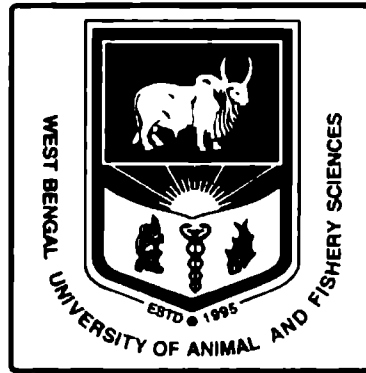


# Adoption Behaviour of Small Ruminant Livestock Owners (SRLO) in two agro-climatic zones of West Bengal

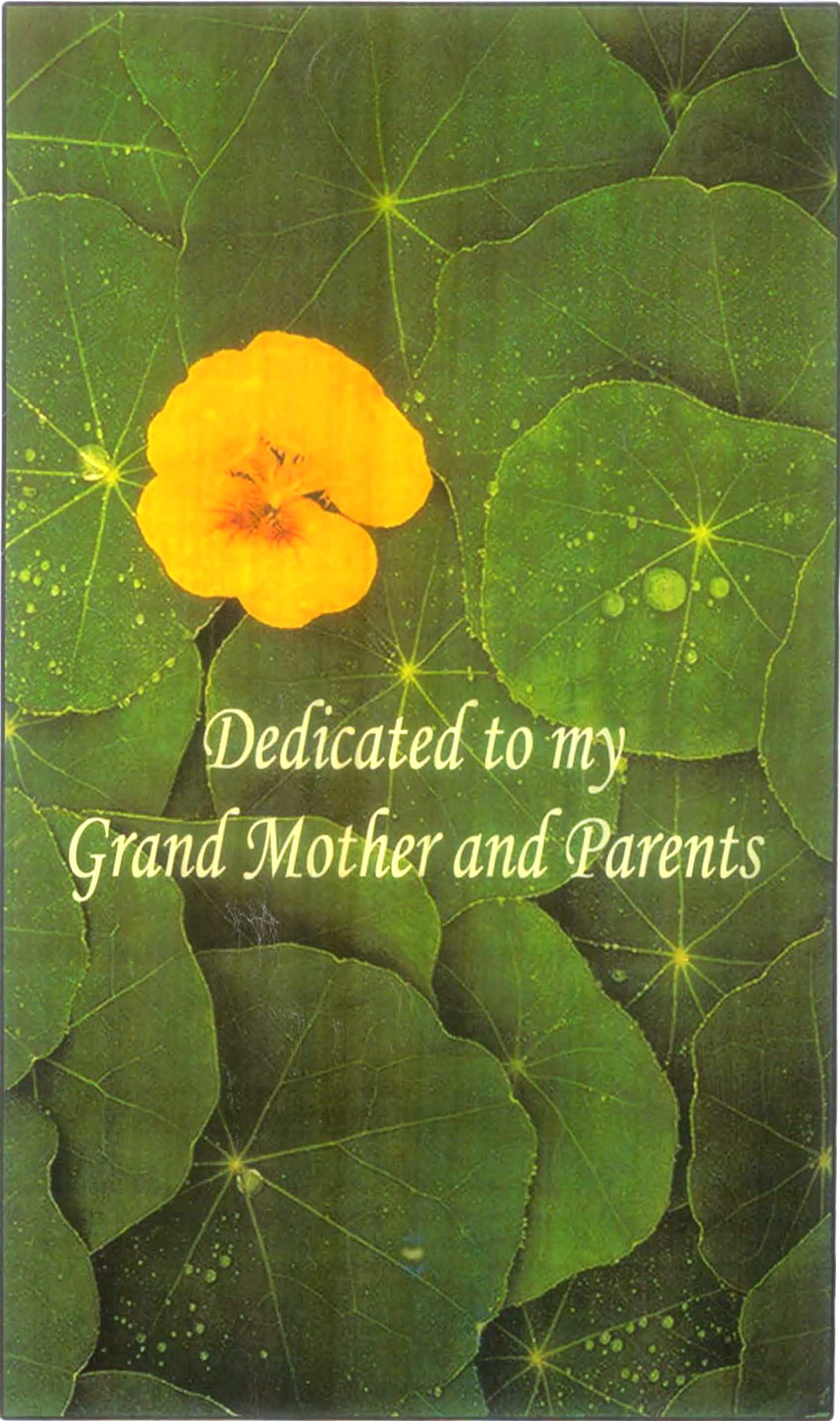


**A Thesis**  
**Submitted to the**  
**West Bengal University of Animal and Fishery Sciences**  
**In partial fulfillment of requirements**  
**for the Degree of**  
**Doctor of Philosophy**  
**IN**  
**VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION**

By  
**Debasish Saha**  
M. V. Sc.

Department of Veterinary & A. H. Extension Education  
Faculty of Veterinary and Animal Sciences  
West Bengal University of Animal and Fishery Sciences  
Belgachia, Kolkata. West Bengal

**2006**



*Dedicated to my  
Grand Mother and Parents*

# West Bengal University of Animal and Fishery Sciences



DEPARTMENT OF  
VETERINARY & ANIMAL HUSBANDRY EXTENSION EDUCATION

*Faculty of Veterinary & Animal Sciences*

37, Kshudiram Bose Sarani, Kolkata - 700 037

Phone : 2556 9234, Fax : 033 2557-1986,

Email : wbuafs@wb.nic.in

Ref. No.....

Date.....

Dr. Arunasis Goswami,  
M.V.Sc., Ph.D., MNAVSc.

## Certificate

This is to certify that the work recorded in the thesis entitled **“Adoption Behaviour of Small Ruminant Livestock Owners (SRLO) in Two Different Agro-climatic Zones of West Bengal”** submitted by Dr. Debasish Saha in partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Veterinary & Animal Husbandry Extension Education of the West Bengal University of Animal and Fishery Sciences, is the faithful and bonafide research work carried out by the candidate himself under my personal supervision and guidance. The results of the investigation reported in the thesis have not so far been submitted for any other Degree or Diploma. The assistance and help received during the course of investigation have been duly acknowledged.

**Place:** Belgachia, Kolkata-37.




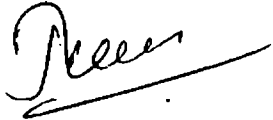
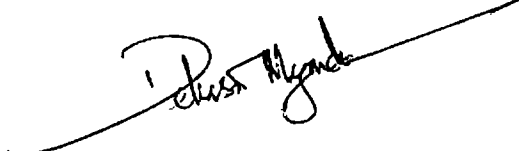
**Dated:** 25th Oct., 2006.

-----  
**(Dr. Arunasis Goswami)**  
**Chairman**  
**Advisory Committee**

CLINS WBUAFS  
01/10

**APPROVAL OF EXAMINERS**  
**FOR THE AWARD OF THE DEGREE OF**  
**Doctor of Philosophy in Veterinary and Animal**  
**Husbandry Extension Education**

We, the undersigned, having been satisfied with the performance of Sri Debasish Saha, in the Viva-Voce examination, conducted today, the 9th January, 2007 and recommend that the thesis be accepted for the award of the degree.

<b>Name</b>	<b>Signature</b>
1. <b>Dr. A. Goswami</b> (Chairman, Advisory Committee)	
2. <u>Dr. J. Oraon</u> (External Examiner)	
3. <b>Prof. A. K. Mazumdar</b> (Member, Advisory Committee)	
4. <b>Prof. S. Biswas</b> (Member, Advisory Committee)	
5. <b>Dr. D. Mazumdar</b> (Member, Advisory Committee)	

## Acknowledgement

Formal words of acknowledgement are inadequate to express my sincere and deepest feelings of gratitude for my advisor, Dr. Arunasis Goswami, Ph.D., In-Charge, Department of Veterinary and Animal Husbandry Extension Education, F/o. Veterinary and Animal Sciences, West Bengal University of Animal and Fishery Sciences, for his kind affection, consistent support, constructive counsel and inspiring guidance. His support and generosity have been much more beyond formal obligation as chairman of my advisory committee. I shall always remain obliged to his benevolence and affection bestowed upon me.

I am highly indebted to Prof. A. K. Mazumdar, D. Sc., Member of Advisory Committee and Former-Head, Department of Agricultural Extension, B.C.K.V., for his sincere advice during the course of my entire work.

Sincere thanks are also attributed to Prof. S. Biswas, Ph. D., Member of Advisory Committee and Head, Animal Products Technology & Marketing, F/o- Veterinary and Animal Sciences, W.B.U.A.F.S., for his valuable suggestion during the research work.

I feel proud in expressing my inexplicable gratitude to Dr. D. Mazumdar, Ph.D., Member of Advisory Committee and Reader, Department of Agricultural Statistics, B.C.K.V., for his kind advice and active co-operation during analysis of the data.

I express sincere thanks to Prof. A. K. Bhattacharya, Former-Hon'ble Vice-Chancellor, W.B.U.A.F.S., Prof. A. K. Bandopadhyaya, Former-Hon'ble Vice-Chancellor, W.B.U.A.F.S., Prof. C. S. Chakraborty, Hon'ble Vice-Chancellor,

W.B.U.A.F.S., Prof. B. B. Ghosh, Former-Dean F/O- Veterinary & Animal Sciences, W. B. U. A. F. S., Prof. A. Chakraborty, Dean F/O- Veterinary & Animal Sciences, W. B. U. A. F. S., Prof. M. K. Bhowmik, Director of Research, Extension & Farm, W.B.U.A.F.S., Prof. N. R. Pradhan Controller of Examinations and Dr. R. Samanta, Registrar, W.B.U.A.F.S., for their commendable suggestions, advice and timely help during my thesis work.

I specially thank to Dr. Prakash Dutta, BLDO, Jhalda; Dr. Debasish Maity, BLDO, Barabazar; Dr. Bikash Rana, BLDO, Kashipur; Dr. Mahadev Naskar, BLDO, Gosaba; Dr. Mahadeb Samanta, BLDO, Patharpratima; Dr. Rajib patra, V.O., Gobindopur; Dr. Pinaki Saha, V.O., Barabazar; Dr. Gora Chand Mondal, V.O., Kashipur; Dr. Tapash Ghosh, V.O., Gosaba; Dr. Prabal Maity, V.O. Patharpratima; Mr. Rabindranath Mondal and Mr. Dayamoy Mondal Pranibandhu, Barabazar; Mr. Puranjoy Barman, Pranibandhu, Gosaba; Mr. Santosh Mondal, Pranibandhu, Patharpratima; for their valuable help and co-operation guidance extended to me during data collection of my research work.

My thanks are also attributed to my departmental students Dr. B. Tudu, Dr. A. De, Dr. R. K. Ghosh, Dr. S. Islam, Dr. R. Roy and Dr. M. Goswami for their persistent encouragement during course of study.

I also express my thanks to Malay da, Tonmay da, Samaresh da, Debasish da, Anirban da, Sanjib da, Apu da and Gopal da for keeping my spirit up and hamstrings in working condition.

I further express my thanks to Hari, Chanchal, Dipak, Sakti, Mihir, Tapu, Siby, Sankhanath, Suman, Arnab, Indra, Santanu, Jyoti, Gobindo, Ranjit, DP, Prasun, Hira, Manik, Aditaya, Sudipto, Bonomali and Somaditya for their excellent company and timely help.

A few words is not sufficient for the non-teaching staff of the Department of Veterinary & A.H. Extension Education, F/o. Veterinary and Animal Sciences, West Bengal University of Animal and Fishery Sciences and all the staff members of Controller of Examinations Section for their kind co-operation during the entire course work.

Indebt ness to all teachers for their blessing, encouragement and good wishes is respectfully recorded.

No words are enough to express my heartiest gratitude to the respondents of this study for their help and kind co-operation during data collection.

And finally and immensely my Maa, Baba, Thakurma and all family members for their love and support.

Date: 25.10, 2006

Place: Belgachia, Kolkata.

*Debasish Saha.*  
[DEBASISH SAHA]

# ABBREVIATIONS

---

---

A.H.	ANIMAL HUSBANDRY
FAO	FOOD AND AGRICULTURAL ORGANIZATION
SRLO	SMALL RUMINANT LIVESTOCK OWNERS
mm	MILLIMETER
Max.	MAXIMUM
i.e.	THAT IS
Km.	KILOMETER
Sq.	SQUARE
E	EAST
W	WEST
N	NORTH
S	SOUTH
LDA	LIVESTOCK DEVELOPMENT ASSISTANT
BLDO	BLOCK LIVESTOCK DEVELOPMENT OFFICER
Yrs.	YEARS
PPR	PESTE DES PETITS RUMINANTS
SC	SCHEDULED CASTE
ST	SCHEDULED TRIBE
OBC	OTHER BACKWARD CASTE
Pgs.	PARGANAS
Fig.	FIGURE
°C	DEGREE CENTIGRADE
%	PERCENTAGE

# CONTENTS

CHAPTER NO	SUBJECTS	PAGE NO
I.	INTRODUCTION	1-6
II.	REVIEW OF LITERATURE	7-30
III.	MATERIALS AND METHODS	31-64
IV.	RESULTS AND DISCUSSION	65-107
V.	SUMMARY AND CONCLUSION	108-131
	BIBLIOGRAPHY	i-xix
	APPENDIX	i-ix

# List of Tables

Table No.	Subject
3.1	Demographic and other important features of West Bengal
3.2	Demographic and other important features of Purulia and North 24 Parganas District
3.3	Variables selected for the study and their empirical measurements
4.1	Distribution of demographic and Socio-personal characteristics of small ruminant livestock owners
4.2	Distribution of SRLO according to their information source utilization (overall)
4.3	Distribution of SRLO according to their information source utilization in Purulia district
4.4	Distribution of SRLO according to their information source utilization in South 24 Parganas district
4.5	Distribution of SRLO according to their knowledge about reproduction practices of small ruminant livestock farming
4.6	Distribution of SRLO according to their knowledge about vaccination practices of small ruminant livestock farming
4.7	Distribution of SRLO according to their knowledge about feeding practices of small ruminant livestock farming
4.8	Distribution of SRLO according to their knowledge about deworming practices of small ruminant livestock farming
4.9	Distribution of SRLO according to their attitude towards entrepreneurship and creativity of small ruminant livestock farming

4.10	Distribution of SRLO according to their attitude towards small ruminant livestock farming
4.11	Distribution of SRLO according to their planning skills of small ruminant livestock farming
4.12	Distribution of SRLO according to their decision making activities of small ruminant livestock farming
4.13	Distribution of SRLO according to their work distribution pattern of small ruminant livestock farming
4.14	Distribution of SRLO according to their record keeping activities of small ruminant livestock farming
4.15	Distribution of SRLO according to their marketing pattern of small ruminant livestock farming
4.16	Distribution of SRLO according to their adoption of improved practices in small ruminant livestock farming
4.17	Path Co-efficient showing the direct and indirect effect of selected independent variables on adoption of improved small ruminant livestock practices
4.18	Path Co-efficient showing the direct and indirect effect of selected independent variables on adoption of improved small ruminant livestock practices of Purulia district
4.19	Path Co-efficient showing the direct and indirect effect of selected independent variables on adoption of improved small ruminant livestock practices of South 24 Parganas district
4.20	Path Co-efficient showing the direct and indirect effect of selected independent variables on attitude of improved small ruminant livestock practices
4.21	Path Co-efficient showing the direct and indirect effect of selected independent variables on knowledge of improved small ruminant livestock practices
4.22	Path Co-efficient showing the direct and indirect effect of selected independent variables on communication score of improved small ruminant livestock practices.

4.23	Correlation of different Independent variables with adoption of Deworming, Castration and Vaccination
4.24	Correlation of different Independent variables with adoption of Colostrum feeding, Selective breeding, record keeping and Treatment with medicine
4.25	Correlation of different Independent variables with Adoption Index
4.26	Showing the effect of Age on adoption
4.27	Showing the effect of Gender on adoption
4.28	Showing the effect of Caste on adoption
4.29	Showing the effect of Category on adoption
4.30	Showing the effect of Religion on adoption
4.31	Showing the effect of Marital Status on adoption
4.32	Showing the effect of Occupation on adoption
4.33	Showing the effect of Family type on adoption
4.34	Showing the effect of Training on adoption
4.35	Showing the effect of Education on adoption

## *LIST OF FIGURES*

<b>Figure no.</b>	<b>Subjects</b>
1	Map showing the study area
2	Bar diagram showing the sex ratio of SRLO
3	Bar diagram showing the age groups of SRLO
4	Bar diagram showing category of SRLO
5	Bar diagram showing different occupation groups of SRLO
6	Bar diagram showing different caste group of SRLO
7	Bar diagram showing different education groups of SRLO
8	Bar diagram showing marital status of SRLO
9	Bar diagram showing religion of SRLO
10	Bar diagram showing family type of SRLO
11	Bar diagram showing training reception by the SRLO
12	Bar diagram showing the house type of SRLO
13	Bar diagram showing social participation by the SRLO
14	Line diagram showing adopter of Small Ruminant Livestock practices by SRLO
15	Line diagram showing Non-adopter of Small Ruminant Livestock Practices by SRLO
16	Utilization of Farm Publication by SRLO in South 24 Pgs
17	Utilization of Farm Publication by SRLO in Purulia District
18	Utilization of Poster by SRLO in South 24 Pgs
19	Utilization Poster by the SRLO in Purulia District
20	Utilization of BLDO/ Veterinary Officer information sources by SRLO in South 24 Pgs
21	Utilization of BLDO/ Veterinary Officer information sources by SRLO in Purulia

# Chapter 1

## Introduction





**Black Bengal Goat**



**Garole Sheep**

## ***INTRODUCTION***

Agriculture is the backbone of rural development and also plays an important role in national economy in our country. Animal husbandry is a pivotal sector of the agricultural economy and the small ruminant livestock plays an important role in animal husbandry sector as well as national economy in our country. Small ruminants farming are one of the most important subsidiary occupations by almost all farmers for generation of rural employment in primary sector together with creation of income opportunities.

World sheep population is 1057.9 million and goat population is 720 million, Where as In India, sheep population is 61.47 million and goat population 124.36 million which is respectively shared 5.7 per cent and 17.3 per cent of the world sheep and goat population. In West Bengal scenario sheep and goat population is 1.5 and 18.7 million respectively which contribute 2.5 and 13.8 per cent of the Indian small ruminant livestock population respectively (Bhattacharjee, 2003).

Small ruminants (sheep and goat) are the most potential livestock of our rural as well as poor people of the society. They are also main meat producing animal in India, their meat is mostly preferred and hence the costliest of all meats and represented almost 37 per cent of total meat produced in the country. FAO, 2003 reported that India produced 234 thousand tones mutton and 473 thousand tones chevon annually. Almost 95 per cent of the goat meat (chevon) produced in the country is consumed locally. But the per capita availability is still far below the requirement. The demand for goat meat in India is high, due to its wider acceptability by the non vegetarians over any other type of meat. There is an increasing demand for goat and sheep meat even in export.

Goat Milk constitutes 3.2 per cent of total milk produced in India. The Skin produced by Indian goat is considered of very high

quality on account of their relatively larger size, minimal blemishes and perhaps high quality processing. "Glance-kid" is the finest world famous leather in the international market. This is produced by black and white varieties of Bengal goats found in the North Eastern part of India.

Other side, the early invaders to the possibly consider sheep as the most useful companion as the area was not suitable for crop production. Sheep, with their capacity of long migration and ability to survive in harsh climate and poor feed regime excels other domestic species to associate with early migrants. Sheep is a potent producer of mutton, skin and manure. Milk yield is very less and is often found to be insufficient for triplet and quadruplet born lambs leading to lamb mortality. Small ruminant livestock has good manure with high Nitrogen value (N-value). Poor farmers prefer small ruminant, because they are highly prolific (goat >sheep) and farmers can easily earn money during the lean period of agriculture or tied period of the crisis.

On the other hand small ruminant have significant contribution to survival of the economically weaker section of our society and to meet the requirements in industry, besides earning valuable foreign exchange through export. Small ruminants can be reared under varied condition with other liabilities and they can thrive on shrubs and leaves which other animal can not. Evidently goat is the last species to live in ecology where virtually no food is available.

Ignorance about the small ruminant livestock must be reduced in every conceivable way since it largely limits progress and achievement. Education is thus vital provision of information regarding fundamental principles of animal production in a significant means by which the developed countries of the world can continue to be of immense value to the developing countries (Gupta and Shankar, 1997).

The efficient application of scientific attitude and knowledge of small ruminant farming will go a long way towards the production of more meat, milk, skin and other products and byproducts from small

ruminant. Long years ago, the Ford Foundation team in its report (1961:234) had recommended that “the urgent need for animal husbandry workers to observe and study, the practices and procedures used by villagers in management of farm animals. In their view, such studies would reveal many opportunities for worthwhile research on simple but important problem (s)”.

Singh and Kunzru (1985), enumerated that the existing livestock practices may provide us not only feedback but an insight into the inventiveness or creativity of the local farmers also. Moreover, extension programmers seek to modify existing practices. Thus it is important to monitor periodically such practices, to study not only what impact has been made by extension intervention, but also to suggest in what manner further changes may be expected. This would also provide an indication for modification of the existing technology.

To enhance the production potential of our small ruminant livestock distributed throughout the length and breadth of our country the only way is to introduce improved Animal Husbandry technologies for mass adoption and to create the critical and necessary infrastructural facilities important for adoption of the Animal Husbandry practices.

