ECONOMICS OF SHEEP REARING IN RURAL AREAS OF ANDHRA PRADESH

THESIS SUBMITTED TO THE
ANDHRA PRADESH AGRICULTURAL UNIVERSITY
IN PART FULFILMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE OF

MASTER OF VETERINARY SCIENCE
(SHEEP, GOAT AND SWINE PRODUCTION)

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RAJENDRANAGAR, HYDERABAD 500 030 (A. P.)

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CERTIFICATE

Shri G. Balakrishna, has satisfactorily prosecuted the course of research and that the thesis entitled "Economics of Sheep rearing in rural areas of Andhra Pradesh" submitted, is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that the thesis or part thereof has not been previously submitted by him for a degree of any University.

Date: 7-4-1983

(A.S. RAMKISHEN MUDALIAR)
Major Advisor

CERTIFICATE

This is to certify that the thesis entitled "Economics of Sheep rearing in rural areas of Andhra Pradesh" submitted in partial fulfilment of the requirements for the degree of Master of Veterinary Science (Sheep, Goat and Swine Production) of the Andhra Pradesh Agricultural University, Hyderabad is a record of bonafide research work carried out by Shri G.Balakrishna under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee.

No part of the thesis has been submitted for any other degree or diploma or has been published. All the assistance and help received during the course of the investigation have been duly acknowledged by him.

(A.S. RAMKISHEN MUDALIAR)
Chairman of the Advisory Committee

Thesis approved by the
Student Advisory Committee.

1. CHAIRMAN : (A.S. RAMKISHEN MUDALIAR)

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ABBREVIATIONS

1.	AB	...	ANDHRA BANK
2.	Av.	...	AVERAGE
3.	CD	...	CRITICAL DIFFERENCE
4.	C.Dis.	...	CIVIL DISPENSARY
5.	d.f	...	DEGREES OF FREEDOM
6.	DPAP	...	DROUGHT PRONE AREA PROGRAMME
7.	HS	...	HIGH SCHOOL
8.	IRDP	...	INTEGRATED RURAL DEVELOPMENT PROJECT
9.	ISDP	...	INTENSIVE SHEEP DEVELOPMENT PROJECT
10.	JC	...	JUNIOR COLLEGE
11.	LPP	...	LIVESTOCK PRODUCTION PROGRAMME
12.	LSU	...	LIVESTOCK SUPERVISORY UNIT
13.	MSS	...	MEAN SUM OF SQUARES
14.	NS	...	NON SIGNIFICANT
15.	PHC	...	PRIMARY HEALTH CENTRES
16.	PS	...	PRIMARY SCHOOL
17.	RLU	...	RURAL LIVESTOCK UNIT
18.	SBI	...	STATE BANK OF INDIA
19.	SFDA	...	Small FARMERS DEVELOPMENT AGENCY
20.	SS	...	SUM OF SQUARES
21.	SSU	...	SHEEP SUPERVISORY UNIT
22.	SWEC	...	SHEEP AND WOOL EXTENSION CENTRE
23.	MFDA	...	MARGINAL FARMERS DEVELOPMENT AGENCY
24.	TV	...	TELEVISION

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7/4/83

(G. BALA KRISHNA)

ABSTRACT

A survey was conducted in five villages of Mahboobnagar district of Andhra Pradesh, to investigate and analyse the management practices in sheep rearing, to work out farm investments and returns of different size sheep units like small (21 and below) medium (22 to 50) and large (above 50) and to study the existing practices of marketing sheep and their products. The complete data about the 5 selected villages and 60 sheep farmers were obtained through a suitably designed questionnaire. The economics of sheep rearing was worked out for a period of 12 months from 1.1.1980 to 31.12.1980.

The survey revealed that the sheep constituted 48.47 per cent of the total livestock population and sheep farmers constituted 8.71 per cent of the total house holds in the area. Most of the sheep farmers were poor and orthodox in sheep rearing practices, following the traditional way of sheep farming. The average flock size was 48 and on an average each person looked after 44 sheep. About 12 to 15 per cent of the flock owners migrated every year towards the south east to provide adequate grazing. Lack of pasture lands/grazing areas and marketing facilities were the main problems of the sheep farmers. The marketing of sheep and their products were also not organised. Middle men were playing a major role in marketing.

The average lambing and mortality were 76.13 and 5.08 per cent respectively, while culling percentage was 2.51 and the ratio of ram to ewes was 1:26.

The average total investment for the three flock sizes on 100 sheep was Rs.20055=70, of which fixed cost was Rs.17721=92 and variable cost Rs.2333=78, constituting 88.36 and 11.63 per cent respectively. The net return from 100 sheep on medium size flock was Rs.8629=26 followed by Rs.8375=28 and Rs.7229=33 on large and small size flocks respectively. On an average the net return for 100 sheep in three sizes of flocks was Rs.8078=00 per year which constituted 40.28 per cent of the total investment. The net return for 100 sheep was significantly high ($P<0.05$) between medium and small size flocks. However, there was no statistically significant difference between large and medium, large and small size flock.

The results indicated that a small flock of 21 sheep which is a recommended unit of many Governmental Programmes like LPP, DPAP and IRDP yields a net return of Rs.1518=00 which is quite a good subsidiary income for the small and marginal farmer, while a medium size flock of 50 sheep yields a net return of Rs.4314=50 per annum which is sufficient to maintain a simple living sheep farmer and his family in the village conditions.

CHAPTER I

INTRODUCTION

Sheep industry is one which still retains a greater element of tradition than any other major branch of livestock farming. It is an industry with a tremendous potential for development and also creating absorbing interest.

India was once the country where domestic animals constituted a man's entire wealth and answered most of his needs. But maintenance of sheep as a source of livelihood became a distinct occupation in course of time and was left to special communities called 'Kurvas/Gollas' locally. Even now sheep rearing remains the monopoly of a class of herders whose tradition has marked them out as a pastoral caste. Sheep rearing for them is not only a profession but also a way of life which they love. In harmony with nature, they and their flocks live in close friendship, oblivious of the vagaries of weather.

The total sheep population inIndia was about 40.2 millions in 1977 and was the sixth largest sheep populated country in the world (Gautam, 1981). According to 1972 census sheep contributed Rs.140 crores per annum to the national economy, basing on rough estimates of production of 34.5 million kg of wool, 101 million kg mutton and 14.6 million pieces of skins, in addition to 20 million quintals of manure as mentioned by Singh and Kalra (1981).

Andhra Pradesh is second to Rajasthan in sheep population and economy with a population of 7.1 millions (1977) accoun-

ting for 17.66 per cent of country's sheep population, comprising mainly of three recognised breeds viz., Deccani, Bellary which are woolly type, dual purpose and Nellore which is a mutton type animal yielding no wool. Out of total sheep population, the woolly and dual purpose Deccani and Bellary breeds may number any where between 2.5 to 3.0 millions according to Reddy (1980).

The estimates worked out by the Andhra Pradesh Income unit of the Bureau of Economics and Statistics (1976-77) on the basis of yielding rates furnished by the Central Statistical Organisation, New Delhi are as follows:

1. Mutton -- 17,017 million Tons worth Rs.1,650=63 lakhs
2. Wool -- 1782 Tons worth Rs.84=63 lakhs
3. Sheep skins -- 24 lakhs skins worth Rs.264=63 lakhs

Sheep with its multi-facet utility plays an important role in our national economy. It is not only because of meat, wool, skin, manure and milk production, but also because the inputs on feeding, equipment, housing and health coverage are very less and capital investment to get into the business may not be high, and returns come quickly. Further, sheep can thrive on extremely poor and low set vegetation. The high prices, ever increasing demand for meat and wool, and surplus labour force in rural areas are the other contributory factors which offer considerable potential for sheep production in India.

In view of steep fall in sheep population in recent years specially in Andhra Pradesh(a reduction of 3.19 millions

in India and 1.24 millions in Andhra Pradesh from 1972 to 1977) as quoted by Reddy (1980), and to uplift the small and poor farmers, several schemes like Drought Prone Area Programme, Livestock Production Programme and Integrated Rural Development Programmes were initiated by Government of India and various State Governments. In these sheep development schemes were also included. Financial assistance is also rendered at present to the sheep farmers by various financial institutions at a low interest rate of 11.85 per cent per annum to improve their socio-economic conditions, thus encouraging them to take up sheep industry more intensively.

Sheep production is a highly sensitive enterprise, which requires scientific knowledge of various practices like breeding, feeding, management, marketing and also health coverage which is very important. For those who are unable to apply sound management principles and business methods, this enterprise might not be very profitable one.

Since our sheep farmers generally do not have adequate knowledge and abilities to make sheep production a very profitable business, there is a need to study, work out and know the costs and returns from this enterprise under existing conditions.

In the light of above situation, a detailed study was carried out to find out economics of sheep rearing in rural areas of Andhra Pradesh, not only as a guide to the financial agencies like LPP, DPAP, IRDP (and various Banks) in which the small, marginal farmers and agricultural labourers are given a subsidy of 25 per cent to 33.33 per cent, but also to encourage the

farmers to take up this industry more intensively. For this purpose the following specific objectives were set for a detailed study.

1. To study and analyse the management practices and problems encountered in sheep rearing in rural areas.
2. To work out farm investments and returns on different sizes of sheep units like small, medium and large.
3. To study the existing practices of marketing sheep and their products.

CHAPTER II

REVIEW OF LITERATURE

This study is the first of its kind envisaged to investigate the economics of sheep rearing in rural areas of Andhra Pradesh. There is not much published literature available regarding the economics of sheep rearing except some from Rajasthan and a few other sheep rearing countries. As such an attempt has been made hereto review the earlier literature which had a direct or indirect bearing on the present study.

2.1 General Information:

Taneja (1974) observed that Indian sheep farmers were poorer than the poorest in agricultural community with a flock size of 35 to 100 sheep, were mostly illiterate and not familiar with modern developments in the sheep industry and felt that their socio-economic condition should be improved as a social need.

Dwivedi and Jain (1977) reported that in Rajasthan most of the sheep and goat farmers were generally poor but a few of them were rich possessing large size flocks and agricultural lands, and the farmers were not well educated.

Dwivedi *et al.*(1978) in a bench mark socio-economic survey on sheep farming in Malpura of Rajasthan observed that the sheep farmers in the area were very poor, living in *kutcha* houses. Most of them possessed less than 15 acres of land and about 83 per cent of the flock owners possessed less than 100 sheep. The average flock size of this survey was 61 sheep.

Singh and Singh (1979) conducted a survey on sheep and goat in Uttar Pradesh under the operational research project and found that sheep and goat husbandry was one of the main occupation of the weaker sections comprising mainly of the land less labourers, marginal and small farmers. The socio-economic status of the sheep and goat farmers was found to be on the lower extreme and that most of the shepherds were illiterate with very little extent of media exposure.

2.2 Management Practices:

Potts (1953) suggested that the farmer should select his ewe flock and rams with special emphasis on their ability to produce lambs that grow fast and reach market weight from 3 to 5 months with high degree of finish. He observed that sheep could be made to yield practically the same net returns on the value of land as cattle and swine if well cared for and kept on land reasonably well adopted for sheep raising.

Kamlade and Kamlade (1955) stated that lambs would make 75 per cent of their nature weight when they attain one year of age. Of this, 50 per cent of growth would take place during the first 3 months, 25 per cent in the next three months and the remaining 25 per cent in the next 6 months.

Dehoach and Williams (1957) felt that ewes milk was the best feed for putting rapid gains on young lambs and emphasized the need for supplementation of grain protein mixture and succulent pasture to the ewe's milk.

. Mudaliar (1965) stated that flushing increased lambing percentage but the effect of flushing decreased as far as weight gain was concerned as the age of the ewe advanced; but there was an increased tendency for twinning. Later in (1972) he stated that flushing increased about 17 to 18 per cent in lamb production

Singh and Moore (1968) mentioned that migration of sheep was very popular in North Indian plains where the flock owners migrate with large flocks to Himalayan region during summer and autumn.

Acharya and Patnayak (1972) felt that although sheep can thrive well on forages alone than any other kind of livestock, the forages available for sheep under natural conditions did not provide sufficient nutrients required and very little attention was paid to develop improved pastures or to improve the available vast lands and grazing areas in the country. They have mentioned that in a survey conducted in Gujrat 15 per cent of deaths among sheep was due to parasitic gastro-enteritis and suggested that under field conditions exotic inheritance could be introduced upto the level of 50 per cent without any serious problems of disease susceptibility and mortality.

Mudaliar (1972) stated that vaccinating the flock against enterotoxaemia was not only the most effective means of protecting the sheep but it also increased the weight gains in lambs.

Gangwar and George (1973) mentioned that sheep can live on uncultivated waste land, their feed requirement was not rigid and they feed on many types of weeds.

Singh et al.(1973) opined that economics of sheep rearing was mainly dependent on attainment of maximum lamb weight in minimum time.

Suryaprasad et al.(1973) mentioned that castrated lambs gained less than the lambs which were not castrated.

Goodwin (1974) suggested cross-breeding in commercial sheep farms which in his opinion enhances polificacy and encourages early maturity through hybrid vigour.

Mudaliar et al.(1974) indicated that Bellary, Bikaneri and their cross-bred ewes were capable of breeding and lambing throughout the year and suggested to restrict the breeding if lambing was not desired during a certain part of the year. Lambs born during summer months is a loss, which is a known fact.

Mudaliar et al.(1974) found that sex-ratio of lambs born in Nellore, Mandya, Bellary crosses, Bellary and Bikaneri breeds were 49.09 : 50.01, 50.36 : 48.44, 45.83 : 54.17, 52.22 : 47.78 and 48.71 : 51.29 as males and females respectively.

Taneja (1974) observed that almost 70 per cent of the sheep farmers in the plains were nomads and they followed the fixed annual cycle of migration from winter camps to summer pasture. To improve this system he suggested to study and map the seasonal movement of migratory types of shepherds and locate the extension centres along the routes of migration to provide all veterinary aid and propagation of improved germplasm through A.I. techniques and exchange the indigenous rams with half-bred rams.

He also felt that cross-breeding was advisable for rapid improvement of wool and mutton production, both qualitatively and quantitatively and suggested to provide cross-bred rams to the sheep farmers free of cost or at subsidised rates.

Mudaliar and Rao (1976) observed that Bellary ewes could go up to 7th lambing even though the percentage of lambing was very small; whereas, Bikaneri, Nellore and Mandya ewes had only 5 lambings.

Sastry and Thomas (1976) mentioned that sheep and goats were raised almost entirely on roughages and as such the cost of production was lower than that of poultry and pigs. They further mentioned that indigenous breeds of sheep and goats could subsist under the most adverse circumstances on scanty feeding as a result their productivity was also very low compared to exotic breeds. They have observed that grazing lands in India were over grazed and generally were in very poor condition and felt that very little attention was paid to develop the pastures.

Dwivedi and Jain (1977) observed that in Rajasthan most of the flocks were normally penned in open fields away from the houses and no shelter was provided to sheep and goats.

Jalihal (1977) mentioned that sheep normally attained full growth when they were about 2 years old and in India ewes were mated at about 9 to 14 months of age, and he felt that one ram could be used for 30 to 40 ewes and a lamb crop generally comprised of equal number of male and female lambs.

Srivastava and Sexena (1977) felt that in Uttar Pradesh sheep were reared and maintained not on any ration or concentrate feeding but on ad lib. grazing where the grazing fields were the open road side, uncultivated fields, orchards and forest lands. They have also indicated that Nali of Bikaneri breed of sheep gave birth to 6 to 7 lambs in their life time and the sex ratio of male and female lambs born was ♂ : ♀.

Dwivedi et al.(1978) recorded the population of 74.3 per cent breedable ewes in the flocks and that of rams 1.8 per cent in a bench mark socio-economic survey in Rajasthan. They have also stated that shearing was done 2 to 3 times a year during February/March, June/July and November/December. The average wool yield was 0.950 kg/adult/year and 0.4 kg/lamb. They have observed that more than 75 per cent flock owners sheared by themselves and few flock owners engaged hired shearers to shear their sheep on payment of cash at the rate of 0-30 paise per sheep or in kind.

Basuthakur and Kalla (1979) mentioned that lamb mortality varied widely with year and season and the mortality in the exotic lambs maintained at different parts of India varied from 7 to 47 per cent and the most important cause of mortality was imperfect mothering of lambs.

Mittal (1979) stated that grazing of sheep was one of the major problemsin western Rajasthan, as from January to June no grazing was available except few bushes and shrubs in common grazing fields. October to December was best season for grazing,

as during this time sheep were grazed in harvested fields. He mentioned that sheep were watered once daily at the noon time. Further, he observed that sheep farmers migrated towards the east in the month of December every year and returned back in June and July. Shearing was carried out during July and October by hand shears. He has mentioned that the most common disease was worm infestation which reached its peak during commencement of early rains in July.

Sinha and Wani (1979) observed that in the eight mating techniques the results were best due to the fact that one ewe got several opportunities of service in the same estrus cycle in the natural flock mating.

Kumar et al.(1980) observed more gain in body weight in castrated ram lambs than the uncastrated ram lambs.

Sharma (1981) recorded that about 22 per cent flocks migrated to smaller distances upto 20 km during lean periods from April to June in Rajasthan and the average flock size was 48 sheep.

