, *et al.,* (2006) conducted a study at Addilo (SNNPR) and Kofole (Oromia) areas also showed that lack of feed which is directly related to shrinking farm size, was ranked as the major constraint by Addilo respondents, while small ruminant disease was ranked as top most priority problem at Kofole.

Endeshaw (2007) studied on production system and marketing study was undertaken using 120 sample households to identify and describing goat production systems, to determine production potentials, opportunities and challenges of goat's production and to describe marketing systems. Three households were drawn from different location and represented three agro-ecologies; Moist Weyina Dega, Dega and Moist Kola. Sampled households were interviewed on socio economic characteristics, flock structure, reproductive performances of goats, feed resources and feeding, routine husbandry management systems and marketing using a pre-tested formal questionnaire. Flock monitoring to identify off take and acquisitions like birth, purchase, transfer and disposal like sales, slaughter, death was carried out for about seven months (September to March). Three primary, one secondary and one terminal markets were studied at Dale, Tula and Hawasa, respectively using Rapid Marketing Appraisal (RMA) technique. The average family size was 7.5± . 247 per household, out of which 5.6% of the households were females and there was no significant difference ($p<0.05$) in family size among the three-agro ecologies. About 75 % of interviewed male households and 50% female households were literate. The overall mean

livestock holdings were 13.1 ±1.16. Among the three-agro ecologies, the average livestock holdings in Moist Kola were significantly higher than in Moist Weyina Dega and Dega. The overall mean goat holdings per household were 5.98 and there is a wider range of variations in flock sizes in agro-ecologies. The overall mean AWA, AFM, AFK, AKI, was 5.2, 9.7, 14.9, 8.6 and 16 months, respectively. Overall mean litter size was 2.07 and lifetime kidding age (parity) was 13.2 months. AWA in Moist Dega was 6.47± 45, and was significantly longer ($p<0.05$) than in Moist Weyina Dega and Moist Kola. Similarly, the average AFM was 16.13 months in Moist Dega, and was significantly longer ($P<0.05$) than in Moist Kola but. Moist Weyina Dega was intermediate of the two-agro ecologies. AKI was 8.56, 7.27 and 8.57 months in Moist Dega, Moist Weyina Dega and Moist Kola, respectively and varied significant ($P<0.05$) among the three agro ecologies. Mean LS for Moist Kola and Moist Weyina Dega was significantly($p<0.05$) lower than that of Moist Dega. Goats in Moist Kola have shown long lifetime kidding or parity (P) of 16.27 years, which is significantly longer ($P<0.05$) than that of the other two agro ecologies. Feed resources for goats varied among agro ecologies. Shrubs and trees are the major feed sources for free foraging goats in the Moist Kola but, feeds from crop by products, crop residues, enset and fruit parts, vegetables and chat leftovers are the main feed sources for tethered and herded goats of Moist Weyina Dega and Dega. Lack of feed, diseases and marketing are the major constraints affecting goat's production. The increasing demand for goat meat, the awareness of rural goat herder about the current price and willingness and attempt to carry out small scale goat fattening activities to utilize the current goat market, the conduciveness of the environment and sufficient man power in the three agro ecologies are the encouraging opportunities to improve goats production and marketing.

Million (2003) conducted a study in SNNPR state indicated that inadequate transport network, limited number of large interregional traders with inadequate storage and working capital high handling costs, inadequate market information system weak bargaining power of producers, and lack of processing facilities have contributed to inefficient livestock market in the region. Efficient and integration of marketing determine the tradability of products and the accessibility of market to farmers. Improving market efficiency contributes to the increased level of food security by reducing consumer prices, increasing returns to producers or both. That is returns to better supply of food.

Nsoso *et al*. (2004) analyzed marketing channels showing that small stock farmers were mostly aware of butchers, middlemen/traders and individuals. Some farmers still believe that financial assistance policy projects were useable even though they have been phased out. The most used marketing channels individuals ranked as the most favored, then butcheries as the second most favored and middle men as the third favored. The least favored was financial assistance policy projects while the rest were largely seen as unflavored. The usage of other marketing channel is very low. Auction and cooperatives are none existent.

Getahun *et al*. (2006) conducted a study on demand for small ruminants in local and international markets, the improving transportation infrastructure, and the experience of farmers in small ruminant keeping are practical opportunities to enhance the contribution of the sector. Furthermore, research on the complex cause–effect relationships is needed to derive policy implications.

Demand for meat is largely festival-led, and thus, predictable with well-set patterns for buying reason. Stock movements between markets is unregulated and increasingly disorganized and may add up to 12% to

the final sales prices with a corresponding loss of condition on the part of the animals (Peter, 1998).

Steinfeld (2004) indicated that, globally, per capita food consumption continues to increase both in the developing and industrialized countries, as well as in countries in transition, as a result of increasing average per caput real incomes. Changes are also occurring in the type of food consumed. With increasing incomes, demand for greater food variety and for higher value and quality foods such as meat, eggs and milk, increases. Between 1997/1999 and 2030, per caput meat consumption in developing countries is projected to increase from 25.5 to 37 kg per person compared with an increase from 88 to 100 kg in the industrialized countries.

2.3 Constraints in sheep and goat rearing

Belli (1990) studied the problems encountered in dairying by Gavali community in Dharwad taluk. He revealed that all of the respondents (cent percent) expressed the problem of depleted grazing lands and fodder problems, 91.67 percent of them complained about water scarcity. Majority of the respondents complained about inadequacy of market infrastructure for the marketing of milk and milk products. The remedies suggested by them were allotment of more land for growing fodder by the forest department, providing water facilities by sinking open wells, tube wells or by constructing small tanks for their animals, better milk price and establishment of veterinary hospitals near their settlements.

Prabaharan and Thirunavakkarasu (1994) studied the constraints in goat farming in seven agro-climatic zones of Tamil Nadu. They found inadequate fodder and grazing lands, exploitation by middlemen was the major constraints of goat farming.

Eswara and Radha (1996) in their survey on analysis of the constraints in sheep marketing and their products in Karimnagar district of Andhra Pradesh concluded that about 60 per cent of the respondents felt marketing place as their main problem. They also found that about 75 per cent of the respondents had the problem of technical know-how and lack of information about marketing functionaries.

The study undertaken by Sani *et al.* (2000) regarding the economics of poultry production in Bachi state of Nigeria concludes that the major constraints associated with poultry enterprise were high cost of feed and the prevalent diseases.

The study of Vyas and Patel (2001) on constraints faced by milk producers in adoption of dairy technology revealed that non-availability of loan facilities for purchase of milch animals and fodder, non-availability of marketing facilities lack of knowledge of scientific animal feeding as well as preservation practices and no pasture land were the main constraints in adoption of dairy industry.

Aslam and Khaushk (2004) studied the economic analysis of buffalo dairy farms in Pakistan. They observed that there were number of technical and socio-economic problems which limit the productivity of dairy farms such as shortage of feed, high mortality, poor genetic potential, high input cost and inadequate marketing facilities.

Hossain *et al.* (2005) studied the problems associated in small scale dairying during 1999 in Bangladesh. The problems identified were scarcity of feed and fodder, high price of concentrate and lack of technical knowledge.

Senthil and Meganathan (2005) in their study on marketing of sheep/mutton observed that among various problems, sheep farmers

ranked non-availability of required food as their major problem followed by poor credit facility and unremunerative price and lack of capital for their investment.

Mahendra and Anil (2006) studied the constraints faced by dairy farms in Rajasthan.The main constraints observed by them were high cost of feeds and fodder, poor availability of fodder and feed, limited financial resources, lack of facilities for treatment, vaccine and medicines, lack of veterinary dispensaries and poor knowledge of scientific management and animal health care practices.

Singh *et al.* (2006) studied the socio-economic conditions of sheep and goat owners and the constraints of rearing in Himachal Pradesh during 2001-02. The major problem was poor veterinary facility in the study area. They also reported that less price for live animal and wool, transportation problems, wild animal attack, higher morbidity rate (15-25%) were their major problems.

2.4 Preference for sheep and goat rearing

Ahmad (2002) studied the role of women farmers in livestock production in Jordan. According to the study the influence of selected socio- economic factors on livestock involvement, and implications to extension activities were examined using factor analysis and non-parametric tests. Women farmers were found to have a significant role in livestock production activities, and in decision-making regarding livestock management. Contribution to production activities and participation in decision-making were found to be positively correlated. Gender division of labor was apparent, which implies that both men and women must have the technical know- how and ability to manage their area of responsibility. Women farmers were found to be under-served by extension services; less than one fifth of women were found to have

access to state extension services and 3% to private extension. Gender-specific extension activities based on relevant information have to be implemented to improve livestock management, and to ease or to mechanize women tasks, using appropriate methods and approaches of extension.

Rahman *et al.* (2007) conducted a survey of 59 small-holder households was used to gather information about livestock production within a small-holder farming system in the Northern Areas of Pakistan. A broader survey of 130 households was used to gather information about cropping patterns, and access to off-farm employment and educational opportunities. The aim was to provide a description of the livestock production sys- tem in the Northern Areas and investigate the effect of agro-ecological zone and proximity to transport infrastructure on small-holder practices, especially those relating to livestock management. Two transects were selected for study differing in the quality of their trans- port infrastructure; the Karakoram Highway transect was defined by the Karakoram Highway, a major transport link through the study region, while the Gilgit–Ghizer Region transect lay along a side valley with a more limited transport infrastructure. One village from each of the three main agro-ecological zones within the region was selected in each transport infrastructure transect. Results showed that aver- age landholding size was 1.6 ha of which around 60% was cultivated. Overall herd size did not differ significantly by zone or transect but there were more animals derived from cross-breeding with exotic breeds in the Karakoram Highway transect. The amount of fodder stored for livestock was higher in the Karakoram Highway transect than in the Gilgit–Ghizer Region transect. There was more selling of livestock in the Gilgit–Ghizer Region transect and the use of draught animals was also more prevalent in the Gilgit–Ghizer Region. The household questionnaire indicated that cash cropping, off-farm employment and degree of formal education were

all higher in the Karakoram Highway transect, providing indirect evidence for a household economy less reliant on traditional livestock keeping for income. In conclusion, the survey results reveal a traditional small-holder system with heavy reliance on livestock. Householders in the lower altitude zones and those close to transport infrastructure appear to rely less heavily on livestock for income but have fodder resources which are more appropriate for their complement of livestock.

Yasothai *et al.* (2009) studied on the profile of rural women of Erode district on various aspects of livestock farming during the on-campus training programmes. The results revealed that majority of the rural women were middle aged, educated up to primary level and reared maximum number of sheep and goat. Majority of them were actively involved in farm activities and maximum number of trainees were interested to start backyard poultry farming.

Ouma *et al.* (2009) studied the urgent need to improve livestock productivity in sub-Saharan Africa in order to keep pace with expected increases in demand for meat and milk is very topical. Breed improvement provides key entry points for increasing productivity in cattle populations. However, there are tendencies for breed improvement programs to focus on single, market driven traits such as milk or meat production in isolation of environmental constraints and broader livestock system functions which cattle assume in developing countries. This potentially leads to genotypes that are not well adapted to the environment and not capable of performing the multiple roles that cattle assume in cattle production systems of developing countries. In developing countries, many important functions of livestock are embedded in non-tradable traits that are neither captured in economic analysis nor considered in livestock improvement programs. This study evaluates preferences of cattle keepers in pastoral and crop- livestock

systems of selected sites in Kenya for various cattle traits, focusing attention on trypanotolerance and employing choice modelling techniques. These systems are characterized by low input management, harsh environmental conditions and prevalence of various cattle diseases. Trypanosomosis is a serious disease constraint in these systems. The results indicate that farmer preferences for cattle traits are influenced by various factors including cultural practices, production system characteristics and environmental conditions, especially in relation to disease prevalence and availability of cattle feeds.. cattle production system, trait preferences, choice experiment, Kenya, Livestock Production/Industries, D11, C35, Q26

Osei-Bonsuand (2009) studied on poverty reduction at Nvuma, a coconut growing community. It also examined the contribution of livestock in the livelihoods of coconut-based households and the economic and technical constraints faced by the farmers. A baseline survey was conducted to identify the needs, aspirations, opportunities and constraints in relation to the livestock kept. The project supported the farmers with training, technical advice and microcredit facility. Livestock contributed to the livelihoods of the participating households through increased income, insurance savings, improved nutrition and job creation. Knowledge of the farmer participants increased, particularly regarding the nutritional needs of livestock and disease and pest control. The farmers value their livestock first as an insurance savings, from which unexpected high expenses, like family medical bills and children school fees are paid. The microcredit provided a minimum financial base for the farmers to establish a foundation stock. It was found that provision of veterinary services is essential for the success of poor household's livestock enterprises. Support from government agencies such as the District Assemblies, NGOs and other development partners is recommended.

David *et al.* (2011) studied about the management of the live stock diseases. Management of livestock diseases is important in ensuring food safety to consumers in both domestic and export markets. Various measures are prescribed under the Sanitary and Phytosanitary Standards (SPS) agreement of the World Trade Organization. In order to prevent the spread of trans-boundary cattle diseases, the SPS agreement recommends the establishment of Disease-Free Zones (DFZs). These have been implemented successfully in some major beef-exporting countries, but in Kenya are still at a pilot stage. To understand Kenyan farmers' preferences on the type of DFZ that would be readily acceptable to them, a choice experiment was conducted using a D-optimal design. Results show that farmers would be willing to pay to participate in a DFZ where: adequate training is provided on pasture development, record keeping and disease monitoring; market information is provided and sales contract opportunities are guaranteed; cattle are properly labelled for ease of identification; and some monetary compensation is provided in the event that cattle die due to severe disease outbreaks. Preferences for the DFZ attributes are shown to be heterogeneous across three cattle production systems. We also derive farmers' preferences for various DFZ policy scenarios. The findings have important implications for policy on the design of DFZ programmes in Kenya and other countries that face similar cattle disease challenges.

Jabir (2011) studied on use of quality information for decision-making among livestock farmers. The rapid growth in the demand for high value agriculture of which livestock products constitute the major share, and fast changing livestock production system necessitate the provision of efficient flow of information and knowledge to the livestock farmers for better decision-making. This paper analyses the use of information and communication technology (ICT) enabled services for livestock information delivery based on primary survey of 342 livestock

farmers in eight districts of Uttar Pradesh. The differences in quality of decisions on various livestock practices, between users and non-users of ICT driven information system have been assessed using analysis of variance (ANOVA) technique. Results indicate that ICT users are making significantly better quality decisions as compared to non-users. Correlation analysis between frequency of ICT use and socio-demographic profile of livestock farmers indicate a significantly positive relationship with a number of factors, which provides practical insights for designing target based ICT driven information system for livestock sector development.

Pallavi *et al.* (2011) studied on preference of service providers for the veterinary services and showed availability of veterinary services is very important for development of livestock sector in India. In many locations apart from state veterinary services other veterinary services are also available and the veterinary service users have the choice available with them regarding the service providers. The preference of service providers depend upon the location, distance, livestock holding and capacity to pay and quality of services. A study was conducted among the livestock owners of Sangli district in Maharastra to assess the preference of the livestock owners towards a particular veterinary service provider. Majority of large farmers preferred state veterinary services and cooperative veterinary services where it had strong presence. Cooperative veterinary service can be a good alternative to the state veterinary services and the private veterinary service providers are still not preferred in the rural area.

Methodology

III CHAPTER

METHODOLOGY

This chapter deals with the brief description of the study area and the techniques used in sample selection and data analysis. The details are presented under the following sub headings.

3.1 Description of the study area

3.2 Data collection

3.3 Analytical techniques employed

3.1 Description of the study area

Information regarding the geographical location, demography, land use pattern, financial institutions and other features are highlighted in this section.

Karnataka state has a total land area of 1,91,791 sq. km and accounts for 5.83 per cent of the total area (32,88,000 sq. km) of the country. Karnataka is located at 11°30' North and 18°30' North Latitudes and 74° East and 78°30' East longitude. Out of total geographical area of 190.50 lakh hectares, 30.62 lakh hectares is under forest cover, 10.17 lakh hectares of permanent pasture, 3.17 hectares under trees and groves and the rest is cultivated. Karnataka receives an average annual rainfall of about 941 mm both from south-west and north-east monsoons. Depending on soil characteristics and rainfall, the state is divided into ten agro-climatic zones. Among these, Eastern dry zone spread across Bangalore rural, Tumkur and Kolar districts is particularly popular for stall-fed sheep and goat rearing.

Bangalore Rural District is located in the South-Eastern corner of Karnataka State spreading over an area of 5,814 sq km. It lies between 77° 05’ and 78° East Longitude and 12°15’ and 13°35’ North Latitude.

The District is bounded on the North by Tumkur and Kolar Districts; on the South by Mandya and Mysore Districts and Tamil Nadu State; on the east by Kolar District and Tamil Nadu State and on the West by Tumkur and Mandya Districts. Bangalore rural district comprises of four taluks namely Devanahalli, Doddaballapur, Hoskote and Nelamangala taluks Rural district enjoys a captivating landscape because of its unevenness in topography.

Tumkur is one of the 29 administrative districts of Karnataka state, located North-west of Bangalore at a distance of about 70 km. The district is spreading over an area of 10,598 sq km. It lies between 77.1° East Longitude and 13.34° North Latitude. The district is bounded by Mandya District in the South; Chitradurga and Hassan districts in the West; Chickmagalur in the Northeast and Ananthapura District of Andhra Pradesh state in the south east direction.

As per the agro-climatic zonal planning of the Planning Commission, the Kolar district comes under zones X and XII under sub region II. It lies between 77° 21' to 78° 35' East Longitude and 20° 46' to 130° 58' North Latitude, extending over an area of 8,225 sq. km. Kolar district is located in the southern region of the state and happens to be the eastern-most district of the Karnataka state. The district is bounded by the Bengaluru Rural district in the west, Chikkaballapur district in the north, Chittoor district of Andhra Pradesh in the east and on the south by Krishnagiri and Vellore districts of Tamil Nadu. It receives an average rainfall of 739 mm, 70 per cent of which is from south-west monsoon season. This district is predominantly agrarian with not many major industrial units. The total geographical area is 3,989 sq. km, out of which six per cent is covered by forests. Kolar district has five taluks with 1598 inhabited villages. The total population (2001 census) was

13.87 lakh with 6.93 in rural areas. Net sown area is 3.54 lakh ha. with 24 per cent of it having irrigation facilities. (Fig.1)

3.2 Data collection

For eliciting information, 30 sheep and goat rearing farmers from Kolar, Tumkur and Bangalore Rural districts were selected randomly in order to elicit information on various aspects of goat rearing. The data were collected for 2009-10 period by using a pretested structured schedule. Care was exercised to select only such farms which were established at least one year and above. A total of 16 goat rearing farmers and 14 sheep farmers were contacted and information on general characteristics of the households, establishment of sheep and goat units, methods of sale, preferences and such other information was obtained through personal interview.

3.3 Analytical Techniques

The data obtained through the survey were analyzed using relevant statistical tools as indicated below.

3.3.1 Descriptive analysis.

3.3.2 Garrett Ranking.

3.3.1 Descriptive analysis

The techniques of descriptive analysis were employed for determining the general characteristics and socio-economic conditions of sheep and goat rearers and also the estimation of costs and returns in sheep and goat rearing.