In above context, the state of West Bengal has one of the best options of improved small ruminant livestock farming to increase the economic condition of rural people. In West Bengal total small ruminant population (only sheep and goat) are 20.3 million and rank third in India, after Rajasthan and Andhra Pradesh. Out of this population total goat population is 18.7 million, which contributes 13.8 per cent of the Indian goat population and rank is first in India. On the other hand sheep population is 1.525 million, which contributes 2.5 per cent of the Indian sheep population (FAO, 2003). West Bengal geographically consists of six zones based on soil character, like- brown hill soil, Teari soils, Red soils, Laterite soils, Alluvial soils and Coastal saline soils. The present study was conducted only in two zones considering different agro-climatic

factors. One is Red-laterite zone (Purulia district) another is Coastal saline zone (South 24 Parganas district). It is estimated that different agro-climatic and socio-economic factors may influence the farming system of livestock along with productivity.

Implementation of any improved Animal Husbandry technology in practical field depends upon the adoption behaviour of the individual who wants to implement. Wilkening (1953) described the adoption of an innovation as a process composed of learning, deciding and acting over a period of time. The adoption of a specific practice is not the result of a single decision to act but series of actions and meaningful decisions. More over the North Central Sociology Subcommittee for the study of diffusion of farm practices (1955) identified five stages of adoption process like awareness, interest, evaluation, trial and adoption. There are various factors that can influence in any stage of adoption.

The adoption behaviours of the small ruminant livestock owners depend on knowledge, attitude, risk orientation etc. Considering this theoretical back up, the study of adoption behaviours was carried out with 37 independent characteristics of the small ruminant livestock owners.

The study on adoption behaviour of livestock owners has already been carried out by Tripathi and Jati (1971), Sharma and Nair (1974), Singh (1978), Sohal and Tyagi (1978), Sinha and Singha (1980), Goswami (1987 & 2000), Ghosh (2004) etc.

Success of any enterprise depends on market oriented production system. So, it becomes vital to study the marketing management of the small ruminant livestock owners. The study on-marketing management has already been studied by Deshpande and Webster (1989), Kohli and Jaworski (1990), Trondsen and Johnston (1998) etc.

Therefore, the present study was carried out with an aim to find out some Socio-economic, Socio-psychological and Communication characteristics of the small ruminant livestock owners that influence

the adoption of some selected livestock practices by the Small Ruminant Livestock Owners (SRLO).

**Objectives of the Study:**

**General Objective:**

The general objective of the study is to find out the relationship of the adoption behaviour (dependent variable) of the Small Ruminant Livestock Owners (SRLO) about selected animal husbandry practices with the selected independent variables.

**Specific Objectives:**

1. To study the demographic profiles of small ruminant livestock owners (SRLO).
2. To study the level of adoption of the small ruminant livestock owners (SRLO) in respect of some selected practices.
3. To study the socio-economic, socio-psychological, communication and administrative characteristics of the small ruminant livestock owners (SRLO) in relation to adoption of selected practices.
4. To compare the level of adoption of selected practices of the small ruminant livestock owners (SRLO) of two different agro-climatic (saline or coastal and non-saline or red-laterite) zones of West Bengal.
5. To identify the farm level factors affecting the decision to be adopted by small ruminant livestock owners (SRLO).
6. To study the relationship of dependent variable with the independent variables.
7. To find out the key variables those influence the adoption of selected practices of SRLO.
8. To study the knowledge level of small ruminant livestock owners in relation to Animal Husbandry practices.
9. To study the work distribution pattern among the SRLO in relation to selected Animal Husbandry practices.

**Need and scope of the study:**

Small ruminant namely goat and sheep are the subsidiary economic weapons of the rural poor. Usually small ruminant livestock owners (SRLO) in rural area rear animals in traditional way. It

requires improved technology for augmenting productivity for which their adoption level have to be studied to identify the training needs as well as the interventions to be adopted by them in future. On the other hand this will help the concerned policy makers to formulate more adequate policy guidelines for effective dissemination of technology in sheep and goat farming to make it more profitable and variable.

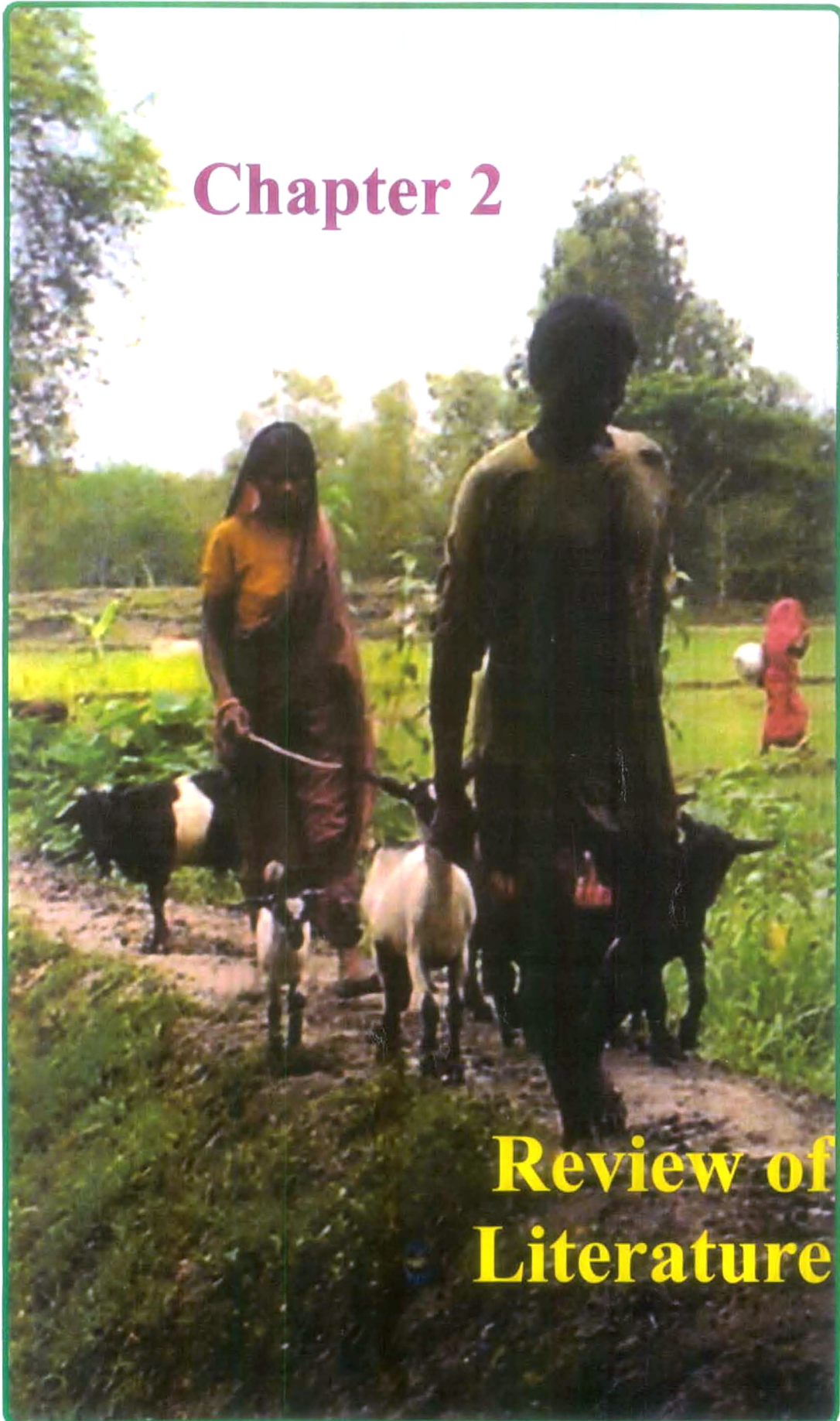
**Limitations of the study:**

1. The present study has the usual limitation of time and resources invariably encountered by the student researcher.
2. The result will be applicable only to the area of sample drawn and also for those areas with similar socio-economic, cultural, environmental and agro-climatic condition.

Despite these limitations, genuine attempt was made to achieve the objectives of the study. Moreover, considerable care and thought were also exercised in making the study as objective, scientific and systematic as possible.

## Chapter 2

## Review of Literature



# ***REVIEW OF LITERATURE***

In order to form a sound basis of study a comprehensive review is very important. The study of 'Adoption Behaviour of Small Ruminant Livestock Owners (SRLO) in two agro-climatic zones of West Bengal' has wide potentiality for scientific investigation. After going through several books, journals, magazines it was observed that some studies have been conducted in this direction but they are on very limited aspect and hence of not so much use for the extension or social workers point of view. An attempt has however, been made in this chapter to review the studies relevant to the present study.

The main functions of review of literature are:

- a) To determine what work, both theoretical and practical has been done previously;
- b) To assist in the delineation of the problem areas;
- c) To provide a basis for the theoretical framework;
- d) To provide an insight into method and procedure;
- e) To suggest operational definitions of major concepts and to provide a basis for interpretation of the findings.

Critical reporting of the studies in the past investigations is important for scientific presentation. For the sake of convenience the study of review of literature has been presented under the following subheads:

2.1 Adoption behaviour of the SRLO in respect of improved small ruminant livestock farming practices.

2.2 Variables related with the adoption behaviour of the SRLO in respect of small ruminant livestock practices, which have been divided into four groups.

- i) Socio-economic
- ii) Communication
- iii) Socio-psychological and
- iv) Administrative

## **2.1. Adoption behaviour of the SRLO in respect of improved small ruminant livestock farming practices:**

Rogers (1962) defined the **adoption** process as the mental process through which an individual passes from first hearing about an innovation to the decision to continue full use of it. Trivedi (1963) observed that socio-economic status and adoption of technology were significantly related. Mulay and Roy (1965) reported that an individual might reject a new idea or practice not because it is uneconomical or unsuitable for his uplift but because it is not in conformity with the norms and values of the social structure of which he is a member.

Desai (1966) revealed that size of farm had positive association with **adoption** of improved farm practices. Nakade (1971), Malhotra (1974), Saha (1974) also supported that findings of Desai.

Rogers and Stanfield (1966) reported that socio-economic status, income and farm size were among the main variables explaining the **adoption** of innovation.

Mutry (1967), Hussain (1968) and Halya (1968) reported that education of the respondents was found to be associated with the **adoption** of improved animal husbandry practices. Mazumdar and Mazumdar (1967) studied that the personality, attitude and knowledge have greater role in the process of adoption. Hussain (1968), while studying the adoption of selected practices of animal husbandry, found that 24 percent of the farmers did not adopt the selected practices. Singh and Singh (1970), Singh *et al.* (1970) found that education of the family was significantly contributing in explaining the adoption behaviour of the farmers.

Sohal and Grewal (1971) indicated that education level of farmers is significantly associated with **adoption** of improved practices. Nakade (1971), Kulkarni (1973), Banerjee (1976) and Sohi and Kherde (1980) found in their study that education level of the farmers was significantly associated with the **adoption** of improved practices. Kakoty (1975) reported that size of land holding was not associated with the **adoption** of improved animal husbandry

practices. Sayeedi (1983) suggested his study that education level of the respondent was found influencing the level of adoption positively to a significant extent. Chug (1986) in his study reported that education of the livestock owner has got its impact on knowledge but not so much on **adoption**. Raymundo (1994) reported that educational attainment affects the utilization or **adoption** of technologies.

Rao and Waliullah (1968) reported that the castration of scrub bulls was adopted by most of the farmers followed by disease control measures and A.I. The practice of rearing of improved breeds of cattle was **adopted** least.

Roy *et al.* (1968), Choubey (1972) and Somasundaram (1976) reported that type of farmer's family was not significantly related with **adoption** of improved practices.

Singh (1969) found positive correlation between knowledge of package of practices and adoption behaviour of farmers.

Tripathi and Garg (1969) and Alao (1971) observed that the family size and **adoption** score of farmers have significant association. In the year 1971 Sohal and Grewal reported that the members of the family played a significant role in favour of refugee farmers in extent of **adoption** of improved farm practices. Ibotambi (1974) revealed that family size was negatively correlated with **adoption**. Kakoty (1975) and Sohal and Tyagi (1978) found that family size was not associated with **adoption** of improved animal husbandry practices. Malik (1978), Chandra (1979) and Chouhan (1979) also reported that family size was not significantly related with adoption of innovations. Sohi and Kherde (1980) observed that positive and significant correlation between size of family and adoption of improved farm practices. Sayeedi (1983) suggested that family size were found influencing the level of adoption positively to a significant extent. Raymundo (1994) revealed that the household size affects the utilization or the adoption of technologies.

Bakshi (1970) found that size of family, size of land holding and number of animals owned by the farmers had significant influence on daily milk production of the animals.

Sharma and Sharma (1970) reported that religious sentiment and lack of faith in control measure were the main obstacles in the adoption of diseases control measures. Kar *et al.* (1970) found that farmers within the age group of 41-50 years adopted maximum no. of innovations.

Guljart (1971) stated that the extent of knowledge, willingness and abilities influence the adoption of practices. Rogers and Shoemaker (1971) theorized that it is usually possible to adopt and use an innovation without possession of principal knowledge but the long range competence of individual to judge future innovations is facilitated by principal knowledge. Guljart (1971) stated that the extent of knowledge, willingness and abilities influence the **adoption** of practices. Tyagi (1975) reported that the adoption of breeding, feeding, disease control and management practices were influenced by the herd size, knowledge, family education, farm size etc. Chander (1976) found that **herd size** influenced the gain in knowledge, but not the adoption. Mikkilineni (1976) reported positive and significant correlation between the adoption scores of the farmers and their personal characteristics like education, farm size, media exposure, extension contact, social participation and knowledge.

Rath (1978) found in his study that the knowledge, extension contact, media exposure, land holding were associated with the adoption of breeding, feeding, disease prevention and management practices. He also reported that socio-economic status of the farmers was not associated with the breeding, feeding and disease prevention practices. The **caste** of the farmers was also found associated with the adoption of breeding and management practices but not with the feeding and disease prevention practices.

Sharma (1979) studied that there were significant relationship amongst the willingness, awareness, knowledge and adoption of

breeding, feeding and disease control practices, however, the principal knowledge of the said practices was not found associated. Saini (1980) reported that quite a large number of small and marginal farmers had low adoption of **leadership** potential. Shukla (1980) observed that economic motivation contributed significantly and positively in predicting the adoption behaviour of the farmers. Sohi and Kherde (1980) revealed that farm size was positively and significantly related with adoption. Sinha and Sihna (1980) and Ogunfiditimi (1981) concluded that land holding was not significantly related to adoption behaviour. Sarkar (1981) and Sushama *et al.* (1981) revealed that farm size was positively and significantly related with adoption.

Sarkar (1981) suggested that adoption level of dairy farmers was highly and significantly associated with their farm income. Singh (1982) reported that awareness, knowledge, socio-economic status and situational resources have positive and significant correlation with the adoption of dairy husbandry practices. Sadamate *et al.* (1982) reported from his study that only 29.88 percent respondents adopted **improved fodder** production practices. Hazarika (1983) revealed that most of the farmers were medium adopters. The land size and attitude towards farming were not found correlated positively and significantly with adoption of the improved dairy farming practices. Wozniak (1984) reported that the larger effects of agricultural extension on the probability of adoption of agricultural technologies may be partially explained by the different role, each information source plays in the adoption decision and diffusion process. Nataraju and Channegowda (1985) exhibited in their study more percentage of small farmers (78 percent) in high adoption group compared to marginal farmers (42 percent) and agricultural labourers (28 percent). Chug (1986) reported interestingly that awareness and knowledge were highly correlated with the extent of adoption of **breeding** practices. Amir and Knipscheer (1987) reported that a behavioural model forces FSR (Farming System Research) practitioners to focus their attention on

aspects of technology transfer and village level adoption of new livestock technologies hitherto neglected.

Reddy (1987) observed that the majority of the respondents adopted the improved **breeding** practices but not improved feeding practices. Saxena (1991) reported non-significant relationship between personal variables and level of adoption. Raju (1992) found that the educational level, level of knowledge and the extension agency contact of the respondents were found to have significant influence on the adoption of the recommended practices. Ogunfiditimi (1993) observed that most adopters of new innovations especially in the developing countries tend to set aside temporarily or totally abandon from such innovations over a period of time. The most crucial reason is lack of stable back-up support services and untimely supply of input. Verma and Tyagi (1993) concluded from their study that knowledge and adoption of scientific dairy farming practice of non-member cattle owners were poor as compared to the member of cattle owners. Bhople and Thakare (1994) reported that the characteristics, namely, education, annual income, risk preference, economic motivation, scientific orientation and cosmopolitaness were positively and significantly related with information sources utilization, adoption and information transfer.

Bhujbal and Kadam (1995) reported non-significant relationship between personal variables and level of adoption. Frank (1995) studied the constraints limiting innovation adoption in the North Queensland beef industry and reported that the personal situation variables influencing reward and behaviour varied inversely with the level of resources per production unit, and directly with economic scale, conceptual skill and level of pro-active management. Sivanarayana and Jayarama (1995) reported that lack of knowledge, nonavailability of crossbreeds, poor adaptability of crossbreeds, unawareness of the practice, scarcity of the grazing land, poor economic status, negligence of practice, nonavailability of concentrate mixtures, difficulty in premium payment, and careless indifferent

attitude towards insurance of animals were the major constraints that were found in the adoption of the improved sheep and goat practices by the small and marginal farmers of the diversified farming.

Marovanidze, (1996) in this study goats were reported to play several roles in the livelihood of smallholder farming households. First and foremost, the farmers used goats as an immediate source of income. In order to generate income, the majority of the farmers sold their goats at anytime of the year. This practice allowed farmers to have a consistent inflow of cash into the household. However, 16% of the farmers sold goats in January and/or October while about 14% of the farmers targeted the festive season periods. Sales in January were used to generate cash for school fees and student uniforms. In contrast, sales in October were driven by the demand to get money for crop inputs such as seed and fertilizer whereas sales during the festive season targeted high prices, as demand was generally high.

Sarkar and Bandyopadhyay (1996) reported that the farmers should be assured of help and subsidies to increase their risk bearing capacity to accelerate the adoption of farm innovations. Sagar and Sagar (1996) reported that family educational status, attitude towards green fodder cultivation, and adoption of animal husbandry practices were found to be positively and significantly correlated with the productivity of the dairy animals of the participants and non-participants livestock owners. Sihag *et al.* (1996) reported from their study that the adoption of breeding and marketing practices was poor and adoption of calf rearing and milking practices was moderately poor. Adoption of feeding and health care and management practices was moderately good.

Bhattacharya *et al.* (1997) indicated from their study that use of computers, veterinary check-up of herd, and herd size influence the probability of adoption. They have also shown that co-operative extension programme enhance the rate of adoption.

Meena and Malik (1999) reported that knowledge about green fodder cultivation was highly significant with the adoption of improved fodder cultivation practices.

Gilger (2000) in his adoption studies has shown that both genes and environments contribute to individual differences in behaviour. Sharma *et al.* (2000) reported that Non-tribal had higher adoption than Tribal due to their background and personal characters.

Daipuria *et al.* (2001) reported that age, education, house type, social participation, risk orientation, knowledge about technologies, personal cosmopolite sources, mass media sources, market orientation are significantly associated with the adoption of dairy practices. It was also revealed from their findings that family type, family size and caste had no significant relationship with the adoption level of the farmers.

Sah and Chand (2002) reported that education, land holding, herd size, income of the farmers were significantly correlated with the adoption of dairy innovations. Tiwari *et al.* (2002) reported that maximum adoption gap regarding cattle rearing practices were in improved breeding practices. Singh and Kushwaha (2002) reported that small farmers are capable of absorbing technologies if given the unique opportunities to do so.

Dutta and Mishra (2002) reported knowledge as the main factor which influence the adoption of pulse production technology. Bhushan *et al.* (2002) reported that education, land holding, social participation, source of information utilized and Knowledge were highly significant with the constraints of the respondents in adoption of biogas plant.

Berhanu and Swinton (2003) reported that the decisions on whether to adopt and how much to adopt can be made jointly or separately. Lahoria and Jaulkar (2003) reported that adoption behaviour of sugar cane growers were significantly associated with education, social participation, economic status but not with the land

holding. Tiwari *et al.* (2003) reported that age (negative association), education and knowledge level of the farmers were significantly associated with the adoption of improved animal husbandry practices in Chhatisgarh plains.

Singh *et al.* (2004) reported that education, social participation, herd size, use of information sources, risk preference and knowledge level of the DCS members were significantly associated with the adoption of dairy management practices. They also reported that age, family type, family size and occupation had no significant association with the adoption level.

Ghosh *et al.* (2005) reported that adoption of AI is highly correlated with all the socio-psychological variables in both member of comparative society and non-member of comparative society. It also revealed that all the communication variables were having significant correlation with adoption of AI both in MCS and NMCS except the urban contact in MCS.

## **2.2 Variables related with the adoption behaviour of the small ruminant livestock owners in respect of improved small ruminant farming practices:**

### **i) Socio-economic:**

Trivedi (1963) observed that socio-economic status and adoption of technology were significantly related.

Mulay and Ray (1965) stated that support from one's **caste** group was an important legitimising force for adoption of improved farm practices. Chand and Gupta (1966) and Jha and Shaktawat (1972) found caste and adoption score of a farmer has no significant association. Mundra and Batham (1967) revealed higher acceptance in higher caste and lower acceptance in lower caste. Patel and Singh (1970) observed that higher caste farmers are having higher understanding of farm planning.