2.3 Economics:

Potts (1953) recommended that a flock of 60 or more ewes would be more economical. Further, he thought that gross annual return from an ewe could be from 10 to 30 $ in U.S.A. depending upon the lambs and fleece produced.

Khot (1957) opined that an average flock of 50 to 60 sheep would provide a better standard of living to a shepherd than an agricultural labourer in India.

Dehoach and Williams (1957) recommended a flock of 20 to 60 ewes and a pure bred ram for a beginner. After gaining experience only one could afford to enlarge the flock to desired capacity. But they warned that sheep man must realise that the more the sheep on any one farm, the greater the parasitic problem.

Adams and Coopersmith (1963) thought that a farm flock should consist of 40 ewes, the number that one ram can handle. Further, they considered that a flock of 100 to 300 ewes would makes a more efficient unit and a flock of 500 to 1000 ewes would make a major livestock enterprise on the farm.

Raut and Sathe (1968) estimated that cost of production of mutton was Rs.1=11 per kg from Nellore sheep with an average flock size of 50 sheep. They hinted that increase in the size of the flock would reduce the cost of production.

Acharya and Saxena (1972) in their socio-economic survey in Rajasthan found an average income from a flock of 100 breedable ewes with attendant rams and followers to be Rs.3881=00 per year from Chokla and Rs.5642=00 from Nali breed of sheep.

Gangwar and George (1973) worked out the cost and returns of 3 to 5 sheep and a flock of 100 sheep. The profit per sheep in the first case was found to be Rs.4=27 and in the later case Rs.10=23.

Chowdhary (1974) stated that in India, the income from sale of wool constituted only 11 to 16 per cent of total earn-

ings from the flock, whereas, in other countries it was of the order of 30 to 40 per cent. He also estimated the return from an ewe to be Rs.5=80 per year.

Mittu et al. (1975) in their bench mark survey conducted in Rajasthan showed an average income of Rs.620=00 per annum from a flock of 72 sheep consisting of ewes, rams and lambs.

Srivastava and Sexena (1977) worked out a net monthly income of Rs.246=66 to Rs.268=20 from a sheep unit consisting of 50 adult sheep besides gaining a herd of 74 sheep of the value of Rs.6880=00 approximately as personal property at the end of fifth year, after repaying the loan and interest.

Dwivedi et al.(1977) in th ir survey work found the estimated income of Rs.720=00 per year from a flock of 100 ewes in Rajasthan.

Dwivedi and Mathur (1977) in their socio-economic survey on sheep farming, estimated a total income per year from a flock of 100 ewes, attendant rams was Rs.1045=00 and Rs.1422=00 during 1975 and 1977 respectively from crosses of Malpura, Marwari and Jaisalmari and on an average Rs.7201=00 from sale of wool from 100 sheep per year.

Dwivedi et al.(1978) in their bench mark survey in Malpura sub-division of Tonk district in Rajasthan had estimated the total income per year from sale of wool, lamb and manure etc. from a flock of 100 Malpura ewes with attendant ram and followers

to be Rs.5666=00 of which wool alone accounted for Rs.2171=00 and manure for Rs.500=00. They estimated the net income per annum per 100 sheep to be Rs.1519=15 i.e., Rs.15=20 per sheep per year.

Singh and Moore (1978) mentioned that generally in India a flock owner maintains 50 to 60 sheep as a minimum economic unit and those who rear sheep as side occupation to farming have a flock of 20 to 30 ewes. They also stated that the major portion of monetary income comes from mutton.

Maxwell (1979) has assessed a gross margin of 8?1 Pounds per flock of 100 ewes (Suffolk X Scottish half bred) with a Down ram per annum.

Kumar (1980) estimated from a sheep unit consisting of 20 Nellore ewes and one ram a net surplus of Rs.140=00, Rs.200=00, Rs.360=00 and Rs.770=00 in the first, second, third and fourth year respectively, for small farmers. whereas for marginal farmers and agricultural labourers the net surplus was Rs.160=00, Rs.140=00, Rs.610=00 and Rs.112=00 during first, second, third and fourth year respectively.

Mudaliar (1980) estimated a net profit of Rs.6250=00 per annum from a sheep unit of 100 ewes and 3 rams, with a total non-recurring investment of Rs.25000=00 and a bank interest at the rate of 10 per cent.

Sahani et al.(1981) estimated a total net saving of Rs.4000=00 per year from 100 adult black faced Marwari sheep

and their progeny. He mentioned that using a family member for grazing the sheep would enhance the annual income by about Rs.1500=00.

2.4 Marketing:

Khot (1957) mentioned that India would need more and more wool and increased supply of mutton for domestic consumption as the living standards improved.

Dehoach and Williams (1957) stated that in United States lambs were graded basing on the amount of finish that a lamb would carry and to gain the required finish for a lamb to be graded top within 4 to 5 months, required sound sheep production practices.

Adams and Coopersmith (1963) felt that it was difficult for a producer with a small flock to market lambs of uniform weight and quality at the proper time; hence suggested combined marketing practice, which allow topping out at the proper weight and quality, by combining lambs owned by several producers.

Venkatramanayya (1972) stated that ¼th of the total sheep in Andhra Pradesh were woolly type and wool produced was generally sold under imperfect market conditions.

Taneja (1974) mentioned that the Mediterranian countries have triple purpose breeds for milk, wool and meat. The sheep's milk was used for cheese making by the migratory flock owners in those countries and suggested the possibilities of introducing triple purpose breeds in India. He also felt that proper

grading and marketing of wool will definitely provide remunerative prices to the sheep breeders and thus provide incentive for improving their sheep for wool quality. He expressed the view that middle men rob the wool grower while purchasing wool and concluded that grading of wool would ensure the correct price to the wool grower in proportion to the quality of wool grown by him.

Srivastava and Saxena (1977) mentioned that in Uttar Pradesh wool collectors of industrial agencies purchase the wool from flock owners at the rate of Rs.7=50 to Rs.8=50 per kg. While the milk produced at the rate of 150 ml approximately per lactating ewe per day was generally consumed by the family members of the flock owners.

Dwivedi et al. (1978) observed that there were no organised agencies to market sheep and wool in Rajasthan and the flock owners sell about 80 per cent of wool produced to the middle men or brokers against cash at a very low price though the average wool price was Rs.18=00 per kg, and that they retain the remaining 20 per cent for home consumption.

They have mentioned that the average price of male lambs of 7 to 8 months age ranged from Rs.60=00 to Rs.70=00 and suggested that a little attention towards the marketing system would certainly increase the income of sheep breeders.

Singh and Moore (1978) stated that price per kg paid for slaughter sheep would depend largely upon the value of dressed animal and young; whereas, well finished lambs would fetch higher price for kg than old sheep. They have observed that the quality

and quantity of mutton was judged by feeling the rump, loins, legs and shoulder.

Mittal (1979) felt that there were no specific marketing facilities for disposal of wool and sheep in Western Rajasthan and the rams aged about 1 to 3 years were sold to visiting traders who go about collecting them for slaughter houses in the big cities.

Rao (1979) observed that there was not a well organised marketing system for livestock and meat in Andhra Pradesh, the cattle and sheep were marketed through weekly livestock markets and agents procured the animals from middle men in the marketing places on cheap bargained price. He mentioned that the price of mutton increased from Rs.6=00 per kg in 1973-74 to Rs.16=00 in 1979-80 and the skins of sheep and goats from Rs.22=00 each in 1976-77 to Rs.37=00 each in 1978-79.

Rao (1980) stated that the sheep population of Andhra Pradesh takes second rank next to Rajasthan accounting for 20.65 per cent of the country's sheep population and estimated to produce 14700 Tons of mutton and 27.16 lakhs kg of wool.

CHAPTER III

MATERIALS AND METHODS

3.1 Selection of the Study Area:

Keeping in view the objectives outlined for the investigation, a micro-level study based on primary cross-section (of sheep farmers), the data was designed. For this purpose five villages from Mahboobnagar district were selected, as Mahboobnagar was the second largest district in Andhra Pradesh after Ananthapur in sheep population and where the sheep development programmes of the Government under DPAP, LPP were in operation with the involvement of financial institutions like banks. The villages selected were thickly sheep populated and covered by Intensive Sheep Development Project under DPAP.

3.2 Selection of the Farmers:

The complete data about the five villages were obtained through a suitably designed questionnaire (appended as Annexure-III Schedule-I) and is presented in Table 1, and all those farmers who possessed sheep were listed from the five selected villages. The sheep farmers were grouped into 3 size categories on the basis of number of sheep owned viz.

1. Small -- 21 and less number of sheep
2. Medium -- Above 21 and below 50 sheep
3. Large -- Above 50 sheep.

From each village 12 sheep farmers, 4 from each category were selected at random. Thus a total of 60 sheep farmers and 20 from each category consituted the basis of this study.

3.3 Method of Data Collection and Period of Enquiry:

The data related to identification, family structure and engagement, land and irrigation sources, livestock particulars of the farmers and other management practices like grazing, feeding, housing and equipment, penning and folding, breeding, health coverage and extension activities were recorded in Schedule-II of Annexure-III while the data pertaining to marketing practices were recorded in schedule-III and the data pertaining to investments and returns were recorded in Schedule-IV of the same Annexure. The data were collected by a survey method and by direct personal investigation, visiting the sheep farmers and flock owners, and by careful enquiry from the head of the family, or some knowledgeable persons in the family who could be trusted for giving the factual data.

For the purpose of working out economics of sheep rearing, a 12 month period was considered. This study thus reports the finding of data collected from 60 sheep farmers in Mahboobnagar district and has reference period of one year from January to December, 1980.

3.4 Establishing Rapport:

Establishing rapport with the sheep farmers was a delicate and very important step in the conduct of this study and in collection of data. Before interviewing the selected sheep farmers, care was taken to acquaint with the problems of sheep rearing in rural areas and to create a sense of confidence among them. As a first step, this researcher introduced himself to

the selected sheep farmers and explained them the purpose and nature of this work (Fig. 1). Friendly and very cordial atmosphere was maintained throughout during the period of collection of data. Care was taken to see that the respondents were at ease and expressed themselves without any hesitation or reservation and every care was taken to administer the questions correctly in their local language Telugu in order to obtain right type of information so that the entire data met the overall objectives set out for this study.

3.5 Costs and Returns:

Fixed and variable costs were studied and analysed. Fixed costs included the cost of ewes, rams, equipment and housing. Variable costs refers to the expenses on grazing, human labour, medicines, miscellaneous expenses and interest on fixed costs and working capital on sheep production.

In the present study while working out income on the three different size units, farm income was worked out in terms of gross returns, and net returns on a unit of 100 sheep. Gross returns includes the receipts from sale of ram lambs, ewe lambs, old, unproductive and culled ewes and rams, excess rams, sale of wool, income from penning and foldings and sale of skins of dead animals, subsidy amount received from Government agencies and capital increment in farm strength.

3.6 Instruments of Analysis:

The entire data collected from the sheep farmers was classified and statistically analysed and tabulated so that tabular

Fig. 1. The researcher establishing rapport with the Sheep Farmers.

and functional analysis could be attempted to arrive at possible relationship, generalisations and ultimately pave the way for drawing the inferences. Analysis of variance was done according to the procedure outlined by Snedecor and Cochran (1967).

3.7 Limitations of this Study:

Since all the field studies using survey method and direct personal contact method of collection of data are subjected to certain limitations, this study was also no exception to this fact. As such the limitations of this study were:

1. The study had the limitation of time and resource of a single investigator.
2. The study was based on the verbal responses of the selected sheep farmers and as such, chances of bias cannot be eliminated completely. It is possible that some of the answers might not be correct or fully reflect their inner thoughts and opinions about the scheme.
3. As the data wereacollected from a sample of 60 sheep farmers of different flock sizes, the findings have to be viewed in the specific context or the conditions as they exist on the selected farmers and villages.
4. Another draw-back was the respondents hesitation in giving the correct information as most of the data concerned their socio-economic status and financial matters which is indeed a closely guarded secret under our cultural situations.

CHAPTER IV

RESULTS

For the purpose of clarity and brevity, the results have been broadly covered with reference to objectives set up for the study hereunder:

1. To study and analyse the management practices and problems encountered in sheep rearing in rural areas.
2. To study and work out farm investments and returns on different flock sizes of sheep like small, medium and large.
3. To study the existing practices of marketing sheep and their products.

4.1 General Information:

4.1.1 Social status:- In the survey conducted in Mahboobnagar district of Andhra Pradesh, it was observed that the area was spread with hills and hillocks, cultivable and waste lands occupied with a variety of vegetation. Most of the sheep farmers were poor. They were living in small kutcha houses and very few farmers were financially sound, having cultivable land with irrigation facilities. Most of the farmers were dependent on both sheep farming and agriculture. Major sources of irrigation were wells and tanks which entirely depend on rains. The major crops were paddy, jawar, ragi, bajra, groundnut, redgram, castor etc. Most of the farmers were not educated. Table 1 gives a general view of the facilities available in the selected villages regarding education, health cover, electricity, transport,

TABLE 1. General information

Sl. No.	Traits	Villages under survey				
		Pebbair	Mirasipally	Kothakota	Addakal	Janampet
1.	Education	Yes (HS)	Yes (HS)	Yes (Jr.C)	Yes (PS)	Yes (HS)
2.	Electricity	Yes	Yes	Yes	Yes	Yes
3.	Post office	Yes	Yes	Yes	Yes	Yes
4.	Telephone	Yes	Yes	Yes	No	No
5.	Transport and communication	Yes	Yes	Yes	Yes	Yes
6.	Health cover	Yes(PHC)	No	Yes(C.Dis)	No	No
7.	Banks	Yes(SBI)	No	Yes (AB)	No	No
8.	Cottage industries	No	No	No	No	No
9.	Drinking water	Yes	Yes	Yes	Yes	Yes
10.	Irrigation	Tank	Tank	Tank	Tank	Tank
11.	Veterinary services	Yes(LSU, SSU&SWEC)	Yes(SWEC)	Yes(LSU &SWEC)	Yes(RLU & SWEC)	Yes(SWEC & RLU)
12.	DPAP	Yes	Yes	Yes	Yes	Yes
13.	LPP	Yes	Yes	Yes	Yes	Yes

communication, banking, drinking water, veterinary services and various livestock development projects in operation in the area. All the villages were having the facilities of education, post and telegraph, transport, electricity and road communication.

Similarly DPAP, and LPP were in operation and veterinary services were freely available in these villages. There were no agriculture and animal based cottage industries in the area except few rice mills now coming up. Most of the sheep farmers were still orthodox in nature and only few of them were sending their children to schools. Consequent on the establishment of State Animal Husbandry Departmental Sheep and Wool Extension Centres under DPAP, the farmers were now showing keen interest and were involved in the sheep development activities of the department.

4.1.2 Distribution of land:- The total cultivable land was 16166.17 acres, of which 3666.17 acres was wet and the remaining 12500 acres was dry. The total waste land was 1071 acres which was used for grazing by all species of livestock. The dry wet and waste land constituted 72.52, 21.27 and 6.22 per cent of the total land respectively as shown in Annexure-I. Out of 343 sheep farmers, 274 farmers were having cultivable land ranging from 0.5 to 14 acres and the remaining 69 farmers were land less. The average land holding of the various categories of sheep farmers is presented in Table 2.

ABLE 2. Social status of sheep farmers

l. Flock o. size	Status of the sheep farmers			Financial assistance		Average flock size	Average land holdings in acres			No. of migratory flocks	No. of sheep looked after by a person
	No. of small farmers	No. of marginal farmers	No. of agril. labourers	No. of farmers taken loan	No. of farmers received subsidy		Wet	Dry	Total		
. Small	2	7	11	10	6	18	0.56	2.80	3.55	Nil	46
. Medium	2	8	10	10	7	28	0.35	2.45	2.80	4	34
. Large	3	17	-	10	7	98	1.00	3.64	4.64	6	53
, Total	7	32	21	30	20	48	0.63	2.96	3.59	10	44
, Percentage	11.7	53.3	35.0	50.0	33.33	-	-	-	-	12.6	-

4.1.3 Distribution of sheep and other livestock:- The village-wise distribution of sheep farmers, number of flocks, sheep and other livestock population is presented in Annexure-I. The livestock population was more than human population in the area. On an average every house hold possessed about 9 animals of which sheep accounted for 3.75 numbers. Distribution of different species of livestock is presented in Table 3. Sheep constituted the highest percentage of the total livestock with 42.47 per cent followed by bovine 29.19 per cent, poultry 24.39 per cent goat 3.09 per cent and others 0.86 per cent in the area of survey.

The total number of house holds were 3935 of which sheep farmers were 343 constituting 8.71 per cent. Of the 343 house holds of sheep farmers, sheep farming was main occupation for 194 families while it was a subsidiary occupation for the remaining 149 families constituting 56.55 and 43.45 per cent respectively.

The per cent number of flock owners possessing different sizes of sheep flocks is presented in Table 4. It is obvious from the table that maximum number (38.19 per cent) of flock owners possessed large units with 51 and more number of sheep, 34.69 per cent of the sheep farmers possessed small flocks with less than 21 sheep and 27.12 per cent of the farmers had medium size flocks with 22 to 50 sheep. For the purpose of grazing, all the sheep were grouped into 79 flocks of which 10 flocks were migratory. The main breed of sheep in this area was Deccani (Fig. 2) along with some other non-descript woolly type.

Fig. 2. Deccani breed of sheep.
An ewe and a ram.