3.3.1.1 Estimation of costs

The annual costs were estimated separately for goat rearers (16 goat rearers) and sheep rearers (14 sheep rearers) who were further

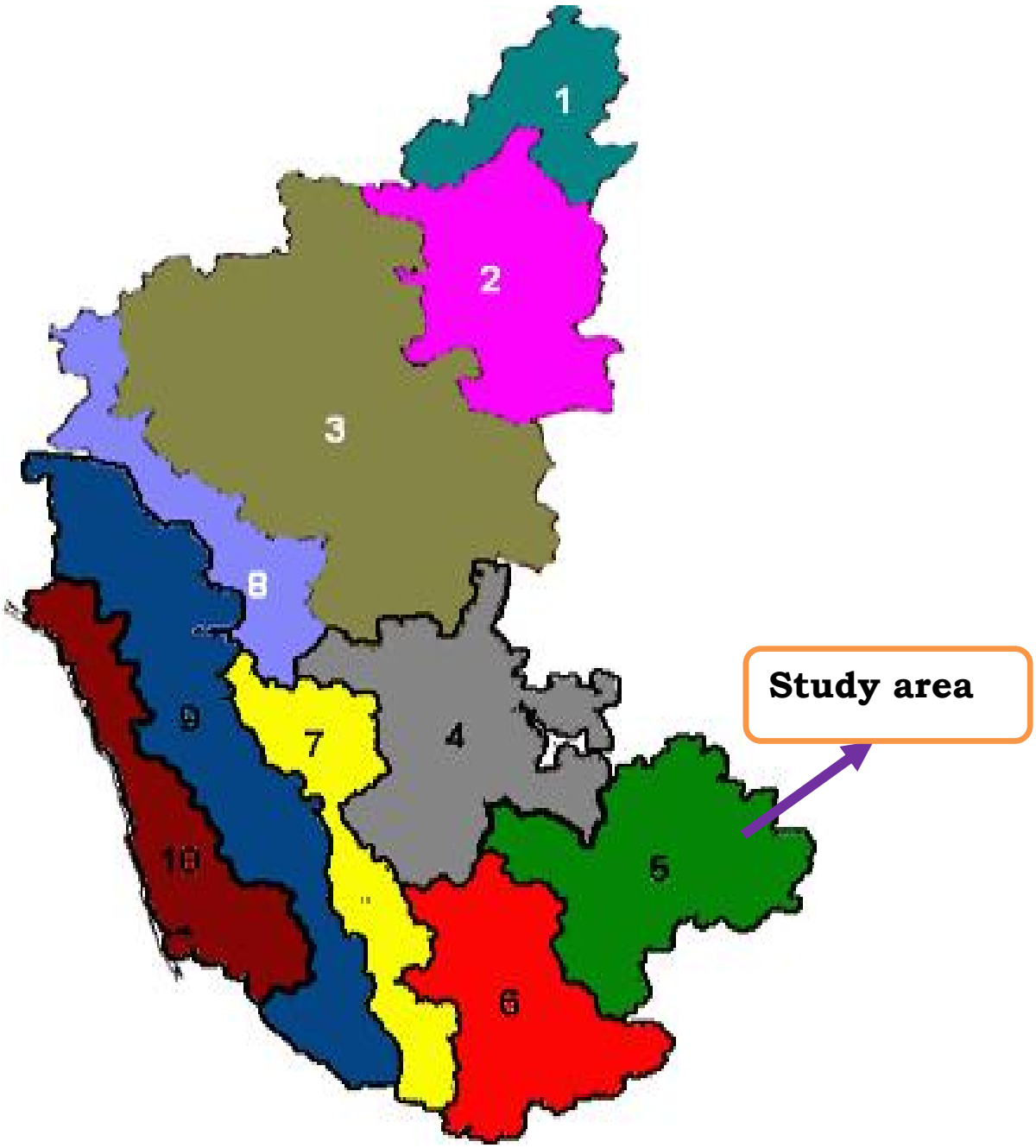


Fig. 1 : Map showing the study area (Eastern dry Zone) Comprising Bangalore rural, Kolar and Tumkur

classified as small and large units based on the number of animals maintained on the farm. The detailed information on establishment cost was obtained which was apportioned to compute annual fixed costs.

Fixed costs

The investment on purchase of parent stock, buildings, equipments or machinery, water storage structures and silo pit were amortized over the economic life to compute fixed costs.

Variable costs

The costs on feed, fodder, labour wages (imputed value of family labour), vaccination and cost of silage were considered under variable costs.

a. Feed/supplement cost

The feed used for sheep and goats rearing are groundnut cake, broken maize and *bhusa*. In small quantities mineral mixture, vaccination, vitamins, deworming etc are administered. The quantities along with their values were obtained for cost computation.

b. Fodder cost

Maize plant cuttings and fodder produced on the farm was valued at actual production cost.

c. Labour cost

The total labour cost was computed at the prevailing wage rate. Both the family and the hired labour are taken into account. Female labour and men labour was calculated on the monthly wage rate basis.

3.3.1.2 Estimation of Returns

The annual returns were also estimated separately for large and small units of stall-fed sheep and goat. The returns from sheep and goats were estimated based on the following,

(i) Sale of sheep and goats during the year.

(ii) Sale of manure from sheep and goats

3.3.2 Garrett Ranking:

This technique is useful for quantifying interval scaled data. The data pertaining to preferences and constraints were ranked using garrett scores. This helps in identifying the most important factors influencing particular choice process. As per this method, respondents were asked to assign the ranks for all the listed factors and outcome of such ranking has been converted into score values with the help of the following formula:

$$\text{Percentage position} = 100(R_{ij} - 0.5)/N_j$$

Where,

R_{ij} = rank given for the i^{th} factor by the j^{th} respondents

N_j = number of factors ranked by the j^{th} respondents.

By referring the Garrett's table, the percentage position estimated is converted into scores. Then for each factor the scores of each individual are added and then mean values is computed for each factor in order to assign ranks.

Results

IV CHAPTER

RESULTS

The data from primary sources were analyzed and the results are interpreted for drawing meaningful conclusion. The findings are presented under the following heads.

4.1 General characteristics of stall fed sheep and goat rearers

4.2 Demographic profile of the stall fed sheep and goat rearers

4.3 Costs and return analysis of stall fed sheep and goat units

4.4 Forward and backward linkages in stall-fed sheep and goat rearing

4.5 Constraints involved in stall-fed sheep and goat rearing

4.6 Preference of the rearers for rearing sheep and goat

4.1 General characteristics of stall fed sheep and goat rearers

The general characteristics of households determine the extent of participation and dependence on sheep and goat rearing. The characteristics considered were age, education level, main occupation and subsidiary occupation. These characters help to know the socio-economic settings of the rearers managing the business.

4.1.1 General characteristics of sheep rearers

The socio-economic characteristics of sample rearers are presented in Table 4.1. The study covered 14 sample stall-fed sheep rearers selected from Bangalore rural, Tumkur and Kolar districts. The sample respondents were post-classified into small rearers and large rearers according to the size flock managed by the households. Thus, the data comprised 8 small rearers owning less than 150 sheep and 6 large rearers with more than 150 sheep. The average number of sheep reared by small rearers was 77 and 458 in the case of large rearers.

The overall age of sheep rearers was around 40 years, while the small rearers group had a mean age of 36 years and the average age of large rearers was around 46 years. It is also observed from Table 4.1 that 50 per cent of the respondents were aged below 35 years and 50 per cent of the respondents were aged between 35-45 years in the case of small and whereas 50 per cent of the respondents were above 45years, and 16.67 per cent were aged below 35 years in the case of large rearers.

The educational level of the sample rearers in Table 4.1 showed that 87.50 per cent of small rearers had college education followed by 12.50 per cent with secondary education. Similarly in the case of large rearers, 33.33 per cent had college level of education, 33.33 had secondary education and 33.33 per cent had primary education. It is interesting to note that all the respondents had at least primary education.

Agriculture was the main occupation for 62.50 cent per cent small rearers and 37.50 per cent had business as an occupation but 50 per cent of the large rearers had agriculture as their main occupation and the remaining had stall-fed sheep rearing as main occupation. All the small rearers had only sheep rearing as subsidiary occupation, whereas in large rearers 50 per cent of them had sheep rearing as a subsidiary occupation, followed by 33.33 per cent with poultry/ Emu and 16.67 per cent of them reporting agriculture as a subsidiary occupation.

4.1.2 General characteristics of goat rearers

The goat rearing respondents were post-classified as small and large rearers based on the number of animals they rear. The small rearers had less than 100 animals while large rearers owned more than 100 goat. The average number of goats reared by small rearers was 71 and large rearers were 196.

Table 4.1 : General characteristics of the sheep rearers

(n=14)

Sl. No.	Characters	Small flock units (n=8)	Large flock Units (n=6)	Overall
1.	Average age of head of the Family (years)	36	46	40
	<35	4 (50.00)	1 (16.67)	5 (35.71)
	36-45	4 (50.00)	2 (33.33)	6 (42.85)
	>45	0	3 (50.0)	3 (21.42)
2.	**Education level**			
	Primary	0	2 (33.33)	2 (14.28)
	Secondary	1 (12.5)	2 (33.33)	3 (21.42)
	College	7 (87.50)	2 (33.33)	9 (64.28)
3	**Main occupation**			
	Agriculture	5 (62.50)	3 (50.00)	11 (78.57)
	Business	3 (37.50)	0	3 (21.42)
	Stall –fed sheep rearing	0 (0.00)	3 (50.00)	3 (21.42)
4.	**Secondary occupation**			
	Sheep Rearing	8 (100.00)	3 (50.00)	11 (78.57)
	Poultry/Emu	0	2 (33.33)	2 (14.28)
	Agriculture	0	1 (16.67)	1 (7.14)

Note: Figures in parentheses indicate respective percentages
Small flock units = (<150 animals per unit),
Large flock units = (>150 animals per unit)

Plate 1: Stall feeding method in Sheep unit

Plate 2: Stall feeding method in Goat unit

The general characteristics of goat rearers are furnished in Table 4.2. It is clearly seen from the table that there was no significant difference between average ages of small and large rearers. Overall age of the goat rearers was found to be 39 years. About 50 per cent of the small rearers were below 35 years followed by 30 per cent group 36-45 years group and 20 per cent in above 45 years of age group. In the case of large rearers, 50 per cent of them belonged to 36-45 age group, 16.67per cent in less than 35 years age and remaining 16.67 per cent belonged to age group of more than 45 years.

The education level of the respondents is given in Table 4.2. It could be observed that majority of the small rearers (70%) had college education and the rest had secondary education. In the case of large rearers also majority (83.33 %) had college education and 16.67 per cent with secondary education..

Regarding the main occupation of the respondents, majority practiced agriculture (40%), followed by 20 per cent doing business and 10 per cent of them had agriculture and allied activity and 10 per cent were employees in the case of small rearers while in the case of large rearers 50 per cent had business, 33.33 per cent practiced agriculture, and the rest had agriculture and allied activities as their main occupation. stall –fed rearing was the main occupation of 20 per cent and 33.33 per cent of the small and large rearers, respectively.

A majority of them have taken up goat rearing as secondary occupation followed by agriculture and allied activities and business.

4.2 Demographic profile of sheep and goat rearers

The demographic profile of the sheep and the goat rearers are studied to get an overview of the households in terms of location, size of the operational land holdings and annual income

Table 4.2 : General characteristics of Goat rearers

(n=16)

Sl. No.	Characters	Small units (n=10)	Large Units (n=6)	Overall
1.	Average age of head of the family (years)	38	41	39
	<35	5 (50.00)	1 (16.67)	6 (37.50)
	36-45	3 (30,00)	3 (50.00)	6 (37.50)
	>45	2 (20.00)	1 (16.67)	3 (18.75)
2.	**Education level**			
	Secondary	3 (30.00)	1 (16.67)	4 (25.00)
	College	7 (70.00)	5 (83.33)	12 (75.00)
3.	**Main occupation**			
	Agriculture	4 (40.00)	2 (33.33)	6(37.50)
	Agriculture + others	1 (10.00)	1 (16.67)	2 (12.50)
	Employee	1 (10.00)	1 (16.67)	2 (12.50)
	Business	2 (20.00)	0 (0.00)	2 (12.50)
	Stall- fed goat rearing	2 (20.00)	2 (33.33)	4 (25.00)
4.	**Secondary occupation**			
	Goat rearing	8 (80.00)	4 (100.00)	14 (87.50)
	Agriculture + others	1 (10.00)	1 (16.67)	2 (12.50)
	Business	1 (10.00)	1 (16.67)	2 (12.50)

Note: Figures in parentheses indicate respective percentages
Small flock units =<100 animals per unit
Large flock units = >100 animals per unit

4.2.1 Demographic Profile of sheep rearers

Livestock activity requires day today monitoring of flock condition and tending animals, therefore availability of household members is a precondition for many of the households venturing stall-fed rearing. As it could be observed from Table 4.3 that majority of the small rearers were from medium size families (50%) followed by small (37.5%) and large (12.5%) families. In the case of large rearers majority (50%) of them had more than seven persons in the household, followed by small (33.33%) and large (16.67%) families respectively. The aggregate sample showed that majority were from small to medium sized families.

Stall-fed rearing requires sufficient availability of green fodder either on farm or through buying. The average size of holding of small and large rearers was 5.25 acres and 9.41 acres respectively (Table 4.3). The majority of (62.5%) small rearers had land holdings below 4 acres followed by (25%) with land holdings between 5 to 10 acres and the rest (12.50%) had more than 11acres of land holdings. Whereas, fifty per cent of the large rearers belonged to more than 11acres land holdings category followed by below 4 acres (33.33%) and between 5 to 10 acres (16.67%) of land holdings.

The annual income of the sample sheep rearers indicated in Table 4.3 revealed that 50.00 per cent of the small sheep rearers belonged to high income group (> Rs.2 lakhs per annum) and 25.00 per cent in low income group (<1 lakh per annum)and 25 per cent earned between one to two lakh rupees per annum. Similarly in the case of the large rearers, majority of the respondents (66.67%) belonged to high income category and (33.33%) earned earned between one to two lakh rupees per annum. On an average about 57.14 per cent of the total respondents earned more than two lakhs income followed by 28.57 per cent and 14.28 per cent in medium and low income category, respectively.

Table 4.3 : Demographic profile of sheep rearers

(n=14)

Sl. No.	Characters	Small units	Large units	Overall
1.	Family size			
	Average(Family size)	5	8	7
	Small(2-4)	3 (37.5)	2 (33.33)	5 (35.71)
	Medium(5-6)	4(50.00)	1 (16.67)	5 (35.71)
	Large(>7)	1 (12.50)	3 (50.00)	4 (28.57)
2.	Land holdings			
	Average(acres)	5.25	9.41	7.03
	<4	5 (62.5)	2 (33.33)	7 (50.00)
	5-10	2 (25.00)	1 (16.67)	3 (21.42)
	>11	1(12.50)	3 (50.00)	4 (28.57)
3.	Annual Income (Main and subsidiary occupation)			
	Average (Lakh Rs.)	1.66	6.49	3.73
	Low (<1)	2 (25.00)	0	2 (14.28)
	Medium (1 - 2)	2 (25.00)	2 (33.33)	4 (28.57)
	High (>2)	4 (50.00)	4 (66.67)	8 (57.14)
4.	Distance to shop(Feed)			
	Average(Km)	10.25	9.83	10.07
	<4	2 (25.00)	1 (16.67)	3 (21.42)
	5-9	3 (37.50)	3 (50.00)	6 (42.85)
	>10	3 (37.50)	2 (33.33)	5 (35.75)
5.	Distance to Veterinary hospital (Km)			
	Average Distance	6.5	5.5	6.07
	<4	3 (37.50)	3 (50.00)	6 (42.85)
	5-9	3 (37.50)	3 (50.00)	6 (42.85)
	>10	2 (25.00)	0	2 (14.28)
6.	Distance to Bank			
	Average(acres)	7	7.33	7.14
	<4	3 (37.50)	2 (33.33)	5 (35.71)
	5-9	3 (37.50)	3 (50.00)	6 (42.85
	>10	2 (25.00)	1 (16.67)	3 (21.42)
7.	Sheep breeds reared			
	Rambouillet	8(100)	6 (100)	14 (100)
	Bellary	3 (37.50)	4 (66.67)	7 (50.00)

Note: Figures in parentheses indicate respective percentages

The retail or whole sale shops to purchase feed and other necessities were located at about 10.25 kilometers distance and at 9.83 kilometers distance in the case of small and large rearers, respectively. Thus, the farms were situated closer to shops supplying feed and supplements for goat and sheep units.

Immediate availability of veterinary hospital facility is important in case of any emergency. Therefore, the proximity to veterinary services is reported here. On an average, for all respondents the veterinary services were available at a distance of about 6 kilometers from their units. Thus, in-terms of veterinary hospital facility, the rearers had quick access to obtain such services.

Banks for day today transaction and availing credit is another important infrastructure for rearing sheep and goat. For majority (37.50%) of the small rearers the bank was situated at less than 4and 5-9 kilometers distance and for (25%) of the respondents it is situated at more than 10 kilometers. But in the case of large rearers for majority (50%) of the respondents the bank was situated between 5 to 9 kilometers followed by 33.33 per cent of the respondents at less than 4 kilometers distance.

The main breed of sheep reared by all the respondents was Rambouilloet which is an exotic breed. The breed has special characteristics like quicker weight gain and wide adaptability. The Rambouillet breed is maintained by all the rearers as the ram(Male sheep). The breed Bellary was reared by 37.50 per cent of the small rearers and 66.67 per cent of the large rearers.

4.2.2 Demographic profile of goat rearers

The demographic profile of the sample goat rearers is presented in Table 4.4. The table shows that majority of the small rearers were from

small size family (50%) of 2-4 persons per household, followed by large (30%) families with more than seven persons in a household and the rest in medium category. In the case of large rearers majority of the respondents were from medium family (66.67%) followed by small (16.67%) and large (16.67%) families respectively.

The average size of holding of small and large rearers was 12.70 acres and 11.33 acres respectively (Table 4.4). The majority of the small rearers (40%) had land holdings between 5 to 10 acres. Similarly, 50 per cent of the large rearers had land holdings between 5 to 10 acres followed by 33.33 per cent with more than 11acres and 16.67 per cent with below 4 acres of holding.

The annual income of the sample goat rearers are indicated in Table 4.4. This table revealed that 60 per cent of the small goat rearers belonged to high income group of earning more than Rs.2 lakh per annum and 40 per cent belonged to medium income group (Rs.1to2 lakh per annum). Similarly in the case of the large rearers, majority of the respondents (66.67%) belonged to high income category and the rest (33.33%) of them belong to the medium income category. On an average 62.50 per cent of the total respondents were having high income and 37.50 per cent belonged to medium income.

From table 4.4 it could be observed that on an average shops to purchase feed medicine and other requirements was located at about 11.80 kilometers distance and at 8.17 kilometers distance in the case of small and large rearers, respectively.