Desai (1966) revealed that **size of farm** had positive association with adoption of improved farm practices. Nakade (1971), Malhotra

(1974), Saha (1974) also supported the findings of Desai. Kakoty (1975) reported that size of **land holding** was not associated with the adoption of improved animal husbandry practices.

Verner and Gubbles (1967) observed that the adoption of dairy farm operators and number of children in a family has negative correlation.

Roy *et al.* (1968), Choubey (1972) and Somasundaram (1976) reported that **family type** of the respondents was not significantly related with adoption of improved practices.

Tripathi and Garg (1969) and Alao (1971) observed that the **family size** and adoption score of farmers have significant association. Ibotambi (1974) revealed that family size was negatively correlated with adoption. Saini (1975) found that family size was found to be associated with overall adoption of dairy practices. Kakoty (1975) and Sohal and Tyagi (1978) found that family size was not associated with adoption of improved animal husbandry practices. Malik (1978), Chandra (1979) and Chouhan (1979) also reported that family size was not significantly related with adoption of innovations. Sohi and Kherde (1980) observed positive and significant correlation between size of family and adoption of improved farm practices. Sohal *et al.* (1982) studied that there was a significant correlation between family size and number of milk animals. Sayeedi (1983) suggested that family size were found influencing the level of adoption positively to a significant extent. Teklewold *et. al.* (2006) reported that education and other training, learning and perfecting skills on the job through experience make an incentive for producers to intensify degree of adoption in poultry production and farmer's **age** may negatively influence both the decision to adopt and extent of adoption of improved poultry breeds even though they said age has no significant effect on probability of adoption.

Chander (1970) observed in the key village scheme area, karnal, that **family education score** was significantly influencing the adoption of A.I. Singh and Singh (1970), Singh *et al.* (1970) found that

education of the family was significantly contributing in explaining the adoption behaviour of the farmers. Tripathi and Jati (1971) suggested that family education play very important role in adoption of poultry enterprise. Sohal and Tyagi (1978) reported that family education has no significant relationship with the adoption of dairy innovations. Sohi and Kherde (1980) reported that family education score was significantly associated with adoption of dairy husbandry practices. Sarkar (1981) reported that adoption levels of dairy farmers were highly and significantly associated with their family educational status. Sayeedi (1983) suggested from his study that family educational status was found having non-significant but positive relationship with the level of adoption of dairy farmers. Dana *et. al.* (1998) suggested that family educational status was significantly and positively correlated with the adoption of livestock production technologies.

Desai and Patel (1974) found a positive relationship between **income** and adoption of improved dairy practices from their case study of a leading dairy in India. Hundal (1976) also supported this finding. Singh (1977) and Chandra (1979) reported the positive and significant relation of **occupation** of the farmers with the adoption of improved farming practices. Chouhan (1979) noticed positive and highly significant correlation between occupation and milk production with adoption. Shukla (1980) observed that **economic motivation** contributed significantly and positively in predicting the adoption behaviour of the farmers. Dana *et. al.* (1998) reported that **economic motivation** was significantly and positively correlated with the adoption of livestock production technologies.

Sinha *et al.* (1974) reported that there was no significant association of **age** with the adoption of concentrate feeding. Singh and Prasad (1974) also indicated that higher adoption was with the farmers in the range of 30-45 years of age. Kumar (1976), Hundal (1976), Mikkilineni (1976) and Singh (1982) reported that age had no significant relationship with adoption of improved dairy innovations.

Yadav and Jain (1984) reported that the **older respondents** were greater adopters. Sharma (1994) studied the status of crossbred cattle owners in nine villages of Haryana and showed that the majority belonged to middle (36-45 years) and old (> 45 years) age groups. Sarkar and Bandopadhyay (1996) reported that younger farmers should be approached to secure better adoption. Bhattu *et al.* (1998) observed that age has significant correlation with the level of adoption of broiler farming. Hundal (1976) and Sayeedi (1983) suggested that **herd size** was having non-significant but positive relationship with the level of adoption of dairy farmers. Raymundo (1994) observed that number of working animals affect utilization or adoption of technologies apart from training.

Sohi and Kherde (1980) revealed that **farm size** was positively and significantly related with adoption. Sinha and Sinha (1980) and Ogunfiditimi (1981) concluded that land holding was not significantly related to adoption behaviour. Sarkar (1981) and Sushama *et al.* (1981) revealed that **farm size** was positively and significantly related with adoption. **Land holding** was found having non-significant but positive relationship with the level of adoption of dairy farmers reported by Sayeedi (1983).

Ghosh and Mukhopadhyay (1986) showed that 60.49% activities related to poultry production were carried out by **females** and 36.51% by **males**. Women were found to be actively engaged in production related activities and the men in market related activities. Adhikari (1987) estimated that the women labour occupies more than 80% of total labour input for livestock and poultry in Nepal. Narmatha (1994) reported that women took active part in farm oriented activities in poultry production while men were actively engaged in commercial activities. Agbede *et al.* (1995) observed that women and children are extensively involved in poultry farming, making up 70% of the work force on traditional poultry production in Cameroon. Veeranna *et al.* (1998) reported that rural women's role in backyard poultry production has significant importance. They are performing most of

the tasks such as feeding, watering, housing and management with utmost care and interest.

Teklewold *et al.* (2006) also reported that as a good source of labour for poultry production management, households with more **family size** are more likely to be adopters than families with lower family size.

## **ii) Communication:**

Murty (1967) found that **social participation** had positive and significant relationship with adoption of improved cattle breeding techniques. Gill (1967), Reddy and Kivlin (1968), Tripathi and Garg (1969) stated that association between adoption and social participation is positive. Halyal (1968) in his study reported that social participation of the respondents did influence the rate of adoption of improved animal husbandry practices. Verma and Prasad (1971), Kolte (1973) and Sinha *et al.* (1974) reported that social participation was found to be significantly associated with the adoption levels in cattle feed mixtures. Social participation was only significantly correlated with the adoption level of dairy farmers reported by Sarkar (1981). Upadhay and Gupta (1987) observed that social participation had no significant impact on the adoption of home making practices.

Ranganathan and Joyshankara (1976) concluded that the **informal-personal sources** are generally utilized by all the farmers. Among the formal personal sources of information, veterinary and livestock officers who happened to be available on the spot had good impact on the adoption of cross breeding among local cattle. Further, it has been appeared from their study that other sources of information such as demonstrations, extension literature, seminars and training of farmers should be provided more intensively and frequently for greater impact on the farmers.

Sawant *et al.* (1979) reported in their study that extension workers, Gram Sevaks in particular need to be properly trained and

encouraged in utilizing various extensions teaching methods like farmer's meetings, trips, discussions to accelerate adoption of cross breeding technique for breed improvement in cattle.

Sarkar (1981) investigated that adoption level of dairy farmers was highly and significantly associated with **localitiness** and **cosmopoliteness** of communication sources.

Singh (1982) reported that **mass media** exposure had positive and significant correlation with the adoption of dairy husbandry practices. Sayeedi (1983) stated that exposure to mass media was not found influencing on the level of adoption of the dairy husbandry practices. Nataraju and Channegowda (1985) that veterinary livestock inspector is the most common source of information for the different categories of dairy farmers (small, marginal and agricultural labourer). Mass media sources such as film show, cattle rally and radio have been utilized to a very large extent. Less percentage of agricultural labourers than marginal and small farmers had contacted each of these information sources. Chug (1986) suggested that **mass-media** exposure of the farmers were significantly influencing the extent of adoption of technology.

Suman and Lal (1993) concluded that the main sources of information regarding improved agricultural practices in Faizabad district of Eastern U.P. are neighbour and local leaders.

Goswami *et al.* (1996) reported that utilization of mass media were positively and significantly correlated with the knowledge level of the livestock owners about AI in both Operational Research Project (ORP) and Non- Operational Research Project (NORP) villages.

Dana *et al.* (1998) reported that the mass media exposure was significantly and positively correlated with adoption of poultry production technologies.

Goswami and Sagar (1998) observed that utilization of mass media by the livestock owners had positive and significant correlation with the level of knowledge of deworming.

Goswami *et al.* (2001) studied that the majority of the livestock owners used radio as an effective mass media with respect to adoption sources of information about the animal husbandry practices whereas the farm publications were least used by the livestock owners used BLDO as an effective personal cosmopolitan sources of information for the adoption. Of the selected animal husbandry practices whereas the University extension personal were least used.

Ghosh (2004) reported that communication variables were significantly correlated with adoption of improved animal husbandry practices in non-member of co-operative society whereas mass media communication, personal local sources and personal cosmopolitan sources were significantly correlated with adoption in member of co-operative society.

Teklewold *et.al.* (2006) reported that the nature of adoption decision may dictate the relative impact of information sources on early adoption, signifying its non-significant effect on the extent of the proportion of exotic poultry breeds.

### **iii) Socio-psychological**

Singh, Bramhjit (1964) reported that education was positively correlated to increase in knowledge and change in attitudes.

Sharma (1967) observed that two-third of the respondents in Haryana did not know the contagious nature of livestock diseases. Most of the respondents were not aware of the disease control measures. Majority of the cattle owners showed some faith in **vaccination** and only 28 percent accepted all types of vaccination.

Bagga (1967) reported that only a few respondents in Hissar district gave special **care** to the dam during **pregnancy** and before and after parturition. Mazumdar and Mazumdar (1967) stated that out of the psychological factors **attitude** is the best prediction of adoption. Kaura (1967) found that unfavorable **attitude** of the farmers towards A.I. was the major cause for its non-adoption in Haryana villages. Sekhon (1970) revealed that the mass media, age and

education had significant association with gain in **knowledge**. Sharma and Dey (1970) also supported these findings.

Choubey (1972), Mikkilineni (1976), Chouhan (1979), Chandra (1979) and Shukla (1980) indicated a significant association with gain in **knowledge** with adoption of animal husbandry practices.

Gupta (1976) observed that a favourable **attitude** towards Animal Husbandry farming leads to higher adoption.

Findings of Sohal and Tyagi (1978) revealed that the composite knowledge of the farmers regarding breeding, feeding and veterinary services were higher in case of urban areas.

Chouhan and Chouhan (1982) found that poor knowledge of cattle owners was mainly responsible for low milk production.

Sohal *et al.* (1982) showed the superiority of the technical input services in attitude towards dairy farming, knowledge about feeding, breeding and management and health care of dairy animals, and adoption of dairy practices.

Anand and Sohal (1984) indicated that the attitude towards extension services tended to improve with increases in education, socio-economic status and emotional stability.

Marincowitz, (1985) goats are farmed by the first group to provide meat, milk and occasionally cash income, but in the second category, goats are a source of cash flow, usually integrated with other farming activities.

Karki (1985) reported thirteen diseases to be prevalent in the migratory flocks of Gandaki Zone. Of these "six-month" diseases, pneumonia, unspecified diarrhoea and foot ailments are the major problems. Of parasitic diseases, parasitic gastroenteritis and fascioliasis are the major migratory flock problems, but are also found in sedentary flocks.

Upadhyay and Gupta (1987) found that **knowledge** had significant impact on the adoption of home making practices.

Joshi (1991) has revealed the serious effects of parasitic gastroenteritis (PGE) on the productivity of sheep, and the prospects

for substantial economic benefits from a regular drenching programme.

Dana and Kanbid (1996) surveyed the 125 cattle owners in UP and classified the cattle owners on the basis of attitude towards A.I. as a suitable technology for their use. **Attitude** was 4 percent less suitable, 62 percent suitable, 28 percent more suitable and 6 percent most suitable.

Francis and Mutisi (1997) reported that farmers are worried to expose their animals to risk through research or trial of new technologies. Therefore farmers usually prefer that their weakest and/or oldest animals be used in trials, hoping that they would be improved.

Goswami and Sagar (1998) reported that majority of livestock owners used demonstration as an effective medium with present to knowledge sources of information about the animal husbandry practices whereas the farm publication were least used by livestock owners used IVRI personnel as an effective personal cosmopolite source of information.

Meena and Chouhan (1999) revealed that attitude towards dairy farming and economic motivation had positive and significant relationship with knowledge level of dairy farmers regarding improved dairy farming practices.

Nsoso *et al* (2004) revealed that there were equal males (52%) and females (48%) farming with small stock. The majority of these farmers (96%) were aged 31 years and older, married (66%) and with either primary (26%) or no education (46%). Most farmers (88%) did not keep any records and weighing before selling was not done (0%). Most farmers (96%) rather preferred using subjective conformation assessment to bargain for prices. Selling was largely through both individual sales (92%) and butchers (34%), which were the most favoured markets because they are relatively cheap and easily accessible. Botswana Meat Commission, which used to be popular, was almost not utilized (4%). Some marketing channels such as co-

operatives and auction sales were not used at all (0%). The majority of small stock farmers (76%) had little knowledge about market forces and quality of their livestock and this limited their ability to choose the right marketing channel based on sound economic decisions which would increase their income.

#### **iv) Administrative:**

##### **Work Distribution Pattern**

Ghosh and Mukhopadhyay (1986) showed that 60.49 per cent activities related to poultry production were carried out by females and 39.51 per cent by males. Women were found to be more actively engaged in production related activities and the men in market related activities.

Adhikari (1987) estimated that the woman labour occupies more than 80 per cent of total labour input for livestock and poultry in Nepal.

Namratha (1994) reported that women took active part in farm oriented activities in poultry production while men were actively engaged in commercial activities.

Agbede *et al.* (1995) conducted a survey on traditional poultry production in Cameroon. They observed that women and children are extensively involved in poultry farming, making up 70 per cent of the work force.

Veeranna *et al.* (1998) reported that rural women's role in backyard poultry production is of significant importance. They are performing most of the tasks such as feeding, watering, housing and management with utmost care and interest.

Raj *et al.* (1999) reported that the rural women by spending only two hours a day in poultry farming without over-loading themselves could reap a good return which helped them to raise their standard of living.

Saha *et al.* (2005) reported that in intensive system it was seen that the majority of the decisions regarding poultry rearing activities

were carried out by male members; women were involved in taking very few cases of decision making. In semi-intensive system, regarding commercial activities were taken by male members, however in other decision making area women played a major role. On the other hand in the backyard system, most of the decisions regarding poultry rearing practices were taken by women and very few men were involved in decision-making process.

### **Decision Making Pattern**

Cravon (1963) stated that farm families belonging to low and middle income group are more likely to take decisions jointly than families belonging to high income group and those who have highly specialized farms.

Sharma and Singh (1970) found that in case of seed storage and care of animals, wives were always consulted. For rest of practices majority of women were never consulted.

Bilgrimi (1974) reported that marketing channel is the path traced in the direct or indirect transfer of title of product as it moved from the producer to ultimate consumer.

Jhansi Rani (1981) found that all members of farm families took part in decision making regarding sale and purchase of livestock. The decision makers in subsidiary enterprises like maintenance of livestock were generally women, whereas, decision making in the main occupation i.e. agriculture was made by male members.

Dubey *et al.* (1982) found that rural women had varying degrees of participation in decision making in various activities of animal husbandry performed by them. It was further revealed that participation of rural women in decision making was high in areas of utilization; such as milk, number of milch animals to be kept, quality of milk to be sold and kept for home consumption and type of fodder to be fed. In areas of fixing of rate of milk, feeding of animals at calving time, which animals to be sold, feeding of young calves, quantity of fodder and concentrates to be fed to milch animals, breed

of milch animal to be purchased, care of new born calf, source of drinking water of animals, stopping of milking before calving, number of milking, treatment of animals and housing of animals in cold and hot season the participation of rural women was medium, whereas, in taking decision about the type of housing for animals, utilisation of income from milk, vaccination against contagious diseases, grazing of animals and breeding practices in animals their participation was low.

Verma (1984) in a study conducted on tribal women in four villages in Kanke block of Ranchi district, found that decisions were taken by male family head alone on vaccination of animals (55%), feeding of minerals and nutrients (40%). Joint decision of husband and wife were reported to be taken in respect of feeding of balanced ration (53%), disinfection of sheds (42%) and deworming of animals (40%). However, it was reported that tribals women (32%) alone were taking decision with respect to disinfection of sheds, isolation of sick animals (20%), and deworming of animals (18%).

Seema (1986) reported that decision about purchase and sale of land, care and management of animals and children's education were taken jointly.

Agarwal (1987) stated that the farm women dominated the decision making in feeding and managerial aspect of animal husbandry and male members of the family dominated the decision regarding breeding activities of their livestock. In the area of animal health, however, most of the decisions were taken jointly.

Ghosh (1987) remarked that in practices related to livestock production male heads of families took decision jointly with the spouse husband or wife.

Saraswati *et al.* (1987) noticed that decision regarding the home consumption or selling of the livestock products were made by women.

Rangnekar *et al.* (1990) observed that among tribal families in Baroda district of Gujarat, the sale or purchase of animals, purchase of fodder, breeding of animals and use of money earned is decided by men. Singh *et al.* (1990) reported that tribal women have less

opportunity in decision making in agriculture and household activities. Mostly, husband dominates in decision making.

Adhiguru *et al.* (1999) reported that the women's involvement in purchase and selling of birds was very much limited.

### **Income and employment:**

According to National Commission on Agriculture (1976), the rearing of poultry provides an excellent opportunity for gainful employment to idle or unemployed members of rural communities because of the ease with which poultry can be handled even by women and children.

Saraswati *et al.* (1987) observed that sale proceeds were generally kept with the women and spent by them on what they considered as appropriate.

Malyadri (1989) reported that poultry farming provided additional employment of about 140 mandays to each family.

Mathialagan (1995) reported that rural poultry production provides supplementary income to farmers. He further added that though it is still considered as a subsidiary enterprise, it has turned to be a main occupation for many providing more than 50 per cent of total annual income.

Bell (1996) reported that village chicken is often perceived to have a superior taste to its industrial counterpart, which can be reflected by a higher price. Sasaki (1996) concluded that the rural poultry could be promoted as a powerful tool of rural development programme, particularly since it would provide women and youth with stable income opportunities. Miah (1996) reported that poultry rearing is an integral part of rural household management system in Bangladesh which plays a very important role in the national economy. Most of the rural households' especially women have been traditionally rearing poultry birds under extensive production system for a long time to meet up their acute financial stringencies. Swain

and Mohanty (1996) reported that average human labour utilization of poultry farms was about 150 mandays per 100 layers.

**Marketing:**

Ranjan (1982) explained marketing as the human activity directed for satisfying the needs and wants through exchange process.

Lebbie and Mastapha (1985) found that butchers and middlemen were favoured for buying in bulk and using their own transport, although their prices were lower than those offered by the individual buyers.

Gunatilake (1988) studied the marketing practices in livestock market in Srilanka. It was found that there were several middlemen involved at various stages of livestock marketing and several malpractices like underpricing, high commission charges by middlemen were observed.

Singh (1988) observed variation in the prices of livestock at the time of marketing because of the seasonality in their productive cycle, age and reproduction status.

Sekar and Srinivasan (1991) identified the following channels in Namakkal block for egg marketing: (i) Producer–wholeseller–consumer–Wholeseller–Retailer–Consumer (ii) Producer–wholesaler–Retailer–Consumer (iii) Producer–Consumer.

Rehman (1995) reported that the Gujjar tribe of Kashmir sell 72.19 per cent of birds directly to consumers and 27.80 percent of birds to shopkeepers. The respondent (62.74%) sold their chicks in local market and 30.39% sold the eggs in local shop (Dana, 1998). In case of majority of families, the interest was in sale of birds for meat. The bird price also varied considerably according to the season and occasion. During winter and festival seasons, well grown birds fetch double the price, as compared to other seasons (Rangnekar and Rangnekar, 1996).

Chikura (1999) reported similar results from Wedza Communal Area in Mashonaland East Province. The findings of this study suggest

that, contrary to the earlier belief by some researchers that goats are important for meat and social status in Zimbabwe's communal areas (Cross, 1974; Scoones, 1992), The major constraint facing smallholder farmers today in the marketing of goats is the lack of transport to reach abattoirs and/or the peri-urban and urban markets (Chikura, 1999; Kusina and Kusina, 2000). Results from this study confirmed that the lack of transport forced farmers to resort to informal marketing within the community. Typically, informal marketing involved sales among farmers in the community, i.e., farmer to farmer, and sales to civil servants, e.g., local teachers and government employees as well as occasional researchers (Marovanidze, 1996; Pratier *et al* 1996, Chikura, 1999).

Kusina and Kusina (2001) reported that four different channels for goat **marketing** were observed from both the survey and PRA studies. These channels are; (1) Producer-Consumers (2) Producer-Abattoir-Retailers-Consumers (3) Producer-Middlemen-Informal-Market-Consumer (4) Producer-Middlemen-Abattoir-Retailers-Consumers. Market chains 1 and 3 are informal and are used by most farmers. Chain 1 was mainly conducted at community level and accounted for approximately 99% of goats sold. Chain 3 on the other hand, although informal, was driven by the desire of middlemen to generate income. Middlemen bought goats from the farmers and, then in turn sold them on the hoof at informal markets at the city outskirts to willing consumers. They also sold to other dealers who would then sell to consumers. He also confirmed that farmers viewed the goat as a vehicle to make money with more than 70% being prepared to sell their goats at any time of the year. Farmers also suggested targeting festive seasons for highest prices and increased revenue generation. However, the small flock sizes limited the number of animals available for sale at anytime. In addition, the absence of a ready market and lack of affordable transport to ferry goats that were ready for marketing was another major limitation.

Ali (2001) reported that despite increasing commercialisation of the poultry industry, many rural households continue to raise indigenous breeds in their backyards, the products from which are sold for a premium in local markets. Traditional poultry birds are typically less efficient in feed conversion ratios although they are generally hardier than the imported breeds.