TABLE 3. Distribution of different species of livestock

S.No.	Species	Number	Percentage
1.	Sheep	14791	42.47
2.	Goats	1073	3.09
3.	Bovines	10164	29.19
4.	Poultry	8496	24.39
5.	Others	296	0.86
	Total:	34820	100.00

TABLE 4. Statement showing per cent number of flock owners possessing different sizes of sheep heads

S.No.	Category	No. of sheep	No. of farmers	Per cent
1.	Small size flock	Less than 21	119	34.69
2.	Medium size flock	22 to 50	93	27.12
3.	Large size flock	51 and above	131	38.19
	Total:		343	100.00

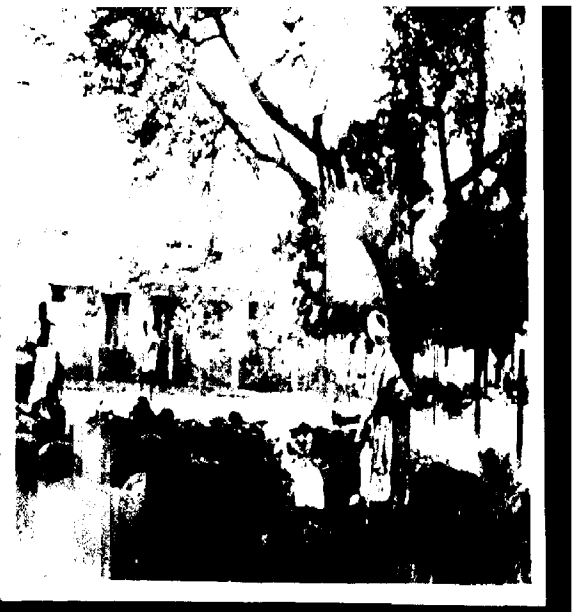

Fig. 3. Lopping and feeding of babul pods and branches.

tivated fields, orchards, common grazing lands, forest land etc. Normally the average distance covered daily for grazing was 2 to 3 km in autumn, 3 to 4 km in winter and 5 to 6 km in summer. The usual grazing hours were from 7 a.m to 7 p.m. in summer with one or two hours rest in the afternoon under shady trees and from 9 a.m. to 6 p.m. in autumn and winter seasons. Sheep were watered twice a day in winter and thrice in summer. In autumn sheep were not taken for watering as the rain water collected every where and sheep drank water while grazing when ever they liked. The main source of water in other seasons were village ponds, tanks and irrigation wells.

4.2.2 Migration:- About 12 to 15 per cent of the flock owners migrated towards south east in the month of January every year and returned back soon after the onset of monsoon, usually in the month of June (Table 2). The main purpose of migration was to provide adequate grazing and watering. During the period of migration the farmers earned a part of their livelihood from sheep foldings, selling weak and sick sheep which could not walk. Owners of large flocks moved along with their families, but the owners of small flocks united to form a large flock numbering about 300 to 500 sheep to minimise the strength of human unit. Generally 3 to 4 boys moved with a large flock. They followed different routes every year and halts were made after every 8 to 10 km distance. They migrated to areas as far as 150 to 200 km. During the migration time the sheep got subjected to a number of difficulties and hardships. They had no protection

and had to halt in the fields, the sheep were exposed to thefts and attacks by predatory animals. The practice of migration was most common during famine when there was scarcity of grazing and drinking water.

4.2.3 Housing and penning:- Sheep in the area were not provided with any type of shelter but they were grazed and penned in the open fields. Cotton rope or fibre rope nets (Fig. 4) were provided around the flock in the nights to protect the sheep from wild animals and one or two dogs were also reared and trained to protect the sheep. During hot summer sheep were given rest for one or two hours in the afternoon under shady trees. There was no protection to the sheep during autumn and winter. No shelter and extra care was given to pregnant and lactating ewes. They were grazed along with other sheep. The new born lambs upto the age of about two months were kept in large inverted baskets called 'Jallas' locally (Fig. 5) during the day time when their dams were sent for grazing. The lambs were allowed to live with their mothers (dams) during night times only.

The sheep were folded in others fields during nights for which the sheep farmers were paid either in cash or kind towards manure (droppings) in some villages. The sheep were folded in flocks of 800 to 1000 sheep. The sick and weak sheep which were unable to walk, were brought and sheltered in the houses of sheep farmers and were stall fed, and if no progress was noticed they were sold to butchers for mutton.

Fig. 4. Fibre rope net enclosing the flock.

Fig. 5. Large inverted baskets (Jallas) for keeping the lambs.

4.2.4 Breeding practices:- The common breed of sheep in this area was Deccani and some non-descript woolly sheep here and there. One of the main activities of the sheep and wool extension centres was sheep development to improve the quality and quantity of meat and wool through cross breeding.

For this purpose 50 per cent crosses of Corriedale - Bellary and Corriedale - Deccani rams were used (Fig. 6). The method of mating followed was natural flock mating. The breeding was uncontrolled as the rams were grazed and penned together with the ewes and were never separated during any part of the year as it involved additional labour, for grazing them separately. The ewes and rams of over 1½ years age were used for breeding. The useful age of breeding noticed was 2 to 7 years. Information collected indicated that the farmers retained the ewes upto 3 to 4 lambings only and the 5th lambing was quite uncommon. Three peaks of oestrus were observed in a year in this study, the first was in March and April, the second during June - July and some times extended to August and the third in October - November. About 60 per cent of the ewes were bred in June - July followed by 20 to 30 per cent in March - April and 10 to 20 per cent in October - November. The lambing percentage also followed the same pattern. Flushing and preflushing was not practiced in the area. Table 5 presents the ratio of rams to ewes maintained, lambing percentage, ratio of male and female lambs born, percentage of culling, mortality and sales in different flock sizes. On an average an ewe lambed once in a year and the lambing rate

TABLE 5. Statement showing lambing, sex ratio of lambs born, culling, mortality and sales

Sl. No.	Flock size	Lambing per cent	Ratio of male to female lambs born	Culling per cent	Mortality (%)			Sales per cent	Ratio of ram to ewes
					Lambs	Adults	Overall		
1.	Small	72.05	55:45	4.47	2.98	3.31	6.29	29.35	1:20
2.	Medium	78.50	51:49	1.04	3.66	0.73	4.39	17.50	1:25
3.	Large	77.86	49:51	2.04	2.96	1.99	4.95	15.14	1:33
4.	Average	76.13	51.66:58.34	2.51	3.20	2.01	5.21	21.66	1:26

was about 76.13 per cent. There was no significant difference in lambing rate among the three different size flocks under study as shown in table 5a, while the sex ratio of male to female lambs born was 55:46 in small size flock which was significantly different ($P<0.05$) from that of medium and large size flocks (table 5a) in which case it was 51:49 and 49:51 respectively as shown in table 5. On an average the male and female lambs born were 51.66 : 48.34. Early weaning was not practiced in the area as the farmers felt that it adversely affected the health and growth rate of lambs. Lambs were usually weaned at the age of 5 to 6 months. The male lambs intended for sale were castrated before weaning (Fig. 7).

4.2.5 Health coverage:- The survey revealed that sheep were prone to various infectious diseases like contagious caprine pleuro pneumonia, enterotoxaemia, foot and mouth disease, sheep pox, rinderpest, foot rot and contagious ecthyma and non-infectious diseases such as impaction of rumen, tympanitis, dysentry and enteritis and maggotted wounds, besides ecto and endo parasitic infestations. It was not possible to collect the disease-wise mortality from the farmers as no records were maintained by them. However, the main cause of mortality was pneumonia. Sheep and wool extension centres were providing prophylactic vaccinations against various infectious diseases for which vaccines were available and periodically deworming and deticking the sheep was practised in these villages. The sheep farmers were only using medicines for the diseased sheep, after they were

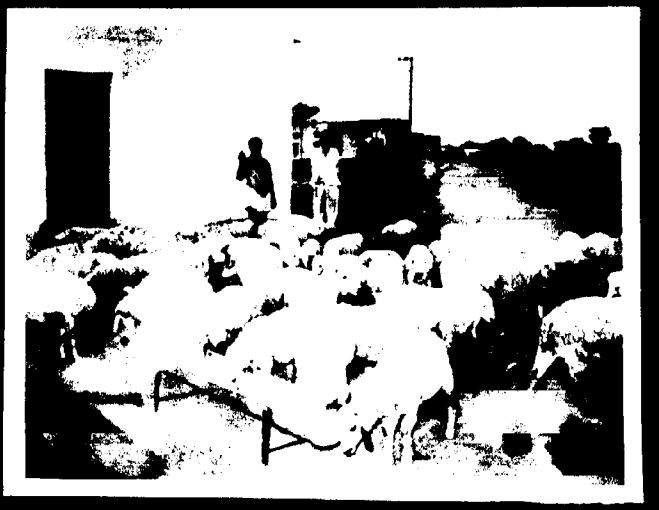

Fig. 6. 50% cross-bred rams used for upgrading local flocks.

Fig. 7. Castrating weaned ram lambs intended for disposal.

convinced about the efficacy of such medicines on the basis of demonstration on a small flock by extension personnel and also collecting information from other farmers in whom they had faith.

The sheep farmers were found to be liberal in spending money towards treatment, however they still belived in using local medicines like alum guar for diarrhoeas, sweet oil for impaction and tympanitis, Acaciabark and turmeric powder in sweet oil for impaction in lambs. There were still some farmers who were orthodoxic and superstitious in nature and believed in curing the diseases by use of 'Mantras'. The mortality and culling percentage among the three size flocks is shown in Table 5. The mortality in lambs was 2.98, 3.66 and 2.96 per cent in small, medium and large size flocks while in adult sheep, it was 3.31, 0.73 and 1.99 per cent respectively. These differences among the three flock sizes were statistically non-significant (Table 5b). The overall mortality for all the flocks was 5.21 per cent. However, the mortality rate in this survey was much low when compared to the approved rate of mortality by the All India Coordinated Research Projects which is about 10 per cent in adult sheep and 25 per cent in lambs. One of the main reason for low mortality was due to personal care and management and disposing off of any sick animal to the visiting butchers that was not responding to treatment.

The culling rate was 4.47, 1.04 and 2.04 per cent in small, medium and large size flocks respectively with an overall average of 2.51 per cent and the differences in culling rate

TABLE 5a. Analysis of variance for the effect of flock size on rate of lambing and sex-ratio among small, medium and large size flocks

Sl. No.	Source of variance	d.f.	MSS	
			Lambing rate	Sex ratio
1.	Between flocks	2	181.68^{NS}	0.87*
2.	Within flocks	57	61.68	0.15

*Significant at (P/0.05). CD = 0.24
Large - 0.95; Medium - 0.97; Small - 1.33.

TABLE 5b. Analysis of variance for the effect of flock size on the mortality and culling rates among small, medium and large size flocks

Sl. No.	Source of variance	d.f.	MSS	
			Mortality	Culling
1.	Between flocks	2	26.6^{NS}	53.61*
2.	Within flocks	57	14.49	13.45

*Significant at (P/0.05). CD = 2.27
Medium - 1.06; Large - 1.8; Small - 4.19.

between small to medium and large size flocks was highly significant (P/0.05) as shown in Table 5b. However, there was no significant difference in culling rates between the medium and large size flocks.

The veterinary services were easily available and the farmers were utilizing properly.

4.2.6 Shearing and other practices:- The adult sheep were sheared twice in a year and the lambs below one year only once. The usual months of shearing were May - June and November - December. Shearing was done with hand shears by a special class of people (Fig. 8), known as Kurvas locally, who are hired by the wool purchasers and were paid Rs.25=00 to Rs.30=00 per 100 sheep for one shearing. One person was found to shear about 20 to 25 sheep in a day and the average wool yield per adult sheep per clip ranged between 200 to 300 grams and that of a lamb, less than 200 grams.

Sheep in the area were usually not milked. In rare cases when the lambs dies the sheep were milked for consumption by the family members only. The average milk yield was said to be between 200 to 300 ml per ewe per day, but sale of ewes milk was unheard in the area.

4.2.7 Extension activities:- Most of the farmers in the surveyed area were not educated, hence they could not read any news papers, journals or magazines and very few of them were found to listen to the radio. They rarely go to the block office for any help

Fig. 8. Hand shearing of the sheep.

as they were pre-occupied with sheep grazing. Whenever there was an outbreak of di ease they approached the veterinary dispensary for advice. They were quite often involved in the group meetings, farmers training programmes and were exposed to the extension activities of Animal Husbandry Department.

4.2.8 Common problems faced by the sheep farmers:- Invariably the reply from a large number of sheep farmers on enquiry about their problems was about the shortage of grazing land and diagnosis of diseases. They felt deprived of their traditional right to graze in forest areas which were now getting more and more restricted by the forest officials. Scarcity of drinking water for sheep during summer months was another problem. The farmers also complained about the common thefts of sheep and attacks by predatory animals. They were facing difficulties for folding their sheep during autumn, as all the agricultural lands were brought under cultivation. They were also facing many difficulties in securing financial assistance from banks. They felt that the Government should provide the required broad spectrum deworming agents for periodical deworming of their sheep even on cost basis. They also felt that the remuneration from sheep rearing was not proportionate to their labour due to lack of organised marketing facilities for sheep and wool, and most of the profits were taken away by the middle men. Thus the problems posed by the poor sheep farmers, who entirely depended on sheep was more complicated than it appeared at the first instance.

4.3 Investments and Returns:

The investments and returns for a period of one year (January to December, 1980) have been worked out basing on the flock position in various categories, at the beginning and at the end of the year which is presented in Table 6. The maximum rate of increase in the flock strength was 34.18 per cent in medium size flock, followed by 30.55 per cent in large size flocks whereas in small size flocks it was only 0.56 per cent, the average increase was 27.49 per cent. The increase of flock strength in medium and large size flocks was highly significant ($P<0.01$) statistically while it was not significant in small size flocks (Table 6a).

The average investments and returns for 100 sheep is prosented in Annexure-II as per the Schedule-II of Annexure-III and the details of investments and returns for various size flocks is presented hereunder the following paragraphs.

4.3.1 Investments:- The investments on the sheep farm are broadly divided into fixed costs that include cost of sheep, housing and equipment and the variable costs that includes interest on the fixed costs, depreciation and repairs of buildings and equipments, cost of medicines, labour, feeding and other miscellaneous expenditure like torch lights etc. The relevant data is presented in Table 7, which gives a broad picture of components of investments. The total investment for 100 sheep was found to be Rs.20718=14 on small size flocks followed by Rs.20464=31 and Rs.18984=64 on medium and large sized flocks respectively. On

TABLE 6. Statement showing the flock position at the beginning and at the end of the year

Sl. No.	Flock size	Flock position at the beginning (as on 1.1.80)					Flock position at the end (as on 31.12.80)					Increase in flock strength	Per cent increase in flock strength
		Ewes	Rams	Ewe lambs	Ram lambs	Total	Ewes	Rams	Ewe lambs	Ram lambs	Total		
1.	Small	340	17	-	1	358	280	15	54	11	360	2	0.56
2.	Medium	518	21	7	1	547	513	20	158	43	734	187	34.18
3.	Large	1826	56	59	17	1957	1733	54	633	135	2555	598	30.55
4.	Total	2683	94	66	19	2862	2526	89	845	189	3649	787	27.49 AV
Percentage over flock strength		93.74	3.30	2.30	0.66	100.0	69.22	2.44	23.16	5.18	100.0	27.49	

TABLE 6a. Paired t-test for increase in flock strength among small, medium and large size flocks

S.No.	Size of the flock	d.f.	t - cal. value
1.	Small	19	0.15 NS
2.	Medium	19	13.55*
3.	Large	19	7.20*

*Significant at (P/0.01).

TABLE 7. Statement showing cost of sheep production for 100 sheep

Sl. No.	Item of cost	Small flock (Rs.)	Medium flock (Rs.)	Large flock (Rs.)	Average (Rs.)	Per cent
I.	Variable costs:					
1.	Interest	762=84	512=06	129=53	468=14	2.33
2.	Depreciation and Repairs	87=98	54=84	36=53	59=78	0.29
3.	Labour	919=55	1164=89	922=33	1002=25	4.99
4.	Medicines	277=93	383=36	370=72	344=00	1.71
5.	Feeding	315=08	-	-	105=02	0.52
6.	Miscellaneous	335=92	439=75	289=72	354=55	1.76
	Total Variable Costs	2698=60	2553=90	1748=83	2333=78	11.63
II.	Fixed costs:					
1.	Cost of sheep	17490=22	17340=03	16870=46	17233=57	85.92
2.	Cost of housing and equipment	529=32	570=38	365=35	488=35	2.43
	Total Fixed Costs	18019=54	17910=41	17236=81	17721=92	88.36
	Total Costs (I + II)	20718=14	20464=31	18984=64	20055=70	100.00

an average the total investment on 100 sheep was Rs.20055=70.

4.3.2 Fixed costs:- Fixed costs accounted for 88.36 per cent of the total investments in which 85.92 per cent was on the cost of sheep alone. The cost of 100 sheep were Rs.17490=22, Rs.17340=03 and Rs.16870=46 for small, medium and large size flocks respectively. There was no statistically significant difference (Table 7a) on fixed costs among the three size flocks.

The investment on housing and equipment was almost negligible, which was on an average about 2.43 per cent of the total investment on 100 sheep. The investment on housing and equipment was Rs.529=32, Rs.570=38 and Rs.365=30 for small, mediu and large size flocks respectively, the average being Rs.488=36 on 100 sheep.