On an average, for all respondents the veterinary services were available at the distance of 5.75 kilometers from their units. For majority (50%) of the small rearers the hospital was situated at 5-9 kilometers distance and for (40%) of the respondents it was situated at

Table 4.4 : Demographic profile of goat rearers

(n=16)

Sl. No.	Characters	Small units	Large units	Overall
1.	Family size			
	Average(Family size)	7	5	6
	Small(2-4)	5 (50.00)	1 (16.67)	6 (37.50)
	Medium(5-6)	2 (20.00)	4 (66.67)	6 (37.50)
	Large(>7)	3 (30.00)	1 (16.67)	4(25.00)
2.	Land holdings			
	Average (acres)	12.70	11.33	12.19
	<4	3 (30.00)	1 (16.67)	4 (25.00)
	5-10	4 (40.00)	3 (50.00)	7 (43.75)
	>11	3 (30.00)	2 (33.33)	5 (31.25)
3.	Annual income			
	Average (Lakh Rs.)	3.38	6.75	3.14
	Medium (1 - 2)	4(40.00)	2 (33.33)	6 (37.50)
	High (>2)	6 (60.00)	4 (66.67)	10 (62.5)
4.	Distance to shop (Feed)			
	Average(Km)	11.80	8.17	10.44
	<4	4 (40.00)	2 (33.33)	5 (31.25)
	5-9	2 (20.00)	2 (33.33)	4 (25.00)
	>10	4 (40.00)	2 (33.33)	6 (37.50)
5.	Distance to Veterinary hospital (Km)			
	Average (Km)	5.10	6.67	5.75
	<4	4 (40.00)	2 (33.33)	6 (37.50)
	5-9	5 (50.00)	2 (33.33)	7 (43.75)
	>10	1 (10.00)	2 (33.33)	3 (18.70)
6	Distance to Bank			
	Average (Km)	6.60	6.88	6.59
	<4	3 (30.00)	2 (33.33)	5 (31.25)
	5-9	5 (50.00)	2 (33.33)	7 (43.75)
	>10	2 (20.00)	2 (33.333)	4 (25.00)
7	Breeds of goat reared			
	Sirohi	7 (70.00)	6 (100.00)	13 (81.25)
	Jamunapari	5 (50.00)	3 (50.00)	8 (50.00)
	Tellicherry	5 (50.00)	4 (66.67)	9 (56.25)
	Boer	9 (90.00)	4 (66.67)	13 (81.25)
	Osmanabadi	1 (10.00)	3 (50.00)	4 (25.00)

Note: Figures in parentheses indicate respective percentages

less than 4 kilometers and for rest of them it is situated at more than 10 kilometers. But in the case of large rearers, for 33.33 per cent each was situated at less than 4 kilometers, between 5 to 9 kilometers distance and more than 10 kilometers distance.

Majority (50%) of the small rearers were situated at a distance of 5-9 kilometers from bank and about 30 per cent were situated at less than 4 kilometers and the rest situated at more than 10 kilometers. But in the case of large rearers equal percentage (33.33%) was in each of the category.

The major goat breeds reared were Sirohi, Jamunapari, Tellicherry, Boer and Osmanabadi. Sirohi is a native breed of Rajasthan which is maintained by almost all the rearers as it gives two kids per time. This breed remained the most sought after breed, particularly in the semi-arid and arid parts of the country. Osmanabadi was exclusively reared in Maharashtra, but has recently started spreading to other states like Karnataka, Andhra Pradesh and Madhya Pradesh. The Jamunapari is a native breed of Jammu Kashmir, it is a good breed as the milking capacity is high which helps in easy care of the young ones and also the weight gain is faster. Tellicherry is a native breed of Kerala it has inherited characteristics of both Jamunapari as well as Sirohi. Boer is a Native breed of South Africa. The Boer goat in India is found in Phaltan, Satara district of Maharashtra.

Unlike sheep rearers, the goat rearers maintained a combination of breeds. All the large goat rearers had the presence of Sirohi breed, whereas 70 per cent of the small farmers reared Sirohi. About 50 per cent of the small and the large units reared Jamunapari; Tellicherry was reared by 50 per cent of the small rearers and 66.67 per cent of the large rearers. Boer was reared by 90 per cent of the small rearers and 66.67

per cent of the large rearers. Osmanabadi was reared by 10 per cent of the small rearers and 50 per cent of the large rearers.

4.3 Costs and return analysis of stall fed sheep and goat rearers

The stall-fed rearing of sheep and goat is a recent method. In this method, the animals are reared in an enclosed area with sufficient walking area where feed and water are made available but they will not let for open grazing. This requires investment on shed, purchase of animals, equipments like chopper, feeders, water cups and even cost incurred in the construction of silo pits. The details of the costs and returns in rearing sheep and goat are discussed below.

4.3.1 Years after establishment of the Stall-fed Goat and Sheep Units

Traditionally, goat rearing has been a subsistence activity of resource poor rural people; its commercialization has taken place only recently.

The year of establishments of the Stall-fed Sheep and goat are presented in table 4.5. The units are categorized into 3 groups based on the number of years after establishing the units like 1 to 2 years, 3-4 years and more than 5years. In the case of sheep rearers, a majority (75%) of the respondents of small flock units was 2 years old and 25 per cent of the units were 3 to 4 years old while in the case of large rearers 33.33 per cent each had their presence in all the three categories.

Similarly in the case of goat rearers 50 per cent of the small flock units were 1-2 years old, 40 per cent were 3-4 years old and 10 per cent were more than 5 years old. In the case of large rearers 66.67 per cent of the units were 1-2 years old and the rest in other categories.

Table 4.5 : Years after establishment of the Stall-fed Goat and Sheep Units

Sl. No.	Particulars	Sheep rearers			Goat rearers		
	Years	Small units	Large Units	Overall (n=14)	Small units	Large units	Overall (n=16)
1.	1-2	6 (75.00)	2 (33.33)	8 (57.14)	5 (50.00)	4 (66.67)	9 (56.25)
2.	3-4	2 (25.00)	2 (33.33)	4 (28.57)	4 (40.00)	1 (16.67)	5 (31.25)
3.	>5	0	2 (33.33)	2 (14.28)	1 (10.00)	1 (16.67)	2 (12.50)

Note: Figures in parentheses indicate respective percentages

4.3.2 Flock particulars of sheep unit

The size of initial flock of sheep for the small and large flock units were observed as an important factor for the success of a stall-fed rearing. The flock size of the sheep units are presented in the table 4.6.

The startup number of Ram was 11 and 20 in the case of small and large flock units respectively. The additions during the year were 26 and 122 in the case of small and large flock units respectively. The mortality was 5 and 8, sales were 23 and 50, and stock at the end was 13 and 84 in the case of small and large flock units respectively.

Similarly the initial stock of the Ewe was 109 and 213 in the case of small and large flock units. Additions were 33 and 266, mortality was7 and 15 and sales were 59 and 90 and the stock at the end was 68 and 374 in the case of small and large flock units respectively.

It was found that 77 was the total stock (Ram and Ewe) at the end in the case of small flock units and 458 in the case of large flock units. The flock particulars of Ram and Ewe of sheep unit are given in the Figures 2 and 3.

4.3.3 Flock particulars of goat unit

Initial stock and stock at the end of male and female goats of the goat unit is presented in Table 4.7. The initial stock of the Buck was 6, 10 and 7 in the case of small, large and overall flock units. The additions to the initial stock was found to be26, 72 and 48, mortality was found to be 3, 5 and 4, sales were 20,55 and 36, the stock at the end was 9, 22 and 15 in the case of small, large and overall flock units.

Similarly, the initial stock of the Doe was 61, 164 and 99 in the case of small, large and overall flock units. The additions to the initial stock was found to be 59, 118 and 84, mortality was found to be 8,10

Table 4.6 : Flock particulars of sheep unit for 2009-10

(n=14)

Sl. No.	Sheep	Particulars	Small units	Large units	Overall
1.	Ram	Startup flock size	11	20	15
		Additions during the year	26	122	73
		Mortality	5	8	6
		Sale	23	50	37
		Stock at end	9	84	49
2.	Ewe	Startup flock size	109	213	154
		Additions during the year	33	266	112
		Mortality	7	15	11
		Sale	59	90	64
		Stock at end	68	374	191
3.		Total stock at the end	77	458	240

Note: Small flock units = (<150 animals per unit)
Large flock units = (>150 animals per unit)

Table 4.7 : Flock particulars of Goat unit for 2009-10

(n=16)

Sl. No.	Goat	Particulars	Small units	Large units	Overall
1.	Buck	Startup flock size	6	10	7
		Additions during the year	26	72	48
		Mortality	3	5	4
		Sale	20	55	36
		Stock at end	9	22	15
2.	Doe	Startup flock size	61	164	99
		Additions during the year	59	118	84
		Mortality	8	10	10
		Sale	50	98	70
		Stock at end	62	174	103
3.		Total stock at the end	71	196	118

Note: Small flock units =<100 animals per unit
Large flock units = >100 animals per unit

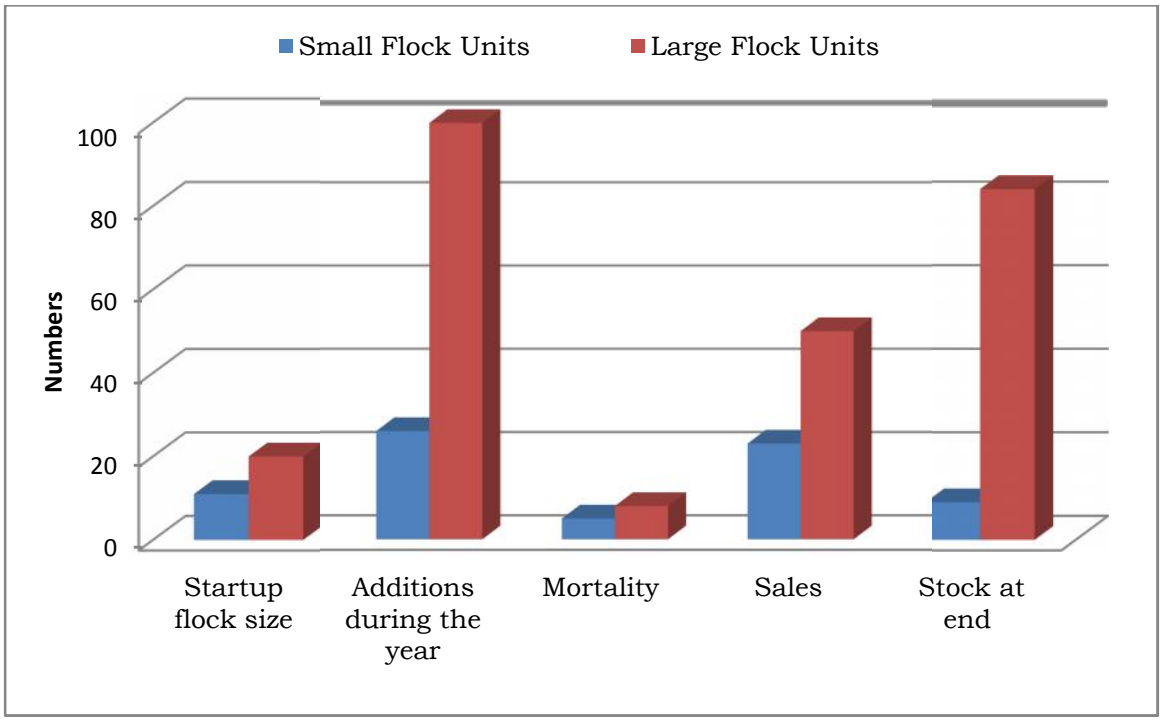


Fig. 2: Flock particulars of the Ram

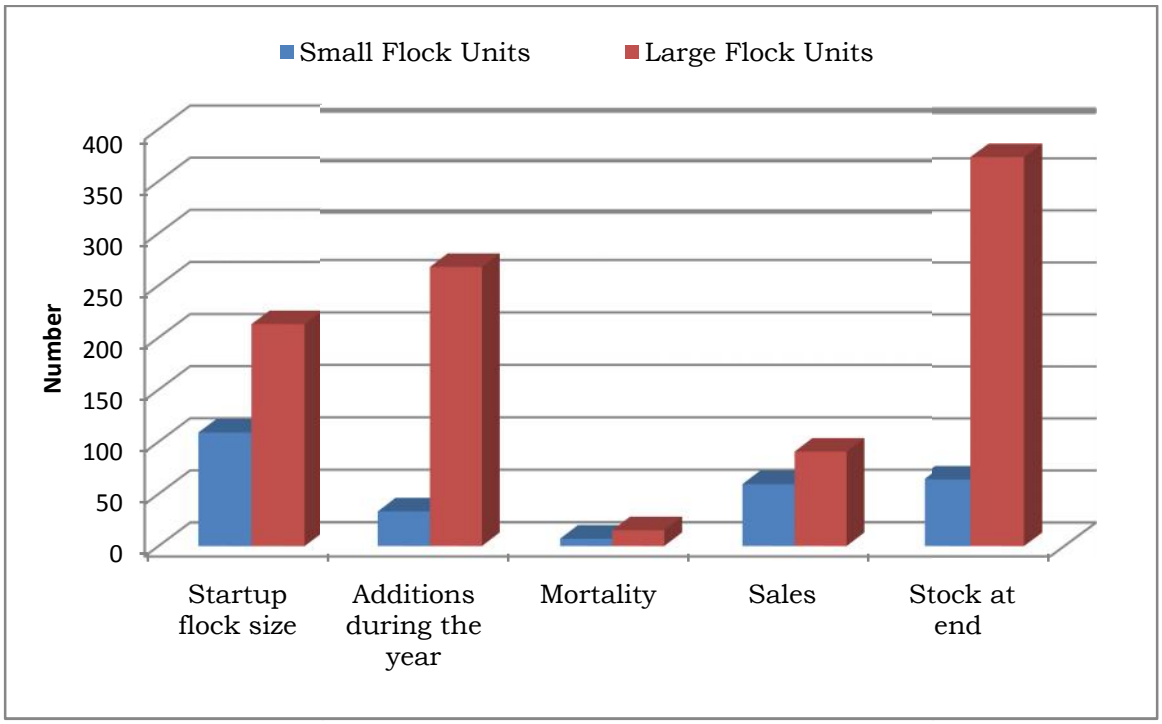


Fig. 3: Flock particulars of the Ewe

and 10, sales were 9,17 and 18 and the stock at the end was 62, 174 and 103 in the case of small, large and overall flock units.

The total stock (Buck and Doe) is 71,196 and 118 in the case of small, large and overall flock units. The flock particulars of Buck and Doe of goat unit are given in Figures 4 and 5.

4.3.4 Investment in sheep rearing

The details of investment made in sheep enterprise are furnished in table 4.8. The investment in sheep enterprise consists of investment on sheep, sheep shed, chopper, feeders, water cups and silo pits. The total investment on these components worked out to Rs. 7,33,998 and Rs. 14,94,141 for small and large rearers respectively and sample as a whole it was Rs. 10,08,382. The major expenditure was on shed which accounted for 44.76 per cent followed by 42.24 per cent for purchase of animals, the rest for other items like chopper, silo pit, feeder and water cups in the case of small rearers.

In the case of large units, the major investment component was purchase of animals which accounted for 69.41 per cent followed by shed construction at 22.08 per cent. Expenditure on other items like chopper and feeder accounted to 4.52 per cent and 2.16 per cent of the total investment, respectively.

4.3.5 Investment in goat rearing

The investments made on goat enterprise are presented in table 4.9. The total investment consisted of purchase of animals, shed, chopper, feeders, water cups and silo pits. The total investment made on these items worked out to Rs.8,19,682 and Rs. 19,78,104 for small and large rearers, respectively. The major investment component was shed which accounted for 45.97 per cent followed by 44.87 per cent for

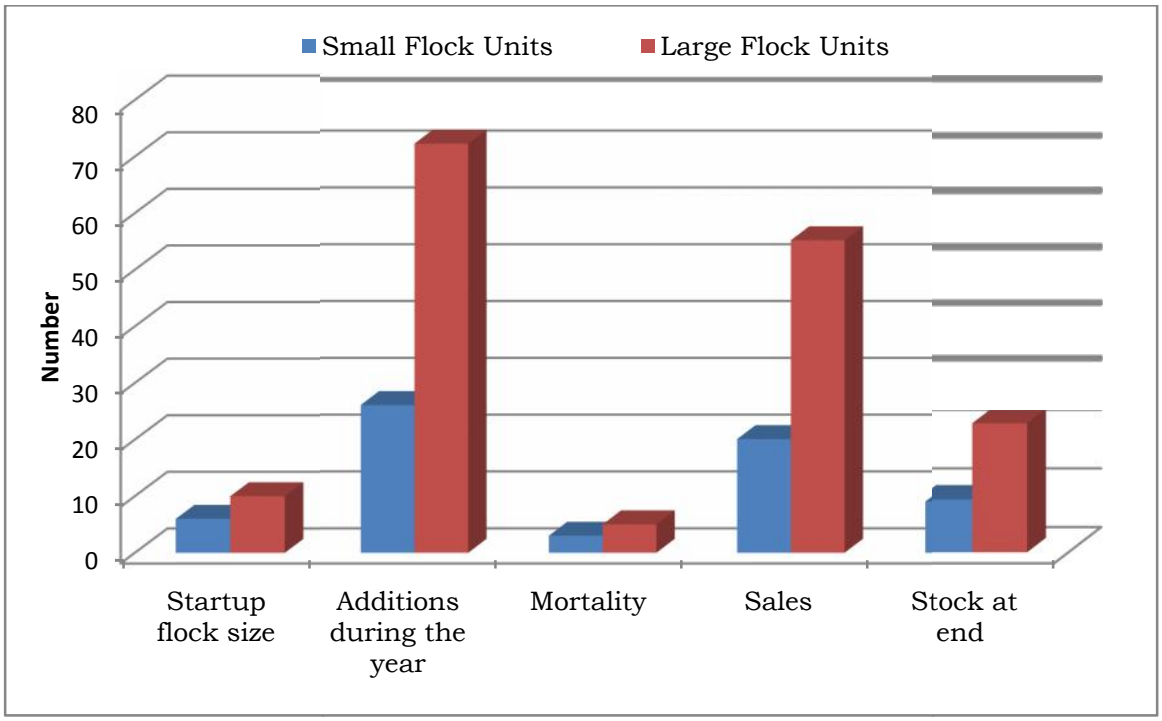


Fig. 4: Flock particulars of the Buck

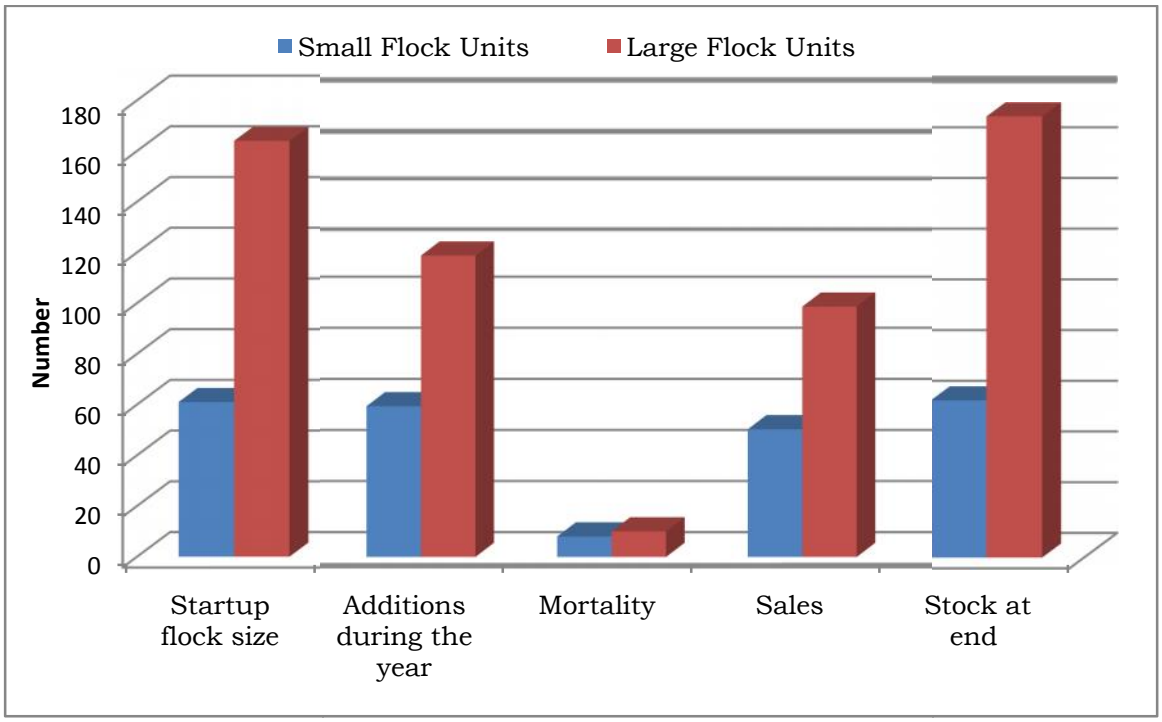


Fig. 5: Flock particulars of the Doe

Table 4.8: Investment in sheep rearing

Sl. No.	Particulars	Small flock units			Large flock units			Overall (n= 14)		
		No	Unit Price (Rs.)	Value (Rs.)	No	Unit Price (Rs.)	Value (Rs.)	No	Unit Price(Rs.)	Value (Rs.)
1.	Ram	11	297	26952 (3.67)	20	280	128333 (8.58)	15	299	70401 (6.98)
2.	Ewe	109	295	283125 (38.57)	213	280	908833 (60.82)	154	288	551286 (54.67)
	Total cost of animals	120		310077	233		1037166	169		621687
3.	Shed	–	LS*	328571 (44.76)	–	–	330000 (22.08)			329090 (32.63)
4.	Equipments									
A	Chopper	–	–	48750 (6.64)	–	—	67600 (4.52)			56000 (5.55)
B	Feeders	5	4410	22050 (3.00)	7	4619	32333 (2.16)	6	4410	26457 (2.62)
C	Water cups	5	110	549 (0.74)	26	110	2875 (0.19)	14	110	1546 (0.15)
	Total cost of equipments			71349			102808			33532
5.	Silo pit	3	8000	24000 (3.26)	3	8056	24166 (1.61)	3	11750	24071 (2.38)
	Total cost of the investment			733998			1494141			1008382