Nsoso *et. al* (2003b) observed to sale most people castrated males. Most small stock farmers did not get any market information, while 38% got it from the radio. Only 4% of the farmers got marketing information from extension officers. They also reported a similar phenomenon in traditional pig farming where most farmers (90.2%) did not seek any information even from extension officers provided for free by the government. Most farmers agreed that they had low market **awareness** while only 24% were aware. Most farmers had never been trained in marketing of farm produce, with only 10% having such training.

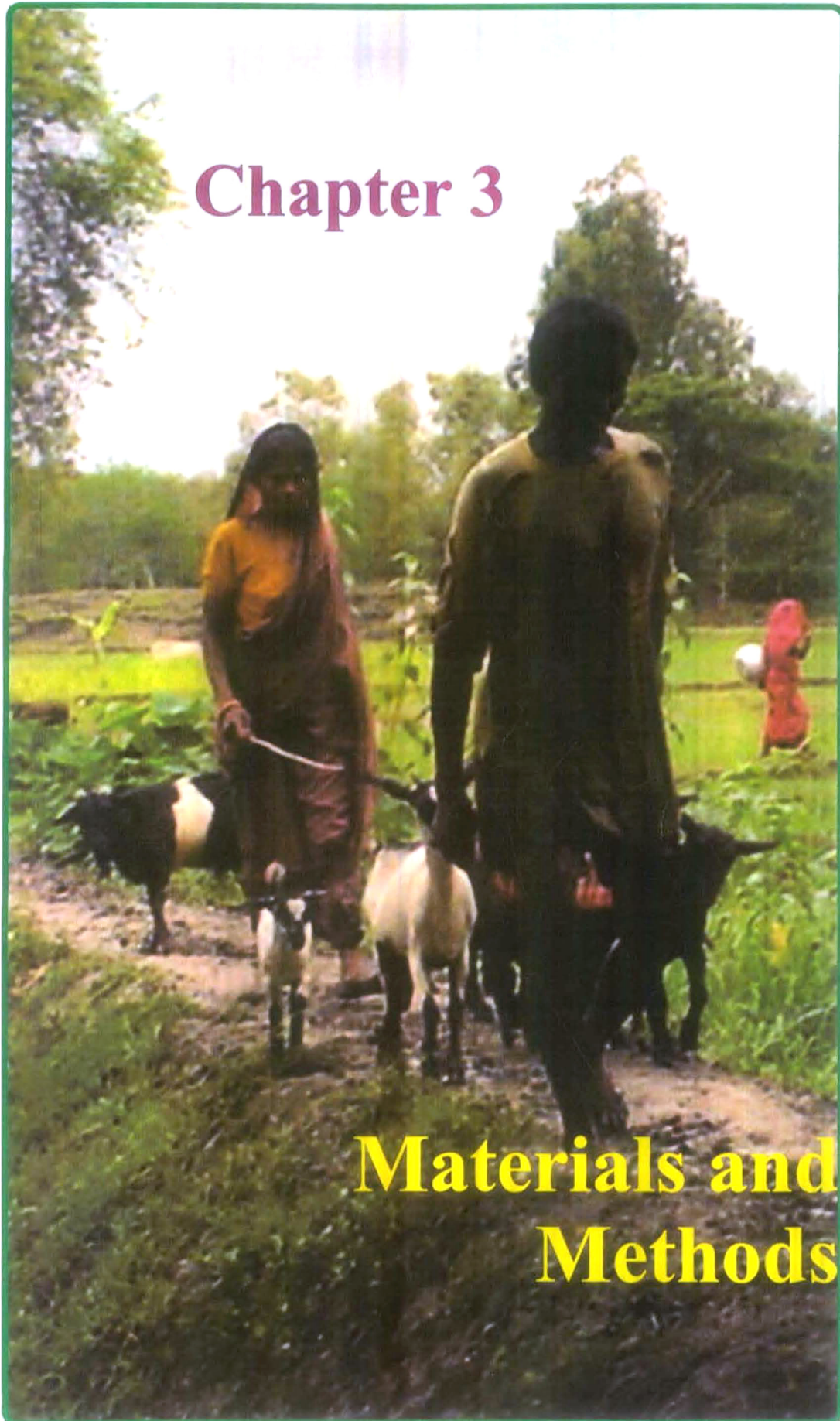
Nwafor *et. al* (2004) in Gambia indicated that about 94% of respondents sold their small ruminant animals because of urgent cash needs. Twenty-two percent of farmers sold 6 to 10 small stocks per transactional sale while very few sold more than 16 animals per transaction.

Nsoso *et al* (2004) told that most farmers of small stock had little **knowledge about marketing**, which limited their ability to access better and reliable marketing channels. Lack of formalized marketing channels was also a problem factor that was contributing to low off take rates and poor accessibility of relevant marketing channels. The butchery and middlemen marketing channels were popular especially among farmers with a large number of small stocks.

Teklewold *et. al.* (2006) reported that the farmers may decide to adopt and increase the number of exotic poultry breed where expected returns from poultry production were higher.

## Chapter 3

# Materials and Methods



# ***MATERIALS AND METHODS***

In order to understand the factors and circumstances that determine the decision to adopt a new technology, it is important to get a general and integrated overview of the study area in which the dependent and the independent variables are tested. To ensure a sustainable livestock production system, the use of communication skills, knowledge, attitude, planning skills, decision making, work distribution pattern and marketing pattern are essential to the small ruminant farming. The non-adoption on farming technologies usually results in poor reproduction level and high mortality rates (Schwalbach, 1998). It is important to take a look at the natural resources available to the small ruminant farmers and to evaluate the effect of the quality of these resources on herd health.

The intension with this chapter is to describe a sound methodology which is integral part of any scientific study. In this chapter, the method was used to analyse adoption level of small ruminant livestock owners (SRLO) in two different agro-climatic zones of west Bengal. The research design, process and technique used to make a great difference in the quality of data collected and there by, severely affected by findings of the study. This chapter brings with a discussion of the area of the study, parameters included, sampling procedure and tools used according to the objectives of the study. For the shake of convenience this chapter has been divided in to the following subheads:

- 3.1 Sampling procedure
- 3.2 Description of methods and variables used
- 3.3 Techniques of field data collection and
- 3.4 Statistical methods used.

## **3.1 SAMPLING PROCEDURE:**

### **3.1.1 Locale of the study area:**

The present study was carried out in the State of West Bengal

which was purposively selected due to the following criteria.

(i) West Bengal ranked among the top three (after Rajasthan and Andhra Pradesh) of total small ruminant livestock (only sheep and goat) owners.

(ii) The researcher is well acquainted with the topography and different animal husbandry practices of the area.

(iii) In this state, large numbers of the farm families are engaged in the small ruminant livestock farming.

(iv) Familiarity of the researcher with the local dialect.

(v) There are adequate marketing facilities in the area.

### **The State: West Bengal**

The present study was carried out in the West Bengal state. According to the report of the census of India 2001 the state of West Bengal is the most enchanting among the coastal states of India. It stretches from the largest estuarine mangrove forest to the highest mountain ranges in the world. Like all great riverine plains, Bengal has acted as one of the cradles of civilization throughout the history. During 19<sup>th</sup> century Bengal was one of the prosperous territories of the British Empire.

West Bengal, being a vast and diverse state has always something to offer its glorious traditions and rich cultural heritage. Besides its cultural heritage, West Bengal also occupies a unique geographical position-an exceptionally varied climate ranging from extreme cold in the Himalayan regions to the heat of plains in the summers.

During the period of the Vedic age Bengal was called "Vanga" and is said to have been inhabited by several groups of people belonging to various races. During the Mahabharatha period this area was divided into small kingdoms and principalities ruled by chieftains. The Aryans inhabited Bengal during the post Vedic period.

The proximity to the sea also resulted in the influence with the foreigners - the Portuguese in the early 16<sup>th</sup> century, the Dutch in

about 1632, the French influence between 1673-1676, the Danish in 1676 and British in 1690. In 1947 when India became independent Bengal was partitioned between India and Pakistan. The state is bounded on its north by Skim and Bhutan, on the east by Assam and Bangladesh, on the south by Bay of Bengal and the West by Orissa, Bihar, Jharkhand and Nepal. It has therefore, three international frontiers, to the north, east and west. The state lies between 27°13'15" and 21°25'24" north latitudes and 85°48'20" and 89°53'04" east longitudes.

The climate is generally tropical hot and humid monsoon type except in the northern mountains. The average annual rainfall in the state is about 175 cm which is mainly received during the period from June to September. Natural vegetation has almost disappeared from different parts of the state to make room for cultivation due to ever-increasing population pressure. The soil of the plains are mainly composed of older and newer alluviums and minor portion of the plains are composed of saline soil. The state of West Bengal is pre-eminently a gift of the river Ganga.

Seventy percent of the population is engaged in agriculture and contributes over thirty percent to the income of the state. West Bengal occupies a leading position among the rice producing states in India. It accounts for about 57.3 percent of jute produced in the country and over 24 percent of tea production (Anonymous, 2003). Export of tea and jute brings about considerable foreign exchange to the state.

The livestock population in the state is: cattle-17,454,000, buffalo-10,11,000, sheep-14,88,000, goat-1,41,69,000, pig 9,54,000, and poultry population is 37,408,000.

In the state, the productivity of livestock is much lower than the national average. Livestock contributes Rs. 11,042 crores to the state income in terms of milk, meat, wool, manure, fertilizer, bio-gas, hides, skin and other by products (Anonymous, 1996). The demographic and other information of West Bengal state is presented in Table 3.1.

**Table 3.1: Demographic and other important features of West Bengal**

<b>Particulars</b>	
Area (Sq. Km)	: 88,751
Capital	Kolkata
Principal Language	Bengali
Livestock Population (In thousand)	
Goat population	1,41,69*
Sheep population	14,88 *
Cattle population	17,454*
Buffalo population	10,11*
Pig population	9,54*
Total poultry population	37,408*
Fish production	9,37,000 tones**
Annual milk production	3.09 million tones**
Annual meat production	0.4 million tones**
Annual egg production	2364 million tones**
Total human population (no.)	8,02,21,171
Males	4,14,87,694
Females	3,87,33,477
Urban Population	25.48%
Rural Population	75.52%
Population Density (Per Sq. km.)	904
Sex Ratio	934 (Females per 1000 males)
Literacy Rate	69.22%
No. of District	19
Approximate Length of coast line (sq. km.)	157
Main crops: Rice, wheat, maize, barley, jute, tea, pan leaf, oil seeds, tobacco, sugarcane	
Main Rivers: Hooghly, Ganga, Bhagirathi, Damodar, and Mayaurshi.	

**Source:**

Anonymous (2006): West Bengal Panorama Manorama Year Book, Bengali version – 2006 (Kolkata)

\* Anonymous (2003): Statistics Abstract, Bureau of applied economics &amp; Statistics, Government of West Bengal - 2003, pp-249-250.

\*\* Anonymous (1996): Status paper on strategies for improvement of animal resources in West Bengal. 9<sup>th</sup> State Conference – 17<sup>th</sup> November, 1996, Calcutta, West Bengal Veterinary Association, P. 16.

### **3.1.2 Selection of districts:**

On the basis of agro-climatic zone the state can be divided into six zones. From these zones two agro-climatic zones were selected purposively due to same reasons as in the state. Obviously, the researcher's familiarity with local dialects and accents were a great help in building up rapport, quick and easy approach and access to the sources of information.

Moreover, these two districts had relatively potential for conducting research work on small ruminant livestock production as it ranks third (South 24 Parganas) and seventh (Purulia) in total small ruminant livestock production in the state. The district Purulia coming from red-laterite zone and south 24 Parganas from saline zone have been selected purposively considering the importance of small ruminants in the rural economy for both the districts.

#### **The District-I: Purulia**

Purulia is located in the western part of West Bengal. The district lies between 23°42'00" and 22°43'00" North latitudes and 86°54'00" and 85°49'00" East longitudes with total area of 6,259 sq. km. of which 6179.63 sq. km. is under rural area and rest 79.37 sq. km. is under urban area (Anonymous, 2004). It consists of 2,456 inhabited villages, 170 Gram Panchayats, 20 blocks, three municipalities and three sub-divisions in which total population is 25,36,516 and have a population density of 405 persons per sq. km. It has total literacy rate of 55.6 per cent where male has 73.7 per cent and female has 36.5 per cent of literacy rate. (Anonymous, 2004). Majority of the population in this district is Hindu (90.59 per cent) and others are Muslim (5.98 per cent) and rest is Christian, Sikhs, Buddhists, Jains etc. Purulia district is in third position in tribal population of the state. Santhal ranks first among all the tribes, who mostly reside in rural and hilly area of the district.

This district has large livestock population which comprises of cattle- 8.57 lakh, Buffalo- 1.63 lakh, Shecp- 3.31 lakh, Goat- 7.18

lakh and having Poultry population of about 21.03 lakh which comprises of fowls- 16.03 lakh, ducks- 4.99 lakh and other- 0.01 lakh.

The soil of the area is mostly red laterite and sandy-loam and very low nitrogen and phosphorus percentages and having poor water holding capacity. Soil depth varies from 4 to 6 inch. A great proportion of the cultivable area is undulated upland which mostly unbounded thereby prone to soil erosion leading to poor fertility. The area falls under high rainfall of short duration i.e. 3 to 4 months with some unpredictability. The people of the area mostly belong to deficit class with their very limited sources of livelihood. Majority of the people are Kharif growers due to very limited sources of irrigation. Paddy is the prime crop. The total forest area of this district is 116.17 thousand hectare. The typical trees in the district are Sonajhuri, Sal, and Shagun. Honey, Kendupata, Timber, Fire wood, Pulp wood, Pole post and Cogging sleeper constitute the main item of forest produce. The main river of this district is Kanshaboti, Silaboti, Darakerswar, Totko and Kumari River.

The topography of the district is undulating with red laterite soil which is full of gravels. Some of the famous hilly terrains are Baghmundi, Ayodhya, Gajburu and Panchet in the district.

Due to scanty rainfall the land is not suitable for cultivation. Besides certain minor forest products, minerals like iron and coal are also found in the area. The economy of the district is predominantly agriculture based. The demographic and other information of Purulia district is presented in Table 3.2.

### **The District -II: South 24 Parganas**

The district South 24 Parganas is located in the southern part of West Bengal. The district lies between 22°33'45" and 21°29'00" North latitudes and 89°4'50" and 88°3'45" East longitudes with a total area of 9,960 sq. km. which contributes 11.22% of the land mass of the State of West Bengal. South- eastern part of the district is bounded by

the district of North 24 Parganas in the north, north-western part by the district of Kolkata and East Midnapore, southern part is bounded by the water recourse of Bay of Bengal and also having the International Border in the form of Indo-Bangladesh boundary in the eastern part of the district. It consists of 4,030 villages, 312 Gram Panchayats, 29 blocks, seven municipalities and five sub-divisions in which total population is 69, 09,015 and have a population density of 694 persons per sq. km. It has total literacy rate of 70.16 percent where male has 79.89 percent and female has 59.73 percent of literacy rate (Anonymous, 2004). The district has a 32.12 % of Schedule Caste population and 1.23% of Schedule Tribe population of the total population. (Census of India 2001). Majority of the population in this district is Hindu (69.12 per cent), others are Muslim (29.94 per cent), Christian (0.98 per cent), Sikhs, Buddhists and Jains etc. Among 29 blocks, 13 blocks come under Sundarban region and rest 16 come under Non-Sundarban region.

The average annual rainfall in the district is 1661.6 mm. except in winter. The district experiences hot summer with high humidity all the year round. The average temperature varies from 36.3<sup>o</sup>C max. to 13.6<sup>o</sup>C min. The district is exposed to storms and depressions from the Bay of Bengal in May and in the post-monsoon season (early October).

The main rivers are Hooghly, Vidyadhari and Piyali. Other important rivers are Matla, Thakuran, Mridangabhanga and Saptamukhi. The Hooghly river marking the western boundary of the district, meets the Bay of Bengal with a breadth of 30 km. at the confluence.

About 53 percent of the working population is directly dependent on agriculture. The total cultivable area is 403906 hectares. The net cropped area is 398073 hectare. Therefore the cropping intensity is 139%. The mono-cropping pattern of cultivation is followed largely because of poor irrigation facilities and high soil salinity. Although rice is the principal crop, cultivation of other cash

crops such as cereals, oilseeds, watermelons and other fruits and vegetables are steadily on the rise. Marginal farmers own 64 per cent of agricultural holdings, while small farmers own another 20 per cent. (Annual Action Plan on agriculture 2000-2001). It ranks 7<sup>th</sup> in production of paddy, 10<sup>th</sup> in wheat, 7<sup>th</sup> in milk production and 1<sup>st</sup> in production of egg, water melon & chilly among the districts in West Bengal.

This district has large livestock population which comprises of cattle- 11.82 lakh, Buffalo- 25.23 thousand, Sheep- 2.08 lakh, Goat- 11.28 lakh and having Poultry population of about 46.20 lakh which comprises of fowls- 31.07 lakh, ducks- 15.08 lakh and other- 0.05 lakh. (Anonymous, 2004). It ranks 1<sup>st</sup> in production of egg among the districts in West Bengal.

The rural part of the district is divided into two parts, viz., the Sundarbans in the south and the non-Sundarbans in the north. The Dampier Hedges Line marks the upper boundary of the Sundarbans. The Sundarbans area covers a reserve forest with an area of 678.5 hectare.

The entire forest area is under the reserve forests that constitute the forest area of the Sundarbans. There are three sanctuaries in the Sundarbans, viz., Sajnekhali, Lothian Island and Holliday Island. The total expanse of the Sundarbans is about 2.05 million hectare out of which 0.79 million-hectare lie in the undivided district of 24 Parganas. Of this, only 0.42 million hectares are under the reserve forests including about 0.13 million hectares covered by creeks and channels. The forest area under the Sudarbans within the jurisdiction of South 24 Parganas district is 4264 square km. The typical trees in the Sundarbans are Gengwa, Passur, Keora and Sundari. The Sundari trees, after which the region gets its name. Honey, Golpata, Hetal leaves and timber and firewood constitute the main item of forest produce. The Sundarbans forests are inhabited by early 50 species and sub-species of mammals. Spotted dear, wild pig, wild boar, tiger (specifically the world famous Royal Bengal Tiger) and leopard are

some of the important mammals available in the Sundarbans. According to the information available from the District Gazetteer, 230 species of birds are accounted from the district. In the Sundarbans, there exists a man-eating species of crocodile technically termed as estuarine. The no. of species of turtles, lizards and snakes are 7, 13 and 17 respectively. The rivers are very rich in fish fauna. There are 55 and 31 species of marine and freshwater fishes in the district.

The demographic and other information of South 24 Parganas district is shortly presented in Table 3.2.

**Table 3.2: Demographic and other important features of Purulia and North 24 Parganas District**

Particulars	Purulia	South 24 Parganas
Area (Sq. Km.)	6259 Sq. Km.	9960 Sq. Km.
Boundaries - South West East	Bihar state and Bardhaman district Jharkhand state Bihar state Bankura district	North 24 Parganas, Kolkata Bay of Bengal East Midnapur Bangladesh
District head quarters	Alipore	Purulia
No. of sub division	Three	Five
No of block	Twenty	Twenty nine
Gram panchayat	170	312
Latitude & longitude	23°42' to 22°43' N & 86°54' to 85°49' E	22°33'45" to 21°29'00" N & 89°4'50" and 88°3'45" E
Total population (no.)	2536516	6906689
Population density(Per Sq. Km)	405	693
Literacy rate	55.6 Per cent	69.4 Per cent
Male literacy rate	73.7 Per cent	79.2 Per cent
Female literacy rate	36.5 Per cent	59.0 Per cent
Temperature	Max. 45°C, Min. 9°C	Max. 35°C, Min. 11°C
Livestock Population (in no.):		
Cattle	857442	1182711
Buffalo	162595	25237
Sheep	330664	208468
Goat	718075	1128197
Pig	86660	51250
Poultry	2103032	4620891
Economic tree	Sonajhuri, Sal, and Shagun etc.	Gengwa, Passur, Kara and Sundari etc.
Artificial Insemination Centers	94	392
Veterinary personnel	276	446
State Animal Health Centers	8	6
Block Animal Health Centers	20	29
Additional Block Animal Health Centers	19	20
Animal Development Aid Centers	132	117

**Source:** Anonymous (2004)<sup>2</sup>: District Statistical Hand Book, Purulia & South 24 Parganas, Bureau of Applied Economics & Statistics. Government of West Bengal.

\* Anonymous (2001): Census of India 2001. Series - 20, W.B., pp. 117-126.

### **3.1.3 Selection of Blocks:**

Two blocks were selected randomly from each district. In this process Barabazar and Kashipur blocks were selected from Purulia district and Patharpratima and Gosaba blocks were selected from South 24 Parganas district of West Bengal. So, total numbers of selected blocks were four from two districts.

#### **Block-I: Barabazar:**

Barabazar block is one of the southern blocks of Purulia District of West Bengal. This block is formed with 10 Gram Panchayats under one Panchayat Samity where 197 villages are inhabited. Total house hold in the block is 26,402. The block were bounded on the north Purulia sadar, on the south by Bihar state, on the east Manbazar block and Bankura district and the west by Balarampur block and Raghunathpur block of Purulia district. Total block area is 410.69 sq. km. with full rural area. It has population of 1,46,927 in which population density is 358 per sq. km. The percentage of block population to district population is 5.79 per cent. Total literacy rate is 52.6 per cent where as male is 72.7 per cent and 32.0 per cent is female. This block is also having potentiality of small ruminant livestock rearing in the district. The main crop is mainly paddy i.e., aman, and some types of vegetables are also cultivated. There are 60,257\* small ruminant population of which goat is 41,716 and sheep is 18,541. (\*Not published, 17<sup>th</sup> livestock census, Collected from BLDO office).