4.3.3 Variable costs:- These include cost of labour, medicines feeding, interest, depreciation and repairs on housing and equipment and miscellaneous costs. On an average the total variable costs for various categories of sheep flocks was 11.63 per cent of the total investment. The total variable costs for 100 sheep in small size flocks was Rs.2698=60, Rs.2553=90 and 1748=83 on medium and large size flocks respectively indicating that the operational costs for a larger flock would be comparatively less though there was no significant difference among the three flock sizes as shown in Table 7a. On an average the total variable cost was Rs.2333=78 for 100 sheep.

4.3.4 Cost of labour:- The average investment on labour for 100 sheep was Rs.1002=25 which accounted for 4.99 per cent of the

TABLE 7a. Analysis of variance for the effect of flock size on fixed costs and variable costs among the small, medium and large size flocks

Sl. No.	Source of variable	d.f.	MSS	
			Fixed costs	Variable costs
1.	Between flocks	2	0.32^{NS}	3.89^{NS}
2.	Within flocks	57	0.53	2.46

total investment. The cost of labour excluding the family labour ranged from a maximum of Rs.1164=89 for medium size flock to Rs.919=55 for small size flocks and Rs.922=33 being the cost of labour for the large size flocks as shown in Table 7.

Some measures of labour efficiency for flocks of various sizes are presented in Table 8. On an average 35 persons were engaged for 1642 sheep of which 28 persons were family members and 7 persons were employed at the rate of one person for every 44 sheep (Table 2). On an average there was a saving of Rs.35294 due to engaging of family members thereby providing themselves with employment as shown in Table 8.

4.3.5 Medicine costs:- Medicines cost on an average was Rs.344=00 per 100 sheep which represents 1.71 per cent of the total investment. The investment on medicines was Rs.277=93, Rs.383=36 and Rs.370=72 for small, medium and large size flocks respectively as shown in Table 7.

4.3.6 Feeding costs:- Cost of feeding sheep was almost negligible since sheep were raised on grazing alone. Whatever little amount that was spent on Babul trees (Acacia arabica) lopped and fed in early summer which was Rs.315=08 in small size flock. The average cost of feeding was Rs.105=02 for 100 sheep which represented only 0.52 per cent of the total investments as shown in Table 7.

4.3.7 Interest, depreciation and repairs:- The interest rate on the fixed costs for 100 sheep on an average was calculated to

TABLE 8. Some measures of labour efficiency

Sl. No.	Items	Flock size			Average
		Small	Medium	Large	
1.	Total number of sheep	603	944	3378	1642
2.	Number of persons engaged	13	30	63	35
	a) Family members	10	24	50	28
	b) Other employed	3	6	13	7
3.	Amount spent on labour	3292=00	6372=00	18050=00	9238=00
4.	Labour charges/100 sheep	545=93	675=00	534 =33	585=08
5.	Labour for 100 sheep	2.15	3.17	1.86	2.39
6.	Labour charges saved due to engagement of family members	10973=33	25488=00	69423=00	35294=77

be Rs.468=14 at the rate of 11.85 per cent which is the present rate of Bank interest. This represented 2.33 per cent of the total investment. The interest on the capital investment was Rs.762=84, 512=06 and 129=53 for small, medium and large size flocks respectively, which was statistically non-significant (Table 7a).

Depreciation and repairs on an average costed Rs.89=78 for 100 sheep which just represented only 0.29 per cent of the total investment. The depreciation and repairs costs for 100 sheep was Rs.87=98, Rs.54=84 and Rs.36=53 for small, medium and large size flocks respectively as shown in Table 7. The differences among the three flock sizes were non-significant.

4.3.8 Miscellaneous costs:- Miscellaneous costs either in cash or kind in the shape of lambs on an average represented 1.76 per cent of the total investment. The miscellaneous costs ranged from the lowest of Rs.289=72 for large size flocks to an highest of Rs.385=99 for small size flock. On an average it was Rs.354=55 for 100 sheep as shown in Table 7. However, the differences were statistically non-significant among the three flock sizes.

4.3.9 Source of investment:- Source of investment for various categories of sheep flocks is presented in Table 9. From the table it is clear that on an average out of Rs.17721=92 this being the total investment on 100 sheep, Rs.12944=78 was self investment, Rs.3908=43 being loan received from various commercial Banks and Rs.778=71 was subsidy amount received from live-

TABLE 9. Statement showing the source of fixed capital investment for 100 sheep

Sl. No.	Flock size	Loan amount (Rs.)	(%)	Subsidy amount (Rs.)	(%)	Self investment (Rs.)	(%)	Total (Rs)
1.	Small	6578=21	36.50	1184=35	6.57	10256=98	56.93	18019=54
2.	Medium	4323=58	24.14	916=63	5.17	12670=21	70.74	17910=42
3.	Large	1093=52	6.35	235=15	1.36	15907=15	92.29	17236=82
4.	Average	3998=43	22.33	778=71	4.36	12944=78	73.32	17721=92

stock production programme in operation representing 73.32, 22.33 and 4.36 per cent respectively. The self investment on 100 sheep ranged from a lowest of Rs.10256=98 in small size flocks to an highest of Rs.15907=15 in large size flocks and Rs.12670=21 for medium size flocks, constituting 92.29, 70.74 and 56.93 per cent of the total investments in large, medium and small size flocks respectively.

Analysis of variance (Table 7a) revealed that there was no statistically significant difference among the three size flocks in respect of fixed costs and variable costs.

4.3.10 Gross returns:- The returns from sheep farming include sale of sheep for mutton, sale of wool, manure, skin of dead sheep and capital increment in farm strength which is the value of unsold lambs in the flock that were added to the original flocks during the year from lambings. Since livestock production programme of state Animal Husbandry Department was in operation some of the sheep farmers received subsidy from State Government. Gross returns with sources of receipt for 100 sheep per year in all three categories of flocks is presented in Table 10.

The total gross returns for 100 sheep on medium size flock was Rs.11183=16 followed by large size flock Rs.10124=06 and lowest of Rs.9927=93 from small size flock. However, these differences between three categories of flocks were statistically non-significant as shown in Table 10b. On an average the total gross returns for 100 sheep was Rs.10411=65.

TABLE 10. Statement showing gross returns for 100 sheep (Rs.)

S.No.	Source of receipt	Small flock	Medium flock	Large flock	Average	Per cent
1.	Sale of ram lambs	3328=21	2537=47	2664=28	2843=32	27.31
2.	Sale of ewe lambs	1318=49	583=18	496=42	799=33	7.68
3.	Sale of culled ewes	1572=62	127=97	289=88	663=52	6.37
4.	Sale of culled rams	111=73	-	10=21	40=64	0.39
5.	Sale of wool	300=75	465=08	445=68	425=83	4.09
6.	Sale of manure	402=51	577=69	606=38	495=52	4.76
7.	Sale of skins	125=13	83=91	95=29	101=44	0.97
8.	Subsidy amount received	1184=35	916=63	235=15	778=71	7.48
9.	Capital increment in farm strength	1518=15	6891=22	5278=48	4229=28	40.62
10.	Other sources	-	-	102=19	34=06	0.33
	Total Gross Returns	9927=93	11183=16	10124=06	10411=65	100.00
	Percent of gross returns on total investment.	47.92	54.65	53.33	51.91	

TABLE 10a. Analysis of variance for various sources of income among small, medium and large size flocks

S.No.	Source of variance	d.f.	SS	MSS	F
1.	Flocks	2	245.51	122.75	0.96^{NS}
2.	Various sources of income	7	4123.86	589.12	4.69*
3.	Error	14	1795.74	128.26	
4.	Total	23	6165.11		

*Significant at (P/0.05).

TABLE 10b. Analysis of variance for the effect of flock size on gross returns and net returns among small, medium and large size flocks

S.No.	Source of variance	d.f.	MSS	
			Gross returns	Net returns
1.	Between flocks	2	3.36^{NS}	1505.21*
2.	Within flocks	87	7.91	444.23

*Significant at (P/0.05). CD = 13.06
Small - 71.06; Large - 81.65; Medium - 88.20.

The per cent of gross returns to total investment was 47.92, 54.65 and 53.33 for small, medium and large size flocks respectively, the average being 51.91 per cent.

Two major sources of income were from the sale of ram lambs, ewe lambs, culled ewes and rams which put together constituted 41.75 per cent and the capital increment in farm strength which was 40.62 per cent of the total returns. Among the income from sale of sheep, the income from sale of ram lambs was highest which was 27.31 per cent, followed by sale ofewe lambs, culled ewes and rams which was 7.68, 6.37 and 0.39 per cent respectively.

The other important sources of income were subsidy received, sale of manure and wool. These constituted 7.48, 4.76 and 4.09 per cent of the gross returns respectively.

The income from sale of skins of dead sheep and other sources was negligible which were 0.97 and 0.33 per cent of the gross returns respectively.

The analysis of variance of various sources of income presented in Table 10a revealed a significant difference ($P<0.05$) among various sources of income within the flock sizes while there was no significant difference among the three flock sizes statistically.

4.3.11 Net returns:- The net returns have been arrived at for the three different flocks after deducting the operational costs, depreciation and interest, from the gross returns. The same is presented in Table 11. The net returns per month and per year

TABLE 11. Statement showing net returns from different sizes of flocks

Sl. No.	Flock size	Per sheep		Per 21 sheep		Per 50 sheep		Per 100 sheep		Percen on tot investment
		Per year Rs.	Per month Rs.	Per year Rs.	Per month Rs.	Per year Rs.	Per month Rs.	Per year Rs.	Per month Rs.	
1.	Small	72=29	6=02	1518=09	126=50	3614=50	301=20	7229=33	602=44	34.89
2.	Medium	86=29	7=19	1812=09	151=00	4314=50	359=54	8629=25	719=10	42.17
3.	Large	83=75	6=97	1758=75	146=56	4187=50	348=95	8375=28	697=94	44.12
4.	Average	80=78	6=72	1696=31	141=34	4038=50	336=56	8078=00	673=16	40.28

for one sheep, 21 sheep, 50 sheep and 100 sheep in various categories have been worked out and presented in Table 11. The per cent of net returns to total investments were 34.89, 42.17 and 44.12 for small, medium and large size flocks respectively, which indicates that as the flock size increased the total investments decreased and the net returns increased. On an average the net returns for 100 sheep per year were Rs.8078=00 which constituted 40.28 per cent of the total investment (Table 11).

Analysis of variance presented in Table 10b revealed a significant difference ($P<0.05$) between the net returns of small and medium size flocks while there was no significant difference between the medium and large size flocks.

Relationship of flock size to gross returns, variable costs and net returns for 100 sheep is presented in Table 12. The total net returns for 100 sheep on medium size flock were Rs.8629=25, followed by Rs.8375=28 for large size flock and Rs.7229=33 for small size flocks, the average being Rs.8078=00.

The per cent of gross returns and net returns to total investment on three size flocks is presented in Table 13. From the table it is clear that the total investment on 100 sheep was Rs.20718=14, Rs.20464=31 and Rs.18984=64 for small, medium and large size flocks respectively, the average being Rs.20056=70. The net returns increased as the size of the flock increased which were 34.89, 42.16 and 44.11 per cent of the total investment for small, medium and large size flocks respectively, the average

TABLE 12. Statement showing relationship of flock size to gross returns, variable cost and net returns per 100 sheep

Sl. No.	Items	Flock size			Average
		Small	Medium	Large	
1.	Sample size	20	20	20	20
2.	Average number of sheep	15	28	98	48
3.	Gross returns (Rs.)	9927=03	11183=18	10124=11	10411=74
4.	Variable costs (Rs.)	2698=60	2553=93	1743=83	2333=74
5.	Net returns (Rs.)	7229=23	8629=25	8375=28	8078=00

TABLE 13. Statement showing the per cent of gross returns and net returns to total investment on small, medium and large size flocks

Sl. No.	Flock size	Total investment for 100 sheep(Rs)	Gross returns		Net returns	
			Amount Rs.	Per cent	Amount Rs.	Per cent
1.	Small	20718=14	9927=85	47.91	7229=33	34.89
2.	Medium	20464=31	11183=15	54.64	8629=25	42.16
3.	Large	18984=64	10124=06	53.32	8375=28	44.11
4.	Average	20055=70	10411=66	51=91	8078=00	40.27

being 40.27 per cent. The gross returns were 54.64 per cent of the total investment in medium size flocks followed by 53.32 and 47.91 per cent in case of large and small size flocks respectively, the average being 51.91 per cent.

4.4 Marketing Practices:

4.4.1 Sheep for mutton:- There were no organised agencies to market the sheep and wool. Usually ram lambs aged between 5 to 6 months, excess rams, old and unproductive rams and ewes and sick sheep were culled and sold to the visiting traders, middle men who go about collecting them for slaughter purpose in the towns. Table 14 indicates the type and number of sheep marketed in various flocks. From the table it is clear that mostly ram lambs are sold and which fetches more price than any other type of sheep, as the mutton from weaned ram lambs was of better quality and there was great demand for weaned ram lambs. Out of 177 sheep sold for mutton in small size flock 121 were ram lambs. Similarly the number of ram lambs sold in medium and large size flocks was 142 out of 167 sheep sold and 536 out of 613 respectively as shown in Table 14. Generally, breedable ewes were not sold. There was no scientific method followed in judging the quantity and quality of meat. The quality and quantity of meat was judged by feeling the rump, loins, thighs and muscles of the body.

The average price fetched for weaned ram lambs was found in the range of Rs.80=00 to Rs.110=00 and that of adult rams Rs.200=00 to Rs.300=00. The price of breedable ewes ranged betwee

TABLE 14. Statement showing number of sheep marketed among various flock sizes

Sl. No.	Category of sheep	Small		Medium		Large		Total no. of sheep marketed	Per cent
		No. of sheep	Per cent	No. of sheep	Per cent	No. of sheep	Per cent		
1.	Rams	-	-	-	-	-	-	-	-
2.	Ewes	13	2.15	-	-	-	-	13	1.35
3.	Ram lambs	121	20.00	142	14.88	536	15.87	799	83.49
4.	Ewes lambs	43	7.13	25	2.62	77	2.27	145	15.15
5.	Total	177	29.28	167	17.50	613	18.14	357	100.00

Rs.150=00 to Rs.220=00. Old, unbreedable and culled sheep fetched very low prices. The prices of sheep slightly varied from village to village and depended upon the season and demand for mutton.

4.4.2 Wool:- There were no specific marketing facilities for disposal of wool. Wool was sold to middle men or brokers. Usually the middle men advanced some amount to the sheep farmers and when the sheep were ready for shearing they engaged the hired labourers for shearing and the purchasers collected the wool. The wool was disposed of on the basis of per animal per clip or per 100 animals per clip basis irrespective of the yield. Classification and grading of wool was not done. In some places the sheep were washed a week before shearing. The wool from washed sheep containedless impurities and was found to be in better condition and fetched more price than unwashed sheep. On an average Rs.100=00 to 250=00 were paid for 100 sheep per clip. The rates varied from place to place and as per the demand and season.

4.4.3 Manure:- Generally sheep were folded in the fields of other farmers during nights. Some sheep farmers having cultivable land folded their sheep in their own fields to reduce the cost on fertilizers. In some villages the sheep farmers were paid towards the value of manure at the rate of Rs.150=00 to Rs.200=00 per flock of 800 to 1000 sheep per week. In some places the farmers were paid in kind i.e., paddy, jowar etc. In some

other places no folding charges were paid as the sheep were allowed to graze in other farmers fields free of cost.

4.4.4 Skins:- Skins of dead animals were sold to the middle men or butchers. Skins of dead animals fetched less price than those of slaughtered animals. The price of a skin ranged from Rs.6=00 to Rs.20=00 from place to place, according to the age, size and condition of the skin. Fresh skins without any wounds, cuts and injuries fetched comparatively more price.

4.4.5 Milk:- It was not a common practice to milk the sheep. Sheep were rarely milked. When the lambs died the milk was drawn and consumed by the members of the family only.

CHAPTER V

DISCUSSION AND CONCLUSIONS

5.1 General Information:

5.1.1 Social status:- During the survey, it was observed that the entire area was covered with hills, hillocks, forest land, cultivable and waste lands. Mahboobnagar district was a chronic drought prone area with very little irrigation facilities and was most suited for sheep rearing. Government of Andhra Pradesh has rightly selected the district for the implementation of sheep development programmes under livestock production programme. Most of the sheep farmers were poor with less than five acres of land and depended mostly on sheep rearing to earn their livelihood, there by gaining self employment. Taneja (1974), Dwivedi *et al.* (1978) and Singh and Singh (1979) also observed similar status of the sheep farmers in other parts of India. Most of the farmers were traditional sheep farmers and liked their profession. They were illiterate, though educational facilities were easily available and very few of them who were financially sound sent their children to schools while other engaged their children in sheep grazing along with them to save the cost on labour and also to teach the profession. The social status of the sheep farmers in the thickly sheep populated Rajasthan State also was similar as described by Dwivedi and Mathur (1977).

All the villages were having minimum required facilities like drinking water, electricity, medical aid, transport and road communication, post offices and schools. Veterinary services

were easily available which the farmers were fully availing. Banking facilities were available in two of the five surveyed villages and the banks were catering to the needs of surrounding villages. The banks were liberally financing the sheep units. 30 out of 60 farmers surveyed had taken loans for their sheep units. The sheep farmers were fully involved in the sheep development activities of State Animal Husbandry Department under the schemes like DPAP, LPP and IRDP. 21 farmers had received subsidy amount under LPP out of the 30 farmers who had taken loan from banks (Table 2).