Note: Figures in parentheses indicate respective percentages
*LS- Lump sum

Table 4.9 : Investment in goat rearing (Rs. /Flock)

Sl. No.	Particulars	Small flock units			Large flock units			Overall		
		No	Unit Price (Rs.)	Value (Rs.)	No	Unit Price (Rs.)	Value (Rs.)	No	Unit Price (Rs.)	Value (Rs.)
1.	Buck	6	6100	32550 (3.97)	10	5917	61750 (3.12)	7	6031	43500 (3.33)
2.	Doe	61	5750	328650 (40.09)	164	5500	873333 (44.15)	99	5656	532906 (41.78)
	Total cost of animals	67		361200	174		935083	106		576406
3.	Shed		LS*	376857 (45.97)			890000 (44.99)			590667 (46.30)
4.	Equipments									
A	Chopper			33700 (4.17)			63667 (3.21)			44938 (3.52)
B	Feeders	5	3610	18050 (2.20)	7	3786	26500 (1.33)	6	3537	21219 (1.66)
C	Water cups	7	196	1375 (0.01)	5	170	854 (0.04)	6	197	1180 (0.09)
	Total cost of equipments			53125			91021			67336
5.	Silo pit	2	14250	28500 (3.47)	4	15500	62000 (3.13)	3	11875	41063 (3.21)
	Total cost of the investment			819682			1978104			1275471

Note: Figures in parentheses indicate respective percentages
*LS- Lump sum

purchase of animals, the other items chopper, silo pit and feeder accounted for 4.17 per cent, 3.47 per cent and 2.20 per cent, respectively in the case of small rearers. Whereas, the major investment component in large rearers was purchase of animals which accounted for 47.27 per cent followed by shed (44.99 %). Expenditure on other items like chopper and silo pit accounted to 3.12 per cent and 3.13 per cent of the total investment for large flock units respectively.

4.3.6 Cost incurred in sheep rearing

The detailed information regarding the costs incurred in sheep rearing enterprises is presented in table 4.10. The costs incurred are divided into fixed and variable costs.

Fixed costs

The fixed costs, include interest on initial value of the sheep unit at 12 per cent rate and amortized investment cost on the sheep enterprise was done by accounting the average life span of equipments and shed at 8-9 years. From table 4.10 it is evident that the total fixed cost worked out to be Rs.89,969 and Rs.1,85,937 for small and large rearers respectively and Rs1,31,768 for overall sample.

Variable cost

The variable cost comprised of expenditure on supplements, fodder, labour, vaccination, silage and interest on working capital. Among all the variable costs, labour wages was the most important among both the categories of respondents. It is clear from table 4.10 that labour accounted for 24.76 per cent of the total cost (Rs.75,000 per flock per year) in the case of small rearers. Other costs such as feed, silage and fodder accounted to 21.26 per cent (Rs.64,469 per flock per year) 11.52 per cent (Rs.34898), 4.84 per cent (Rs.14,700 per flock per year) and vaccination amounted to 0.33 per cent (Rs.1,013) in the case of

Table 4.10 : Annual cost of sheep maintenance

Sl. No.	Particulars	Small flock units		Large flock units		Overall	
		No./ qty	Value (Rs.)	No./ qty	Value (Rs.)	No./ qty	Value (Rs.)
I	Fixed cost						
1.	Amortization on investment		80312 (26.51)		166015 (30.38)		117650 (28.47)
2.	Interest on Investment		9657 (3.18)		19922 (3.64)		14118 (3.41)
3.	Total		89969 (29.69)		185937 (34.02)		131768 (31.88)
II	Variable cost						
1.	Fodder(Quantity in tones)						
i	Maize	19	4950 (1.63)	29	8000 (1.46)	24	6257 (1.51)
ii	Lucerne	80	4000 (1.32)	77	5000 (0.91)	79	4429 (1.07)
iii	Fodder grass	0	0	50	1667 (0.30)	50	714 (0.17)
iv	Lopping		5750 (1.89)		1667 (0.30)		4000 (0.96)
v	Total fodder	99	14700 (4.84)	156	14667 (2.97)	153	15400 (3.71)
2.	Supplements(Quantity in Kgs)						
i	Ground nut cake	456	9764 (3.22)	2616	57548 (10.53)	1382	30243 (7.31)

Table 4.10 (Cont...)

Sl. No.	Particulars	Small flock units		Large flock units		Overall	
		No./ qty	Value (Rs.)	No./ qty	Value (Rs.)	No./ qty	Value (Rs.)
ii	Broken maize	2692	26919 (8.88)	1825	18250 (3.34)	2320	23204 (5.63)
iii	*Bhusa*	2646	20942 (6.91)	3650	25550 (4.67)	3076	22917 (5.54)
iv	Mineral mixture	0	0	110	6023 (1.10)	47	2581 (0.62)
v	Others	2509	6844 (2.25)	4867	26767 (4.89)	3520	15382 (3.72)
vi	Total supplement cost		64469 (21.26)		134138 (24.53)		94327 (22.82)
3.	Cost of vaccination	4	1013 (0.33)	4	5383 (0.98)	4	2886 (0.69)
4.	Silage(tones)	56	34898 (11.52)	250	79550 (14.56)	175	58060 (14.05)
5.	Labour wages	2	75000 (24.76)	3	88000 (16.10)	2	80571 (19.50)
6.	Interest on working capital		22810 (7.53)		38609 (7.06)		30150 (7.29)
7.	Total variable cost		212890		360347		281394
8.	Total cost (fixed+ variable)		302859		546284		413162

Note: Figures in parentheses indicate respective percentages

small rearers. The interest on the working capital was Rs.22,810 which accounted for 7.53 per cent of the total maintenance cost of the small rearing units.

Among Large rearing units feed was the major cost 24.53 per cent (Rs.1,34,138 per flock per year) followed by labour cost which accounted for 16.10 per cent (Rs.88,000 per annum). The other costs like silage accounted for 14.56 per cent (Rs.79,550) followed by fodder sharing 2.97per cent (Rs.14,667) and vaccination 0.98per cent (Rs. 5,383 per flock per year) of the total cost.

4.3.7 Cost incurred in goat rearing

The estimated cost of goat rearing is furnished in table 4.11. Similar to the sheep rearing enterprise, here also the cost is divided into fixed and variable costs.

Fixed cost

It could be observed from table 4.11 that the total fixed cost (Rs.61719 per flock per year) was 18.87 per cent of the total annual maintenance cost of the small rearers and (Rs.1,46,736 per flock per year) 27.4 per cent for large rearers. The share of amortization was Rs.1,31,014 in large units compared to that of small rearers i.e. Rs.55106. The interest on fixed was around two and a half times more (Rs.15722) in large rearers than that of small rearers (Rs. 6613).

Variable cost

The variable cost includes costs on supplements, fodder, Labour, vaccination, silage and interest on working capital. Supplements comprises of groundnut cake, broken maize, *bhusa,* mineral mixture and other such items.

Table 4.11 : Annual cost of goat maintenance

Sl, No.	Particulars	Small flock units		large flock units		Overall	
		No./ qty	Value (Rs.)	No./ qty	Value (Rs.)	No./ qty	Value (Rs.)
I	Fixed cost						
1.	Amortization on investment		55106 (16.85)		131014 (22.69)		83571 (19.10)
2.	Interest on Investment		6613 (2.02)		15722 (2.72)		10029 (2.29)
3.	Total		61719 (18.87)		146736 (25.41)		93600 (21.39)
II	Variable Cost						
1.	Fodder (Quantity in tones)						
i	Maize	15	3280 (1.00)	21	4083 (0.70)	17	3581 (0.51)
ii	Lucerne	10	1500 (0.45)	31	3533 (0.61)	17	2263 (0.51)
iii	Green fodder	11	1600 (0.48)	14	3500 (0.60)	12	2313 (0.52)
iv	Lopping	23	2750 (0.84)	60	3917 (0.67)	39	3188 (0.72)
v	Total fodder	59	9130 (2.77)	126	15033 (2.58)	85	11345 (2.26)

Table 4.11 (Cont...)

Sl, No.	Particulars	Small flock units		large flock units		Overall	
		No./ qty	Value (Rs.)	No./ qty	Value (Rs.)	No./ qty	Value (Rs.)
2.	Supplements (Quantity in Kgs)						
i	Ground nut cake	2343	44369 (13.57)	3772	73730 (12.77)	2879	55380 (12.66)
ii	Broken maize	3504	35040 (10.72)	4867	48667 (8.43)	4015	40150 (9.17)
iii	*Bhusa*	329	3942 (1.20)	3163	40211 (6.99)	1392	17543 (4.01)
iv	Mineral mixture	9	502 (0.15)	61	3346 (0.57)	29	1568 (0.35)
v	Others	3249	19418 (5.94)	2859	22873 (3.96)	3103	20714 (4.73)
vi	Total supplement cost	9433	103271 (31.58)	14722	188827 (32.72)	11417	135355 (30.57)
3.	Cost of vaccination	4	1000 (0.30)	3	1900 (0.32)	4	1338 (0.30)
4.	Silage (tonnes)	50	39320 (12.03)	143	72580 (12.57)	97	66720 (15.25)
5.	Labour wages	3	84000 (25.70)	3	106000 (18.36)	3	92250 (21.08)
6.	Interest on working capital		28407 (8.69)		46121 (7.99)		36840
7.	Total variable cost		265128		4304601		343837
8.	Total cost (fixed+ variable)		326847		577197		437437

Note: Figures in parentheses indicate respective percentages

Among all the variable costs, the supplement cost was the most important among both the categories of respondents followed by labour cost. It is clear from the table 4.11 that cost of supplements accounted for 31.58 per cent of the total cost (Rs.1,03,271 per flock per year) in the case of small rearers and about 32.72 per cent of the total cost (Rs.1,88,827) in the case of large rearers. Similarly, labour accounted for 25.70 per cent (Rs.84,000 per flock per year) and 18.36 per cent (Rs.1,06,000) in the case of small and large rearers respectively. The other costs such as silage, fodder, and vaccination accounted for 12.03 per cent (Rs.39,320 per flock per year), 2.58 per cent (Rs. 9,130 per flock per year), 0.32 per cent (Rs.1,000) in the case of small rearers respectively.

Among large rearering units, the cost of silage, fodder and vaccination accounted for 12.57 per cent (Rs.72,580), 2.158 per cent (Rs.15,033 per flock per year) and 0.32 per cent (Rs 1900), respectively. The interest on working capital was Rs.46,121 per flock per year which accounted for 7.99 per cent of the total cost of the large rearers.

4.3.8 Cost incurred in silage preparation for Sheep rearing

Silage is an important feed of sheep and goat in stall-fed method of rearing. Silage is highly nutritious and easily digestible by animals and helps in quick weight gain. Silage is the main component of feed which is fed on a regular basis. By preparing silage and stocking on the farm facilitates regular availability of feed during off seasons and saves considerable labour for fodder harvesting and chopping.

The different costs involved in silage preparation for sheep rearing are presented in table 4.12. the requirement varies with the flock size, therefore the costs are computed separately for large and small units. Fodder maize is valued at the actual cultivation cost rather than

Table 4.12 : Cost incurred in silage preparation for Sheep rearing

Sl. No.	Particulars	Small units		Large units		Overall	
		No./ qty	Value (Rs.)	No./ qty	Value (Rs.)	No./ qty	Value (Rs.)
1	No: of pits	3		3		4	
2	No: of times silage preparation	3		3		3	
3	Quantity per pit (tonnes)	25		30		27.5	
4	Maize (tonnes)	82	18750	250	45000	166	31875
5	Labour wages	28	4200	66	9900	47	7050
6	Salt(Kg)	56	168	250	750	175	525
7	Jaggery (Kg)	56	1960	250	8750	175	6125
8	Culture(gm)	250	1300	750	3900	500	2600
9	Tractor hiring and fuel charges (hours)	24	4020	30	6750	27	6685
10	Plastic sheet	3	4500	3	4500	3	4500
11	Total cost	56	34898	250	79550	175	58060

Note: Figures in parentheses indicate respective percentages

imputing at market price as all the farmers grew maize on the farm itself rather than outsourcing the same. The other cost components of silage preparation are labour, Jaggery, salt and culture for silo making.

The total cost of silage preparation amounted to Rs.34898 for small units of which fodder maize constituted 53.72 per cent followed by labour Rs.4,200, tractor and fuel charges (Rs.4,020) jaggery (Rs.1,960), and salt Rs.168. Whereas in the case of large rearers fodder maize cost accounted for 56.56 per cent share followed by labour Rs.9,900, jaggery Rs.8,750, salt Rs.750 and cost of culture Rs.3,900. The total cost of silage preparation for 250tonnes worked out to Rs.79,550 on large units.

The Number of silo pits in the case of small rearers and large rearers was 3.

4.3.9 Cost involved in silage preparation for goat rearing

The different costs involved in silage preparation for goat rearing are presented in table 4.13. The major cost consisted of cost of fodder maize, labour, fuel charges, Jaggery, culture and salt.

The fodder maize cost was Rs.17,500, labour wages amounted to Rs.4,500, jaggery worth Rs.17,500, cost of culture Rs.1,300 and salt at (Rs.150) in the case of small rearers. Similarly for large rearers also maize constituted major item of cost (Rs.40,000) followed by labour Rs.9,000, fuel and tractor hire charges Rs.9,750, jaggery Rs.5,000, salt Rs.430 and cost of culture Rs.3,900.

The Number of silo pits in the case of small rearers was 2 and 4 in the case of large rearers.

Table 4.13 : Cost incurred in silage preparation for Goat rearing

Sl. No.	Particulars	Small flock units		Large flock units		Overall	
		No./ Qty	Value (Rs.)	No./ Qty	Value (Rs.)	No./ Qty	Value (Rs.)
1	No: of pits	2		4		5	
2	No: of times silage preparation	3		3		3	
3	Quantity per pit	20		25		22	
4	Maize (tonnes)	66	17500	190	40000	155	35000
5	Labour wages	30	4500	60	9000	45	11250
6	Salt(Kg)	50	150	143	430	97	290
7	Jaggery (Kg)	50	1750	143	5000	97	3395
8	Culture(gm)	250	1300	750	3900	500	2600
9	Tractor hiring and fuel charges (hours)	24	9620	30	9750	27	9685
10	Plastic sheet	3	4500	3	4500	3	4500
11	Total cost	50	39320	143	72580	97	66720

Note: Figures in parentheses indicate respective percentages

4.3.10 Labour hours and Labour cost involved in stall-fed sheep and goat rearing

As discussed earlier, the stall fed rearing requires proper feed, fodder, livestock and disease management. This requires constant presence of workforce in the vicinity. The labour required in the farm of hours spent on daily activity is presented in table 4.14. On an average one male labour was required on small units, while large units required 3 men labour daily. In the case of goat units two labourers were needed daily irrespective of the size units as there was no wide difference between small and large units. All types of units employed one woman labour daily. The major activities like feeding cutting and watching operations required much of the labor. Out of 16 male labour hours daily, feeding operation required the maximum male labour hours of 3 per day and 7 hours in the case small and large sheep rearers followed by cutting grass, watching and cleaning. Much of the female labour hours was spent on feeding 4 hours and 5 hours, watching and cleaning.

On an average feeding operation requires the maximum male labour hours of 6 per day and 8 hours in the case of small goat rearers followed by cutting 2 hours and 2 hours, watching 6hours and 2 hours and cleaning 2 hours and 3 hours, respectively. Most of the female labour hours was spent on feeding 5 hours and 4 hours and watching 2 hours and 2 hour per day in the case of small and large rearers of goat units.

4.3.11 Annual cost of sheep maintenance for units above 2 years of establishment

As indicated earlier, the cash out flow is observed from second year onwards. The breeding males could be maintained for a maximum of six years while female could be maintained profitably for 9 years. Most of the stall-fed units in the study area were in 1-2 years after establishment.

Table 4.14 : Activity-wise labour requirement in sheep and goat farming

Sl. No.	Particulars		Sheep rearers			Goat rearers		
			Small flock units	Large flock units	Overall	Small flock units	Large flock units	Overall
1	Labour	No: of Male	1	2	2	2	2	2
		No: of Female	1	1	1	1	1	1
	Total No: of labour required		2	3	3	3	3	3
2	Cleaning (labour Hrs/day)	Male	1	2	1.5	2	3	2.5
		Female	1	2	1.5	1	2	1.5
3	Feeding (labour Hrs/day)	Male	3	7	5	6	8	7
		Female	4	5	4.5	5	4	4.5
4	Cutting (labour Hrs/day)	Male	2	4	3	2	2	2
		Female	-	-	-	-	-	-
5	Watching (labour Hrs/day)	Male	2	3	2.5	6	2	4
		Female	3	1	2	2	2	2
6	Total cost of labour per year		75000	88000	80571	84000	106000	92250

Note: Figures in parentheses indicate respective percentages

Therefore cash-flows for such units which have completed two years is computed for assessing profitability (table 4.15).