#### **Block-II: Kashipur:**

Kashipur block is one of the North-eastern blocks of Purulia District of West Bengal. This block is formed with 13 Gram Panchayats under one Panchayat Samity where 200 villages are inhabited. Total house hold in the block is 33,703. The block were bounded on the north by Raghunathpur block, south by Hura block, on the east Bankura district and the west by Para block and of Purulia district. Total block area is 430.23 sq. km. It has population of 1,87,038 in which population density is 435 per sq. km. The

percentage of block population to district population is 7.38 per cent. Total literacy rate is 64.2 per cent where as male is 79.8 per cent and 47.9 per cent is female. This block is also having potentiality of small ruminant livestock rearing in the district. The main crop is mainly paddy i.e., aman, and some types of vegetables are also cultivated. There are 61,371\* small ruminant population of which goat is 43,085 and sheep is 18,286. (\*Not published, 17<sup>th</sup> livestock census, Collected from BLDO office).

### **Block-III: Patharpratima**

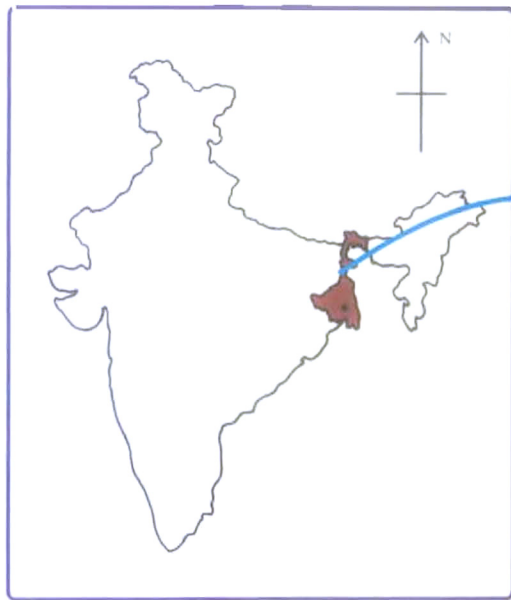
Patharpratima block is one of the southern blocks of South 24 Parganas District of West Bengal. This block is formed with 15 Gram Panchayats under one Panchayat Samity where 88 villages are inhabited. Total house hold in the block is 50,764. Some portion of this block is under Sundarbans areas and is bounded on its north by Kulpi and Mathurapur block, on the south by Bay of Bengal, on the east Kulti block and the west by Kakdip and Namkhana block of South 24 Parganas district. Saptamukhi and Thakuran river mainly surrounded the block. Total block area is 469.05 sq. km. with full rural area. It has population of 2,88,394 in which population density is 615 per sq. km. The percentage of block population to district population is 4.18 per cent. 34.7 per cent people of the blocks are cultivators, 31.1 per cent people are agricultural labours and rest people are engaged in different kinds of works like fisheries, small industries, collection of wood and honey from forest area etc. The block is directly connected with the capital (Kolkata) of the state by road. Total literacy rate is 72.8 per cent where as male is 84.3 per cent and 60.6 per cent is female. This block is also having potentiality of small ruminant livestock rearing in the district. The main crop is mainly paddy i.e., aman & boro, Vegetables, water melon, chilli, wheat, cotton etc. are also cultivated. There are 82,865\* small ruminant population of which goat is 57,810 and sheep is 25,055. (\*Not published, 17<sup>th</sup> livestock census, Collected from BLDO office).

**Block-IV: Gosaba:**

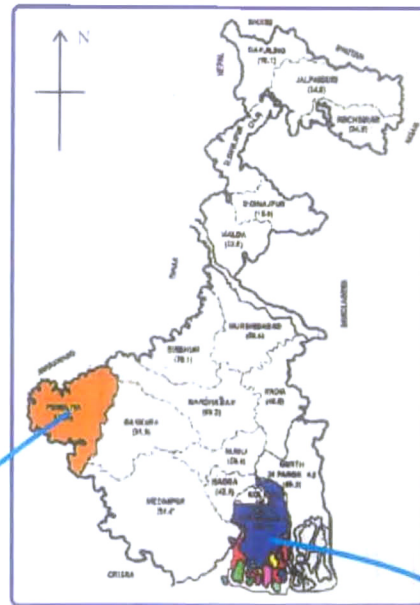
Gosaba block is one of the south-eastern blocks of South 24 Parganas District of West Bengal. This place was established by Sir David Hamilton. It is formed 14 Gram Panchayats under one Panchayat Samity where 51 villages are inhabited. Total house -hold in the block is 44,478. The block is fully separated from the main land as it is formed by few islands. The block is one of the important part of Sundarbans and is bounded on its north by North 24 Parganas district and Canning block, on the south by Bay of Bengal, on the east by Bangladesh and the west by Basanti block. Gosaba and Matla river mainly surrounded the block. Total block area is 285.85 sq. km, which is fully under rural area. It has population of 2,22,822 in which population density is 780 per sq. km. The percentage of block population to district population is 3.23 per cent. 26.4 per cent people of the block are cultivators, 47.1 per cent people are agricultural labours and rest people are engaged in different kinds of works like fisheries, small industries, collection wood and honey from forest area, etc. Only one pucca road which length of 10 km. approximately is found in the block. Total literacy rate is 68.9 per cent where male is 80.6 per cent and 56.6 per cent is female. This block is also having potentiality of small ruminant livestock rearing in the district. Many number of Non-Government Organisations, Social welfare societies trying to develop the area through animal husbandry practices in the block. Main crops are paddy, jute, mustard and different kinds of vegetables etc. There are 68,003\* small ruminant population of which goat is 45,045 and sheep is 22,968 (\*Not published, 17<sup>th</sup> livestock census, Collected from BLDO office).

**3.1.4 Selection of Gram Panchayats:**

Two Gram Panchayats were selected from each block considering highest number of small ruminant livestock population (judgment sampling). In this process, Tumrasole and Lodpoda Gram Panchayats from Barabazar block, Kalidaha and Rangamati Rangandhi Gram Panchayats from Kashipur block of Purulia district



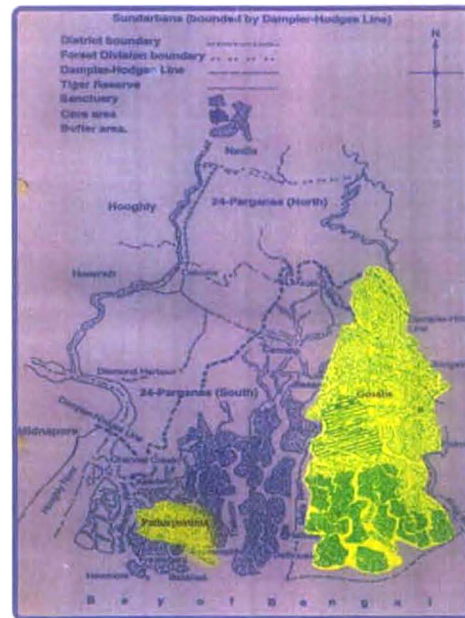
Map of India showing the selected state



Map of West Bengal showing the selected districts



Purulia district showing the selected blocks (Kashipur and Barabazar)



South 24 Parganas district showing the selected blocks (Gosaba and Patharpratima)

Figure 1: Showing the study area

were selected. On the other hand Patharpratima and G-Plot Gram Panchayats were selected from Patharpratima block and Kumirmari and Amlatali Gram Panchayats were selected from Gosaba block. Therefore, total study was carried out in eight Gram Panchayats of four selected blocks from two different agro-climatic zones of West Bengal.

### **3.1.5 Selection of respondents:**

From each selected Gram Panchayat thirty five respondents were selected randomly with judgment sampling. In this process, total one hundred forty respondents were selected from each district. So, the total sample size was two hundred eighty.

## **3.2. VARIABLES AND THEIR EMPIRICAL MEASUREMENTS:**

### **3.2.1. DEPENDENT VARIABLE**

#### **(Y) Adoption of improved practices in small ruminant farming:**

Adoption of improved animal husbandry practices has already been studied by many researchers like Sinha and Sinha (1974), Sohal and Tyagi (1978), Halyal *et al.* (1980), Sarkar (1981), Singh (1982), Chug (1986), Raymundo (1994), Dana and Kanbid (1996), Singh and Kherde (1997), Goswami (2000) and Ghosh (2004) etc.

In the present study, adoption refers to the acceptance and use of improved practices in small ruminant farming. Wilkening (1953) described the adoption of an innovation as a process composed of learning, deciding and acting over a period of time. According to Johnson and Haver (1955), adoption is essentially a decision making process.

Rogers and Shoemaker (1971) defined adoption as one of the consequences of the innovation decision process. According to them, innovation-decision process is the mental process through which an individual passes from first knowledge of an innovation to a decision to adopt or reject and to confirmation of this decision. Adoption of farm innovation has been conceived both as a process and a point in the process by several research workers.

Research workers namely, Copp (1956), Bose (1962), Chattopadhyay (1963) etc. have developed a number of scales and indices for measuring the level of adoption of the livestock owners.

In the present study, the adoption was measured by the adoption index method developed by Dasgupta (1968). According to him index referred as “Years of use of adopted applicable practices” not only takes the number of practices adopted by a livestock owner into consideration but also the number of years he has been using each of the adopted practices. The adoption score, according to this index, is derived for each livestock owner by adding the number of years he has used each of the applicable practices. The figure so obtained is then divided by the number of practices applicable to his farm. For example, if a livestock owner adopted two out of seven practices applicable to his farm and has been using one practice for ten years and the other for eight years, then he is assigned an adoption score =  $(10+8) / 7 = 2.57$

The seven improved small ruminant livestock practices (deworming, Castration by Burdizzo Castrator, Vaccination, Feeding of Colostrum milk, Selective Breeding, Record keeping, Treatment with medicine) have been selected and considered as the seven practices in the study area for the present study on adoption behaviour of small ruminant livestock owners in two different agro-climatic zones of West Bengal.

### **3.2.2. INDEPENDENT VARIABLES**

The purpose of this selection is to describe the selected variables to be tested in the different small ruminant livestock owners in two different agro-climatic zone of West Bengal. All the independent variables selected from the literature that were measured in a slightly different way in this study, as well as all the variables are briefly discussed in this section

It is possible to classify and use some variables either as continuous or as categorical variables, depending on how a variable is

approached or measured. As example, is that, how long you have been farming which can be classified as a continuous variable in number of years is measured, or as a categorical variable is that, whether the farmer received animal husbandry training or not. The following thirty seven continuous and categorical independent variables were used to determine predictors contributing to adoption of the small ruminant livestock owners. The independent variables are described below in four separate groups like: (a) Socio economic (17variables), (b) Communication (4 variables), (c) Socio-psychological (12 variables) and (d) administrative (4 variables).

#### **A. SOCIO-ECONOMIC VARIABLES:**

##### **(X<sub>1</sub>) Gender:**

Gender will be included as a categorical variable. It refers to the type of sexual category.

Male: 1

Female: 2

##### **(X<sub>2</sub>) Age:**

Age refers to the number of years the respondent has completed since birth at the time of interview and was rounded off to the nearest whole number. Age was categorized into three equal groups on the basis of percentiles value. The categories were:

Young group : upto 31 years

Most active group : 31-42 years

Elder group : above 42 years

##### **(X<sub>3</sub>) Category:**

The amount of land is an important economic parameter to assess the economic standing of that person in the society. Components of "Socio-economic status scale-rural" developed by "Pareek and Trivedi (1964)" was used and score allowed to each category was as follows:

Landless: No land: 0

Marginal: Upto 1 hectare: 1

Small: 1 to 2 hectare: 2

Medium-large: above 2 hectare: 3

**(X<sub>4</sub>) Occupation:**

Occupation of the livestock owner refers to the primary occupation from where his main source of income comes. In the present study, occupations of the selected respondents were categorized as follows:

- Labour : 1
- Business : 2
- Independent Profession: 3
- Cultivation : 4
- Service : 5

**(X<sub>5</sub>) Caste:**

It is a social category whose members are assigned to a permanent status within a given hierarchy and whose contacts are restricted accordingly. It was operationalised as the hierarchical status of the respondent in a given society. In the present study, caste of the selected respondents was categorized as follows:

- General : 1
- Scheduled Caste : 2
- Scheduled tribe : 3
- Other backward caste : 4

**(X<sub>6</sub>) Education of the owners:**

Scoring system followed by Pareek and Trivedi (1964) in their “Socio-economic status scale-rural” was used to quantify the educational status of the respondents. Education is measured in terms of the highest grade the farmer has achieved in formal education.

<u>Level of Education</u>	<u>Score</u>
Illiterate	0
Can read only	1
Can read and write	2
Primary	3
Middle School	4
High School	5
Graduate	6

**(X<sub>7</sub>) Marital possession:**

The marital status is the important parameter to justify the locus stand of an individual in the social system. The frequencies under each status were calculated. They were catagorised as follows:

Unmarried	: (1)	Married:	(2)
Widow / widower	: (3)	Divorced:	(4)

**(X<sub>8</sub>) Religion:**

Religion is belief in supernatural power and it provides means to individual so that they can face crises and ups and down in life with strength and fortitude. It is a social category. In the present study, religion of the selected respondents was categorized on type of religion availability in the study area and they were as follows:

Hindu	: 1	Muslim	: 2
Christian	: 3	Others	: 4

**(X<sub>9</sub>) Family type:**

In the present study, it refers to whether there is single or joint family system in the livestock owner's family. A family was considered as single when it is consisted of husband, wife and unmarried children. A joint family consisted of other blood relatives also. The scoring system developed by Pareek and Trivedi (1964) in their "Socio-economic status scale-rural" was followed to quantify the family type of the livestock owners.

**(X<sub>10</sub>) Family size:**

It refers to the number of members in the family of the individual livestock owner. This variable was quantified by the actual number of members in the family. But the effective family size was quantified by subtracting the members who were below four years of age from the family size.

Generally, families consisting of one to five members are being regarded as small sized families while large sized families consist of more than five members. Here also the scoring system followed by Pareek and Trivedi (1964) in their "Socio-economic status scale-rural"

was followed.

Upto five members- 1

Above five members- 2

**(X<sub>11</sub>) Family Educational Status:**

The method followed by Ray (1968) in computing the Family Educational Status was followed in the present study. In this method, the educational achievement of each member of the family was noted and scored as suggested by Pareek and Trivedi (1964) in their "Socio-economic status scale-rural". The total score of a family on education was then divided by the "Effective Family Size" to get the educational status of the family. The procedure adopted is illustrated with an actual computation.

**Computation of Family Educational Status:**

Livestock owner	: Sri. K. Mahato
Gram panchayet	: Lotpoda
Total members in the family	: 8
<u>Members upto 4 years of age</u>	<u>: 0</u>
Effective family Size:	8

**Educational Scores of the family members:**

Level of Education	Scale Score	Frequency	Total Score
Graduate	6	0	0
High School	5	0	0
Middle School	4	2	8
Primary	3	1	3
Can read and write	2	0	0
Can read only	1	0	0
Illiterate	0	4	0
	<b>Total</b>		<b>11</b>

Index of Family Educational Status =  $\frac{\text{Total Education Score}}{\text{Effective Family Size}}$

$$= \frac{11}{8} = 1.375$$

**(X<sub>12</sub>) Received training:**

It indicates the farmers who received training. Received training is an indicator for improved small farming practices.

**(X<sub>13</sub>) Herd size:**

It refers to the total number of small ruminant livestock (sheep and goat) possessed by the family.

**(X<sub>14</sub>) Economic status:**

The Economic Status of the Livestock owners was measured with the help of some components of the "Socio-economic status scale-rural" developed by Pareek and Trivedi (1964). The scale consisted of nine items, of which four items- land, house, farm power and material possession were taken into consideration for measuring economic status. The summation of scores of all the four items indicated the economic status of an individual small ruminant livestock owner. The items of the "Socio-economic status scale-rural" and scores allotted to each of them are given in the Interview schedule.

**Land:** The amount of land is an important economic parameter to assess the economic standing of that person in the society. Components of "Socio-economic status scale-rural" developed by Pareek and Trivedi (1964) was used and score allotted to each category was as follows:

No Land	:(0)	Upto one Hectare	:(1)
Upto two Hectare	:(2)	Above two Hectares	:(3)

**House Type:** The possession of a house and the nature of the house are important indicators of socio-economic status. Components of "Socio-economic status scale-rural" developed by Pareek and Trivedi (1964) was used and score allotted to each type of house was as follows:

No house	:(0)	Hut	:(1)
Kutch house	:(2)	Mixed house	:(3)
Pucca house	:(4)	Mansion	:(5)

**Farm Power:** The possession of farm power positively contribute towards earning from the farm. This variable was measured as below (Pareek and Trivedi, 1964).

No Draught animal: (0) 1-2 Draught animals: (2)

3-4 draught animals or 1 or more prestige animals: (4)

5-6 draught animals or tractor: (6)

**Material Possession:** Some material possessions are indicators of modernization. Components of "Socio-economic status scale-rural" developed by Pareek and Trivedi (1964) was used and score allotted to each item of material possession was as follows:

Bullock Cart : (1) Cycle : (1)

Radio : (1), Solar light/ electricity : (1)

Developed Agricultural Implements: (2). Television :(1)

**(X<sub>15</sub>) Urban contact:**

It refers to the frequency of visits of the respondents to nearby town. Each respondent was asked to indicate, how often he/she visits the town. According to frequency of contact different scores were assigned as never-0, rarely-1, sometime-2, often-3 and most often-4.

**(X<sub>16</sub>) Social participation:**

It refers to the voluntary sharing in the person to person and in the group to group relationship beyond the immediate households. It shows the degree to which the respondents were involved in formal organization as member or office bearer to any organization. The score given for the member added to the score given for the office bearer to get final score (Pareek & Trivedi, 1964).

Member of one organization : 1

Member of more than one organization : 2

Office bearer of any organization : 3

Wider public leader : 6

**(X<sub>17</sub>) Farming experience:**

Farming experience is proxied by the number of years of

farming experiences with small ruminant livestock.

## **B. COMMUNICATION VARIABLES:**

### **(X<sub>18</sub>) Mass Media Communication” as a Source of Information:**

The mass media source of information considered for the present research work were Radio, Television, Educational film, News Paper, Farm Publication, Poster Demonstration, Exhibition/ Krishi Mela,. These were relevant for the area under investigation and were finalized after discussion with the extension personnel and other subject matter specialists.

To measure the degree of utilization of the mass media sources, each respondent was asked to indicate on a four-point continuum as to how often he got information about improved practices of small ruminant. The scoring procedure for the response was most often- 3, often- 2, sometimes- 1, and never- 0, Bandyopadhyay (1986). The score for an individual small ruminant livestock owner was obtained by adding the scores over different sources. The range of the score, therefore, was from 0 to 24.

### **(X<sub>19</sub>) “Personal Cosmopolite” as a Source of Information:**

The personal cosmopolite sources of information considered for the present study were specialist from Deptt. of Animal Resources Development, Govt. of West Bengal; Block Livestock Development Officer (BLDO) or Veterinary Officer, Livestock Development Assistant (LDA), Gram Sebak/ Prani bandhu, University Extension Personnel, Panchayet personnel, Non-Government Organization or Co-operative Society Personnel, Bank personnel, Input dealer and Livestock owners of other villages. These were relevant for the area and were finalized after discussion with the experts and extension personnel of the University.

To measure the degree of utilization of the personal cosmopolite sources of information, each livestock owner was asked to indicate on a four point continuum as to how often he got information about

improved animal husbandry practices. The scoring procedure for the response was most often- 3, often- 2, sometimes- 1, and never- 0 Bandyopadhyay (1986). The score for an individual livestock owner was obtained by adding the scores over different sources. The range of the score, therefore, was from 0 to 30.

**(X<sub>20</sub>) “Personal Localite” as a Source of Information:**

The “Personal Localite” source of information considered for the present study was Own Family Member, Resident of the same village but other than neighbour, Relatives, Friends and Neighbour. These were relevant for the area of the investigation and were finalized after discussion with the experts and extension personnel of the University.

The scoring pattern to measure the degree of utilization of the personal cosmopolite sources of information was same as that followed for personal cosmopolite. The range of the score in this case was from 0 to 15.

**(X<sub>21</sub>) Communication skills:**

Communication is a variable skill and part of management. It runs through all the activities of management, and its end objective is effective management (Appley, 1969). Communication skill in this study refers to the small ruminant livestock owners’ skill in receiving and imparting information.

Communication skill was measured with the help of communication skill rating scale developed by Pareek and Singh (1974). The scale consisted of seven items. The items were rated in five-point response categories ranging from always to never. The scoring of the item was always-4, most often-3, often-2, sometimes-1, never-0. The range of scores for the scale was form 0 to 28. Communication skill of each respondent was measured by his total score in the scale.

**C. SOCIO- PSYCHOLOGICAL**

**(X<sub>22</sub>) Knowledge about reproduction of male livestock:**

Knowledge generally understood as an intimate acquaintance of an individual with facts. English and English (1958) had defined knowledge as a body of understood information possessed

by an individual or by a culture.