Sheep rearing was more popular with marginal farmers and agricultural labourers as observed. Out of 60 farmers surveyed, 53 belonged to the above mentioned categories. The average flock size was 48 sheep and on an average each person looked after 44 sheep as shown in Table 2. About 80 per cent of the labour engaged in sheep rearing were family members. Mostly the large size flock owners engaged other labourers as indicated in Table 8.

5.1.2 Distribution of land:- In the surveyed area, out of 16166.17 acres of cultivable land, dry land constituted 72.5 per cent indicating lack of irrigation facilities (Annexure-I). The farmers mostly depended on rain fall which was very low (60 to 104 mm). The waste land constituted only 6.22 per cent and was used for grazing all species of livestock resulting in limited grazing facilities for sheep. Out of 343 sheep farmers in the area, 274 farmers were having cultivable land, most of

them being marginal farmers with less than five acres of land. Of the 60 sheep farmers surveyed 32 were marginal farmers and 21 were agricultural labourers with out any land, which clearly indicated the financial status of sheep farmers. Similar observations were made by Dwivedi and Jain (1977) from thickly sheep populated state of Rajasthan. From the findings of the survey it was very clear that sheep farming was mostly taken up by small, marginal farmers and land less agricultural labourers to earn their livelihood and was a means of self employment.

5.1.3 Distribution of sheep and other livestock:- Sheep constituted the highest per cent of the total livestock population, the percentage being 42.47, followed by bovines, poultry and goats with 29.19, 24.39 and 3.09 per cent respectively, as indicated in Table 3. This clearly showed that sheep farming was more popular than poultry and dairy farming, Similar findings were reported by Dwivedi et al. (1978) in Rajasthan.

Sheep farming was the main occupation for 56.55 per cent of the shepherd families while it was a subsidiary occupation along with agriculture for the remaining 43.45 per cent families.

The survey revealed that maximum number (38.10 per cent) of flock owners possessed large size flocks with more than 51 sheep. Dwivedi et al. (1978) reported a maximum number (35.10 per cent) of the flock owners possessing 51 to 100 sheep in Rajasthan, while 34.69 per cent of the flock owners possessed small size flocks with less than 21 sheep and 27.12 per cent

of the flock owners possessed medium size flocks with 22 to 60 sheep as indicated in the Table 4. The average flock size in the surveyed area was 45 sheep, while Dwivedi et al. (1978) reported the average flock size to be 61 sheep in Rajasthan. For the purpose of grazing management, all the sheep were grouped in to 79 flocks of which 10 flocks were migratory constituting 12.6 per cent (Table 2), while Sharma (1981) recorded 22 per cent flocks migrating to smaller distances in Rajasthan.

5.2 Management Practices:

5.2.1 Grazing, feeding and watering:- Grazing of sheep was a major problem of the sheep farmers due to intensive cultivation. The common grazing land was only 6.22 per cent of the total land (Annexure-I) for all classes of livestock, and whatever was left and available was not looked after and cared properly. Similar conditions were reported in other parts of the country by Acharya and Patnayak (1972), Sastry and Thomas (1976) and Mittal (1979). October to December was the best season for grazing, as during this period sheep were grazed in harvested fields. Mittal(1979) also reported similar conditions prevailing in western Rajasthan. Srivastava and Saxena (1977) reported that in Uttar Pradesh sheep were reared and maintained not on any ration or concentrate feeding but on ad lib. grazing and the grazing areas were open fields orchards and forest lands etc. The findings in the present investigation were not different from their findings. No fodder crops were grown exclusively for sheep feeding and no supplementary

feeding was given to any type of sheep, except some lopping of trees and air dried pods of Acacia during early summer.

Gangwar and George (1973) stated that sheep could live on cultivated waste land, their feed requirement was also not rigid and they fed on many types of weeds. Thus they were excellent destroyers of weeds. While Sastry (1976) opined that as sheep and goats were raised almost entirely on roughage, the cost of production was lower than that of poultry and pigs. In the present study also the feed cost represented only 0.52 per cent (Table 7) of the total cost of production. This cost was mainly due to purchase of babul trees during summer.

The sheep were grazed for about 10 to 12 hours in summer and 8 to 10 hours during winter and autumn, depending upon the availability of grazing areas and covering about 2 to 6 kms a day. In the scarcity areas during summers the sheep farmers were forced to migrate in search of grazing lands just the same way as mentioned by Singh and Moore (1968) and Mittal (1979).

It is an established fact that good level of feeding is essential to exploit the genetic production potential of the animal. Therefore, it was felt necessary that some concentrates should be given to ewes every day, 3 weeks before breeding, (Flushing)6 weeks before and 8 weeks after lambing. The rams also should receive concentrate ration during breeding season (Fig. 9) because he is half of the flock and should be in a fit condition. Feeding ewes 2 to 3 weeks before breeding is called flushing which increases the lamb crop by 17 to 18 per cen

Fig. 9. Feeding the breeding rams with concentrates during breeding season.

(Mudaliar,1972) and it also ensures liberal flow of milk for the offsprings which is very essential, since there is no food like ewes' milk for putting rapid gains on young lambs as mentioned by Dehoach and Williams (1957). The economics of sheep rearing was mainly dependent on attainment of maximum lamb weight in minimum time as reported by Singh et al.(1973). Since there is a lot of competition for concentrates by poultry and pigs, it is suggested that agricultural wastes, industrial by-products and dry roughages treated with urea and minerals could be made best use of for feeding sheep.

Profits could be enhanced by providing good pastures, provided that the density of stocking and level of management were proper. Since well managed flocks will produce more per acre, per unit of labour and per unit of capital employed. It is suggested that some areas should be left and protected for good pastures since the area was thickly sheep populated.

Sheep were watered twice in winter and thrice in summer and during autumn from the rain water that collected every where. The main source of water during other seasons were village ponds, tanks and irrigation wells. Mittal (1979) reported that in western Rajasthan sheep were watered once daily at noon time due to scarcity of drinking water. It was felt that sheep should have free access to fresh and clean water all the time. While allowing sheep to drink water from ponds and tanks care should be taken to eliminate snails to control liver fluke infestation.

5.2.2 Migration:- About 12 to 15 per cent of the flock owners were forced to migrate every year towards south east (Kurnool and Srisailam) in January to provide adequate grazing and watering to sheep. They returned at the onset of monsoon, usually in the month of June. During the period of migration, the flock owners earn a part of their livelihood from sheep folding, by selling weak and sick sheep.

Migration was not only common in this area but also in Northern India as mentioned by Singh and Moore (1968), Taneja (1974), Mittal (1979) and Sharma (1981). To improve the system of migration Taneja (1974) suggested to study and map the seasonal movement of the migratory shepherds and locate the sheep and wool extension centres along the routes of migration to facilitate and provide all veterinary aid. This would also help in propagation of improved germ plasm through artificial insemination techniques and also help exchange the indigenous rams with half bred rams in the areas where cross-breeding for wool or mutton was desired.

5.2.3 Housing and penning:- It was found that sheep were not provided with any type of shelter and they were penned in the open fields. Similar observations were made by Dwivedi and Jain (1977) in Rajasthan. The amount spent towards housing and equipment was just 2.43 per cent of the total cost of production. This amount was spent for purchase of 'Jallas' and nets, etc. (Fig. 4 and 5). The new born lambs upto the age of 2 months

were kept in the large inverted baskets called 'Jallas' during the day time (Fig. 4). Some trained dogs were seen with the sheep to protect them from predators etc.

It was felt here as also the farmers agreed that sheep required shelter to protect themselves from heavy rains, severe colds and hot summer, and also from the attacks of predatory animals. Every sheep farmer should provide sheep sheds with atleast thatched roof with a floor area of 1 to 1.5 square meters per sheep (Fig. 10). Common shelters (folding centres) should be established in the routes of migration to provide shelters to the migratory flocks. The shelters should be spacious, fenced with barbed wire and have sheds with asbestos roofs or any cheap and light material roof like asphault.

5.2.4 Breeding practices:- The common breed of sheep in this area was Deccani and some non-descript woolly sheep were also found here and there. Deccani breed of sheep was not only poor in birth weight, weaning weight, age at maturity but also it was poor in prolificacy, when compared to North Indian and exotic breeds. The farmers retained the ewes for 3 to 4 lambings only and the 5th lambing was uite uncommon. Mudaliar and Rao (1976) reported upto 7 lambings in Bellary breed, though the percentage of lambing was very small and about 5 lambings in Bikaneri, Nellore and Mandya breeds of ewes, while Srivastava (1977) reported 6 to 7 lambings in Nali and Bikaneri breed. The breedable ewes in the flocks constituted 69.22 per cent of the total sheep population in the present survey, while Dwivedi

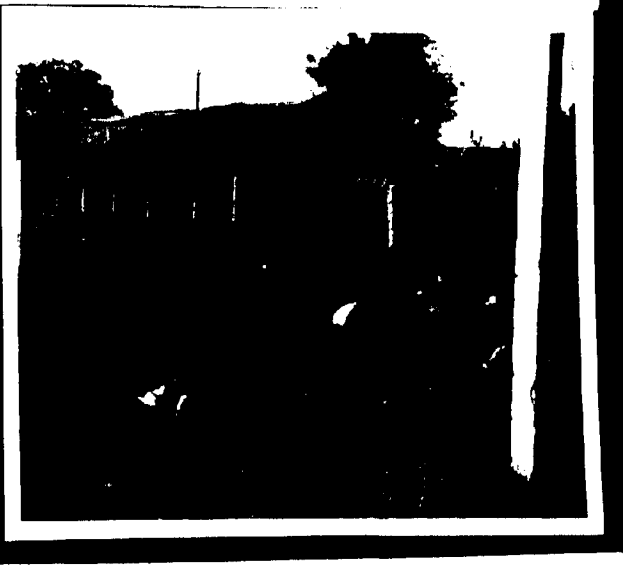

Fig. 10. Kutcha thatched roof shed for housing sheep.

et al. (1978) recorded 74.3 per cent breedable ewes in Rajasthan. The average lambing per cent was 76.13 in the present study while sex ratio of male and female lambs borns was 51.66 : 48.34, through various authors reported different sex ratios of lambs born they are not significantly differing from the present findings. Mudaliar (1974) reported the sex ratios in Nellore, Mandya, Bellary crosses, Bellary and Bikaneri breeds to be 49.09 : 50.01, 50.36 : 48.44, 45.83 : 54.17, 52.22 : 4.78 and 48.71 : 51.29 respectively, while Jalihal (1977) and Srivastava and Jexena (1977) reported ♂ male : ♀ female in Mali and Bikaneri sheep. It was noticed during the survey that ewes and rams of over 1½ years were used for breeding. Jalihal (1977) mentioned that in our country the sheep normally attained full growth when they were about 2 years old but they were mated at about 9 to 14 months of age. However, breeding at the age of 9 to 14 months of age is not good because they are not fully developed.

The ratio of rams to ewes maintained in the flocks was 1:20 in the present study which was more than the suggested 30 to 40 ewes per ram by Jalihal (1977). The excess of rams in the present survey might be due to the fact that a number of sheep farmers together group their sheep in to a big flock and each farmer maintained rams for his flock. Three peaks of oestrus were observed in a year, the first being March - April, second in June - July and some times extended to August and the third in October - November. Maximum number of about 60 per cent ewes were bred in June - July followed by 20 to 30 per cent and

10 to 20 per cent in summer and winter seasons respectively. Mudaliar et al.(1974) indicated that Bellary, Bikaneri and their cross-bred ewes were capable of breeding and lambing throughout the year and suggested that if lambing throughout the year was not desired breeding should be controlled.

It was observed that breeding was uncontrolled as the rams were grazed and penned together with the ewes and were never separated during any part of the year. This practice may be due to the fact that it involved additional labour for grazing the rams and ewes separately. Sinha and Wani (1979) felt that the results were best in the night mating techniques because one ewe got several opportunities of service in the same oestrus cycle in the natural flock mating.

It is suggested here, to control the breeding season so that lambing is confined to one period only and the entire lamb crop can be given proper care, besides the labour and expenditure entailed in their management are restricted to shorter period. It is extremely important that the sheep farmers should plan breeding in such a way that good feeding conditions exists for ewes, especially during the latter stages of pregnancy and after lambing, so that liberal flow of milk is ensured to the lambs. The farmers should concentrate much on autumn breeding to achieve the above mentioned goals. Lambing in summer should be discouraged since it is a loss.

It was found during the study that some efforts were made to cross-bred the local stock by using 50 per cent crosses

of Corriedale Bellary and Corriedale Deccani rams supplied by the State Animal Husbandry Department, but the drive of cross-breeding was not intensive enough to bring result oriented improvement in the production. This may be due to non-availability of cross-bred rams to the extent needed and perhaps also that the farmers were not able to divide their flocks into two groups, one for cross-breeding and the other for pure-breeding with native breed due to lack of management facilities. In addition considerable research is needed to fix the exact level of exotic inheritance that would suit well for the local agro-climatic conditions. Another problem the farmers were facing with the cross-bred sheep was high mortality which may be due to the fact that the farmers never give any concentrate feed to their flock and the rams supplied by the Government Department were used to feeding on concentrates.

Though Deccani breed is a woolly type breed, the wool was coarse and the annual wool yield seldom exceeds 0.5 kg per sheep as against the yields of 4 to 6 kg of fine wool in case of some exotic breeds as mentioned by Singh and Moore (1977), and about 0.950 kg in North Indian breeds as reported by Dwivedi et al. (1978). The mature body weights of the Deccani breeds were less than 25 kg. This clearly indicated the inferior germ plasm of the native breed.

There is no better way to improve the production potential of native breeds for both wool and mutton than by upgrading them and improving the genetic makeup of the breed by cross-

breeding as mentioned by Acharya and Patnayak (1972) and Taneja (1974). They considered that cross-breeding of our indigenous sheep with exotic blood would only be the main tool for rapid improvement of wool and mutton both quantitatively and qualitatively. Goodwin (1974) observed that cross-bred animals tend to be more vigorous, fast growing, more prolific and early maturing because of hybrid vigour, while Acharya and Patnayak (1972) felt that exotic sheep were more prone to parasitic infestations and other disease conditions and suggested that 50 per cent exotic inheritance would be safe without any serious problems of disease susceptibility and mortality.

As it is difficult to get so many exotic rams for cross-breeding local ewes, it is suggested to encourage selective breeding immediately, and as and when the exotic rams were available cross-breeding programmes may be taken up extensively to increase the wool and mutton production both qualitatively and quantitatively. Another important problem with cross-bred sheep is plane of nutrition which is lacking at present with the farmers since the lands were over grazed and the farmers do not believe in spending on feeding concentrates to any type of sheep.

It was found that early weaning was not practiced in the area as the farmers felt that it adversely affected the health and growth rates of lambs. Lambs were usually weaned at the age of 5 to 6 months which is quite late. The male lambs were castrated before weaning. Juryaprasad et al. (1973) mentioned that castrated lambs gained less than the lambs which were not

castrated while Singh and Moore (1978) stated that castration of ram lambs at an early age would improve grain of the muscle and make it tender, Kumar et al. (1980) observed more gain in body weights in goats after castration than in uncastrated ones. It is felt that considerable research is needed to find out the effect of castration on weaned lambs before any conclusion could be drawn. The present practice of castrating ram lambs seems to certainly help for taking up controlled selective breeding and cross-breeding programme.

5.2.6 Health coverage:- Mortality in sheep varied with year and season. Basuthakur and Kalla (1979) stated that mortality in the exotic lambs maintained in different parts of India varied from 7 to 47 per cent and the most important cause being imperfect mothering of lambs. However, in comparison the average mortality in lambs in the present investigation was only 3.2 per cent and overall mortality being 5.21 per cent (Table 5). The main cause of mortality was pneumonia.

The mortality in the present study was much lower than the approved rate of mortality by All India Coordinated Research Projects which is 10 per cent in adult sheep and 15 per cent in lambs. The main reasons for low mortality may be mainly due to personal care, management, and disposing of any sick animals to the butchers which were not giving any response to treatment.

Acharya and Patnayak (1972) mentioned that in a survey conducted in Rajasthan 15 per cent of deaths among sheep was

due to parasitic gastro-enteristis, Mittal (1979) also expressed similar opinion.

The local sheep and wool extension centres' personnel of State Animal Husbandry Department were providing prompt Veterinary aid to the sheep by periodically deworming and deticking sheep to check the endo and ecto parasitic infestations. They were also protecting the sheep against Enterotoxaemia and Rinderpest diseases. Mudaliar (1972) mentioned that vaccinating against Enterotoxaemia was not only the most effective means of protecting sheep against the disease, but it also increased the weight gains in lambs.

Mortality in sheep depends upon many factors like poor milk yield, twinning, lack of pastures, parasitism, improper housing, exposure to colds and adverse weather conditions and predatory animals. Therefore proper management practices to be followed to ensure better health of the flock. Periodical deworming, deticking and seasonal prophylactic vaccinations should be ensured.

It was observed that some farmers still believed in using local medicines and curing the diseases by use of 'Mantras'. The belief on superstitions and 'Mantras' in the flock owners could be removed by educating the farmers through extension methods.