The total maintenance cost incurred was Rs.2,70,966 and Rs.6,48,274 in the case of small and large rearers respectively. The total fixed cost incurred was Rs.71,384 and Rs. 2,59,193 in the case of small and large rearers respectively. The expenditure on labour was the major cost (Rs.76,000) followed by silage (Rs.34,898), supplements at Rs.51,100 and fodder Rs.14,700 in the case of small rearers. Similarly for large rearers also the labour cost was the highest (Rs.109500) followed by supplements (Rs.1,38,677), silage (Rs.79,550) and fodder Rs.14,667.

4.3.12 Annual cost of goat maintenance for units above 2 years of establishment

The cost of the units with more than 2 years of establishment is worked out to analyze the net returns and are presented in table 4.16.

The total cost incurred was Rs.3,16,355 and Rs.6,79,746 in the case of small and large units respectively. The total fixed cost incurred was Rs.66,253 and Rs. 2,43,071, respectively. Labour wages accounted for major cost of Rs.86,400 followed by silage Rs.39,320, supplements Rs.96,386 and fodder Rs.9,130 in the case of small rearers. In the case of large rearers the labour cost was second in importance (Rs.1,20,000), after supplements (Rs.1,97,008), silage Rs.72,580 and fodder Rs.15,033.

4.3.13 Returns from Sheep rearing

The total returns from sheep rearing include the income from sale of sheep, manure. The details of the returns are presented in table 4.17 The total returns from the enterprise per year for small and large rearers were Rs.3,46,146 and Rs.7,87,250 respectively .The major income was obtained from the sale of sheep (which includes sale of lamb, rams and

Table 4.15 : Annual cost of sheep maintenance (> 2 years of establishment)

Sl. No.	Particulars	Small flock units		Large flock units		Overall	
		No./Qty	Value(Rs.)	No./Qty	Value(Rs.)	No./Qty	Value(Rs.)
I	Fixed cost						
1	Amortization cost		63736		231422		156467
2	Interest on fixed cost		7648		27771		18776
3	Total fixed cost		71384		259193		175242
II	Variable cost						
1	Fodder (tonnes)	98	14700	156	14667	153	15400
2	Supplements (Kgs)	5597	51100	14126	138677	10470	116018
3	Vaccination	4	1500	5	5000	4	4557
4	Silage (tonnes)	56	34898	250	79550	175	58060
5	Labour wages	2	76000	4	109500	3	95143
6	Interest on working capital		21384		41687		34701
7	Total variable cost		199582		389081		323879
8	**Total (FC+VC)**		270966		648274		499121

* Fodder- maize, Lucerne, green fodder, lopping.
* Supplements: Ground cut cake, broken maize, bhusa, mineral mixture, others.

Table 4.16: Annual cost of Goat maintenance (> 2 years of establishment)

Sl. No.	Particulars	Small Flock units		Large Flock Units		Overall	
		No./Qty	Value(Rs.)	No./Qty	Value(Rs.)	No./Qty	Value(Rs.)
I	Fixed cost						
1	Amortization cost		59154		217028		107875
2	Interest on fixed cost		7099		26043		12945
3	Total fixed cost		66253		243071		120820
II	Variable cost						
1	Fodder (tonnes)	59	9130	21	15033	85	11345
2	Supplements (Kgs)	10162	96386	15421	197009	11667	125135
3	Vaccination	3	1200	3	300	3	943
4	Silage (tonnes)	50	39320	143	72580	97	66720
5	Labour wages	3	86400	3	120000	3	96000
6	Interest on working capital		26797		46787		34656
7	Total variable cost		250102		436675		323454
8	**Total(FC+VC)**		**316355**		**679746**		**444274**

* Fodder- maize, Lucerne, green fodder, lopping.
* Supplements: Ground cut cake, broken maize, bhusa, mineral mixture, others.

Table 4.17: Returns from Sheep rearing (>2 years of establishment)

Sl. No.	Particulars	Small flock units			Large flock units			Overall		
		No./ Qty	unit price (Rs.)	Value (Rs.)	No./ Qty	unit price (Rs.)	Value (Rs.)	No./ Qty	unit price (Rs.)	Value (Rs.)
1	Male	23	4833	111159	50	4375	218750	37	4571	169127
2	Female	38	5833	221654	90	5250	472500	64	5500	352000
3	Total sale of animals	61		332813	140		691250	101		521127
4	Sale of manure	13	1000	13333	96	1000	96000	61	1000	60571
5	Gross returns			346146			787250			581698
6	Net returns			75180			139000			82577
B:C Ratio				0.217			0.176			0.141

Small flock units = (<150 animals per unit)

Large flock units = (>150 animals per unit)

adult ones and imputed value of unsold additions during the year). The average numbers of animals sold were 61 and 140 in the case of small and large rearers. The next major source of income was from the sale of manure which accounted for Rs.13,333 and Rs.96,000 per year in small and large units respectively. The net returns from the sheep rearing units was Rs.75,180 and Rs.13,9000 in the case of small and large rearers respectively and are depicted in Table 4.17 and figure 6. The B:C ratio found slightly higher in small units (0.217) as compared to large units (0.176).

4.3.14 Returns from goat rearing

The overall income from sale, net additions and manure was Rs.403000 and Rs.8,23,000 for small and large rearers respectively. The major income was obtained from the sale of goat (which includes sale of kid, bucks and adult ones) among both small and large rearers and it was Rs. 3,95,000 and Rs. 7,99,000 respectively for both the categories. The average numbers of animals sold were 70 and 153 in the case of small and large rearers. The next major source of income was from the sale of manure which accounted for Rs.8000 and Rs.24,000 per year in small and large units respectively. Similar to sheep rearers the net returns of the goat units are Rs.86,645 and Rs.1,43,254 in the case of small and large rearers respectively and are presented in Table 4.18 and figure 7. The result evident that B:C ratio found slightly higher in small units (0.215) compared to large units (0.174).

4.3.15 Sheep rearers opinion regarding criteria involved in time of sale

The response of the sheep rearers for criteria involved in selling was analyzed through Garrett scoring. It was found that (table 4.19) the major criteria adopted in selling was marketable weight of the animal followed by synchronize with high meat price period, right age of the

Table 4.18: Returns from goat rearing (>2 years of establishment)

Sl. No.	Particulars	Small flock units			Large flock units			Overall		
		No./ Qty	unit price (Rs.)	Value (Rs.)	No./ Qty	unit price (Rs.)	Value (Rs.)	No./ Qty	unit price (Rs.)	Value (Rs.)
1	Male	20	6000	120000	55	6000	309000	36	6000	216000
2	Female	50	5500	275000	98	5000	490000	70	5000	350000
3	Total sale of animals	70		395000	153		799000	106		566000
4	sale of manure	8	1000	8000	24	1000	24000	12	1000	12000
5	Gross returns			403000			823000			578000
6	Net returns			86645			143254			133726
B:C Ratio				0.215			0.174			0.231

Small flock units =<100animalsper unit

Large flock units = >100animals per unit

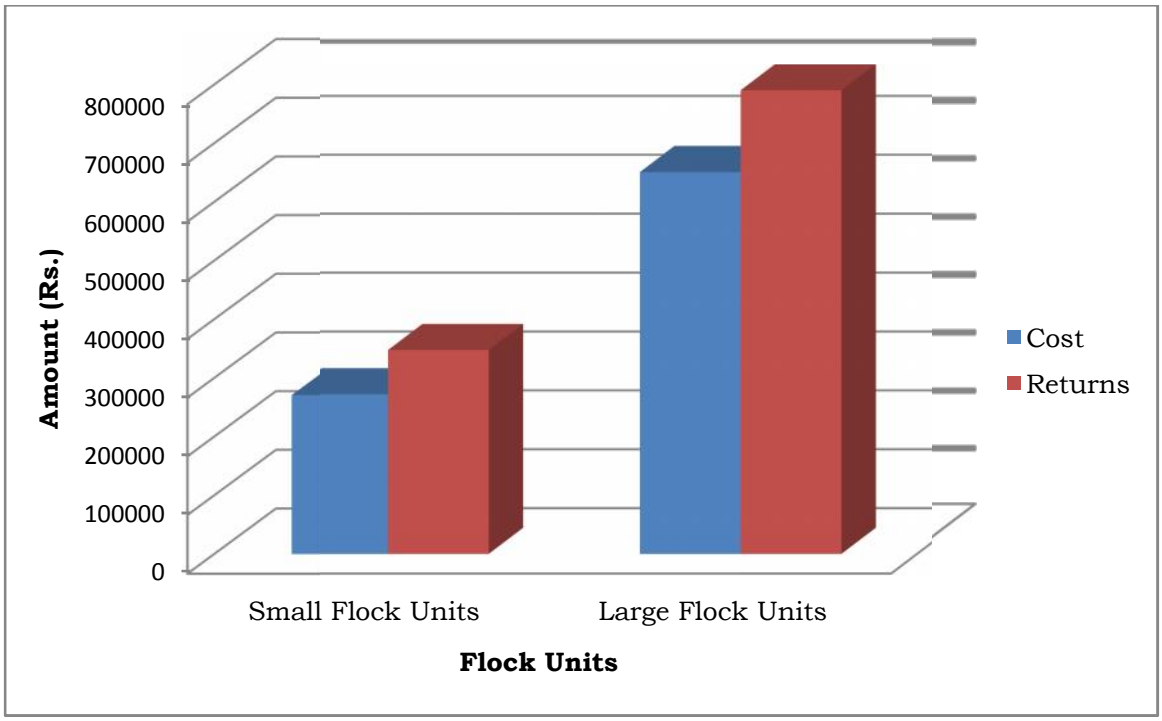


Fig. 6: Cost and returns of the sheep unit

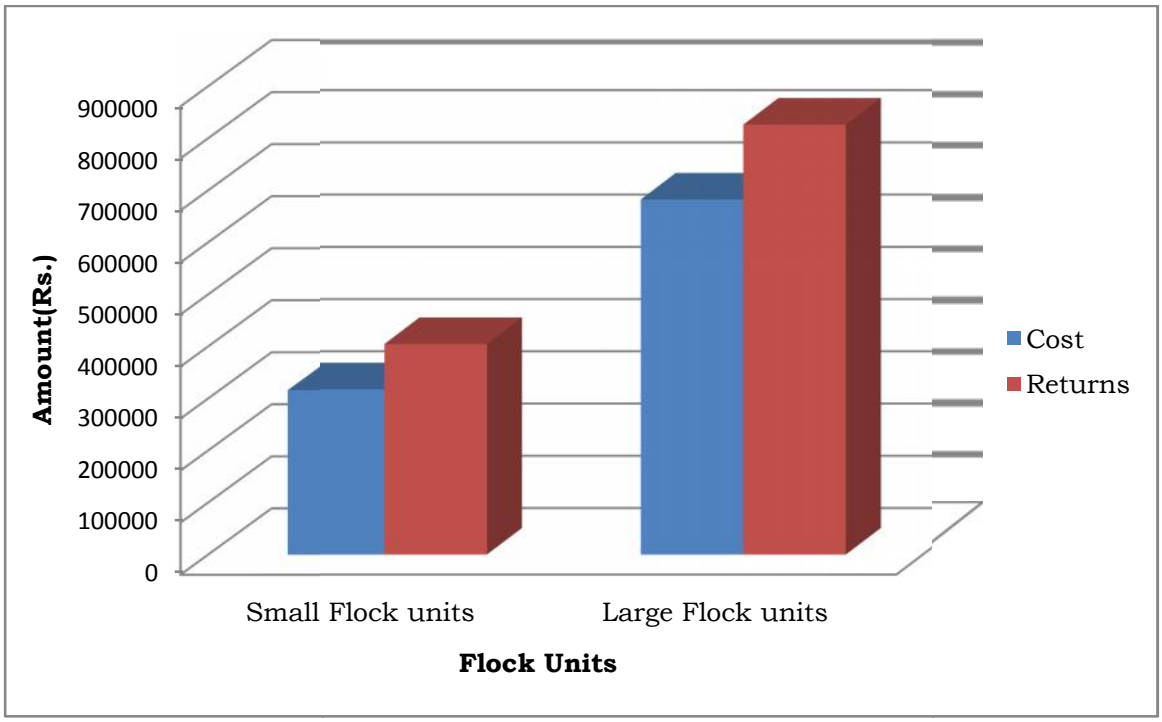


Fig. 7: Cost and returns of the goat unit

Table 4.19: Garrett scores of the sheep rearers criteria for timing of sale

Sl No	Particulars	Small flock units	Rank	Large flock units	Rank	Overall n=14	Rank
1	Cash urgency	46.38	V	29.17	VI	39.00	IV
2	Right age of animal	56.63	III	59.33	III	57.79	III
3	Marketable weight of animal	65.38	I	63.83	II	64.71	II
4	Sell from time to time	33.25	VI	40.67	IV	36.43	VI
5	Synchronize with High meat price	63.88	II	70.83	I	66.86	I
6	During village festivals	48	IV	36.17	V	42.93	IV

Small flock units = (<150 animals per unit)

Large flock units = (>150 animals per unit)

Table 4.20: Garrett scores of the goat rearers criteria for timing of sale

Sl. No.	Particulars	Small flock units	Rank	Large flock units	Rank	Overall n=16	Rank
1	Cash urgency	46.00	IV	43.50	V	45.06	V
2	Right age of animal	66.60	I	63.33	II	65.38	I
3	Marketable weight of animal	59.70	II	67.00	I	62.44	II
4	Sell from time to time	45.40	V	45.67	IV	45.50	IV
5	Synchronize with High meat price	49.70	III	47.50	III	48.88	III
6	During village festivals	34.00	VI	33.00	VI	33.63	VI

Small flock units =<100animalsper unit

Large flock units = >100animals per unit

animal, sell during village festival, cash urgency and sell from time to time as per some convention in the case of small rearers. Large rearers on the other hand managed to synchronize with high meat price, marketable weight of the animal, right age of the animal, sell from time to time, during village festivals and cash urgency for time of selling.

4.3.16 Goat rearers Opinion regarding criteria involved in Selling

The small goat rearers timing of marketing animals depended on right age of the animal, marketable weight of the animal, synchronize with High meat price, cash urgency, sell from time to time and during village festivals. Large rearers also adopted more or less similar criteria while deciding on sale of animals like marketable weight of the animals followed by right age of the animal, synchronize with high meat price, sell from time to time, cash urgency and during village festivals.

4.4 Forward and backward linkages in Stall-fed sheep and goat rearing

The forward and then backward linkages involved in sheep and goat rearing are presented in the form of a flow diagram (Fig. 8).

The backward linkages involve sourcing finance, information on availability various inputs, sourcing breeds, fodder and feed. Majority of the rearers availed loan from nationalized commercial banks. The cooperatives and other source of finance do not have much role as the loan required is high in this enterprise. The information regarding the availability of the breeds is obtained from the agents of this enterprise or from the Veterinary hospital. The breeds are outsourced through agents or existing rearers. Fodder is available on the farm itself. The supplements or the feed is purchased from nearby retail shops, wholesalers and the milk cooperative unions.

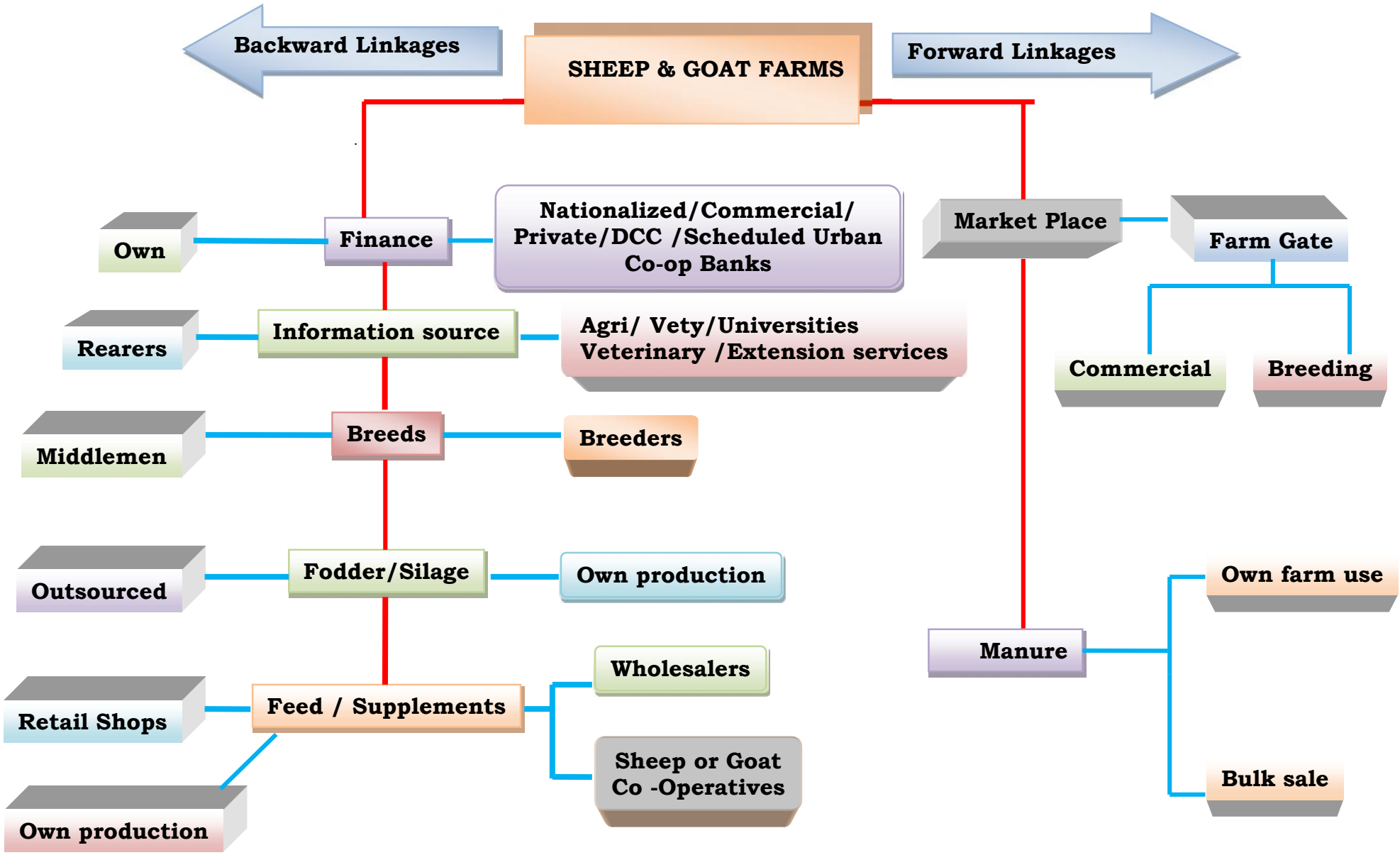


Fig. 8: Forward and backward linkages of stall-fed sheep and goats

The forward linkages involved are the market place for sale of animals and manure. The animals are sold on the farm and for breeding commercial purpose. The manure is used for their farms and sold in bulk.