This variable was measured with the help of developed about schedule knowledge of reproduction with male small ruminant livestock. The schedule consisted of seven items. The respondents were asked to answer the items in question form. One score was given for each correct answer. The summation of the scores for correct replies over all the items of a particular respondent indicated his level of knowledge about reproduction of male livestock.

**(X<sub>23</sub>) Knowledge about Reproduction of female livestock:**

This variable was measured with the help of developed schedule about reproductive knowledge of reproduction of female small ruminant livestock. The schedule consisted of twenty one items. The respondents were asked to answer the items in question form. One score was given for each correct answer. The summation of the scores for correct replies over all the items of a particular respondent indicated his level of knowledge about reproduction of female livestock.

**(X<sub>24</sub>) Knowledge about feeding:**

This variable was measured with the help of developed schedule about feeding of small ruminant livestock. The schedule consisted of 6 items. The respondents were asked to answer the items in dichotomized form. One score was given for each correct reply. The summation of the scores for correct replies over all the items of a particular respondent indicated his level of knowledge about feeding of small ruminant livestock owners.

**(X<sub>25</sub>) Knowledge about deworming:**

This variable was measured with the help of developed schedule about deworming. The schedule consisted of four items. The respondents were asked to answer the items in question form. One score was given for each correct reply. The summation of the scores for correct replies over all the items of a particular respondent indicated his level of knowledge about deworming.

**(X<sub>26</sub>) Knowledge about vaccination:**

This variable was measured with the help of developed schedule about vaccination. The schedule consisted of three items. The respondents were asked to answer the items in question form. One score was given for each correct reply. The summation of the scores for correct replies over all the items of a particular respondent indicated his level of knowledge about vaccination.

**(X<sub>27</sub>) Attitude towards leadership:**

It is proposed that an "Attitude as a mental state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1935). It is learned predispositions towards various aspects of our environment. They may be positively or negatively directed towards certain aspects of small ruminant farming.

W. T. Nell (1998) studied the "Transfer and adoption of technology by sheep and goat farming in Quaqua, South Africa". The statements were rated in five points response categories from 'strongly agree' to 'strongly disagree'. In the present study, schedule was developed following the guidelines of W.T. Nell (1998).

The leadership refers to the process through which a person directs, guides and influences the thought, feeling and behaviour of other member of the society. In the study two statements were developed in the schedule. The statement were rated in five points response categories from 'strongly agree' to 'strongly disagree'. The scoring for the positive to negative statements was strongly agree- 4, agree- 3, undecided- 2, disagree- 1 and strongly disagree-0. For the negative statement the reverse order of scoring was followed.

**(X<sub>28</sub>) Attitude towards need for achievement of goals:**

This is the starting point of extension work. The effective extension work must bring with the interest and needs of the people which is a challenging task. The extension worker should give priority to the felt needs of the people. W. T. Nell (1998) studied the attitude towards need for achievement of goals of small ruminant farming

practices.

In the study two statements were developed in the schedule following Nell (1998). The scoring for the positive to negative statements was strongly agree- 4, agree- 3, undecided- 2, disagree- 1 and strongly disagree-0. For the negative statement the reverse order of scoring was followed.

**(X<sub>29</sub>) Attitude towards creative and innovative skills of marketing:**

In this study three statements were developed in the schedule following Nell (1998). The statement were rated in five points response categories from 'strongly agree' to 'strongly disagree'. The scoring for the positive to negative statements was strongly agree- 4, agree- 3, undecided- 2, disagree- 1 and strongly disagree-0. For the negative statement the reverse order of scoring was followed.

**(X<sub>30</sub>) Attitude towards motivation of progress:**

In this study two statements were developed in the schedule following Nell (1998). The statement were rated in five points response categories from 'strongly agree' to 'strongly disagree'. The scoring for the positive to negative statements was strongly agree- 4, agree- 3, undecided- 2, disagree- 1 and strongly disagree-0. For the negative statement the reverse order of scoring was followed.

**(X<sub>31</sub>) Attitude towards need for autonomy:**

In this study only one statement were developed in the schedule following Nell (1998). The statement was rated in five points response categories from 'strongly agree' to 'strongly disagree'. The scoring for the positive to negative statements was strongly agree- 4, agree- 3, undecided- 2, disagree- 1 and strongly disagree-0. For the negative statement the reverse order of scoring was followed.

**(X<sub>32</sub>) Attitude towards risk:**

The attitude towards risk in the study refers to the farmers' attitude towards profit flow. W. T. Nell (1998) indicated that a risk seeking farmer is the one willing to spend money in adopting a new technology that will probably have higher incentives. A risk-averse farmer is not willing to risk current profits in a new technology that

costs money, in the hope of higher incentives. The term risk commonly refers to all outcomes which lead to losses or deviations of relations from expectations (Heady et al., 1937). Risk orientation may be described as the degree to which a livestock owner is oriented towards encountering risks and uncertainty in adopting new ideas.

In this study five statements were developed in the schedule following Nell (1998). The statements were rated in five points response categories from 'strongly agree' to 'strongly disagree'. The scoring for the positive to negative statements was strongly agree- 4, agree- 3, undecided- 2, disagree- 1 and strongly disagree-0. For the negative statement the reverse order of scoring was followed.

**(X<sub>33</sub>) Attitude towards small ruminant farming:**

It is learned predispositions towards various aspects of our environment. They may be positively or negatively directed towards certain aspects of small ruminant farming. It is proposed that an "attitude is a mental ---state of readiness" (Allport, 1935). It is learned predispositions towards aspects of our environment. They may be positively or negatively directed towards certain aspects of farming.

The attitude towards dairy farming scale of Gupta and Sohal (1976) was used to measure the attitudes of the livestock owners towards the dairy farming. The scale consisted of 8 statements. The statements were rated in three-point response categories ranging from 'agree' to 'disagree'.

The schedule consisted were developed in the schedule following Gupta and Sohal (1976). The scale consisted of 9 statements. The statements were rated in three point response categories ranging from 'agree' to 'disagree'. There were 7 positive statements and 2 negative statements in the scale. The scoring for the positive statements was 'agree – 3', 'undecided' – 2', 'disagree – 1'. For the negative statement the reverse order of scoring was followed.

**D. ADMINISTRATIVE SKILLS:**

**(X<sub>34</sub>) Planning skills:**

Planning skills defines the efficacy of capabilities of an individual to forecast the future programme and accordingly to make a plan. In the present study it is measured with the summation of total scores obtained from few open ended questions listed in interview schedule.

**(X<sub>35</sub>) Decision making:**

Decision making pattern refers to the extent of participation of the rural people in decision making in small ruminant livestock related activities. The respondent were given score of 1, 2, 3, 4, 5, 6 for independent decision by male only, independent decision by female only, independent decision by children only, joint decision by husband and wife, joint decision by female and children only and no response, respectively. The frequency of responses in each activity was calculated.

**(X<sub>36</sub>) Work distribution pattern:**

Time utilization depends on the distribution of work in small ruminant livestock farming. In order to study the distribution of work in small ruminant farming, data were collected regarding the major six activities where the male, female and children were involved the practices and they were given time for the activities in a day.

**(X<sub>37</sub>) Marketing management:**

Marketing management refers in the study about the administrative capabilities to manage the marketing network for selling the produces. Here it has been measured with the summation of the scores obtained from the SRLO through personal interview.

**Table- 3.4: Variables selected for the study and their empirical measurements:**

Sl. No.	Variables	Measures
<b>A. Dependent Variables</b>		
(Y)	Adoption of improved practices in small ruminant farming: a) Deworming b) Castration by Burdizzo Castrator c) Vaccination d) Colostrum Feeding e) Selective Breeding f) Record keeping g) Treatment with medicine	Adoption Index Method, Dasgupta (1968)
<b>B. Independent Variables</b>		
<b>a. Socio-economic</b>		
(X <sub>1</sub> )	Gender	Schedule developed
(X <sub>2</sub> )	Age	Schedule developed
(X <sub>3</sub> )	Category	Pareek and Trivedi (1964)
(X <sub>4</sub> )	Occupation	Schedule developed
(X <sub>5</sub> )	Caste	Schedule developed
(X <sub>6</sub> )	Education	Pareek and Trivedi (1964)
(X <sub>7</sub> )	Marital status	Schedule developed
(X <sub>8</sub> )	Religion	Schedule developed
(X <sub>9</sub> )	Family type	Pareek and Trivedi (1964)
(X <sub>10</sub> )	Family size	Pareek and Trivedi (1964)
(X <sub>11</sub> )	Family education status	Ray (1968)
(X <sub>12</sub> )	Received training	Schedule developed
(X <sub>13</sub> )	Herd size	Schedule developed
(X <sub>14</sub> )	Economic status	Pareek and Trivedi (1964)
(X <sub>15</sub> )	Urban contact	Schedule developed
(X <sub>16</sub> )	Social participation	Pareek and Trivedi (1964)
(X <sub>17</sub> )	Farming experience	Schedule developed
<b>b. Communication</b>		
(X <sub>18</sub> )	Utilization of Mass Media	Bandyopadhyay (1986)
(X <sub>19</sub> )	Utilization of Personal cosmopolite sources of information	Bandyopadhyay (1986)
(X <sub>20</sub> )	Utilization of Personal localite sources of information	Bandyopadhyay (1986)
(X <sub>21</sub> )	Communication skills	Pareek and Singh (1974).

<b>c. Socio-psychological</b>		
(X <sub>22</sub> )	Knowledge about reproduction of male livestock	Schedule developed
(X <sub>23</sub> )	Knowledge about reproduction of female livestock	Schedule developed
(X <sub>24</sub> )	Knowledge about feeding	Schedule developed
(X <sub>25</sub> )	Knowledge about deworming	Schedule developed
(X <sub>26</sub> )	Knowledge about vaccination	Schedule developed
(X <sub>27</sub> )	Attitude towards leadership	Scheduled developed following Nell (1998)
(X <sub>28</sub> )	Attitude towards need for achievement of goals	-Do-
(X <sub>29</sub> )	Attitude towards creative and innovative skills of marketing	-Do-
(X <sub>30</sub> )	Attitude towards motivation of progress	-Do-
(X <sub>31</sub> )	Attitude towards need for autonomy	-Do-
(X <sub>32</sub> )	Attitude towards risk	-Do-
(X <sub>33</sub> )	Attitude towards small ruminant farming	Scheduled developed following Gupta and Sohal (1976)
<b>d. Administrative:</b>		
(X <sub>34</sub> )	Planning skills	Scheduled developed following Nell (1998)
(X <sub>35</sub> )	Decision making	Scheduled developed
(X <sub>36</sub> )	Work distribution pattern	Scheduled developed
(X <sub>37</sub> )	Marketing management	Scheduled developed

### 3.3 TECHNIQUES OF FIELD DATA COLLECTION:

The process of data collection essentially involves the ways and means of approaching and gaining access to different sources of information in order to fulfill the objective of the study. The process also involves the way of rapport building with local people, which enables them to express themselves and generate information reliably and in a relaxed atmosphere. Department of Veterinary and Animal Husbandry Extension Education, West Bengal University of Animal and Fishery Sciences, Kolkata, provided background information and guided the researcher to identify other sources of secondary information. Accordingly, at state level Bureau of Applied Economics and Statistics, Govt. of west Bengal in New Secretariat Building, Kolkata, District level Animal Resources Development, (South 24 Parganas and Purulia district), offices of the Block Livestock Development officer of the respective blocks were approached to obtain secondary information.

**Tools and techniques:**

A structured schedule was developed for the purpose of data collection. While constructing the schedule, the objectives were taken into consideration and statements were included based on the experience. The schedule was pre-tested in the actual field situation at a place other than the locale of the present study. Necessary modifications were incorporated accordingly and a final schedule was developed (Appendix I).

**Field Data Collection**

The background information about the area of the study were obtained through secondary sources. A local village level worker designated as “Pranibandhu” accompanied the researcher in gaining easy entrance to the study villages. Before the actual data collection, several visits were made to build-up rapport. The data collection was taken up during September '05 – January' 06. All the respondents were personally interviewed.

**3.4 STATISTICAL METHODS USED:**

The data were collected, compiled and tabulated. The data were also categorized for further clarity, understanding and interpretation. In the present study, the following methods were used in analysis of data using the standard formulae.

The statistical methods used in the study includes percentage analysis, analysis of variance, co-efficient of correlation, Mann-Whitney U Test, Kolmogorov-Smirnov Z Test, Chi-square test and Path analysis.

**Percentage analysis:**

The percentage was calculated for making simple comparison. For calculating percentage, the frequency of a particular cell was divided by the total number of respondents in that particular category and multiplied by 100. Percentage was calculated up to two places after decimal point.

**Analysis of variance:**

Analysis of variance is the separation of the variance ascribable

to one group of causes from the variance ascribable to other groups (Weatherburn, 1961).

The analysis of variance was used to see the significance of difference of means of the dependent and independent variables.

**Co-efficient of correlation:**

When two variables change together in such a way that an increase in one variable is accompanied by an increase in the other, the variables are said to be positively correlated (Panse and Sukhatme, 1967). The intensity of correlation is measured by a coefficient, usually indicated by the symbol of  $\gamma$  which is computed according to the formula:

$$\gamma = \frac{\sigma_{x y}}{\sigma_x \times \sigma_y}$$

Should an increase in one variable go hand in hand with a decrease in the other, these two variables are said to be negatively correlated. If there is no relationship between two variables, they are said to be independent or un-correlated.

**Mann-Whitney U Test:**

The test is a non- parametric equivalent to the t test. Test whether two Independent samples are from the same population. It is more powerful than the median test since it uses the ranks of the cases. Requires an ordinal level of measurement is the number of times a value in the second group, when values are sorted in ascending order.

**Kolmogorov-Smirnov Z Test:**

The test is based on the maximum absolute difference between the observed cumulative distribution function for both samples. When this difference is significant is large, the two distributions are considered different. The Wald-Wolfowitz runs test combines and ranks the observation from both groups. If the two samples are from the same population, the two groups should be randomly scattered throughout ranking.

**Chi-square test:**

Chi-square test can be used to determine if categorical data shows dependency or if the two classifications are independent. It can also be used to make comparisons between theoretical populations and actual data when categories are used. This test is used to test the significance of association between two attributes.

$$\chi^2 = \frac{\sigma_s^2}{\sigma_p^2} (n-1)$$

$\sigma_s^2$  = Variance of the sample

$\sigma_p^2$  = Variance of the population

(n-1) = Degrees of freedom

n = number of items in the sample.

**Path Analysis:**

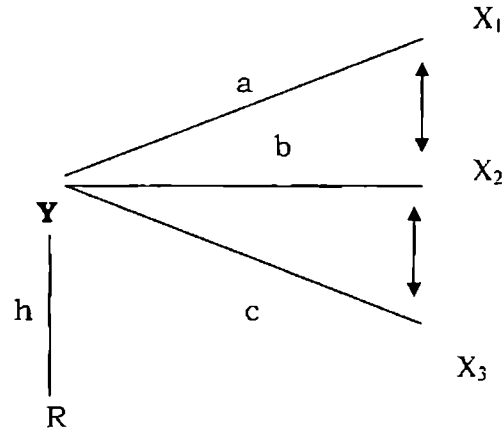
Path analysis adopting the multivariate Path Model as suggested by Land (1969) was used to isolate the direct as well as indirect effects of exogenous variables on endogenous variables. Obviously, the general principles of path analysis are more attuned to construction of uni-dimensional causal theories, but there are ample evidences where it has proved its efficiency in handling reciprocal relationships as well. From the epistemological and scientific logic perspective, we concur that path analysis is a better tool of analysis than simple correlation and regression models.

Correlation studies in conjunction with path coefficient analysis will give a better picture of cause and effect relationships existing between pairs of characters. The techniques of path coefficient analysis involve a method of partitioning the total correlation between the dependent variable and the independent variable into direct effect of independent variable and its indirect effect via third variable on dependent variable.

Path coefficient can be defined as the ratio of the standard deviation of the effect, i.e., if Y is the effect and  $X_1$  is the cause, the path coefficient for the path from cause  $X_1$  to effect Y is  $\sigma_{x_1} / \sigma_y$ .

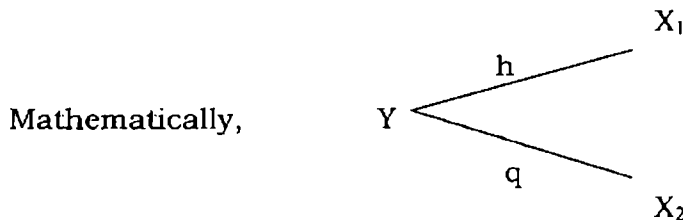
If the cause and effect relationship is well defined, it is possible to represent the whole system of variables in the form of a diagram,

known as path diagram. Let us consider that the yield 'Y' is the function (effect) of various components (causal factors) like number of years etc.



From this figure it is obvious that yield is the result of  $X_1$ ,  $X_2$  and  $X_3$  and some other undefined factors designated by 'R'. Further  $X_1$ ,  $X_2$  and  $X_3$  in turn are correlated. In the figure a, b, c and h are the path co-efficient due to respective variables.

The advantages of path diagram, is that a set of simultaneous equations can be written directly from a diagram and a solution of these questions provides information on the direct and indirect contributions of these causal factors to the effect.



$Y = X_1 + X_2$  or  $\sigma^2y = \sigma^2x_1 + \sigma^2x_2$ , assuming  $X_1$  and  $X_2$  are independent.

Thus the theoretical basis of these equations may be explained as follows:

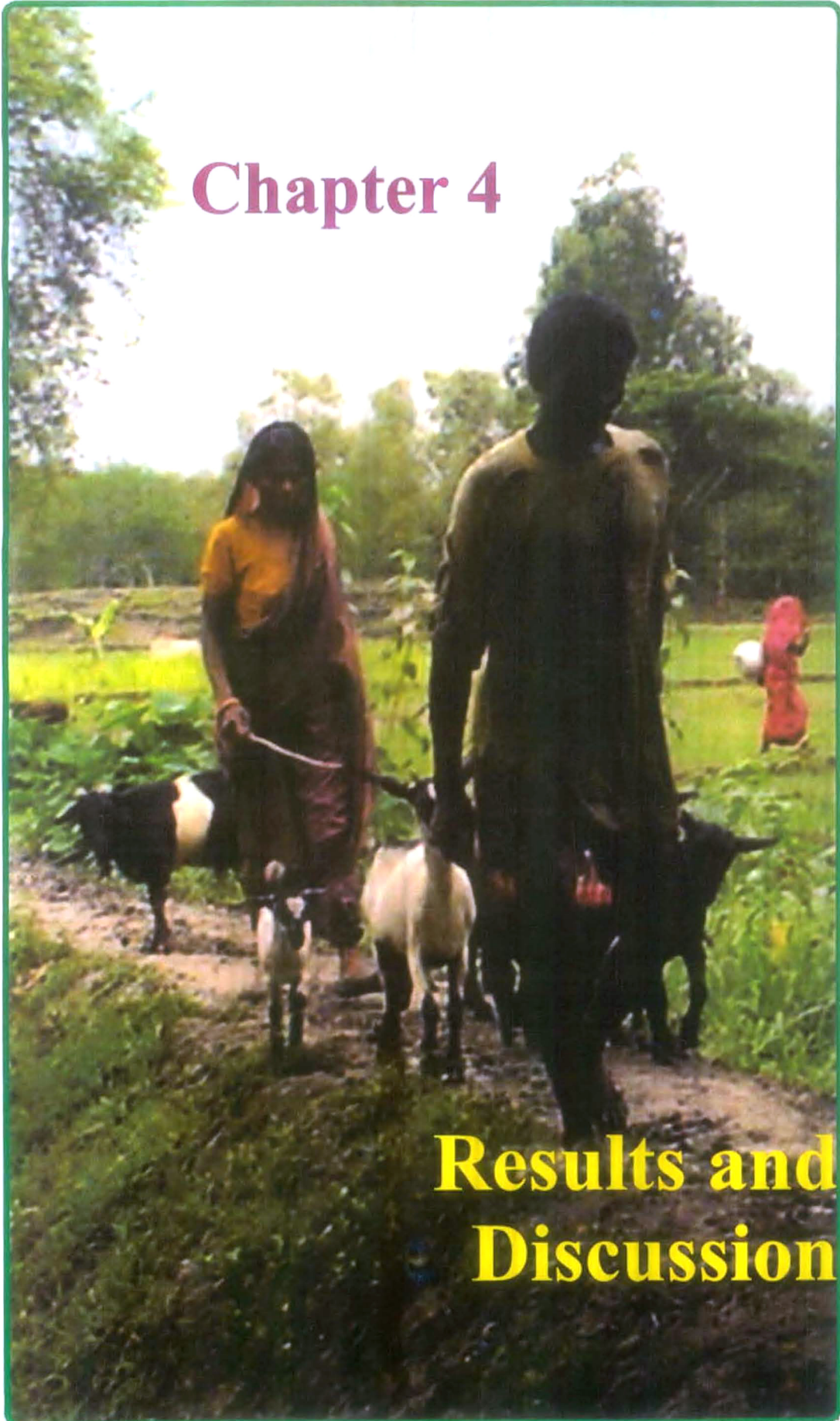
Let us consider the correlation between  $X_1$  and Y, i.e.  $Y (X_1; Y)$  in assuming that

$$Y = X_1 + X_2 + X_3 + R$$

And 
$$Y = \overline{X_1} + \overline{X_2} + \overline{X_3} + \overline{R}$$

## Chapter 4

## Results and Discussion



## ***RESULTS AND DISCUSSION***

This chapter deals with the results and discussion of the present study. The findings of the study have been presented on the basis of the specific objectives of the study. The present investigation was undertaken in eight Gram Panchayats of Purulia and South 24 Parganas district to study Small Ruminant Livestock Owners (SRLO) in relation to influences of selected socio-economic, socio-psychological, communication and administrative factors on adoption behaviour in West Bengal. The results obtained are being presented in following sections.