The average culling per cent in the present study was 2.51 as indicated in Table 5. If a healthy flock, free from

diseases has to be maintained and sheep farming has to be profitable, removal of unhealthy, unproductive both in wool and lamb production, uneconomical and old animals is a must. Removal of superfluous rams and ewes which do not lamb regularly is desirable.

5.2.6 Shearing and other practices:- Generally sheep were sheared twice in a year: May - June and November - December. The shearing was done with hand shears by a special class of people called 'Kurvas' locally who are hired by the wool purchasing agents. The shearers were paid at the rate of Rs.25=00 to Rs.30=00 per 100 sheep. The average wool yield recorded in the survey ranged between 200 to 300 gm per clip per adult sheep and about 200 gm per lamb.

Dwivedi et al. (1978) mentioned that shearing was done thrice in year in Rajasthan during February - March, June - July and November - December, while Mittal (1979) stated that shearing was done thrice yearly in March, July and October by hand shearing machines. They also stated that more than 75 per cent flock owners sheared the sheep themselves and a few flock owners engaged or hired shearers on payment at the rate of Rs.0=30 per sheep or in kind. The average wool yield in Rajasthan was 0.950 kg/adult/year and 0.4 kg/lamb.

It is suggested that sheep farmers in the villages should be trained in shearing and they should be supplied with improved varieties of hand shearers with more spring action which will reduce the 'cuts' and 'bruises' on the skin, so that

they themselves shear their own sheep and sell the wool to wool spinning mills or Government agencies on weight basis.

Mechanical shearing should be popularised in the villages which has multifacet advantage of more yield, more staple length less time and labour involvment.

Sheep were generally not milked in the area. In rare cases when the lambs died, the ewes were milked and the milk was consumed by the family members only. Sale of ewes' milk was not practised. The average milk yield was said to be about 200 to 300 ml per ewe per day. Srivastava and Sexena (1977) also reported similar findings from Uttar Pradesh.

5.2.7 Extension activities:- Most of the sheep farmers were not educated, hence they could not read any newspaper, journal or magazine and very few of them listened to radios. Though educational facilities were available in the villages, most of the farmers did not send their children to schools due to economic reasons.

All the sheep farmers should be exposed to the modern methods of sheep management practices through various extension methods. They should be encouraged to listen to radios and T.V.as and when available and enrolled in the adult education programmes The sheep and wool extension centres of State Animal Husbandry Department should be located in thickly sheep populated villages, taking into consideration, the routes of migration so that they can cater to the needs of more and more sheep farmers. These

centres should be well equipped to provide all the veterinary aid required besides publicity material like charts, maps, bargraphs. with the information on various aspects of improved sheep management practices including health cover. The sheep farmers should be actively involved in the group meetings, farmers' training programmes and visits to the various Government Sheep Breeding Farms.

5.2.8 Common problems faced by the sheep farmers:- The main problem of sheep farmers was the shortage of grazing lands. This was also observed by Bhattacharya and Sahani (1978). Improvement of pasture is a must and importance of fodder trees cannot be denied as opined by Taneja (1974). Reserve pastures should be built in the sheep zones which should be opened to the migratory flocks during the lean months. This also will be help the sheep farmers during drought periods. The improvement of available fodder in the permissible grazing land has to be done concommitant to improvement of genetic potential of sheep.

The Government agencies like Animal Husbandry Department, forest department and soil conservation department may thrash out the problem by adopting a balanced eco-system consisting of soil, forest, sheep/goat man as suggested by Bhattacharya and Sahani (1978).

In the forest areas there is enough opportunity for sheep and goat grazing. There is a need for diversification of forestry in the low and semi-denuded hills and hillocks and

a change of strategy from traditional forestry management to hillock culture with motivation for animal production and to promote recycling of nitrogen between plants and animals.

The district-wise development programme of pasture lands for sheep and goat on scientific footing, on hills and hillocks of Andhra Pradesh is indeed the key to success towards solving grazing problems of the traditional sheep farmers.

The other problems like drinking water during summer, folding and penning during autumn, financial assistance for purchase of sheep units and lack of marketing facilities for sheep and their products should be solved by the Government agencies through sheep development programmes by providing water points, common shelters for sheep in the villages, prompt veterinary aid, simplifying the labourious and time consuming procedures for obtaining loans from banks and by establishing regulated markets for sheep and their products in rural areas.

As the results of this survey showed, sheep farming is a reasonably profitable occupation in rural areas providing livelihood and self employment for the small and marginal farmers, agricultural labourers and educated unemployed persons, Government should take up and encourage sheep development programmes more intensively to help the poor farmers and artisans in the rural sector.

5.3 Investments and Returns

The investments and returns were worked out for a period of one year in the three flock size categories, basing on the

flock positions at the beginning and end of the year as shown in Table 6. It was seen that, while there was statistically significant increasing in the flock strengths in medium and large size flocks, the increase in small size flocks was non-significant (Table 6a), which may be due to low percentage of lambing, high rate of culling, mortality and sales as indicated in Table 5.

The results of the survey indicated that the average size of the flock was 48 (Table 2) which was almost in the range that many of the earlier authors suggested as the most economical size of the flock. Potts (1953) suggested more than 60 sheep, Ahot (1957) recommended 50 to 60 sheep while Dehoach and Williams (1957) felt that an economical flock should have 20 to 60 sheep, whereas Admas and Cooperamith (1963) opined that 40 ewes and a ram would be aneconomical flock size while Singh and Moore (1978) indicated 50 to 60 sheep as a minimum economical unit in India.

5.3.1 Investmental- The investments consisted of fixed costs that included cost of sheep, housing and equipment and variable costs which represented the operational costs like cost on labour, feeding, medicines, interest on fixed costs, depreciation and repairs of housing and equipment and miscellaneous costs etc. The total investments in small, medium and large size flocks were found to be on an average Rs.20718=14, Rs.20464=31 and Rs.18984=64 respectively for 100 sheep per annum with an overall average of Rs.20056=70 (Table 7) indicating that the

investment on sheep farming were inversely proportional to the size of the flock to some extent. However, the differences among flock sizes were non-significant (Table 7a).

5.3.2 Fixed costs:- The fixed costs on an average accounted for 88.36 per cent of the total investment among the three flock sizes of which, cost of sheep alone was 86.92 per cent and the investment on housing and equipment was negligible which was just 2.43 per cent (Table 7). The total fixed costs for 100 sheep were Rs.18019=64, Rs.17910=41 and Rs.17235=81 on small, medium and large size flocks respectively (Table 7), but the differences were statistically non-significant (Table 7a).

Mudaliar (1980) estimated the total non-recurring expenditure of Rs.25000=00 for 100 ewes and 3 rams which was about Rs.5000=00 higher than the average investment arrived at in this survey. This may be due to expenditure on providing shelter with an expenditure of Rs.4000=00.

5.3.3 Variable costs:- The variable costs on an average constituted 11.63 per cent of the total investment among the three flock sizes. The variable costs for 100 sheep were Rs.1748=83, Rs.2553=90 and Rs.2698=60 for large, medium and small size flocks respectively, the average being Rs.2333=78. Thus the lowest variable costs on large size flocks indicated that the operational costs on large size flocks would be comparatively less. Raut and Sathe (1968) expressed similar views. This is considered an important factor in sheep rearing since operational costs definitely play a role in arriving at the size of the

5.3.4 Cost of labour:- Labour cost on an average accounted for 4.99 per cent of the total investment. It was Rs.919=55, Rs.1164=89 and Rs.922=33 per 100 sheep in small, medium and large size flocks respectively, the average for the three flocks being Rs.1002=25 (Table 7). It could be seen from Table 8 which indicates some measures of labour efficiency, that the labourers for 100 sheep were minimum (1.86) in large size flock in contrast to 2.15 and 3.17 labours for small and medium size flocks respectively. The amount spent on labour per 100 sheep also followed the same pattern. The amount saved due to engagement of family labour also was highest in large size flocks which was in conformity with the views expressed by Sahani et al. (1981). Results of the investigation revealed that labour efficiency was more in large size flocks than that of small and medium size flocks.

5.3.5 Medicines costs:- Cost on medicines on an average represented 1.71 per cent of the total investment which was Rs.344=00 per 100 sheep (Table 7). The amount spent on medicines in small size flocks was lowest which was Rs.277=93 while in medium and large size flocks it was Rs.383=36 and Rs.370=72 respectively, with insignificant difference (Table 7a). The lower expenditure on medicines in small size flocks might be because of more personal attention, close supervision and better management which might have resulted in better health of the flock and lesser disease and parasitic problems as so saved the cost on medicines. The findings of this survey were in

conformity with the views expressed by Dehoach and Williams (1957) who mentioned that more sheep on any one farm, the greater number the parasitic problem.

5.3.6 Feeding costs:- It was interesting and encouraging to note that the cost on feeding was almost negligible which represented only 0.52 per cent of the total investments. The little amount spent was on feeding lopped trees and babul pods during early summer. The negligible expenditure on feeding was due to the fact that the sheep were raised entirely on grazing and no supplementary feeding was done. The farmers also do not believe in spending anything on supplementary feeding. In other livestock enterprises like Dairy, Poultry and Piggary the cost of feeding alone would range about 59 to 85 per cent of the cost of production.

5.3.7 Interest, depreciation and repairs:- The interest on fixed costs on an average represented 2.33 per cent of the total investments. The amount of interest was Rs.762-84, Rs.512-06 and Rs.129-53 for small, medium and large size flocks. The interest on large size flocks was lowest because of higher self investment (92.29 per cent). The cost on depreciation and repairs also followed the same pattern, while the operational costs would be comparatively less as the size of the flock increased.

5.3.8 Miscellaneous costs:- The overall miscellaneous costs for the three flock sizes constituted 1.76 per cent of the total investments which was Rs.354-55 per 100 sheep. The mis-

cellaneous costs were again lowest in large size flocks which was Rs.289-72 followed by Rs.385-92 and Rs.438-75 in small and medium size flocks respectively (Table 7).

5.3.9 Source of investment:- It was found that 92.29 per cent of the fixed investments were personal investment in large size flocks while it was 70.74 and 56.93 per cent in medium and small size flocks respectively, the average being 73.32 per cent (Table 9). It was also significant that the loan amounts taken from various banks was highest in small size flocks which was 36.5 per cent of the fixed costs, while it was 24.14 and 6.35 per cent in medium and large size flocks respectively, indicating that small size flocks were mostly established for a subsidiary income by the poor farmers having little or no cultivable land. In most of the cases the personal investments on large and medium size flocks were in the shape of sheep, passed on to the farmers by their parents who were in the sheep rearing profession almost as a tradition.

5.3.10 Gross returns:- The flock strength at the beginning and at the end of the year (Table 6) indicated an overall increase of 27.49 per cent among the three flock sizes. The increase in the flock strength was highest in the medium size flock, this was due to higher percentage of lambing, lower rate of mortality and culling and less per cent of sales which resulted in more capital increment in flock strength when compared to large and small size flocks.

The gross returns with source of receipt in the three flock sizes is presented in Table 10. The gross returns for 100 sheep per year was Rs.9927-93, Rs.11183-16 and Rs.10124-06 in small, medium and large size flocks respectively, with an overall average of Rs.10411-65. The per cent of gross returns to total investment is shown in Table 13, which also indicated the highest gross returns from medium size flocks, followed by large and small size flocks with 54.64, 53.32 and 47.91 per cent of total investment respectively with an average of 51.91 per cent.

The gross returns from the total sale of sheep for mutton, sale of ram lambs, ewe lambs, culled ewes and rams, constituted on an average 41.75 per cent while capital increment in farm strength was 40.62 per cent of the gross return (Table 10). Thus the major source of income was obtained from mutton. Singh and Moore (1978) stated that in India the major portion of monetary income comes from mutton. In the present investigation the returns from sale of wool was only 4.09 per cent of the gross returns. Chowdhary (1974) stated that in India the income from sale of wool constituted about 11 to 16 per cent of total earnings compared to 30 to 40 per cent in other countries. The lower returns from wool in the present study may be due to lower yield of poor quality of wool which was black and coarse, whereas the North Indian breeds produced good carpet wool in higher quantities. Analysis of variance of various sources of income

presented in Table 10a, revealed a significant difference ($P<0.05$) among the different sources of income within the flock sizes, while there was no significant difference between the three flock sizes.

The lower returns from wool indicating the lower yielding of poor quality wool, suggests the immediate need for the improvement of the local breed by cross-breeding with suitable exotic fine wool breeds like Australian Merino and Rambouillet to enhance the production of superior quality wool. Similar suggestions were made by Taneja (1974).

The other sources of returns were from sale of manure and skins of dead sheep which accounted for 4.76 and 0.97 per cent of the gross returns respectively. Since the LPP was in operation in the district the small and marginal farmers and agricultural labourers were supplied with sheep units comprising 20 ewes and one ram. They were also given a subsidy of 25 to 33 1/3 per cent of the cost of the unit. This will certainly help the poor farmers to get some subsidiary income and to some extent self employment too.

5.2.11 Net returns:- Net returns from 100, 50, 21 and one sheep per year and per month are presented in Table 11, which indicated Rs.7229=33, Rs.8629=25 and Rs.8375=28 per 100 sheep per year from small, medium and large size flocks respectively, the average being Rs.8078=00. The net returns per sheep per year was Rs.72=29, Rs.86=29 and Rs.83=75 for small, medium and large size

flocks respectively, the average being Rs.80=78. In terms of percentage of net returns to the total investments, it was 34.89, 42.17 and 44.12 per cent from small, medium and large size flocks respectively, the average being 40.28 per cent i.e., about four times more than the present rate of bank interest.

In the past various workers reported different net returns per animal per year. Acharya and Saxena (1972) reported a net profit of Rs.38=81 from Chokla breed and Rs.56=42 from Mali breed. Gangwar and George (1973) worked out the net return to be Rs.10=23. Later, Chowdhary (1974) arrived at a low return of Rs.5=80 while Mittu et al.(1976) worked out a profit of Rs.8=61 per sheep per year. Mudaliar (1980) arrived at a net profit of Rs.62=50 per sheep from a flock of 100 ewes with 3 rams.

The net return of Rs.80=78 per sheep per annum in the present investigation was higher than the returns reported by the earlier workers, which may be due to various factors like low rate of mortality and culling, more labour efficiency and engaging family labour, which perhaps saved significant amounts on labour and also perhaps due to the fact that the prices of mutton increased from Rs.6=00 to Rs.16=00 per kg from 1973-74 to 1979-80 as mentioned by Rao (1979). Before drawing any conclusions regarding the net profits, it should be borne in mind that the cost of production and returns vary widely from place

to place, time to time, season to season, depending upon the demand and market conditions and also the type of animals, and quality and quantity of wool produced.

From the findings of this study it could be concluded that a small flock of 21 Deccani sheep (which is a recommended size for many Governmental programmes like DPAP, LPP and IRDP) gives a net return of Rs.1518=00 per annum which is quite a good subsidiary income for small and marginal farmers, while a medium size flock of 50 sheep with attendent rams yielded a profit of Rs.4314=50 per annum which is sufficient to maintain a simple living sheep farmer family in rural areas.

5.4 Marketing Practices:

5.4.1 Sheep for mutton:- In the present investigation it was observed that there were no organised agencies to market sheep and wool, unlike poultry and Dairy. In this trade middle men were playing a key role in marketing sheep and wool. The weaned ram lambs, excess rams, old and unproductive ewes were being sold to the visiting traders and middle men who go about collecting them for slaughter purpose in the towns. Similar observations were made by Dwivedi et al.(1978) and Mittal (1979).

Good marketing facilities for the disposal of the farm products are of prime importance for the survival of any livestock enterprise. In the absence of such marketing facilities, the middle men tend to exploit the inability of the farmers in marketing their products, and most of the gains are likely taken

away by the traders and middle men. Adams and Coopersmith (1963) felt that it was difficult for a producer with a small flock to market lambs of uniform weight and quality at the proper time and hence suggested combined marketing practice. Dwivedi et al. (1978) felt that a little attention towards the marketing system would certainly increase the income of sheep breeders, while Rao (1979) expressed his views about the lack of marketing facilities for livestock and sheep in Andhra Pradesh.

It is suggested to organise regulated markets in rural areas for disposal of sheep, wool and their products to eliminate the middle men, brokers and commission agents, thereby pave the way for accruing the actual profits to the sheep farmers.

The survey indicated that on an average 21.64 per cent of sheep from the flock were marketed. It was observed that there was a great demand for weaned ram lambs which fetched more price than any other type of sheep. This was due to the fact that the meat from ram lambs was tender and of better quality. Out of total number of sheep marketed for mutton, ram lambs constituted 83.49 per cent (Table 14). Similar observations were made by Singh and Moore (1978).

The method adopted in judging the quality and quantity of meat was not scientific. The quality and quantity of meat was judged by feeling the rump, loins, thighs and muscles of the body as described by Singh and Moore (1978), while in United States lambs were graded basing on the amount of finish that a lamb would

carry and to finish a lamb to be graded top within 4 to 5 months, required sound sheep production practices as stated by Jahoach and Williams (1967).

The average price fetched for weaned ram lambs ranged from Rs.80=00 to Rs.110=00 while adult rams fetched Rs.200=00 to Rs.300=00. The price varied slightly from place to place depending upon the condition of the animals, season and demand for mutton in the nearby towns. Dwivedi et al. (1978) stated that in Rajasthan the average price of male lambs of the age of 7 to 8 months ranged from Rs.60=00 to Rs.70=00.