4.5 Constraints involved in stall-fed Sheep and Goat rearing

4.5.1 Constraints of Sheep rearing

The constraints involved in sheep rearing are mentioned in the table 4.21. The major constraints faced by the small rearers and the large rearers was mortality of animals (Kumar *et al.,* 2003), followed by high cost of skilled labour, high cost of construction, weight gain not as per anticipation, High feed cost, lack of veterinary services, kidding not as anticipated, poor credit facility, lack of financial facility, fear of theft, inadequate market facilities, lack of land for fodder cultivation, lack of space, lack of market intelligence and exploitation by middlemen.

4.5.2 Constraints of Goat rearing

The constraints in goat rearing are analyzed using Garrett scoring and presented in the table 4.22. The major constraints faced by the small rearers were high cost of construction, mortality of animals, high cost of skilled labour, and lack of financial facility. lack of veterinary services, poor weight gain , high feed cost, poor credit facility, kidding not as anticipated, threat of theft, inadequate market facilities, exploitation of middlemen, lack of market intelligence, and lack of space for fodder cultivation. Whereas large rearers faced mainly the problem of mortality of animals followed by high cost of skilled labour & construction, poor weight gain & kidding, lack of veterinary services, high feed cost, poor credit facility, theft, lack of timely financial facility, inadequate market facilities, lack of fodder area and lack of market intelligence.

Table 4.21: Garrett scores of constraints of sheep rearing

Sl. No	Particulars	Small flock units	Rank	large flock units	Rank	Overall n=14	Rank
1.	Lack of space	65.91	XIII	65.81	XII	65.96	XIV
2.	High cost of construction	75.36	III	75.15	III	75.16	III
3.	Lack of land for fodder cultivation	66.12	XII	65.74	XIII	66.72	XII
4.	High cost of skilled labour	76.23	II	75.62	II	77.21	II
5.	Kidding not as per anticipation	69.35	VII	69.37	VIII	71.93	V
6.	Weight gain not as per anticipation	73.82	IV	72.46	IV	73.92	IV
7.	Mortality of animals	81.52	I	79.12	I	81.23	I
8.	Fear of theft	68.00	X	67.92	X	69.67	IX
9.	High feed cost	72.05	V	70.60	V	70.91	VII
10.	Lack of veterinary services	69.61	VI	70.22	VI	71.60	VI
11.	Inadequate market facilities	67.57	XI	67.47	XI	68.92	XI
12.	Exploitation by middlemen	64.27	XII	64.87	XV	65.23	XV
13.	Lack of market intelligence	64.74	XIV	65.31	XIV	66.11	XIII
14.	Lack of financial facility	68.56	IX	69.45	VII	69.36	X
15.	Poor credit facility	68.91	VIII	69.31	IX	70.62	VIII

Small flock units = (<150 animals per unit)
Large flock units = (>150 animals per unit)

Table 4.22: Garrett scores of constraints of goat rearing

Sl. No.	Particulars	Small flock units	Rank	Large flock units	Rank	Overall	Rank
1.	Lack of space	63.20	XIV	64.00	XIV	63.50	XIII
2.	High cost of construction	72.30	I	73.83	III	72.88	III
3.	Lack of land for fodder cultivation	62.00	XV	65.17	XII	63.19	XV
4.	High cost of skilled labour	70.90	III	76.50	II	73.00	II
5.	Kidding not as per anticipation	65.10	IX	71.17	V	67.38	IX
6.	Weight gain not as per anticipation	68.00	VI	73.17	IV	69.94	IV
7.	Mortality of animals	70.90	II	80.67	I	74.56	I
8.	Fear of theft	64.30	X	68.50	IX	65.88	X
9.	High feed cost	66.80	VII	69.50	VII	67.81	VII
10.	Lack of veterinary services	68.40	V	70.50	VI	69.19	V
11.	Inadequate market facilities	64.00	XI	67.50	XI	65.31	XI
12.	Exploitation by middlemen	63.60	XII	63.33	XV	63.50	XIV
13.	Lack of market intelligence	63.60	XIII	64.50	XIII	63.94	XII
14.	Lack of financial facility	69.00	IV	67.67	X	68.50	VI
15.	Poor credit facility	66.40	VIII	69.33	VIII	67.50	IX

Small flock units =<100 animals per unit

Large flock units = >100 animals per unit

4.6 Preference of the rearers between rearing sheep or goats

The 7 attributes, ease of management, resistance to diseases , ease of marketing, market demand, profitability, marketing risk and grading parameters were considered to know the preference between sheep and goat rearers for stall-fed method of rearing. The corresponding parameters of all the attributes are presented in respective tables.

4.6.1 Revealed preference of managing stall fed sheep and goat units in comparison to conventional rearing

The response to the preference to the attribute ease of management is given based on the parameter stall-feeding, resistance to diseases, managing of the female animals in breeding, managing of male, Removal of hooves and dehorning and castration. The response to these parameters of preference is presented in the table 4.23.

About 87.50per cent preference was given by the small rearers and all the large sheep rearers for stall-feeding parameter, 87.50 per cent and 83.33 percent of preference was given for resistance to diseases parameter, all the small rearers and 83.33 per cent of large rearers preferred managing the animals for breeding. The other parameters had less preference.

Similarly, in case of goat rearers about 80.00 percent of small rearers and all the large rearers preferred stall-feeding, 90 percent of the small rearers and all the large rearers preferred because of disease resistance, and 90 per cent and 83.33 percent preferred managing the animals for breeding.

4.6.2 Preference revealed for diseases resistance in stall-fed farms

Under this attribute less mortality rate, low cost of vaccination, regular vaccination and deworming parameters were selected. The

Table 4.23: Revealed Preference of managing stall fed sheep and goat units in comparison to conventional rearing

Sl No	Parameters	Sheep rearers			Goat rearers		
		Small flock units	Large flock units	Overall n=14	Small flock units	Large flock units	Overall n=16
1	Stall-Feeding	7 (87.50)	6 (100.00)	13 (92.86)	8 (80.00)	6 (100.00)	14 (87.50)
2	Resistance to disease	7 (87.50)	5 (83.33)	12 (85.71)	9 (90.00)	6 (100.00)	15 (93.75)
3	Managing of female animals in breeding	8 (100.00)	5 (83.33)	13 (92.86)	9 (90.00)	5 (83.33)	14 (87.50)
4	Managing of male	3 (37.50)	3 (50.00)	6 (42.86)	3 (30.00)	0 (0.00)	3 (18.75)
5	Removal of hoofs and dehorning	2 (25.00)	0 (0.00)	2 (14.29)	0 (0.00)	1 (16.67)	1 (6.25)
6	Castration	0 (0.00)	0 (0.00)	0 (0.00)	1 (10.00)	2 (33.33)	3 (18.75)

Note: Figures in parentheses indicate respective percentages

Table 4.24: Revealed preference scores for the diseases resistance in stall-fed farms

Sl. No.	Parameters	Sheep rearers			Goat rearers		
		Small flock units	Large flock units	Overall n=14	Small flock units	Large flock units	Overall n=16
1.	Less mortality rate	7 (87.50)	6 (100.00)	13 (92.86)	9 (90.00)	6 (100.00)	15 (93.75)
2.	Low cost of vaccination	7 (87.50)	5 (83.33)	12 (85.71)	9 (90.00)	6 (100.00)	15 (93.75)
3.	Need regular vaccination	1 (12.50)	1 (16.67)	2 (14.29)	1 (10.00)	0 (0.00)	1 (6.25)
4.	Regular de-worming	0 (0.00)	1 (16.67)	1 (7.14)	3 (30.00)	0 (0.00)	3 (18.75)

Note: Figures in parentheses indicate respective percentages

response of the rearers to these parameters are presented in the table 4.24.

In case of sheep rearers 87.50 per cent of the small rearers and all the large rearers preferred for less mortality rate and 87.50 per cent and 83.33 per cent of the small and large rearers preferred for low cost of vaccination.

Similarly, in goat reares, 90per cent of the small rearers and all the large rearers preferred because of fewer diseases and low cost of vaccination.

4.6.3 Preference revealed for stall fed sheep and goat on account of Ease of marketing

The parameters were on farm sale, preference for young ones, preference for adults, selling for breeding purpose, selling for slaughtering purpose and need based marketing. The response of the sheep and goat rearers to these parameters are presented in the table 4.25

In case of sheep rearers majority of all the small rearers preferred young ones, followed by 75 per cent preference for on farm sale and selling for breeding purpose. Others preferred least. But all the large rearers preferred for the adult, followed by 83.33 percent selling age of the animal.

In case of goat rearers cent per cent of the small rearers preferred selling for breeding purpose, followed by 90 per cent for preference for adults, 80 percent for Preference for young ones, 70 percent preferred on farm sale and Need based marketing parameters. But in case of large rearers cent per cent preference was given for selling age of the animal and 83.33 per cent preference for young ones and selling for breeding purpose parameters.

Table 4.25: Revealed preference for stall fed sheep and goat on account of Ease of marketing

Sl. No.	Parameters	Sheep rearers			Goat rearers		
		Small flock units	Large flock units	Overall n=14	Small flock units	Large flock units	Overall n=16
1.	On farm sale	6 (75.00)	5 (83.33)	11 (78.57)	7 (70.00)	6 (100.00)	13 (81.25)
2.	Preference for young ones	8 (100.00)	4 (66.67)	12 (85.71)	8 (80.00)	5 (83.33)	13 (81.25
3.	Preference for adults	5 (62.50)	6 (100.00)	11 (78.57)	9 (90.00)	4 (66.67)	13 (81.25
4.	Selling for breeding purpose	5 (62.50)	3 (50.00)	8 (57.14)	10 (100.00)	5 (83.33)	15 (93.75)
5.	Selling for slaughtering purpose	6 (75.00)	4 (66.67)	10 (71.43)	5 (50.00)	3 (50.00)	8 (50.00)
6.	Need based marketing	4 (50.00)	4 (66.67	8 (57.14)	7 (70.00)	2 (33.33)	9 (56.25)
7.	Excess Capacity of farm	6 (75.00)	5 (83.33)	11 (78.57)	4 (40.00)	4 (66.67)	8 (50.00)

Note: Figures in parentheses indicate respective percentages

4.6.4 Preference rating for Market Demand by the sheep and goat rearers

The attribute was rated using the parameters higher demand for breeding purpose slaughtering purpose, market accessibility, due to festivals, demand in fairs, demand by weight gain and demand due to age of animal. The response to these parameters is indicated in the table 4.26

In sheep rearers, 100 per cent preference was given by the small rearers to the parameter higher demand for breeding purpose, 75 per cent of them preferred demand due to age of the animal and 37.50 percent preferred market accessibility. Similarly 83.33 per cent large rearers preferred higher demand due to breeding purpose, 66.67 per cent of them preferred due to age of animal and 66.67 percent preference for demand due to weight gain. The other parameters were given meager preference by both small and large rearers.

In goat rearers, 80 per cent of small rearers preferred higher demand for breeding purpose, 70 per cent for them preferred demand due to age of animal and 60 percent preference for demand due to weight gain. But in large rearers 83.33 percent of them preferred for breeding purpose, 83.33 percent preferred demand due to age of animal parameters and 66.67 percent preference for demand due to weight gain.

4.6.5 Preference rating by the Sheep and Goat rearers for profitability, marketing risk and grading attributes.

The table 4.27 indicates the response of the sheep and the goat rearers for different attributes like profitability, marketing risk and grading parameters.

Table 4.26: Preference rating by the sheep and goat rearers for the attribute Market Demand

Sl. No.	Parameters	Sheep rearers			Goat rearers		
		Small flock units	Large flock units	Overall n=14	Small flock units	Large flock units	Overall n=16
1.	Higher demand for breeding purpose	8 (100.00)	5 (83.33)	13 (92.86)	8 (80.00)	5 (83.33)	13 (81.25)
2.	Slaughtering purpose	0 (0.00)	1 (16.67)	1 (7.14)	2 (20.00)	0 (0.00)	2 (12.50)
3.	Market accessibility	3 (37.50)	1 (16.67	4 (28.57)	2 (20.00)	2 (33.33)	4 (25.00)
4.	Demand by weight gain	4 (50.00)	4 (66.67)	8 (57.14)	6 (60.00)	4 (66.67)	10 (62.50)
5.	Demand due to age of animal	6 (75.00)	4 (66.67)	10 (71.43)	7 (70.00)	5 (83.33)	12 (75.00

Note: Figures in parentheses indicate respective percentages

Table 4.27: Preference rating by the Sheep and Goat rearers for the attributes Profitability, marketing risk and grading parameters

Sl. No.	Attributes	Parameters	Sheep rearers			Goat rearers		
			Small flock units	Large flock units	Overall n=14	Small flock units	Large flock units	Overall n=16
1.	Profitability	Profitability of breeding	8 (100.00)	6 (100.00)	14 (100.00)	10 (100.00)	6 (100.00)	16 (100.00)
		Profitability of slaughtering	0	0	0	0	0	0
2.	Marketing risk	Easy mode of payment	6 (75.00)	5 (83.33)	11 (78.57)	8 (80.00)	5 (83.33)	13 (81.25)
		Mortality due to transit	6 (75.00)	3 (50.00)	9 (64.29)	6 (60.00)	5 (83.33)	11 (68.75)
3.	Grading parameters	Structures	7 (87.50)	5 (83.33)	12 (85.71)	7 (70.00)	5 (83.33)	12 (75.00)
		By weight	7 (87.50)	5 (83.33)	12 (85.71)	6 (60.00)	4 (66.67)	10 (62.50)
		By guessing	4 (50.00)	4 (66.67)	8 (57.14)	7 (70.00)	5 (83.33)	12 (75.00)

Note: Figures in parentheses indicate percentages

In case of profitability attribute, profitability due to breeding was the only parameter considered by both the sheep and the goat rearers. In case of marketing risk attribute, 75 per cent of the small rearers of the sheep rearers equally preferred both the parameters of easy mode of payment and mortality due to transit. But majority 83.33 per cent of the large rearers preferred mode of payment parameter.

Whereas, in goat rearers majority 83.33 per cent of the large rearers preferred both the parameters like easy mode of payment and mortality due to transit. But majority 80 per cent of the small rearers preferred mode of payment parameter and 60percent preference for mortality due to transit. In case of grading parameter attribute by structure and by weight are mainly preferred by both sheep and goat rearers.

4.6.6 Preference rating by the sheep and goat rearers for the attributes Ideal Breed, Group marketing and Vertical integration of marketing by branding

500+25 and 40+2 are the ideal standard herd size suggested by the NABARD for the stall-fed sheep and goat rearing. But the table 4.28 shows that 75 percent of the small rearers preferred other breeding size , 25 per cent of them preferred to rear 40+25 animals . In case large rearers 66.67 per cent of them preferred to rear other breeding size, 33.33 per cent of them preferred to rear 500+25 animals.

87.50 per cent preference was given by small farmers for group marketing and vertical integration of marketing by branding .66.67 per cent preference was given by large farmers for group marketing and vertical integration of marketing by branding.

In case of goat rearers 70per cent of the small rearers gave their preference to rear other breed size, 30 percent of them preferred to rear

Table 4.28: Preference rating by the sheep and goat rearers for the quality parameter Ideal Breed, Group marketing and vertical integration of marketing by branding

Sl. No.	Parameters	Sheep rearers			Goat rearers		
		Small flock units	Large flock units	Overall n=14	Small flock units	Large flock units	Overall n=16
1.	500+25	0 (0.00)	2 (33.33)	2 (14.28)	0 (0.00)	1 (16.67)	1 (6.25)
2.	40+2	2 (25.00)	0 (0.00)	2 (14.28)	3 (30.00)	1 (16.67)	4 (25.00)
3.	Others	6 (75.00)	4 (66.67)	10 (71.42)	7 (70.00)	4 (66.67)	11 (68.75)
4..	Group marketing	7 (87.50)	4 (66.67)	11 (78.57)	7 (70.00)	6 (100.00)	13 (81.25)
5.	Vertical integration of marketing by branding	7 (87.50)	4 (66.67)	11 (78.57)	7 (70.00)	6 (100.00)	13 (81.25)

Note: Figures in parentheses indicate percentages

40+25 animals. Similarly in case of large farmers 66.67per cent of them preferred to rear other breed size, 16.67 per cent of them preferred to rear 500+25 animals.

70.00 per cent preference was given by small farmers for group marketing and vertical integration of marketing by branding. All the small and the large rearers of goat gave their preference for group marketing and vertical integration of marketing by branding.

4.6.7 Preference rating by the Sheep and Goat rearers for different facilities needed to improve rearing business

The different facilities needed to improve the rearing business as preferred by both the sheep and the goat rearers are presented in the table 4.29

In sheep rearers 87.50 per cent of the small rearers need easy bank credit facilities to be improved, 62.50 per cent of them need training for rearers, and 62.50 per cent need improvement in concentrate feed facility, 83.33 large rearers preferred training for rearers, 66.67 per cent of them preferred credit facilities and providing improved concentrate feed facilities.

Similar to sheep rearers, in goat rearers also, 80 per cent of small rearers needed improved easy bank credit facilities , 70 per cent of them needed training for rearers and providing concentrate feed facility to be improved, all the large rearers preferred easy bank credit facilities to be improved, 83.33 of them preferred training for rearers and 66.67precent preferred providing concentrate feed and good market facilities for live animals.

Table 4.29: Preference regarding facilities needed to improve stall-fed rearing business

Sl. No.	Facilities	Sheep rearers			Goat rearers		
		Small flock units	Large flock units	Overall n=14	Small flock units	Large flock units	Overall n=16
1	Training for rearers	5 (62.50)	5 (83.33)	10 (71.43)	7 (70.00)	5 (83.33)	12 (75.00)
2	Easy bank credit	7 (87.50)	4 (66.67)	11 (78.57)	8 (80.00)	6 (100.00)	14 (87.50)
3	Govt. Sponsoring Scheme to extend Financial assistance for silage	4 (50.00)	2 (33.33)	6 (42.86)	4 (40.00)	2 (33.33)	6 (37.50)
4	Providing subsidized concentrate feed	5 (62.50)	4 (66.67)	9 (64.29)	7 (70.00)	4 (66.67)	11 (68.75)
5	Good Market Facilities on live weight Basis	4 (50.00)	3 (50.00)	7 (50.00)	7 (70.00)	4 (66.67)	11 (68.75)

Note: Figures in parentheses indicate percentages

Discussion

V CHAPTER
DISCUSSION

The results obtained through data analysis are discussed in detail in this chapter in the light of past studies, theory and logical reasoning. The results are discussed under the following broad headings.

5.1 General characteristics of stall-fed sheep and goat rearers

5.2 Demographic profile of the sheep and goat rearers

5.3 Costs and returns in Stall-fed Sheep and Goat units

5.4 Forward and backward linkages in Stall-fed Sheep and Goat rearing

5.5 Constraints in Stall-fed Sheep and Goat rearing

5.6 Preference for stall-fed Sheep and Goat rearing

5.1 General characteristics of Stall-fed Goat and Sheep rearers

Studies elsewhere have shown that the socio-economic characteristics of households determine the preference for vocation and profitability. Therefore the particulars on age, education, type of main and subsidiary occupation are presented.