### **Demographic indicators and socio-personal characteristics of SRLO in two agro-climatic zones of West Bengal:**

In the present context demographic and socio-personal profiles of the SRLO included the gender, age, categories, occupation, caste, education, marital status, religion, family type, training, land holding, house type and social participation of small ruminant livestock owners. The data have been categorised under three types to indicate the overall SRLO in the West Bengal and difference between the SRLO in two districts or two different agro-climatic zones of West Bengal.

The overall study found that majority of the SRLO (62.1%) were females, however, a detailed look at the table 4.1 revealed that 70.7 per cent and 53.6 per cent of the SRLO were females in south 24 Parganas and Purulia district, respectively (fig.2).

The table 4.1 indicated that majority of the SRLO (48.5%) were of the most active group, whereas, 32.9 per cent belonged to young age group and only a mere 18.6 per cent hailed from the elder age group and had an age of over forty five years. The table also found that, the most active age group of SRLO was more in both the districts (Fig.3). Nell (1998) reported in his studies that the younger small ruminant farmers tend to be less conservative and more likely to

adopt external parasite remedies. He further indicated that the adoption of internal parasite technologies requires more experience, i.e. age.

The perusal of table 4.1 indicated that majority of owners belonged to Marginal category (63.2%) followed by small category (20%), medium-large (8.6%) and rest SRLO were found land less (here land less means the SRLO personally have no land for cultivation or rearing small ruminant). The numbers of marginal land holder (70.7%) were found in South 24 Parganas district where as medium-large SRLO were more found in Purulia district (Fig.4).

It can be observed from table 4.1 that agricultural labour was the main occupation of forty six per cent of the SRLO. A mere 6.4, 21.4, 22 and 4 per cent had business, independent profession, cultivation and service, respectively. The study found that independent profession of SRLO in South 24 Parganas district was more prevalent than Purulia district (Fig.5).

Table 4.1 revealed that majority of the respondents on overall basis belonged to either schedule caste (31.8%), other backward caste (25.7%) and schedule tribe (24.3%), whereas, nearly eighteen per cent of the respondents belonged to the general category of caste. The majority of distribution was found in Purulia district to be 44.3 per cent other backward caste and 34.3 per cent to scheduled tribe, whereas, in South 24 Parganas district 54.3 per cent SRLO coming from scheduled caste (Fig.6).

It was clear from the table that majority of the respondents (52.8%) had an education ranging from primary to middle school and only 16.8 per cent were illiterate. It can further be seen that majority 32 per cent of SRLO had an education from middle school in Purulia, whereas, 28.6 per cent SRLO had an education of primary level in South 24 Parganas district (Fig.7). The study found that majority of the SRLO was married (82.9%) in the study area (Fig.8).

**Table - 4.1: Distribution of demographic and Socio Personal characteristics of small ruminant livestock owners (SRLO):**

Characters	Category	Overall (n=280)	Purulia (n=140)	South 24Pgs. (n=140)
1. Gender:	Male	37.9 (106)	46.4(65)	29.3 (41)
	Female	62.1 (174)	53.6(75)	70.7 (99)
2. Age	Young group (upto 30 years.)	32.9 (92)	38.6 (54)	27.1 (38)
	Most active group (30-45years.)	48.5 (136)	43.6 (61)	53.6 (75)
	Elder Group (above 45 years.)	18.6 (52)	17.8 (25)	19.3 (27)
3. Categories	Landless	8.3 (23)	5.7(8)	10.7 (15)
	Marginal	63.2 (177)	55.7(78)	70.7 (99)
	Small	20.0 (56)	25.0(35)	15.0 (21)
	Medium-Large	8.6 (24)	13.6(19)	3.6 (5)
4. Occupation	Labour	46.1 (129)	53.6(75)	38.6 (54)
	Business	6.4 (18)	7.1(10)	5.7 (08)
	Independent profession	21.4 (60)	11.4(16)	31.4 (44)
	Cultivation	22.1 (62)	24.3(34)	20.0 (28)
	Service	3.9 (11)	3.6(5)	4.3 (06)
5. Caste	General	18.2 (51)	12.1(17)	24.3 (34)
	Schedule caste	31.8 (89)	9.3(13)	54.3 (76)
	Schedule tribe	24.3 (68)	34.3(48)	14.3 (20)
	Other backward caste	25.7 (72)	44.3(62)	7.1 (10)
6. Education of the respondent	Illiterate	16.8 (47)	18.6(26)	15.0 (21)
	Can read only	4.6 (13)	4.3(6)	5.0 (07)
	Can read and write	10.4 (29)	5.0(7)	15.7 (22)
	Primary	25.4 (71)	22.1(31)	28.6 (40)
	Middle school	26.4 (74)	32.1(45)	20.7 (29)
	High school	11.4 (32)	10.7(15)	12.1 (17)
	Graduate	5.0 (14)	7.1(10)	2.9 (04)
7. Marital Status	Unmarried	10.0 (28)	12.9(8)	7.1 (10)
	Married	82.9 (232)	80.7(113)	85.0 (119)
	Widow/ Widower	7.1 (20)	6.4(9)	7.9 (11)
8. Religion	Hindu	89.0 (249)	100(140)	77.8 (109)
	Muslim	4.3 (12)	0.00(000)	8.6 (12)
	Christian	6.8 (19)	0.00(000)	13.6 (19)
9. Family type	Nuclear family	50.4 (141)	42.1(59)	58.6 (82)
	Joint family	49.4 (139)	57.9(81)	41.4 (58)
10. Training	Not received	81.4 (228)	80.0(112)	82.9 (116)
	Received	18.6 (52)	20.0(28)	17.1 (24)
11. House	Katcha house	68.3 (191)	62.8 (88)	73.6(103)
	Mixed house	29.6 (83)	35.0 (49)	24.3(34)
	Pucca house	2.1 (6)	2.1 (3)	2.1(3)
12. Social participation	No participation	59.3 (166)	64.2 (90)	54.3 (76)
	Member of one organization	33.2 (93)	30.7 (43)	35.7 (50)
	Member of more than one-organization	3.6 (10)	0.7 (1)	6.5 (9)
	Office holder	3.9 (11)	4.3 (6)	3.6 (5)
	Wider public leader	0.0	0.0	0.0

(Figures in parentheses indicate number of SRLO)

Fig. 2: Bar diagram showing the sex ratio of SRLO

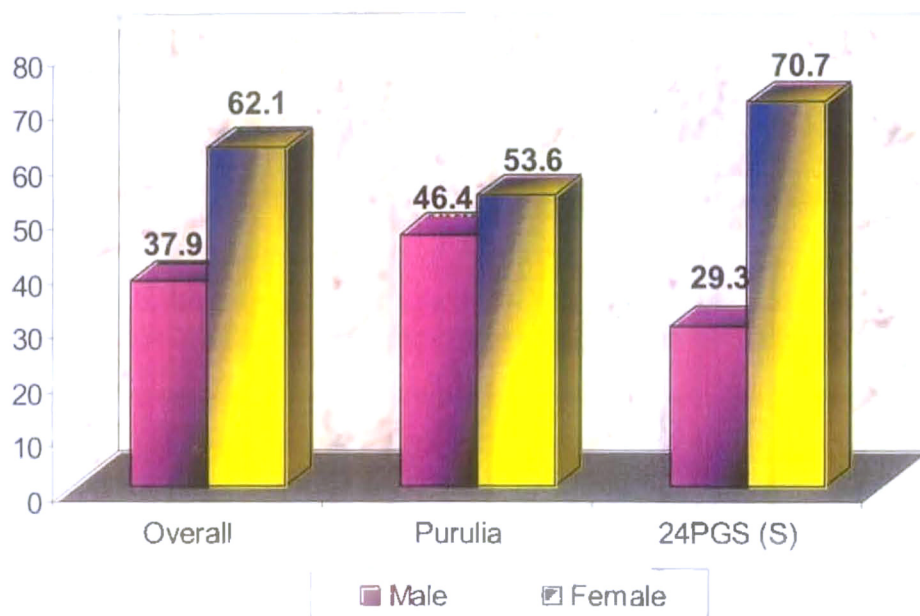
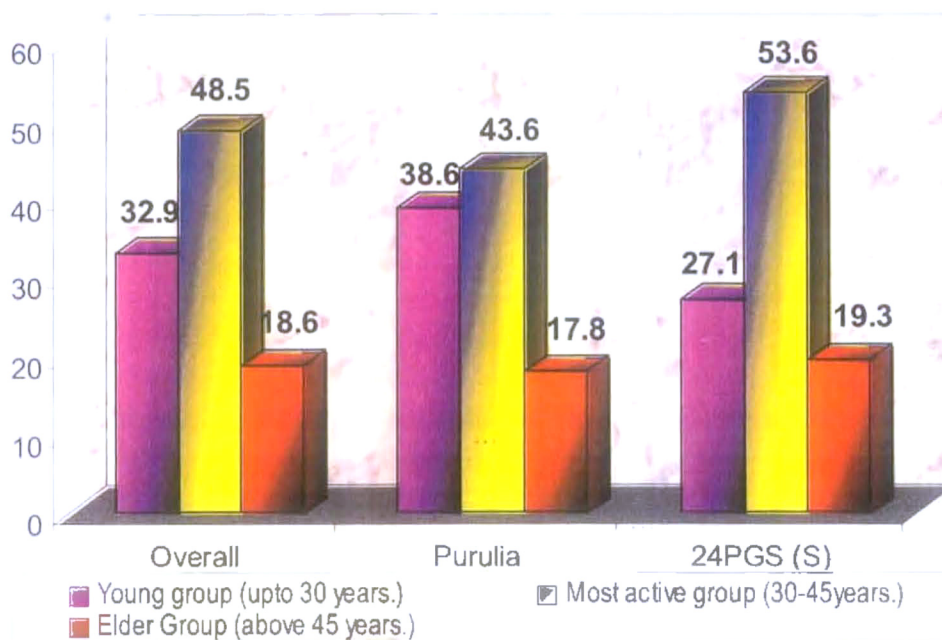
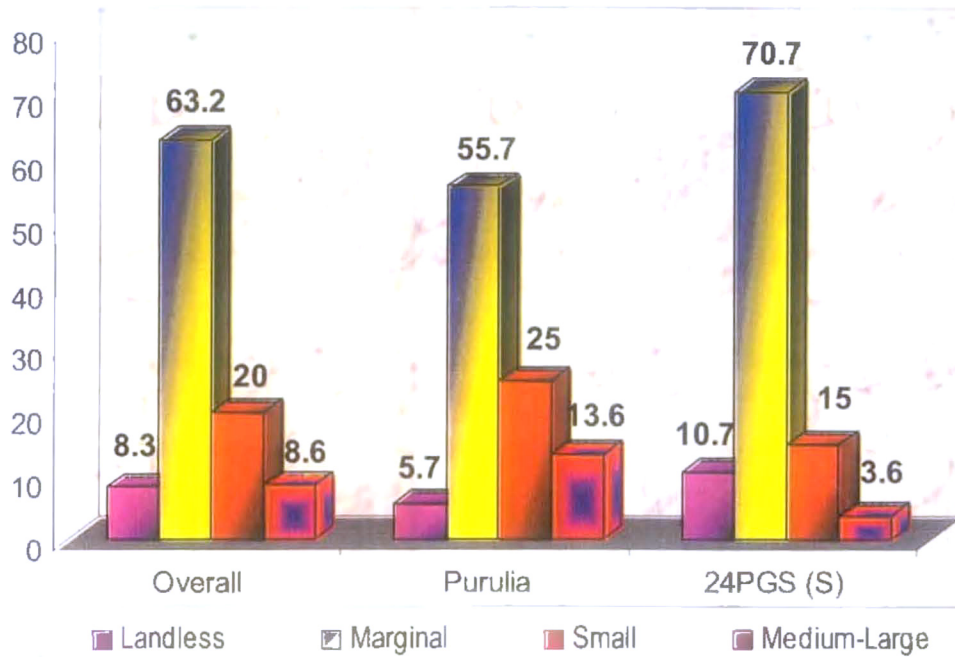


Fig. 3: Bar diagram showing the age groups of SRLO



**Fig. 4: Bar diagram showing category of SRLO**



**Fig. 5: Bar diagram showing different occupation groups of SRLO**

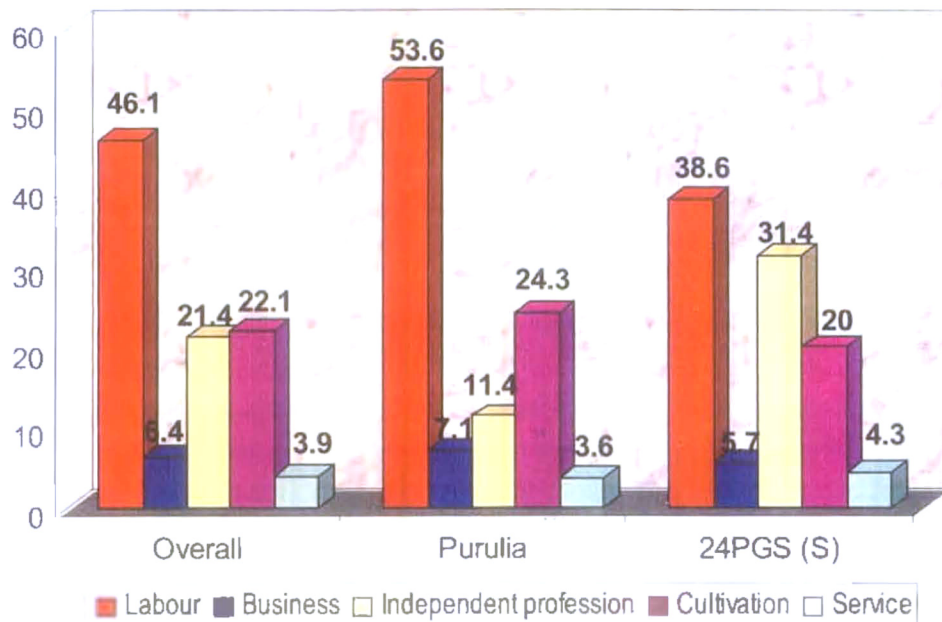


Fig. 6: Bar diagram showing different caste group of SRLO

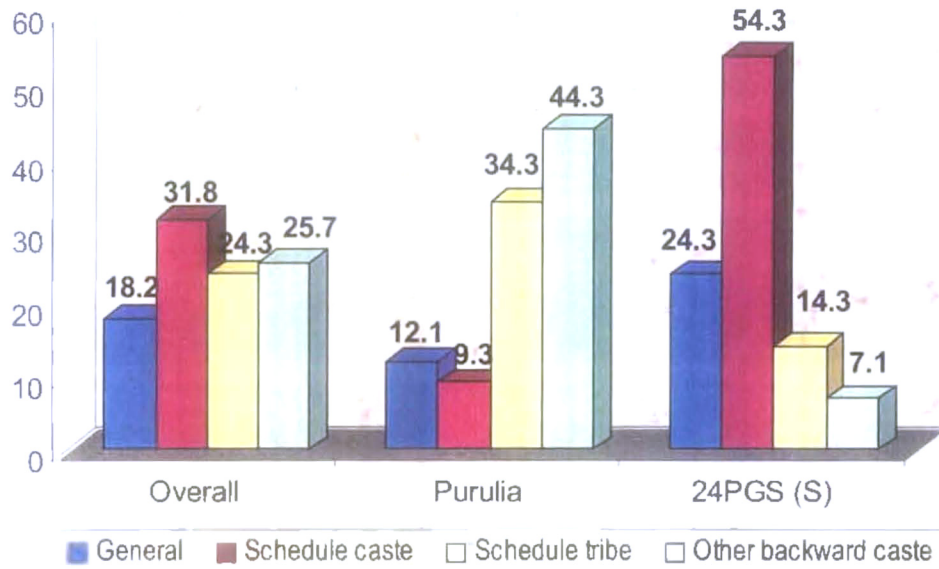


Fig. 7: Bar diagram showing different caste group of SRLO

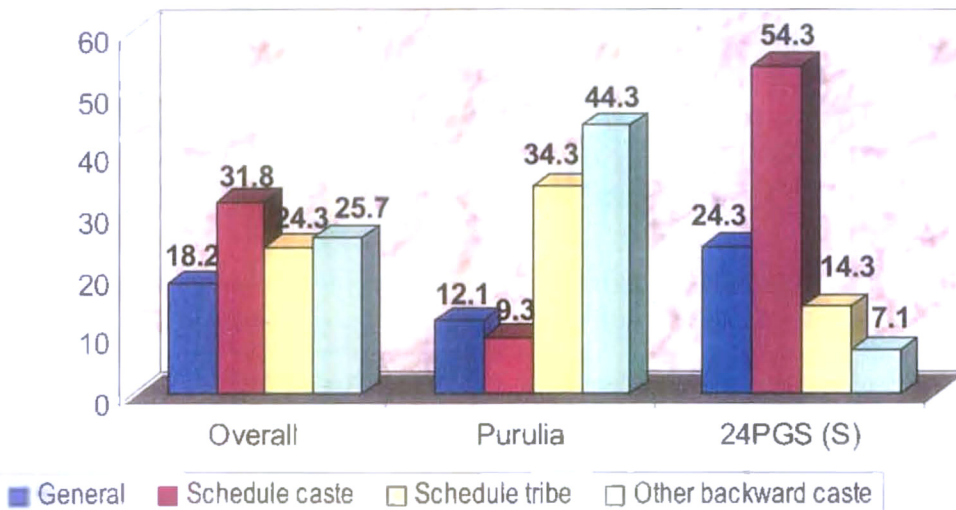


Fig. 8: Bar diagram showing marital status of SRLO

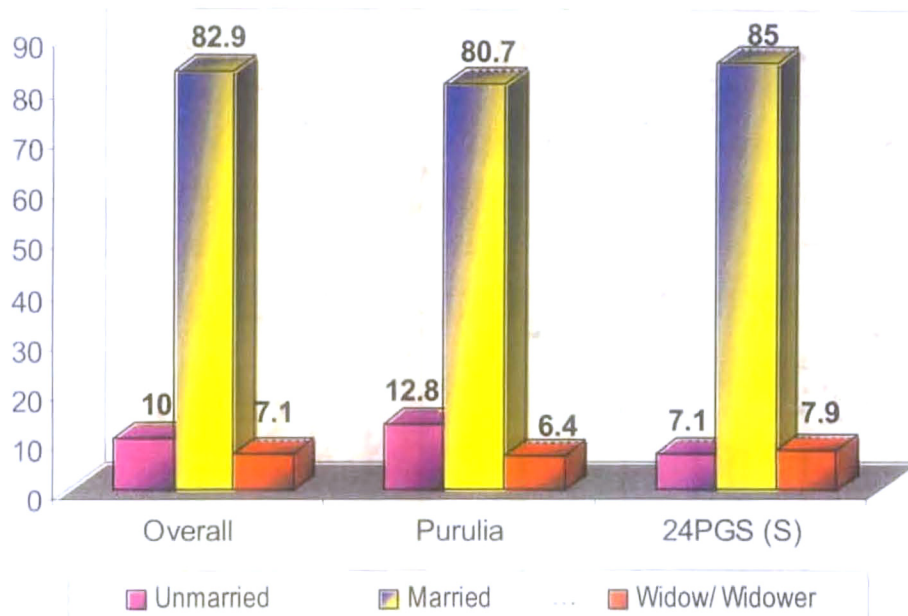
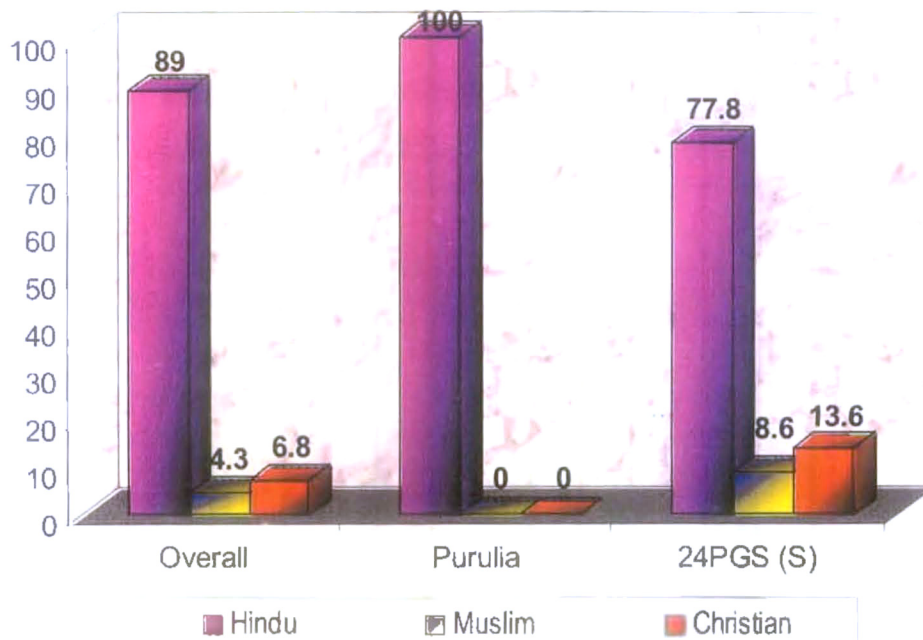


Fig. 9: Bar diagram showing religion of SRLO



A cursory look at this table revealed that majority (89%) of the SRLO were Hindu followed by 4.3 per cent Muslim and 6.9 per cent Christian. Hundred per cent SRLO was Hindu in the study area of Purulia district (Fig.9).