A scientific method of evaluation of sheep for mutton basing on the body weight, age and finish should be evolved so that both the consumers and producers were benefitted.

5.4.2 Wool:- There were no specific marketing facilities for disposal of wool nor any classification and grading was done. The wool was sold to middle men or brokers on the basis of per animal per clip or per 100 sheep per clip basis irrespective of yield. Venkataramanayya (1972) observed that wool produced in Andhra Pradesh was generally sold under imperfect market conditions. The average price paid for 100 sheep per clip ranged from Rs.100=00 to Rs.250=00 depending upon whether the sheep were washed prior to shearing or not.

Srivastava and Saxena (1977) mentioned that in Uttar Pradesh the wool collectors of industrial agencies purchased the wool from flock owners at the rate of Rs.7=50 to Rs.8=50 per kg. Dwivedi et al. (1978) reported similar conditions of

marketing wool in Rajasthan as prevailing in Andhra Pradesh but the flock owners generally shear their sheep and sell about 80 per cent of the wool produced against cash and retain about 20 per cent for home consumption, and the average price wool fetched was Rs.18=00 per kg.

The comparatively higher price fetched for wool in Rajasthan and Uttar Pradesh may be due to the fact that the wool of North Indian breeds was of better quality and white in colour which was used mostly for carpets, but the wool from Deccani sheep was coarse and black in colour suitable only for Kambala and this itself is a good cottage industry.

Taneja (1974)felt that proper grading and marketing of wool will definitely provide remunerative prices to the sheep breeders and thus provide incentive for improving their sheep for wool quality. He also felt that the middle men rob the wool grower while purchasing his wool and suggested that grading of wool will ensure the correct price to the wool grower in proportion to the quality of wool grown by him.

5.4.3 Manure:- Each sheep adds about 0.5 to 0.6 Tons of manure per year which is rich in nitrogen and potassium and has great demand since it reduces the cost of fertilisers. But in the present study it was observed that sheep farmers were not able to get proper remuneration as the sheep were folded either in their own or other farmer's fields. When the sheep were folded in other farmer's fields the flock owners were nominally paid

either in cash at the rate of Rs.150=00 to Rs.200=00 per week for a flock of 800 to 1000 sheep or in kind in the shape of cereal grains. In some areas the flock owners did not get any remuneration, as the sheep were allowed to graze in others fields free of cost. Since there was no organised system for disposal of manure the flock owners were being deprived of a good source of income. Hence, the flock owners should be educated about the importance of manure value and a system evolved either to sell on weight basis or cart load basis, to get suitable remuneration.

5.4.4 Skins:- It was observed that skins of dead sheep were sold to the visiting brokers, middle men or butchers and they fetched very low prices. The skins of slaughtered animals fetched more than that of dead animals. The price of a skin ranged from Rs.6=00 to Rs.20=00 depending upon the condition, skinning, cuts and also place and season. The low price of skins was due to lack of marketing facilities.

5.4.5 Milk:- It was not a practice to milk the sheep in the area as the ewes gave just about 200 to 300 ml milk per day which was hardly sufficient to nourish the lamb. However, when the lambs died the ewes were milked and it was consumed by the family members only. Taneja (1974) stated that the Mediterranian countries had triple purpose breeds milk, wool and meat and the sheep's milk was used for cheese making by the migratory flock owners and he suggested to consider the possibilities of introducing triple purpose breeds in India. Srivastava and Saxena (1977) mentioned that in Uttar Pradesh the milk produced at the

rate of 150 ml approximately per lactating ewe was generally consumed by members of the flock owners.

From the results of the survey it was clear that the flock owners were expoited by the middle men due to lack of organised marketing facilities for sheep, and their products In the present circumstances there is a need to organise regulated markets, proper and scientific evaluation and grading of sheep and wool for fixing their prices, so that the profits of sheep production accrue to the sheep breeders only. The various Governmental agencies operating to subsidise and uplift the sheep farmers could organise, educate and work in this direction in the interest of sheep farmers.

CHAPTER VI

SUMMARY

Study was conducted in five villages of Mahboobnagar district, Andhra Pradesh, to work out the economics of sheep rearing and study the management and marketing practices of sheep, wool and their products. Economics were calculated by broadly categorising the sheep farmers into 3 size groups, namely, small (below 21), medium (22 to 50 sheep) and large (51 and above). 20 farmers from each group were selected at the rate of 12 farmers from each village at random. The complete data about the selected villages and 60 sheep farmers were obtained with the help of a suitably designed questionnaire (Annexure-III). The economics of sheep rearing were worked out for a period of one year i.e., from January to December, 1980. The data was analysed statistically and tabulated.

Sheep population constituted highest (42.17 per cent) of the total livestock and sheep farmers constituted 8.71 per cent of the total house holds. The common breed of sheep in the area was Deccani and some non-descript woolly sheep were also seen here and there. Most of the sheep farmers were occupational without any scientific knowledge of management. The average flock size was 48 and on an average each person looked after about 44 sheep. Most of the sheep farmers were poor. The availability of grazing land was only 6.22 per cent of the total area and grazing of sheep was the main problem. For want of sheep grazing, about 12 to 15 per cent of the flock owners migrated every year towards south east.

In general the sheep were managed well following the traditional methods. Efforts were being made to expose the sheep farmers to the scientific methods of management by the State Animal Husbandry Department personnel through sheep and wool extension centres. The mortality rate ranged from 5 to 10 per cent in case of lambs and less than 5 per cent in adult sheep. The average mortality was 5.08 per cent which is very low. The main cause of mortality was pneumonia and parasitic gastro-enteritis. The lambing percentages were 72.05, 78.50 and 77.86 among the small, medium and large size flocks respectively, which was not significantly different but the sex ratio of lambs born differed significantly ($P<0.05$) between small, medium and large size flocks which was 55:45, 51:49 and 49:51 respectively. Sheep were maintained only on grazing. No supplementary feeding was done to any class of sheep except lopping of trees and dry pods of Babul trees during early summer. Breeding was uncontrolled and the method followed was natural flock mating. The ratio of rams and ewes maintained was 1:26. Sheep were not provided with any type of shelters during any part of the year. The flocks were pened and folded in the open fields during nights. The sheep were sheared twice a year and the average annual yield was about 400 to 600 gm per sheep.

There were no organised agencies for marketing sheep, wool and their products. Middle men were playing a major role and as such most of the profits were being taken away by the middle men. The total investment for 100 sheep was found to be

highest (Rs. 20718=14) on small size flocks followed by medium size (Rs.20464=34) and large size flocks (Rs.18984=64) indicating that as the flock size increased the investment was reduced. The fixed costs on an average represented 88.36 per cent among the three size flocks. On an average the investment on 100 sheep was Rs.20056=70 and investment on housing and equipment was negligible (only 2.43 per cent) unlike other livestock enterprises. Likewise cost of feeding was only about 0.52 per cent in the present investigation as sheep were maintained only on grazing without spending any thing on supplementary feeding.

The total gross returns for 100 sheep was highest from medium size flocks (Rs.11183=16) followed by large size flocks (Rs.10124=06) and small size flocks (Rs.9927=98). The average being Rs.10411=65 which constituted 54.65, 53.33, 47.92 and 51.91 per cent respectively.

The average returns from sale of ram lambs represented 27.31 per cent and from sale of ewe lambs, culled ewes and rams represented 7.68, 6.37 and 0.39 per cent respectively, among the three size flocks. The capital increment in farm strength which represents the value of unsold lambs that were added during the year constituted a major share of income; on an average it was 40.62 per cent. The returns from sale of wool, manure and skins on an average represented 4.09, 4.76 and 0.97 per cent respectively. The net returns for 100 sheep was highest for medium size flock which was about Rs.8629=25 and lowest on small

size flock which was Rs.7229=33 indicating a significant difference (P/0.05) as shown in Table 10b and Rs.837-28 for large size flocks. The average of all the three size flocks was Rs.8078=00 indicating a net profit of Rs.80=78 per sheep per annum.

The results from this study revealed that maintenance of a flock consisting more than 21 sheep was comparatively more economical than maintaining a small flock of less than 21 sheep.

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ANNEXURE-I

DISTRIBUTION OF SHEEP FARMERS, FLOCKS, OF LIVESTOCK POPULATION AND LAND IN THE SELECTED VILLAGES OF MAHABOOBNAGAR DISTRICT

Name of the village	No. of sheep farmer in flock				No. of flocks	Livestock population					
	Small	Medium	Large	Total		Sheep	Goats	Bovines	Poultry	Others	Tota
Pebbair	37	20	53	110	21	3294	392	1530	862	-	6078
Mirasipally	7	9	27	43	14	2406	260	2102	2187	-	6955
Kothakota	57	42	12	111	14	4535	338	3509	3515	210	12107
Addakal	9	11	23	43	15	1921	29	874	386	86	3296
Janampet	9	11	16	36	15	2636	54	2149	1546	-	6384
Total	119	93	131	343	79	14791	1073	10164	8496	296	34820
Percentage	34.69	27.12	38.19	100.00		42.47	3.09	29.19	24.39	0.86	100.00

Contd....ii.

Cultivable land(acres)			Waste land for grazing(acres)	Total land (acres)
Wet	Dry	Total		
1025.00	4435.0	5460.00	280.0	5740.00
363.00	898.0	1261.00	261.0	1522.00
961.17	2632.0	3593.17	40.0	3633.17
517.00	1835.0	2352.00	340.0	2692.00
800.00	2700.0	3500.00	150.0	3650.00
3666.17	12500.0	16166.17	1071.0	17237.17
21.27	72.52	93.78	6.22	100.00

ANNEXURE-II

INVESTMENTS AND RETURNS FROM A FLOCK OF 100 SHEEP

I. EXPENDITURE:

		(Rs.)
A)	**Capital Investment:**	
	1. Cost of sheep @ Rs.172=00	17233=87
	2. Cost of housing, equipment and other petty items, @ Rs.4=83 per sheep.	488=36
	Total (A)	17721=92
B)	1. Interest on Capital Investment @ 11.95%	468=14
	2. Repairs and depreciation of the houses and equipments.	59=78
	Total (B)	527=92
C)	**Operational Cost:**	
	1. Labour charges @ Rs.10=00 per sheep	1002=25
	2. Cost of medicines and Veterinary Services @ Rs.3=40 per sheep.	344=00
	3. Feeding charges @ Rs.1=05 per sheep	105=02
	4. Miscellaneous charges @ Rs.3=55 per sheep	354=55
	Total Operational cost (C)	1805=82
	Total Recurring Expenditure (B + C)	2333=74
	Total Investments (A+B+C)	20055=70

II. INCOME:

D)	1. Sale of Ram lambs	2843=22
	2. Sale of ewe lambs	799=33
	3. Sale of culled, old and unproductive ewes	663=52
	4. Sale of old, culled and surplus rams	40=64
	5. Sale of wool	425=83

6. Sale of manure	495=52
7. Sale of skins of dead animals	101=44
8. Subsidy amount received from LPP	778=71
9. Capital increment in farm strength	4229=28
10. Other sources	34=06
Total Income (D)	10411=74
Net Income (D-(B+C))/per annum	8078=00
Net Income per month	673=16

ANNEXURE-III

"ECONOMICS OF SHEEP REARING IN RURAL AREAS OF ANDHRA PRADESH"

SCHEDULE-I

(DETAILED ENQUIRY OF THE SELECTED VILLAGE AS A WHOLE)

1. Name of the village . . . . . .
2. Name of the Block . . . . . Taluk . . . . . Dist. . . .
3. Distance from Block Headquarters . . . .
   Taluk . . . . . Dist. Headquarters . . . .
4. Communication and transport facilities available. Bus / Train / any other means . . . . . .
5. Post office and telephone facilities available. Yes / No
6. Whether electrified. Yes / No
7. Education facilities available. Yes / No
8. If yes, primary School / High School / College / any other.
8. Irrigation facilities available. Tanks / Wells / Canals (specify).
9. Nearest Livestock market . . . . . Distance . . . . . Mode of transport . . . . . .
10. Type of Livestock. Sheep / Goat / Cattle / Poultry / any others.
11. Nearest slaughter house . . . . . Distance . . . . . whether slaughtered by stunning. Yes / No
12. Whether medical facilities available. Yes / No. If yes,
    (a) PHC / Civil Dispensary / Civil Hospital / Any other.
    (b) Homeopathic / Ayurvedic / Unani / or any other system of medicine

13. Whether Veterinary services available. Yes / No

RLU = Rural Livestock Unit/SWEC= Sheep and wool extension Centre/SSU= Sheep supervisory unit/LSU=Livestock spervisory Unit/LSU= Livestock Supervisory Unit/VH= Veterinary Hospitals / Any other (Specify).

14. Whether any livestock development scheme are in operation. If yes, DPAP / LPP / IRDP / SFDA / MFDA / Any other(specify).

15. Total human population of the village . . . . . .

16. Total house holds in the Village . . . . . .

17. Number of sheep farmers in the village . . . . . .

a) Sheep farming as main occupation . . . . . .

b) Sheep farming as subsidiary occupation . . . . . .

c) Professional sheep farmers . . . . . .

d) Traditional sheep farmers . . . . . .

e) Small farmers (upto 21 sheep) . . . . . .

f) Medium farmers (22 to 50 sheep) . . . . . .

g) Large farmers (about 50 sheep) . . . .

18. Agencies financing for Agriculture / Animal Husbandry activities. Bank/Coop. Society/DPAP/BC Corp/SC Corp/Block/Tahsil/ Any other.

19. Any Cottage Industry whether animal based Agriculture based. Yes / No. If yes specify . . . . . .

20. Number of sheep farmers who have taken assistance from Bank/DPAP/LPP/Coop.Soc./PS Block/Tahsil/Any other sources.

21. Number of sheep farmers involved in DPAP/LPP . . . . . .

22. Number of sheep farmers without Agricultural land . . . . .

23. Number of sheep farmers with Agricultural land . . . . .

Ranging . . . . . Acres to . . . . . Acres.

24. Livestock population of the Village:

S.No.	Livestock kind	Male		Female		Total
		Young	Adult	Young	Adult	
1.	Sheep					
2.	Goat					
3.	Cattle					
4.	Buffaloes					
5.	Poultry					
6.	Swine					
7.	Any other					

25. Total cultivable land in the Village . . . . . Wett . . . .

Dry . . . . . .

26. Total waste land in the village . . . . . .(Specify)

27. How the waste land is utilised? . . . . . .

28. Whether grazing facilities available for sheep? Yes / No

Common grazing land / Hilly areas / Any other.

b) If no where the sheep are grazed.

29. Total number of flocks in the village . . . . . .

Migratory . . . . . Stationary . . . . . .

30. Drinking water facilities available for human population:

Specify . . . . . .

31. Drinking water facilities for livestock:

Specify . . . . . .

32. Any recreational facilities. Yes / No

If yes name . . . . . .

SCHEDULE-II

DETAILED ENQUIRY OF SHEEP AND WOOL (GENERAL AND MANAGEMENT) OF SELECTED SHEEP FARMERS

1. Identification, family structure and engagement:

1.1 Name of the sheep farmer . . . . . Sex . . . . Age . . .

1.2 Name of the Father . . . . . .

1.3 Village . . . . . Taluk . . . . . District . . . . . .

1.4 Number of adults: Male . . . . . Female . . . . . .

1.5 Number of children: Male . . . . . Female . . . . . .

1.6 Number of school going children: Male . . . . Female . . .

1.7 Number of working members:(A) Adult: Male . . . Female ...

(B) Children: Male . . . . . Female . . . . .

1.8 Number of engaged in sheep farming:

a) Adults : Male . . . . . Female . . . . .

b) Children: Male . . . . . Female . . . . .

1.9 Number of other persons employed for sheep rearing:

a) Adults : Male . . . . . Female . . . . . .

b) Children : Male . . . . . Females . . . . . .

1.10 Whether sheep farming is min/subsidiary occupation

1.11 Since how long you are in this line of sheep farming .....

1.12 Are you a traditional sheep farmer Yes / No

1.13 Do you have knowledge of reading / Writing. Yes / No

a) If yes, your educational qualification:

Primary / Higher Secondary / College

2. Land and Irrigation Sources:

2.1 Do you own any agricultural land? Yes / No

a) If yes, Wet land . . . . . dry land . . . . Total . . . .

b) Source of irrigation: Well / Tank / Canal / Rain / Any other.

c) What are the common crops cultivated? . . . . . .

d) Do you come under: (i) Small farmer (ii) Margianl farmer
(iii) Agricultural Labour.

2.2 Total income from agricultural source / year . . . . . .

3. Livestock Particulars:

3.1 Number of sheep owned . . . . . Breed . . . . Type . . .

a) Ewes . . . . (b) Rams . . . . . (c) Ewe lambs . . . . .

d) Ram lambs . . . . . e) Cross-breeds . . . . . .

3.2 Number of goats owned . . . . . Breed . . . . Type . . . .

3.3 Number of bovines owned . . . . White . . . . Black . . ..

3.4 Other livestock if any . . . . . .

4. General Information:

4.1 Did you get any assistance from any source? Yes / No

If yes, specify . . . . . .

a) Loan amount . . . . . Agency . . . . Rate of interest....

b) Margin money . . . . . Agency . . . . . .