5.1.1 General characteristics of sheep rearers

The sample sheep rearers were post-classified into small and large according to the number of sheep maintained by them. The 14 respondents were classified into 8 small and 6 large units by taking the mean value of 150 animals as the cutoff point.

On an average, majority 64.28 per cent of them has college education, 21.42 per cent of them with secondary education and 14.28 per cent of them are educated upto primary level. This shows that many of the educated farmers have taken up stall-fed sheep farming

Agriculture is the main occupation for 50 per cent of large rearers and 62.50 percent of the small rearers. Stall-fed sheep rearing is the main occupation for the remaining 50 per cent of large farmers while 37.5 per cent of small rearers are primarily business men taking up sheep rearing as subsidiary occupation. This reflects that in the study area sheep rearing has assumed varying levels of importance based on the extent of specialization or diversification of the households (Table 4.1). Gender-wise classification is not reported in the study as all the sheep units are managed by men.

5.1.2 General characteristics of goat rearers

Similar to the sheep rearers, the goat rearers are classified as small and large units according to number of goats reared by them. Among 16 goat rearers, 10 were classified as small who managed less than 100 animals and 6 are classified as large rearers who managed more than 100 goats at any given time.

It is noticed that majority (83.33%) of the large rearers have college education when compared to small rearers (70%) and the remaining16.67per cent and 30 per cent of the large and the small rearers had secondary education. This clearly indicates that goat rearers are well educated literacy level is high in the. However, education will definitely increase the efficiency in the business.

Agriculture is the main occupation for 40 per cent of the small rearers and 33.33 per cent of the large rearers. Stall-fed goat rearing is the main occupation of 20 per cent of the small rearers and 33.33 percent of the large rearers. This indicates that the rearing activity is gaining its own importance and this enterprise may even be substituted as the main occupation in the near future.

Since the literacy level is high, there is an ample scope to improve the business with modern technology.

5.2 Demographic profile of sheep and goat rearers

Demographic profile reflects family size, extent of land availability, income and access to infrastructure facilities. These features can serve as major drivers to stall-fed sheep and goat rearing.

5.2.1 Demographic profile of sheep rearers

In this section, the demographic profile of the sample sheep rearers were discussed which are presented in Table 4.3.

It is evident from the study that each household is involved in more than one income generating activity. On an average a majority of the households belonged to small or medium family with fewer than 6 members per family (71.5 %). In general small flock units are owned by small to medium sized families, while large families have large flock units. Therefore, contrary to common norms, large sized family is a boon to goat rearers. Farmers are of the view that stall-fed sheep and goat rearing is much easier than managing dairy units.

The average land holdings in the case of small and large rearers were 5.25 acres and 9.41 acres respectively. Both agriculture and livestock rearing require adequate land holdings for sustainable production. The economic position of the families of the sheep rearers indicated that 50.00 per cent of small rearers and 66.67 per cent of large rearers belonged to high income group and 25 per cent belonged to medium income group in the case of small rearers. About 1/3rd of the small rearers belonged to low income group. Thus, the results showed that, on an average the household income was above two lakhs for majority of large sheep rearers.

Sheep need balanced diet for healthy growth and sufficient weight gain. Generally feed concentrates and grains are purchased locally. Such input shops are located close by within a distance of about 10 kilometers. Since all the farmers sell these animals on the farm itself, the information on output market is not reported here.

The presence of Veterinary hospital nearby for disease management is essential. It may be observed (table 4.3) that the veterinary hospital is situated nearby at around 6.07 kilometers distance of to the sheep units. Hence for animal health protection, veterinary care and medicine are easily available to the sheep rearers. This gave Philip to sheep rearers as regular veterinary care is one of the important components in sheep rearing enterprises.

The study further indicates that the sheep rearers have better access to financial facility, as commercial banks are situated at an average distance of 7.14 kilometers.

The major exotic breed of sheep reared is the Rambouillet. This breed has special features like faster weight gain and resistance to diseases. The minimum price of pure Rambouillet lamb is more than Rs.5000 which is not affordable by small units. Therefore they usually prefer to buy local Bellary breed and genetically upgrade this by way of crossing with Rambouillet over time.

5.2.2 Demographic profile of goat rearers

The demographic characteristics are presented in Table 4.4 of results chapter. Majority of the respondents are having small sized family (2-4 members) followed by families with 5-6 members who are classified as medium sized. On the contrary, large families operated larger units as compared to owning small flock units.

The average land holdings are more 12.70 acres in small rearers as compared to large rearers 11.33 acres. As agriculture was the main occupation of majority of the small rearers and most of the large rearers were employee in different organization.

Around fifty per cent of goat rearers were high income earners (>Rs.2 lakh per annum). Even with the goat rearing small rearers also, high income earners were quite sizable. The shops supplying feed was situated at an average distance of around 10.44 kilometers for the goat rearers in these districts.

The Veterinary hospital was situated at an average distance of 5.75 kilometers; hence, animal health protection, veterinary care and medicine are easily available to the goat rearers.

Accessibility to financial institutions is at an average distance of 6.59 kilometers to the goat rearers. Thus the goat rearers had better scope to improve their enterprise either by improving the breed, increasing the flock size, purchasing quality feed, proper medicine and veterinary care or improving marketing facilities through availing credit from these financial institutions situated nearby.

In majority of the goat units the buck is Boer breed, and the major doe breed reared is Sirohi. This is due to the fact that Boer breed has the characteristic of faster weight gain, and Sirohi breed being local has less purchase cost and gives 2 kids per year. The other breeds like Jamunapari, Tellicherry and Osmanabadi, are also reared.

5.3 Cost incurred in sheep and goat rearing

The different costs incurred in rearing sheep and goats are computed to assess the profitability of such units. The establishment cost and maintenance costs are computed.

5.3.1 Establishment years of the Stall-fed Goat and Sheep units

Most of the small units of sheep were in the range of 1-2 years after the establishment. But in the case of large rearers more number of units were above two years category. On the other hand, most of the goats rearing units were in the range of 1-2 years after the establishment of the units. The stall-fed sheep and goat rearing is a new concept which has attracted many new entrants to take up this business venture. Therefore, there is emerging demand for breeding purpose which fetches higher income than the traditional method of rearing.(Table 4.5)

5.3.2 Flock particulars of the sheep units

The overall start up flock size was 15 and 154 in the case of Ram and Ewe, and the stock at the end has increased to 49 and 191 respectively, inclusive of young and adult animals. This indicates that flock size increased over the years irrespective of sales and mortality. It is found that the total stock at the end is 77 and 458 in the case of small and large rearers respectively (Table 4.6, Figure 2 & 3).

5.3.3 Flock particulars of the goat units

The overall start up flock size was 7 and 99 in the case of Buck and Doe, and the stock at end has increased to 15 and 103 respectively. This indicates that flock size increased over the years irrespective of sales and mortality. It is found that the total stock at the end is 71 and 196 in the case of small and large rearers, respectively (Table 4.7, Figure 4 & 5).

5.3.4 Investment in sheep rearing

As narrated in Table 4.8 that total investment in sheep rearing was around Rs.10,08,382, while it ranged between Rs.7,33,998 to Rs.14,94,141per flock depending upon the size of the flock.

Major component of investment is on purchase of animals. Small rearers on an average started the business with around 120 sheep and their investment on sheep purchase was around Rs.310077 which constitutes around 42.24 per cent of the total investment. Young animals aged between three to eight months old are purchased on per kilo basis. While in the case of large rearers, they invested around Rs.1037166 for the purchase of around 233 animals. Their investment on sheep purchase constituted around 69.40 per cent of the total investment. Thus, it is evident that investment on purchase of animals in the sheep rearing business is quite significant. Therefore, sheep rearers exercise caution and search various farms before buying to ascertain purity of breed, health and age of the animal apart from the cost. Certain new breeds of sheep with high fecundity are available in the market which the sheep rearer can consider while selecting the breeds.

Sheep pen/shed was another important area of investment of sheep rearers, which constituted around 44.76 per cent and 22.0 percent of the total investment cost of the small and large rearers. . Locally available, cheap but durable materials are used to reduce the cost on sheds/pen.

Thus it is an ideal subsidiary enterprise with minimum risk. Flooring and feeders are relatively less expensive and thus affordable for small farmers as well.

5.3.5 Investment in goat rearing

Although goat meat (chevon) is a delicacy for certain food preparation, stall-fed goat rearing is relatively new in the study area. On an average Rs.12, 75,471 investments are needed for starting a goat rearing farm of 106 animals. In the case of small farms investments on purchase of goat (67nos) is Rs.3, 61,200 (44.06% of total investment)

while on large farms on an average 174 animals are purchased with an investment of around Rs. 9, 35,083 (47.27% of total investment). The profitability of entire goat business depends upon the parent stock and management of animals purchased at the beginning. Therefore proper breed selection, number of animals and feed management is essential for enhancing profits.

The rearing shed is partitioned into four parts to accommodate males, young ones, pregnant doe and the rest of the flock. Pen/shed is the major item of investment which constituted around 45.97per cent and 44.99 per cent of the total investment cost of small and large rearers. Farmers need to pay more attention towards cost reduction without jeopardizing any of the quality aspects of the shed (Table 4.9).

5.3.6 Costs incurred in sheep rearing

The apportioned cost of investment, interest and variable costs are considered to estimate annual maintenance cost of sheep units. The study revealed that on an average the total cost of rearing of sheep in small and large flock is Rs.3,02,859 and Rs.5,46,284 per flock per year respectively.

The amortized establishment cost, labour and feed accounted for 26.51 per cent, 24.76 per cent and 21.26 per cent of total costs in small farms. Similarly among large farms also amortized establishment cost, cost of supplements and labour were the major items which accounted for 30.38 per cent, 24.53 per cent and 16.10 per cent respectively. This indicates that the cost of supplements is high in the case of large rearers. Usually the rearers depend on permanent labour for managing different tasks pertaining to rearing. On an average two labourers worked on small farms, while it was around 3 labour on large farms. Since, sheep

rearing is a labour intensive enterprise; much care has to be given for proper utilization of labour.

Silage and fodder are next major items of variable cost, which constituted around 11.52 per cent, 4.84 per cent and 14.56 per cent and 2.97 per cent of the total cost in the case of large and small rearers respectively. Sheep rearers are in search of nutrient rich fodder and grass in order to enhance production efficiency (Table 4.10).

5.3.7 Costs incurred in goat rearing

The study reveals that most of the goat units are newly established and within 2 years of establishment. Total fixed cost accounted for 18.87 per cent and 25.41 per cent of maintenance cost on small and large units, respectively.

The major item of variable costs in goat rearing is on supplements and labour. In the study it is observed that supplements and labour wages constituted around 31.58 per cent and 25.70 per cent of the total cost of rearing among small flock rearers, whereas it was about 32.72 per cent and 18.36 per cent respectively in the case of large flock rearers.

Silage and fodder costs are next in importance as it varies with the body weight of the animal (Table 4.11).

5.3.8 Cost involved in silage preparation for Sheep and goat rearing

The availability of green fodder is limited and many farmers prepare silage out of maize plants two times during the year. Maize is valued at the actual production cost or purchase price. The amortized investment cost on silo pit is accounted as fixed cost. The cost of silage preparation accounted to Rs. 34,898 and Rs.79,550 in the case of small and large rearers of the sheep units whereas in goat rearers it accounted to Rs. 39,320 and Rs 72,580 for the small and the large rearers. The cost

of the silage depend upon the flock size, i.e. larger the flock size larger the quantity of the silage requirement. Silage is one of the basic feed for the animals. The stall-fed method of rearing animals depends on silage for supplemental feeding. Hence cost of silage also accounts to maximum share in the total cost (Table 4.12 and table 4.13).

5.3.9 Labour utilization pattern in stall-fed sheep and goat rearing

As indicated earlier, on average small sheep rearers manage the unit by employing a man and a woman daily. While large units require two male and a woman labour to take care of the flock. On the other hand, irrespective of the size, goat rearers employed two male and a female labour daily. Activity-wise labour utilization shows that among the four major activities performed daily much of the labour is utilized for feeding animals. Green fodder, loppings, mineral mixture and silage are fed to animals at regular intervals. Watching animals pertains to letting them in paddock area, checking for disease, washing animals and administering medicine. Thus, in stall-fed sheep rearing labour plays a major role (Table 4.14).

5.3.10 Annual cost of sheep maintenance of units over 2 years of establishment

Stall-fed sheep and goat rearing is a new concept more prevalent in certain rain-fed agro-eco systems of the state. Since many of the units are newly established, the returns are yet to be realized. Therefore, the profitability of sheep and goat is computed by considering only such units which have completed one production cycle. The establishment cost, annual maintenance cost and returns pertain to selected units while the cost incurred for more than **two** years of establishment are presented in table 4.15. The total maintenance cost of small units with worked out to Rs. 2,70,966 while those of large units it amounted to

Rs.6,48,274. Fixed cost constituted 35.11 per cent of the total maintenance expenditure, followed by supplements and labour wages.

5.3.11 Annual cost of goat maintenance (> 2 years of establishment)

The cost incurred in rearing goat units in existence for more than two years are presented in table 4.15. The major items of cost comprised of amortization on investment, supplement cost and labour cost. Stall-fed is a labour intensive and feed intensive method of rearing for faster weight gain (table4.16).

5.3.12 Returns from Sheep rearing

The returns from stall fed units comprises of the value of animals added to the stock which may be sold or imputed for accounting revenue and sale of manure. The returns are higher Rs.7,87,250 in the case of large flock units as to Rs.3,46,146 in the case of small rearers. The sale of meat is not found as the animals are sold only for breeding purpose. The net returns obtained are Rs.75,180 and Rs.1,39,000 in the case of small and large rearers, respectively (Table 4.17 & fig.6).

5.3.13 Returns from goat rearing

Similar to sheep rearering, the returns the returns from the small flock units of goat is Rs.4,03,000 and in the case of the large rearers it is Rs.8,23,000. The kidding age is 1.2 years. The returns is obtained only from second year onwards, as the animals are reared for breeding purpose no sale of mutton or wool is noticed. The net returns obtained is Rs.86,645 and Rs.1,43,254 in the case of small and large rearers respectively. The returns is higher in the case of goat units as compared to sheep units as the kids per time is 2 in the case of goat whereas only one in the case of sheep and also the sale price is higher in goat (Table 4.18 & Fig. 7).

5.3.14 Sheep rearers Opinion regarding criteria involved in Selling

The response of the sheep rearers for criteria involved in timing of sale is analyzed through Garrett scoring. It is found from table 4.19 that the major criteria for timing sale is marketable weight of the animal followed by synchronize with High meat price, right age of the animal, and during village festival. Other farmers sell animal as a matter of practice from time to time or when there is a cash urgency in the case of small rearers. Similar reasons are reported by large farmers as well. Therefore, it could be concluded that farmers adopt such mechanisms of sale which may work well for the context in which they live (Table 4.19).

5.3.15 Goat rearers opinion regarding criteria involved in Selling

The major criteria involved in sale of goat is similar to that of sheep, namely, right age, marketable weight of the animal, synchronize with high meat price, cash urgency, sell from time to time at regular intervals to meet cash needs and during village festivals (Table 4.20).

5.4 Forward and backward linkages in Stall-fed Sheep and Goat rearing

The backward linkages involve sourcing finance, information on breeds, supply of breeds, availability of fodder and availability of the feed. Majority of the rearers avail loan from nationalized banks. NABARD is providing credit linked back ended subsidy. The information regarding the availability of the breeds is obtained from the agents of this enterprise or from the veterinary hospital. The breeds is supplied by agents or existing rearers. The fodder is available on the farm itself. The supplements or the feed is available from nearby retail shops, wholesalers and the sheep and goat cooperative unions.

The forward linkages involved are the market place and sale of manure. Market place of the breeds is on the farm. This reduces the

intervention of the middlemen and reduces the marketing cost. The purchase of the animals is for the breeding purpose and very few for commercial purpose. Since breeding fetches higher price the most of the sale is for breeding.(Fig:8)

5.5 Constraints in stall-fed sheep and goat rearing

Although people from different walks of life are interested in taking to stall-fed sheep and goat rearing, there are certain challenges for successful performance. The respondents were asked to indicate major constraints faced in stall-fed rearing which is rank ordered using Garrett scores. Among the major constraints in the order of importance, mortality of the animals, high cost of skilled labour and high cost of shed construction followed by Weight gain not as per anticipation, Lack of free veterinary services, lack of financial facility, high feed cost, Poor credit facility, kidding not as per anticipation, Fear of theft, Inadequate market facilities, Lack of market intelligence, Lack of space for business expansion, exploitation by middlemen and lack of land for fodder cultivation (Tables 4.21 and 4.22).

5.6 Preference for stall-fed Sheep and Goat rearing.

There is a renewed interest among people from different education and professional background to take up stall-fed sheep and goat rearing. Among the stall-fed sheep farmers, about 70 per cent were previously tending sheep in open grazing. On the other hand about 45 per cent of them previously owned conventional goat units. It is noticed that among respondents some prefer to maintain exclusive sheep or goat rearing units, while others manage a bit of both.

5.6.1 Revealed Preference of managing stall fed sheep and goat units in comparison to conventional rearing

The sheep and goat rearers preferred the attribute ease of managing of animal in stall-fed method as segregating animals according to age and special attention is possible in stall-fed as compared to conventional. Similarly disease management and caring for pregnant and young ones is easy in stall-fed. It is revealed from the study that the risk of attack by carnivores or snake bite observed in open grazing of the animals is reduced in stall- feeding. Due to regular vaccination disease occurrence was less (Table 4.23).

Both the sheep and goat rearers are of the opinion that stall-fed animals are easy to manage in case of disease outbreak and also have better resistance to disease due to regular vaccinations. All the farmers followed vaccination and de-worming schedule regularly by consulting veterinarian from nearby hospitals (Table 4.24).

The marketing of animals is easier in stall-fed units as many new rearers are buying parent stock from breeders. Further, sufficient number of animals is available in one spot as animals are sold on the farm itself. Both young as well as adults animal type are preferred by buyers (Table 4.25)

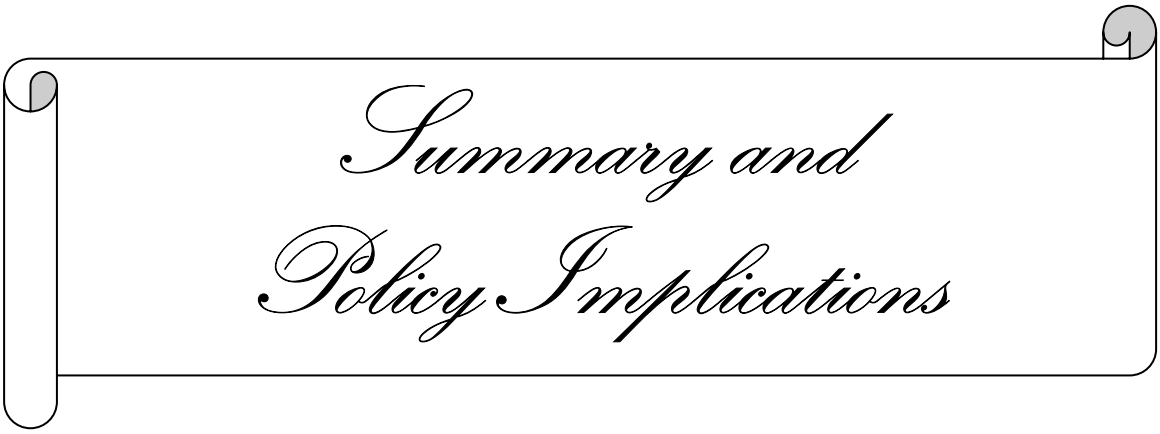
There is ever increasing consumer preference and demand for goat and sheep meat. At the moment the demand for live animals is mainly from other farmers for establishing new stall-fed units. The parameters like higher demand for breeding purpose, demand due to right age and ideal weight of animal is reported by majority of rearers (Table 4.26).