Rate of interest . . . . . .

c) Subsidy amount and % . . . . . Agency . . . . . .

d) Personal in investment . . . . . .

e) Any other source . . . . . Agency . . . . . .

Rate of interest . . . . . .

4.2 Total number of sheep purchased/owned:

a) Ewes . . . . . Rate . . . . . .

b) Ewe lambs . . . . . Rate . . . . . .

c) Rams . . . . . Rate . . . . . .

d) Ram lambs . . . . . Rate . . . . .

4.3 Number of other persons employed . . . . . .

4.4 How much each person is paid / Year

a) For adults in cash . . . . . in kind . . . . . .

b) Total amount . . . . . .

b) For young in cash . . . . . . In kind . . . . .

Total amount . . . . . .

4.5 How many sheep one person is looking after? . . . . . .

5. Grazing practices:

5.1 a) Own land (b) Neighbours land (c) Village lands

d) Revenue land (e) Forest land (f) Common grazing land

g) Any other land.

5.2 Do you spend any amount for grazing? Yes / No

If yes, how much per sheep per year? . . . . . .

	Summer	Winter	Autumn
5.3 Grazing hours	. . . .	. . . .	. . . .
5.4 Average distance covered daily for grazing from sheep pen	. . . .	. . . .	. . . .

5.5 Are the adults and young lambs grazed separately Yes / No

5.6 Whether the pregnant ewes are grazed separately? Yes / No

5.7 whether rams are grazed separately during breeding season? Yes / No

5.8 Any other information on grazing practices . . . . . .

5.9 Whether your flock is stationary or Migratory? . . . . . .

If Migratory a) Purpose of migration . . . . . .

b) Migration time . . . . . .

c) Return time to home stead . . . . . .

d) Total period of migration in any year . . . . .

e) Distance covered during migration . . . . . .

f) Mode of journey for migration . . . . . .

g) Do you spend any amount for migration? Yes / No

If yes, source and amount per sheep . . . . . .

h) Is there any income during migration? Yes / No

If yes, source and amount per sheep . . . . . .

i) Advantages of migration . . . . . .

j) Disadvantages of migration . . . .

6. <u>Feeding practices:</u>

6.1 Are you practicing improved methods of feeding like:

a) Flushing (b) Pre-flushing (c) Feeding concentrates during pregnancy and lactation (d) Feeding lambs

e) Feeding rams. Yes / No

6.2 Do you feed any roughages in addition to grazing Yes / No

If yes (a) what are the roughages commonly fed . . . . . .

(b) Approximate amount spent / Sheep / Year . . . .

6.3 Do you feed concentrates in addition to grazing? Yes / No

If yes, type of feed and source . . . . . .

6.4 Do you pre-flush the ewes? Yes / No

6.5 Do you practice flushing the ewes? Yes / No

If yes (a) what are the common ewes? Yes / No

b) Period of flushing . . . . . .

c) Rate of feeding . . . . . .

d) Amount spent per sheep per year . . . . . .

6.6 Do you feed concentrates to breeding rams? Yes / No

If yes (a) What are the common feeds given . . . . .

b) Period and rate of feeding . . . .

c) Amount spent per ram / year . . . . . .

6.7 Do you feed concentrates to young lambs? Yes / No

If yes (i) whether(b) Creep feed (c) Fattening ration

(d) Finishing ration (e) Milk replacers

(ii) Rate of feeding lambs . . . . . .

(iii) Period of feeding . . . . . .

(iv) Amount spent per lamb . . . . . .

6.8 Do you practice weaning of lambs? Yes / No

If yes, approximate age of weaning . . . . . .

6.9 Do you supplement the ewes / Lambs / Rams with

a) Vitamins (b) Minerals (c) Salt licks (e)Antibiotics Yes/No

If yes, period . . . . . rate . . . . . And amount spend

per sheep per year . . . . . .

6.10 Any other method/information on feeding adult sheep and

lambs . . . . . .

7. Housing and equipment:

7.1 Do you provide any shelter for sheep? Yes / No

(A) If yes (b) Season . . . . . and period . . . . . .

(b) What type of shelter/Home provided? (i) Thatched shed,

(ii) Pucca shed/(iii)Fencing (iv) any other type.

(c) Area of covered floor space provided/sheep .....

(d) Approximate cost of providing shelter per sheep....

(B) If no, (a) how do you protect the sheep from (i) Rain (ii) Colds (iii) winds (iv) sun (v) Predatory animals like dogs, wolves, jackals etc . . . . . .

7.2 What type of shelter is provided to young lambs?

Specify tyep . . . . . cost per lamb . . . . .

7.3 Any other information on housing sheep and providing shelter and fencing . . . . . .

. . . . . .

7.4 What are the commonly used equipment for sheep (for feeding, watering, drenching, identification, breeding, castration, hoof trimnining, shelter and protection).

S.No.	Name of the equipment	Nos.	Rate	Total amount
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

8. Penning and folding practices:

8.1 Whether are the sheep kept during hights? Sheds/fields

8.2 If in the fields whether your own fileds or others' fields?..

8.3 If others' fields what is the income from folding/sheep/year..

3.4 Do you keep your flock alone or along with others flocks?.....

8.5 What is the number of sheep in one flock while folding.....

8.6 Duration of folding sheep . . . . . .

8.7 Income from foldings:

	In the village	During migration
In cash	. . . . .	. . . . .
In kind	. . . . .	. . . . .
Total amount	_____	_____

8.8 Any other information on penning and folding of sheep .....

(How much manure produced per sheep and cost per ton).....

9. Breeding practices:

9.1 Do you adopt scientific methods of breeding sheep like selective breeding/cross-breeding/upgrading/artificial insemination Yes/No

A) If yes a) what is the method adopted? .....

b) Breed of rams used . . . . . .

c) What are the advantages noticed? . . . . . .

B) If no, a) What is the method of breeding followed? .....

b) Breed of rams used . . . . . .

c) whether rams are grazed along with ewes during only during nights? . . . . . .

9.2 What are the breeding season and % of animals bred?

Season	% of ewes bred
i.	. . . . .
ii.	. . . . .
iii.	. . . . .

9.3 What is the method of mating? (a) Flock mating or (b) Hand mating (c) or both . . . . . .

9.4 Length / duration of breeding season . . . . . .

9.5 How many ewes are mated to one ram? (sex ration . . . . .

9.6 Do you flush or preflush the ewes? Yes / No

If no, why . . . . . .

9.7 What is age of breeding for ewes . . . . . Rams . . . . .

9.8 What is the % of lambing? . . . . . .

9.9 whether twinning is common in your flock? Yes / No

9.10 what is the lambing interval in your flock? . . . . . .

9.11 what is the ratio of male and female lambs born? . . . .

9.12 when do you wean the lambs? . . . . . .

9.13 a) whether two lambings in 18 months is common? Yes / No

b) If yes, what is the percentage? . . . . . .

9.14 a) Do you follow the method of castrating male lambs? Yes/No

9.15 Any other information on breeding of ewes . . . . . .

10. Health coverage:

10.1 whether any veterinary aid is vailable? Yes / No

If yes, specify . . . . . .

10.2 Do you seek the services of a veterinarian when ever there is an out break or if any animal falls sick: Yes / No

10.3 Do you belive in controlling/curing the diseases by

Mantras? Yes / No

By local medicines Yes / No

10.4 What are the common diseases noticed in your flocks?

a) ST (B) SP (c) H.P. (d) F & M D (e) H.S. (f) B.Q.

g) Anthrax (h) Any other

10.4.1 Season of outbreak of disease . . . . . .

10.4.2 Any control measures taken b the Veterinary or

sheep and wool extension staff? Yes / No

If yes, what type? . . . . . .

10.4.3 What is the % of mortality in adults . . . . . in

lambs . . . . . .

10.4.4 whether prophylactic vaccinations in sheep are bone?

If yes,	Name of the vaccine	Time of vaccination
1.	. . . . .	. . . . .
2.	. . . . .	. . . . .
3.	. . . . .	. . . . .
4.	. . . . .	. . . . .

10.5 What are the other common non-specific diseases which cause

mortality in sheep and lambs? . . . . . .

10.6 Do you get your sheep dewormed periodically? Yes / No.

If yes,	Time of deworming	Dewormers used
1.	. . . . .	. . . . .
2.	. . . . .	. . . . .
3.	. . . . .	. . . . .

10.7 Whether sheep are deticked periodically? Yes / No

If yes (a) what is the intervals . . . . . .

b) Method followed: Dips /Sprays/Dusting/Paste/Any other

c) What are the common deticking agents used? . . . . . .

10.8 What is the amount spent on each sheep per year towards health coverage like deworming/deticking/vaccination/treatment of sick animals? . . . . . .

10.9 Any other informationon health coverage in sheep . . . . . .

11. Shearing practices:

11.1 How many times sheep are sheared in a year? . . . . . .

11.2 Months of shearing . . . . . .

11.3 Shearing is done by (a) family members (b) hired labourers (c) labourers engaged by purchaser.

11.4 If hired labourer shearting charges per sheep or per 100 sheep in cash ..... in kind ..... total .....

11.5 Type of equipment used for shearing . . . . . .

11.6 The average yield of wool per sheep per clip is:

a) Ewes . . . . . b) Rams . . . . . c) Lambs

11.7 Annual total wool production . . . . . .

11.8 Any other information on shearing of wool . . . . . .

12. Other management practices:

A) Watering:

a) How many times sheep are watered?

	Summer	Winter	Autumn
i. No. of time	. . . . .	. . . .	. . . .
ii. Time of watering	. . . . .	. . . .	. . . .
iii. Distance covered	. . . . .	. . . .	. . . .

b) Source of water . . . . (water troughs/wells/tanks/ponds canals/any other source

c) Any other information on watering sheep . . . . . .

B) Milking practices:

i. Whether sheep are milked? Yes / No

ii. If yes, when start milking? . . . . . .

iii. Approx. yield per ewe/day . . . . . .

iv. Total lactation length . . . . . days

v. Whether milk is sold or consumed . . . . . .

vi. If sold what is the price per kg? . . . . . .

vii. How much milk is sold daily? . . . . . .

viii. How much milk is consumed? . . . . . .

ix. Total value of milk sold and consumed . . . . . .

x. What are the milk products and value per kg?

	Product	Quantity sold	Price per kg	Amount
1.	. . . . .	. . . . .	. . . . .	. . . .
2.	. . . . .	. . . . .	. . . . .	. . . .
3.	. . . . .	. . . . .	. . . . .	. . . .
4.	. . . . .	. . . . .	. . . . .	. . . .

13. Extension activities:

13.1 Do you read any newspaper? Yes / No

13.2 Do you read any journal or magazine? Yes / No

If yes, name of the journal / magazine . . . . . .

13.3 Do you listen radio programme on agril. & AH Yes / No

13.4 Did you participate in farmers' training programmes or group meetings conducted by A.H. Department? Yes / No

13.6 Do you approach A.H. Extension officer in the Block for any help or guidance in your field? Yes / No

14. General:

14.1 What are the common problems you face in sheep rearing?.....

. . . . . .

a) Veterinary aid . . . . . .

b) Grazing . . . . . .

c) Watering . . . . . .

d) Breeding/breeding . . . . . .

e) Financing . . . . . .

f) Marketing . . . . . .

g) Any other

14.3 What do you expect from a sheep specialist?

SCHEDULE-III
MARKETING PRACTICES

A. Sheep for mutton:

1. What is the season of marketing lambs? . . . . . .

2. Reasons for marketing . . . . . .

3. Age of market lambs . . . . . .

4. Approx. weight of market lambs . . . . . .

5. Method of marketing . . . . . .

a) Middle man (b) Direct to butcher (c) Direct to consumer

d) Sold through markets or shandies (e) through cooperative

6. Basis of selling lambs and adult sheep . . . . . .

i. On live weight basis ii. By feeling rump & loin etc.

iii. By age and physical condition iv. Just appearance

v. Any other basis.

7. Approximate price of (a) Ram . . . . . .

b) Ewe . . . . . (c) Ram lamb . . . . . .

d) Ewe lamb . . . . . .

8. Any other information on marketing of sheep . . . . . .

. . . . . .

B. Wool:

1. How do you dispose wool? . . . . . .

a) On weight basis (b) per animal per clip (c) per 100 sheep

d) Or any other basis . . . . . .

ii) What is the method of disposal? . . . . . .

Sell in the market/middle men/weavers/coop.society/

spinning mill/Govt.agency/any other method.

iii) What is the price per kg of wool?

iv) What is the amount paid per sheep/clip or per 100 sheep? . . . . . .

v) Do you manufacture kambals? Yes / No

vi) If yes, how many kg wool/how many sheep is required for making one kambal? . . . . . .

vii) Where do you sell the kambals? . . . . . .

viii) What is the price of one kambal? . . . . . .

ix) Whether kambal making is profitable or selling wool? . . . . . .

x) How many kambals do you manufacture and the amount received per year? . . . . . .

C. Other products:

1. How many carts of manure is produced? . . . . . .

2. whether manure is sold or used in your fields? . . . . .

3. Cost of manure sold . . . . . issued in your field . . . .

Total . . . . . .

4. Where do you sell the milk and milk products? . . . . .

5. Where do you sell the skins of dead animals? . . . . . .

a) Middle men (b) butcher (c) market (d) any other

6. What is the cost of a skin? . . . . . .

7. Whether you slaughter sheep and sell the mutton locally?

Yes / No

If yes, what is the price of mutton / kg? . . . . . .

Price of a) Head and legs or head (b) Legs . . . (c)Liver...

d) Lungs . . . . . (e) Intestines and stomach . . . . . .

8. What is the total income if slaughtered and sold including hide for:

   a) Ram . . . . . (b) Ewe . . . . . (c) Lamb. . . . . .

9. Whether selling live sheep is profitable or slaughtering and selling mutton is profitable? . . . . . .

10. What are the common problems faced in marketing sheep/wool/manure/skins/milk/mil products? . . . . . .

11. Any other information on marketing of sheep and wool.

SCHEDULE-IV
INVESTMENTS AND RETURNS

I. Expenditure:

A. Capital investment:

1. Cost of ewes . . . . . .

2. Cost of rams . . . . . .

3. Cost of ewe lambs . . . .

4. Cost of ram lambs . . . .

5. Cost of housing . . . . . .

6. Cost of equipment and other petty items . . . . .

Total (A) . . . . . .

B. 1. Interest on capital investment @ . . . .

2. Repairs and depreciation of the houses and equipment @ . . . . . .

Total (B) . . . . . .

C. Operational costs

i. Labour charges (if employed) . . . . . .

ii. Cost of medicines and Veterinary services . . . . .

a) Dewormers . . . . . .

b) Dêticking agents . . . . . .

c) Vaccination . . . . . .

d) Other medicines . . . . . .

e) Veterinary services . . . . . .

iii. Feeding charges (if any) . . . . . .

(specify) . . . .

iv. Shearing charges . . . . . .

v. Miscellaneous charges if any . . . . . .

(specify) . . . . . .

vi. Interest on operational cost . . . . . .

Total (C) operational cost . . . . . .

Total recurring expenditure (B+C) . . . .

Total investment (A+B+C) . . . . . .

II. Income:

D. 1. Sale of ram lambs . . . . . .

2. Sale of ewe lambs (if any) . . . . .

3. Sale of old, unproductive and culled ewes and surplus ewe . . . . . .

4. Sale of old and culled rams and surplus rams . . . . .

5. Sale of wool . . . . . .

6. Sale of manure . . . . . .

7. Sale of skins of dead animals . . . . . .

8. Sale of milk or value of milk consumed . . . . . .

9. Sale of milk products (if any) . . . . . .

10. Subsidy amount received from: DPAP/LPP/Any other agency . . . . . .

11. Capital increment in farm strength . . . . . .

12. Income of from any other source (specify) . . . .

Total income (D) . . . . . .

Net income for( ) sheep . . . . . .

(D - (B+C)) . . . . . .

Net income per sheep per year . . . .

Net income per 100 sheep per year . . . . . .

Net income per month for 100 sheep . . . . . .

V I T A

I, G. Balakrishna, was born on October 8, 1947 to Smt. G. Tirupathamma and Sri G. Sarviah in Hyderabad, Andhra Pradesh, India. I married Indira of Hyderabad on February 9, 1973 and we have one daughter and one son. I completed my High School education from Government City College, Hyderabad and passed H.S.C.(Multipurpose) in March, 1965 and passed B.V.Sc. in First Class from College of Veterinary Science, Rajendranagar, Hyderabad in November, 1970. I served the Department of Animal Husbandry, Government of Andhra Pradesh from March, 1971 to September, 1979 as Veterinary Officer in Panchayat Samithis, Veterinary Hospitals, Compounders' Training Centre and Sheep Supervisory Units.

During September, 1979 I was sponsored by the Department of Animal Husbandry for M.V.Sc. (Sheep, Goat and Swine Production) to College of Veterinary Science Rajendranagar, Andhra Pradesh Agricultural University, Hyderabad. I worked for my M.V.Sc. degree under the able guidance of Dr. A.S.R. Mudaliar, Specialist in Sheep and Goat Husbandry, Department of Animal Science, College of Veterinary Science, Hyderabad. At present I am working as Veterinary Officer in Indo-Australian Sheep Project at Large Scale Sheep Breeding Farm, Hamidipally, Hyderabad, Animal Husbandry Department, Government of Andhra Pradesh.