As indicated earlier, most of the farmers sell animals on farm gate itself which has its own advantages in-terms of better bargaining ability, avoiding mortality of animals in transit and easy handling of transaction.

The buyers generally gauge animals for overall appearance and by weight of the animal (Table 4.27).

The National Bank for Agriculture and Rural Development has indicated ideal standards for size of breeding flock but respondents in the study area have adhered to convenient numbers. And also majority of the rearers have indicated preference for group marketing and vertical integration of meat marketing by branding (Table 4.28).

Further, a majority of sheep and goat rearers need training on scientific rearing, credit facilities and providing concentrate feed at subsidized rate for expanding the business in the initial stages (Table 4.29).


Summary and
Policy Implications

VI CHAPTER

SUMMARY AND POLICY IMPLICATIONS

Animal husbandry is an important subsidiary activity for most of the agriculturists in India, as it provides reasonable income round the year. Sheep and goat are small ruminants conveniently managed by one and all irrespective of income status or land holdings. These are considered as major source of food and nutritional security for households in rural areas. Sometimes they are termed as 'mobile banks' or 'ATM'. Besides, sheep and goat rearing is suitable for wide range of climatic conditions and are gaining importance in Karnataka in recent years to meet the increasing demand for meat.

The State and Central governments have targeted high growth rates for 11th Five Year Plan which would be possible through substantial increase in livestock sector. Gainful self employment to the rural youth can is possible through stall-fed sheep and goat rearing in large numbers as there is sufficient market potential for these ventures. In stall fed goat and sheep farms the drudgery of work can be avoided wherein work will be easily distributed across many tasks unlike in extensive grazing system where persons have to be with goats throughout the day roaming around a lot of distances by which most of energy of goats and sheep is spent and wasted not facilitating adequate weight gain.

Goat and Sheep rearing has been found equally rewarding under both intensive and semi-intensive systems of management. Intensification and commercialization of goat and sheep enterprise has been recorded important because of shrinking of resources for extensive grazing. Commercialization would help in increasing the goat productivity and bridging the demand-supply gap. However, use of improved technologies, particularly prophylaxis, superior germplasm, low

cost feeds and fodder and innovative marketing of the produce would be the pre-conditions for successful commercial goat and sheep production. The National Bank for Agriculture and Rural Development (NABARD) has initiated Back-ended subsidy linked loans through all the nationalized commercial banks. As a result a number of new units have come into existence especially during the eleventh five year plan period. So far, there are no comprehensive studies to assess economic performance of stall-fed sheep and goat rearing. Hence, the present study was taken up with the following objectives.

1. To compute costs and returns of stall-feeding,
2. To analyze the forward and backward linkages,
3. To identify the constraints install-fed sheep and goat rearing
4. To elicit preference for stall-fed sheep and goat rearing

Sampling procedure

A large number of stall-fed sheep and goat units are operated in Bangalore rural, kolar and Tumkur districts of Eastern dry zone in the recent past. Therefore, these districts were purposively selected for the study. From among these, thirty respondents were randomly selected as to give a holistic view of goat and sheep rearing in the state. A total of 16 sheep units and 14 goat units were surveyed during 2009-10 period. The rearers were interviewed with the help of a structured schedule. The details pertaining to investment, maintenance of animals, silo preparation, feed, fodder, marketing and preferences for sheep and goat were collected.

The sample respondents were post-classified into two groups as small rearers and large rearers based on the number of animals reared by them. Hence, the sheep rearing (8 small and 6 large) rearers who were rearing below 150 sheep were considered as small and above 150 sheep

as large rearers. Similarly the goat rearing rearers who had below 100 goats were classified as small and above 100 were categorized as large (10 small and 6 large farmers).

Analytical tools and techniques

The descriptive analysis was used to work out the costs and returns structure of sheep and goat rearing, demographic profile of sheep and goat farmers, distribution of land holdings, and the preference for sheep and goat rearing.

The Garrett ranking is used to rank the constraints in rearing of goat and sheep. It also used to rank the criteria involved in selling goat and sheep.

Major findings

The important findings of the study are as follows.

1. The average land holding of sheep rearers was 5.25 acres and 9.41 acres in the case of small and large farmers, respectively. About 12.70 acres and 11.33 acres of average land were owned by small and large goat farmers.

2. The investment in sheep rearing was Rs.7, 33,998 per flock, Rs.14, 94,141 per flock respectively for small (<150 sheep) and large (>150 sheep) categories of farmers.

3. Similarly for goat rearing it was observed to be Rs.8, 19,682 per flock, Rs.19, 78,104 per flock in small (<100 goats) and large (>100 goats) categories of farmers.

4. The annual average total cost of sheep rearing in small and large units was Rs.3, 02,859 and Rs.5, 46,284 per flock per year respectively. The same worked out to Rs. 3, 26,847 and Rs. 5,

77,197 per flock per year respectively for small and large goat farmers.

5. The major component of maintenance cost involved in sheep rearing was amortized establishment, supplements and labour. In small rearers the amortization cost, supplement and labour cost per flock per year was Rs. 80,312, Rs.64,469 and Rs.75,000. In case of large rearers amortization was Rs.1,66,015, supplements Rs.1,34,138 and labour cost was Rs.88,000.

6. For goat rearing also, labour and amortization and supplements were the major items in cost of rearing. The labour cost was Rs.84,000, amortization cost was Rs.55,106 and supplement cost Rs.1,03,271 in case of small flock units whereas, in large flock units labour cost was Rs.1,06,000, amortization cost was Rs.1,31,014 and supplements cost was Rs.1,88,827.

7. The gross income realized from sheep rearing in small and large were Rs.3,46,146 per flock per year and Rs.7,87,250 per flock per year, respectively and the gross returns from goat rearing were Rs.4, 03,000 per flock per year and Rs.8,23,000 per flock per year respectively for small and large rearers.

8. The Net returns from sheep rearing were Rs.75,180 per flock per year and Rs.1,39,000 per flock per year in case of small and large rearers and the net returns from goat rearing was Rs.86,645 per flock per year and Rs. 1,43,254 per flock per year in case of small and large farmers

9. The backward linkages prevailing in sheep and goat rearing are by way of timely credit, availability of breeds, provision of breeds, availability of fodder and feed.

10. Rearers did not report much marketing problems as farm gate sale of animals was prevailing in the study area. However, subsidized electronic balances need to be made available.

11. Normally sheep requires shearing twice a year, since manual shearers have dwindled, mechanical shearers have to be made available.

12. The major constraints faced by both stall-fed sheep and goat rearers were high cost of construction, mortality of animals, high cost of skilled labour in the case of both small and large flock units.

13. The majority of the sheep and goat rearers preferred stall-feeding over conventional rearing for obvious advantages like ease of managing animals for breeding, vaccination and ease of sale.

14. All the sheep and goat rearers reported that the timing of sale was based on parameters like right age of the animal, high price season, marketable weight of animal, regular sale and synchronize with major festivals.

15. The majority of the sheep and goat rearers gave their preference flock size between 40+2 and 500+25 animals as recommended by the NABARD. All the rearers preferred group marketing and vertical integration by way of branding.

16. The majority of the sheep and goat rearers expressed the need for training, credit facilities and providing subsidized feed and concentrates.

Policy implications:

1. Many of the rearers expressed the need for adequate training and breed related information. Therefore, apart from credit, there should be arrangements for organizing regular training programmes by line departments and universities.

2. Since the stall-fed sheep and goat farming is still in nascent stage, there is need for making available the required breeds in adequate numbers from livestock farms and universities.

3. One of the by-products of sheep husbandry is wool, which can be effectively utilized in manufacturing value added products like mat, rugs, blankets and carpets. There is a need encourage such cottage industries for increasing profitability of sheep units.

4. At the moment sheep and goat rearers are not organized, therefore, there is a need to organize them in the form of associations or groups for better bargaining power.

5. The concept of branded meat is new in Indian markets. Therefore, efforts should be made to facilitate branding by rearers groups and establishing suitable supply chains for upcountry markets.

6. The mortality is the major constraints in both sheep and goat rearers. Therefore vaccines are to be made available through animal husbandry department network.

References

VII CHAPTER

REFERENCES

ABDUR RAHMAN A, ALAN J. DUNCAN A, DAVID W. MILLER B,C, JUERGEN CLEMENS D, PILAR FRUTOS E, IAIN J. GORDON ATIQ-UR REHMAN F, ATAULLAH BAIG G, FARMAN ALI G, IAIN A. WRIGHT, 2007, Livestock feed resources, production and management in the agro-pastoral system of the Hindu Kush – Karakoram – Himalayan region of Pakistan: The effect of accessibility. *Science direct.* **Vol 54**(4)

AHMAD SHUKRI AL-RIMAWI, 2002, The Role of Jordanian Women Farmers in Livestock Production with Implications to Agricultural Extension Education. *Journal of international agricultural and extension education* **Vol 9**(1) p.1-9

ARUN, P. AND DHAKA, J. P., 2005, Efficiency of male goat markets in the central alluvial plains of West Bengal. *Agric. Econ. Res. Rev.*, **18**(2):197-208.

ASLAM, M. AND KHAUSHK, A. M., 2004, Economic analysis of buffalo dairy farms in Sindh. *Indus J. Biol. Sci.,* **1**(3): 231-240.

BELLI, R. B., 1990, A study on socio-economic conditions and management practices being followed by the Govalis of Dharwad taluk. *M.Sc. (Agri) Thesis*, (unpublished), Univ. Agric. Sci., Dharwad.

BENIN S., EHUI S. AND PENDER J. 2002. Policies for livestock development in the Ethiopian highlands. *Socio-economics and Policy Research Working Paper,* ***41.***p.20. ILRI (International Livestock Research Institute), Addis Ababa, Ethiopia.

DAVID JAKINDA OTIENO, ERIC RUTO, LIONEL HUBBARD, 2011, Cattle Farmers' Preferences for Disease-Free Zones in Kenya: An application of the Choice Experiment Method, *Journal of Agricultural Economics* **Vol 62**(1), p.207–224.

DEOGHARE, P. R. AND BHATTACHARYA, N. K., 1993, Economic analysis of Goat rearing in Mathura district of Uttar Pradesh. *Indian J. Agric. Econ,* **63**(4):439-444.

DESTA, Z. H., OBA, G. 2004, Feed scarcity and livestock mortality in inset farming systems in the Bale highlands of southern Ethiopia. *Outlook on agriculture*, **Vol. 33**(4), p.277-280.

DWAIPAYAN BARDHAN, SRIVASTAVA, R.S.L. AND DABAS, Y.P.S., 2005, Economics of buffalo milk production in Tarai area of Uttranchal. *Indian J. of Dairy Sci.*, **58**(2): 129-133.

EHUI S. K., AHMED M. M., BERHANU GEBREMEDHIN, BENIN S. E., NIN PRATT A. AND LAPAR MA. L. 2003, Policy factors affecting live stock technology adaption, *10 years of Livestock Policy Analysis.* p.118 pp ILRI (International Livestock Research Institute), Nairobi, Kenya.

ENDESHAW ASSEFA 2007 AWASSA) Assssment of Production and Marketing System of Goats in Dale District, Sidama Zone, *M.Sc.(Agri.) Thesis*, (unpublished) Agric. Uni. Of Hawassa Bangalore.

ESWARA PRASAD, Y. AND RADHA, Y., 1996, Constraints in sheep marketing: perception of marketing of sheep and sheep products. *Indian J. Agric. Mktg.,* **10**(2): 105.

FRANCIS, O. H., 1994, Goat rearing: Challenges and Opportunities. *Fin. Agric.*, **26**: 20-25.

FRANK PINKERTON AND LYNN HARWELL. (2002). Marketing Channels for Meat Goats**.** *http://goats.clemson.edu/ NC%20Handbook/ market.htm*

GANESHKUMAR, B. and RAI, R.B., 2006, Economic status of poultry Farming enterprises in Andaman and Nicobar Islands. *Agric. Econ. Res. Rev.*, **19**: 377-386.

GETAHUN LEGESSE, MARLANNA SIGMUND, GIRMA ABEBE AND ANNE VALLE. 2006. Smallholder sheep and goat production system in southern Ethiopia. Opportunities and limitations. *Prosperity and poverty in a Globalized World -challenges for Agricultural Research*, Tropentag , Bonn, Germany.

Government of India, 2005, Economic Survey, Economic Division, *Ministry ofFinance*, New Delhi.

HOSSAIN, M. M., ASLAM, M. M., RASHID, M. M., ASADUZZAMAN, M. AND RAHMAN, M.M., 2005, Small scale dairy farming practice in a selective area of Bangladesh. *Pakistan J. Nutr.*, **4**(4): 215-221.

JABIR ALI, 2011, Use of quality information for decision-making among livestock farmers: Role of Information and Communication Technology,*Live stock research for rural development* **23** (3).

JITENDER, B., U. K., PANDEY AND SUHAG, K. S., 2005, Small ruminant's economy of semi-arid region in Haryana. *Indian J. Agric. Econ,* **60**(2):163-183.

LEEUW P.N. DE. 2003. Crop Residues in Tropical Africa: Trends in Supply, Demand and Use. *International Livestock Research Institute*, Nairobi, Kenya

MAHENDRA SINGH AND ANIL CHAUHAN, 2006, Constraints faced by dairy owners in adoption of scientific dairy farming practices. *Indian J. Dairy Sci.,* **59**(1): 49-51.

MILLION TADESSE. 2003. Challenges and opportunities in livestock products and marketing in Southern Nation Nationalities and peoples region. A case study of Wolayita Zone. *Proceeding of the 10th annual conference of the Ethiopian Society of Animal production* (ASAP), Addis Ababa, Ethiopia. P

NSOSO S. J. AND MONKHEI M. AND TIHWAAFALIO. B. E. 2004. A survey of traditional small stock farmer in molepole North Kweneng district, Botwanan Demographic parameters market practices and marketing channel. *Livestock research for rural development,* **16** (12) p.8, Botswana.

OSEI BONSUAND. A., S. K. DERY, 2009, The contribution of livestock in livelihoods of coconut- based households in Ghana. *Journal of Sustainable Development in Africa,* **Vol 11**(4), 2009)

PADMANABAN, N. R., 1994, An Analysis of sheep farming in Tamil Nadu with particular reference to economics and resource use efficiency. *Indian J. Ani. Sci.,* **64**(6): 639-642.

PALLAVI P.MIRAJKAR, SANJAY KUMAR AND Y.P.SINGH.,2011 Preference of service providers for the veterinary service-a case study of Sangli District of Maharashtra state*, India,Vet.world*, 4(3),p.106-108

PETER S. 1998. The international marketing of hides and skins and leathers. MoA/FAO, (Ministry of Agriculture/ Food and Agricultural Oganization. p.44.

PRABAHARAN, R. AND THIRUNAVAKKARASU, N., 1995, Income and Employment dynamics of goat farms in different agro climatic zones of Tamil Nadu. *Indian J. Animal Prod. Mgnt.*, **11**(1): 14-26.

PRABAHARAN, R. AND THIRUNAVUKKARASU, M., 1994, Constraints in goat farming – a study in Tamil Nadu. *Indian J. Dairy Sci.,* **47**(12): 1061-1063.

RAHMAN, S.M.A., ALAM, J. AND RAHMAN, M.M., 2003, Economics of dairy farming in Bangladesh. *Indian J. Dairy Sci.,* **56**(4): 245-249.

RAMESH, N.S., 1990, Evaluation of investment in sheep rearing in Bangarpet taluk, Kolar district, Karnataka. *M.Sc.(Agri.) Thesis*, (unpublished) Univ. Agric. Sci., Bangalore.

RATH, N., 1992, Economics of sheep and goat in Maharashtra. *Indian J. Agric. Econ.,* **47**(1): 62-78.

ROBERTS, D., 1994, Costs and Returns from egg production. Farm Management, Dept. of Agricultural Economics, Univ. of Manchester, UK, **8**(10):466-475.

SANI, R.M., TAHIR, I. AND KUSHWAHA, S., 2000, Economics of poultry Production in Bauchi state: A case study of Bauchi local government area. *Nigerian J. Anim. Prod.,* **27**: 109-113.

SENTHIL KUMAR. G. AND MEGANATHAN, N, 2005, Marketing of Sheep/ Mutton. *Indian J. Mar.*, **19**(3): 52-60.

SHAH, D. AND SINGH, P., 1995, An economic study of costs and returns in crossbred cows in rural and urban areas of Barielly district. *Livestock Advisor*, **20**(1):13-19.

SHALANDER KUMAR, 2007, Commercial Goat Farming in India: An Emerging Agri-Business Opportunity *Agricultural Economics Research Review* Vol. **20** pp 503-52

SINGH, D.R., SUSHILA KAUR AND SIVARAMANE, N., 2006, Migratory sheep and goat production system : the mainstay of tribal hill economy in Himachal Pradesh. *Agric. Econ. Res. Rev.*, **19**: 387-398.

SINGH, N.P., RAJITKUMAR AND SINGH, R.P., 2005, Dynamics of bovine economy in the Indo-Gangetic plain of India : Issue of growth, equity and sustainability. *Agric. Econ. Res. Rev.,* **18**: 51-70.

SINGH, S.P., MEERAKUMARI AND YADAV, R.N., 2005, Resource use efficiency of milk production of Pusa block. *Environ. Ecol..,* **23**(4): 694-701.

SRIVASTAVA, S.P. AND SARASWAT, B.L., 2006, Marketing of Janapuri goats in its native tract. *Indian J. Ani. Res.,* **40**(2): 127-130.

STEINFELD HENNING. 2004. The livestock revolution—a global veterinary Mission. Vet.Parasitol, Vol 125(1-2),p.19-41.

TRIPATHI, R.S., 1997, Production and marketing of Angora wool products in Uttar Pradesh. *The Bihar J. Agric. Mktg.,* **5**(2): 152-157.

VERMA, L.C. AND SINGH, K.S., 1997, Cost and Return structure on layer farmer, *Indian J. Pou. Sci.*, **32**(2): 152-185.

VYAS, H.V. AND PATEL, K. F., 2001, Constraints faced by milk producers in adoption of dairy technology. *Rural India*, **64**(96): 117-124.

WORKNEH AYALEW, RESCHKOWSKY B AND KING J.M. 2004, Concepts and calculations of net benefits from goats in Ethiopian smallholdings. *Ethiopian Journal of Animal production,.* Vo.**4**(1), p49.

YASOTHAI,R, T.R.GOPALA KRISHNA MURTHY, P.SHAMSUDEEN,2009, Profile of Women Trainees In Livestock Farming, *J. Veterinary & Animal Sciences,* **5**(2): 51-55.