Near about fifty per cent SRLO had nuclear and joint family of the study area. In Purulia district it was found that nearly fifty eight (57.9) per cent SRLO were coming from joint family and South 24 Parganas district 58.6 per cent SRLO were found from nuclear family (Fig.10). Nell (1998) reported that family size was a significant predictor contributing positively to the partial adoption of antibiotics for small ruminant. The study area found only 18.6 per cent SRLO received training about small ruminant farming or animal husbandry farming (Fig.11). A perusal of table 4.1 showed that majority of the SRLO 68.3 per cent and 29.6 per cent had katcha and mixed houses respectively, and only two per cent SRLO had pucca house of the overall study area (Fig.12). The table 4.1 showed that only forty one per cent (33.2% member of one organization, 3.6% member of more than one organization and 3.9% office holder) SRLO were involved in formal organization as member or office bearer to any organization. Majority of them 59.3 per cent were not having any social participation (Fig.13).

**Distribution of SRLO according to their information source utilization:**

As reported in table 4.2 hardly any source was utilized frequently by the SRLO for gaining information regarding small ruminant farming on an overall basis. Majority of the SRLO used the mass media source, like radio (56.5%), farm publication (49.3%) and poster (29.6%) of the overall study area. In case of personal cosmopolite sources of information, ninety eight per cent SRLO used BLDO / Veterinary officers, then eighty eight per cent owners used to collect information from livestock owners of other villages and fifty two per cent SRLO used to collect information about small ruminant livestock farming from LDA. University extension personnel (98.6%)

Fig. 10: Bar diagram showing family type of SRLO

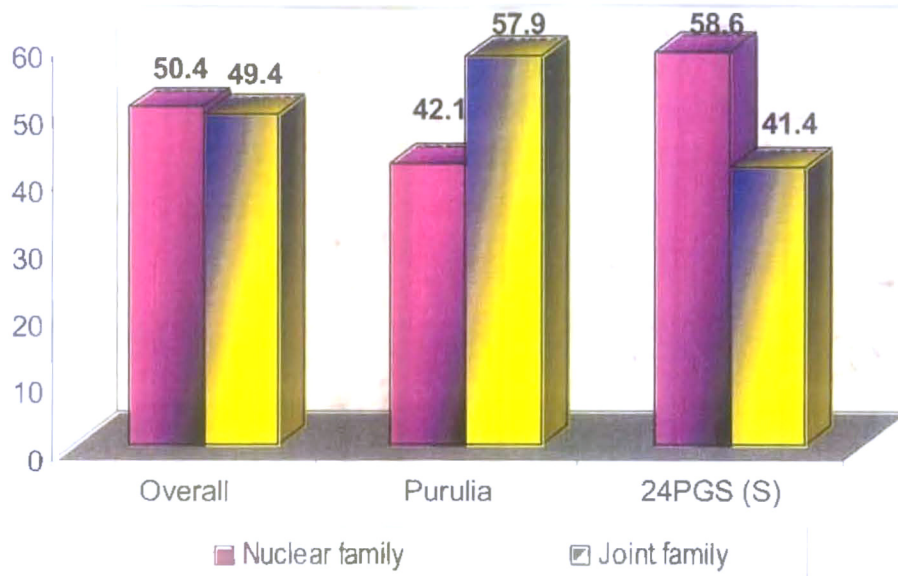
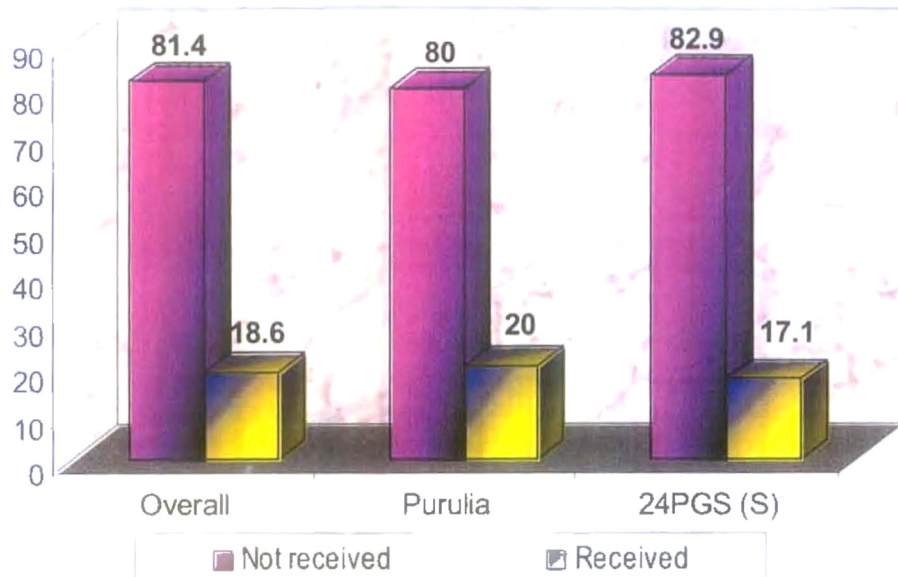
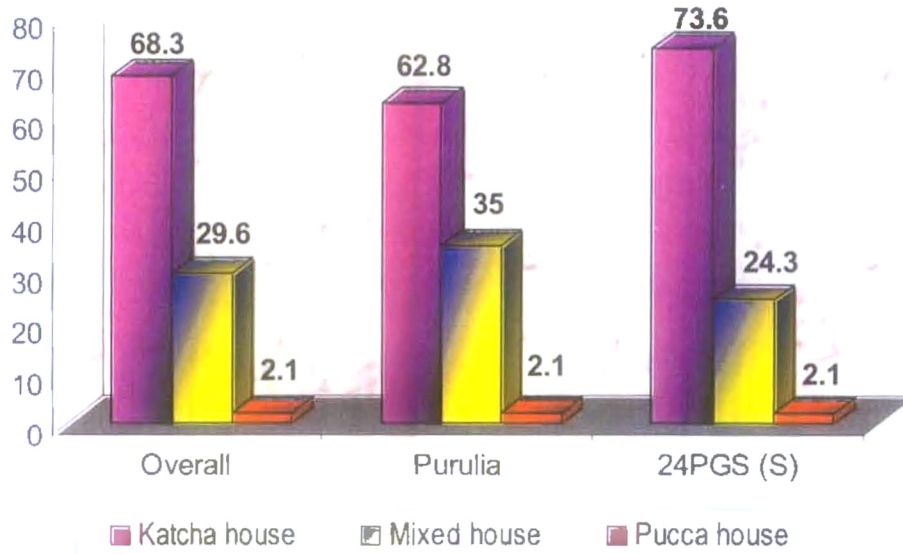


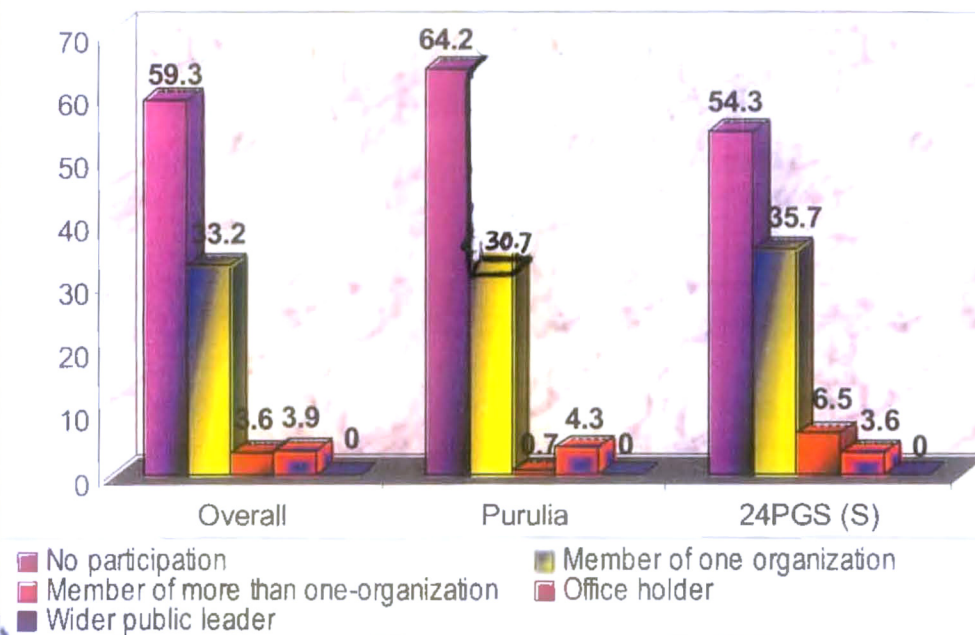
Fig. 11: Bar diagram showing training reception by the SRLO



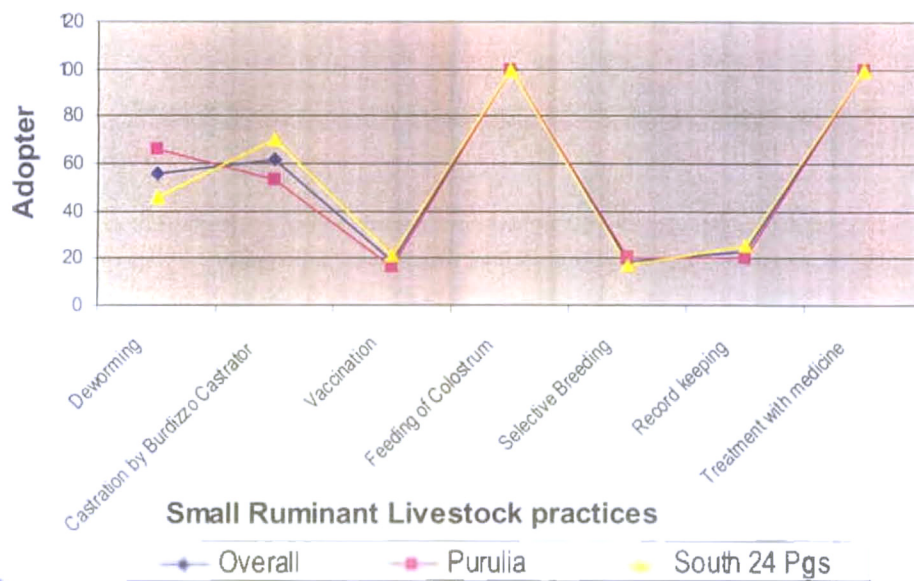
**Fig. 12: Bar diagram showing the house type of SRLO**



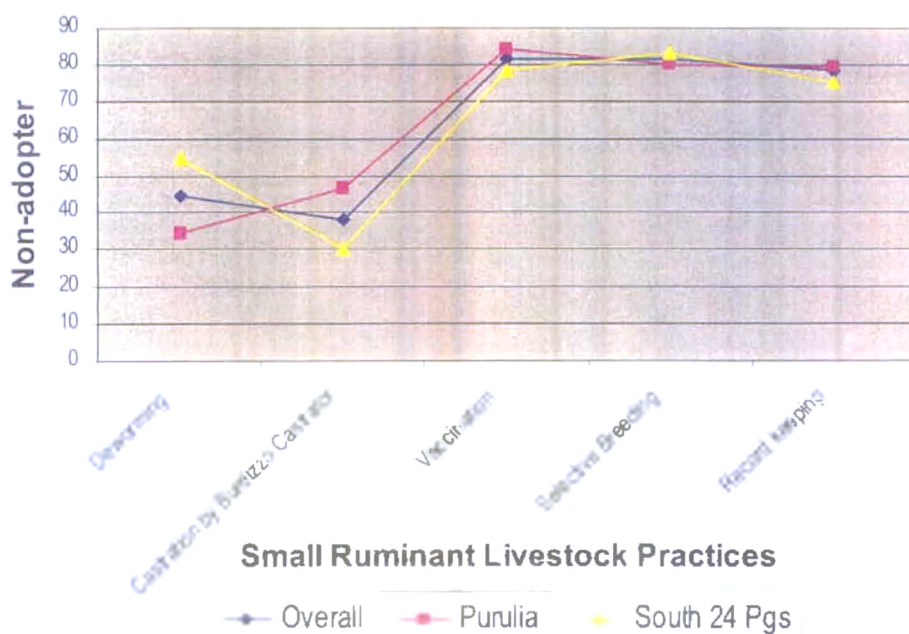
**Fig. 13: Bar diagram showing social participation by the SRLO**



**Fig. 14: Line diagram showing adopter of Small Ruminant Livestock practices by SRLO**



**Fig. 15: Line diagram showing Non-adopter of Small Ruminant Livestock Practices by SRLO**



and specialists from ARD department (77.5%) had no role as personal cosmopolite sources of information. In personal localite sources of information, ninety seven per cent SRLO used to collect the information about small ruminant farming from their neighbors. The table also showed that in major cases (61.4%) friends had no role as information source.

Results of Purulia district indicated from table 4.3 that majority of the SRLO used the mass media sources, like radio (61.4%), farm publication (42.9%) (Fig.17) and poster (25%) (Fig.19) of the study area. Educational film (100%), demonstration (98.6%) and exhibition (98.6%) had almost no role as mass media. In personal cosmopolite sources of information 80 per cent, 79.3 per cent and 70 per cent of the SRLO used to collect information from livestock owners of other villages, livestock development assistant and block livestock development officers or veterinary officers respectively (Fig.21). In the personal localite sources of information, small ruminant livestock owners (SRLO) used to collect information for farming from neighbour, resident of the same village but other than neighbors and other family member were (98.6%), (96.4%) and (52.8%), respectively.

Results of South 24 Parganas revealed from table 4.4 that majority of SRLO used farm publication (55.7%) (Fig.16), radio (51.4%) and poster (34.3%) (Fig.18) as mass media. Majority of them did not use educational film (98.6%) and television (85%). In the personal cosmopolite sources of information, 95.8 per cent, 95.7 per cent, 85.7 per cent and 64.3 per cent SRLO used to collect information from block livestock development officers or veterinary officer, livestock owner of other villages, livestock development assistant and panchayat personnel respectively (Fig.20). In the personal localite sources of information, small ruminant livestock owners (SRLO) used to collect information for farming from neighbour, other family members and residents of the same village but other than neighbors were (98.6%), (98%) and (90%), respectively.

Table – 4.2: Overall distribution of SRLO according to their information source utilization.

A. Mass Media	FREQUENCY OF UTILIZATION (n=280)			
	Never (0)	Sometimes (1)	Often (2)	Always (3)
Radio	43.3 (122)	36.1 (101)	15.4 (43)	5.0 (14)
Television	81.1 (227)	14.6 (41)	3.9 (11)	0.4 (01)
Education Film	99.3 (278)	0.7 (02)	0.0 (0)	0.0 (0)
Farm Publication	50.7 (142)	45.7 (128)	3.6 (10)	0.0 (0)
Poster	70.4 (197)	29.69 (83)	0.0 (0)	0.0 (0)
Demonstration	87.5 (245)	12.5 (35)	0.0 (0)	0.0 (0)
Exhibition	82.2 (247)	11.8 (33)	0.0 (0)	0.0 (0)
<b>B. Personal cosmopolite</b>				
Specialist from Department Of ARD. Govt. of WB	77.5 (217)	22.5 (63)	0.0	0.0
BLDO/ Veterinary Officer	2.1 (6)	39.3 (110)	36.8 (103)	21.8 (61)
L D A	17.1 (48)	51.1(143)	29.6(83)	2.1(6)
Gram Sebak / Prani bandhu	71.8 (201)	20.7(58)	7.5(21)	0.0 (0)
University Extension Personnel	98.6 (276)	0.7(2)	0.7(2)	0.0 (0)
Panchayet Personnel	36.4 (102)	60.4(169)	3.2(9)	0.0 (0)
NGO	76.4 (214)	10.0(28)	12.9(36)	0.7(2)
Bank personnel:	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Input dealer	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Livestock owner from other villages	12.1(34)	61.4(172)	25.4(71)	1.1(3)
<b>C. Personal Localite</b>				
Other Family Member	2.9 (8)	32.9 (92)	44.3 (124)	20.0 (56)
Resident of the same village but other than neighbors	28.6 (80)	67.9 (190)	3.2 (9)	0.4 (1)
Relatives:	56.1 (157)	38.9 (109)	5.0 (14)	0.0 (0)
Friends	61.4 (172)	33.9 (95)	3.9 (11)	0.0 (0)
Neighbors:	1.4 (4)	38.9 (109)	38.2 (107)	0.0 (0)

(Figures in parentheses indicate number of SRLO)

**Table – 4.3: Distribution of SRLO according to their information source utilization in Purulia district**

A. Mass Media	FREQUENCY OF UTILIZATION (n=140)			
	Never (0)	Sometimes (1)	Often (2)	Always (3)
Radio	38.6 (54)	25.0 (35)	26.4 (37)	10.0 (14)
Television	77.1 (108)	20.7 (29)	2.2 (3)	0.0 (0)
Education Film	100 (140)	0.0 (0)	0.0 (0)	0.0 (0)
Farm Publication	57.1 (80)	37.9 (53)	5.0 (9)	0.0 (0)
Poster	75.0 (105)	25.0 (35)	0.0 (0)	0.0 (0)
Demonstration	98.6 (138)	1.4 (2)	0.0 (0)	0.0 (0)
Exhibition	98.6 (138)	1.4 (2)	0.0 (0)	0.0 (0)
<b>B. Personal cosmopolite</b>				
Specialist from Deptt. Of ARD, Govt. of WB	70.7 (99)	29.3 (41)	0.0 (0)	0.0 (0)
BLDO/ Veterinary Officer	30.0 (42)	40.0 (56)	30.0 (42)	0.0 (0)
L D A	20.7(29)	52.9 (74)	22.9 (32)	3.6 (5)
Gram Sebak / Prani bandhu	82.9 (116)	12.1 (17)	5.0 (7)	0.0 (0)
University Extension Personnel	98.6 (138)	1.4 (2)	0.0 (0)	0.0 (0)
Panchayet Personnel	37.1 (52)	57.9 (81)	5.0 (7)	0.0 (0)
NGO	98.6 (138)	1.4 (2)	0.0 (0)	0.0 (0)
Bank personnel:	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Input dealer	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Livestock owner from other villages	20.0 (28)	50.7 (71)	27.1 (38)	2.1(3)
<b>C. Personal Localite</b>				
Other Family Member	3.6 (5)	32.9 (46)	44.3 (62)	19.3 (27)
Resident of the same village but other than neighbors	47.1 (66)	47.1 (66)	5.7 (8)	0.0 (0)
Relatives:	52.9 (74)	37.9 (53)	9.3 (13)	0.0 (0)
Friends	51.4 (72)	41.4 (58)	5.7 (8)	1.4 (2)
Neighbors:	1.4 (2)	32.1 (45)	39.3 (55)	27.1 (38)

(Figures in parentheses indicate number of SRLO)

**Table – 4.4: Distribution of SRLO according to their information source utilization in South 24 Parganas district**

A. Mass Media	FREQUENCY OF UTILIZATION (n=140)			
	Never (0)	Sometimes (1)	Often (2)	Always (3)
Radio	48.6 (68)	47.1 (66)	4.3 (6)	0.0 (0)
Television	85.0 (119)	8.6 (12)	6.4 (9)	0.0 (0)
Education Film	98.6 (138)	1.4 (2)	0.0 (0)	0.0 (0)
Farm Publication	44.3(62)	53.6 (75)	2.1 (3)	0.0 (0)
Poster	65.7 (92)	34.3 (48)	0.0 (0)	0.0 (0)
Demonstration	76.4 (107)	23.6 (33)	0.0 (0)	0.0 (0)
Exhibition	77.9 (109)	22.1(31)	0.0 (0)	0.0 (0)
<b>B. Personal cosmopolite</b>				
Specialist from Deptt. Of ARD, Govt. of WB	84.3(118)	15.7 (22)	0.0 (0)	0.0 (0)
BLDO/ Veterinary Officer	4.3 (6)	48.6 (68)	33.6 (47)	13.6 (19)
L D A	13.6 (19)	49.3 (69)	36.4 (51)	0.0 (0)
Gram Sebak / Prani bandhu	60.7 (85)	29.3 (41)	10.0 (14)	0.0 (0)
University Extension Personnel	98.6 (138)	1.4 (2)	0.0 (0)	0.0 (0)
Panchayet Personnel	35.7 (50)	62.9 (88)	1.4 (2)	0.0 (0)
NGO	54.3 (76)	18.6 (26)	25.7 (36)	1.4 (2)
Bank personnel:	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Input dealer	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Livestock owner from other villages	4.3 (6)	72.1 (101)	23.6 (33)	0.0 (0)
<b>C. Personal Localite</b>				
Other Family Member	2.1 (3)	32.9 (46)	44.3 (62)	20.7 (29)
Resident of the same village but other than neighbors	10.0 (14)	88.6 (124)	1.4 (2)	0.0 (0)
Relatives:	59.3 (83)	40.0 (56)	0.7 (1)	0.0 (0)
Friends	71.4 (100)	26.4 (37)	2.1 (3)	0.0 (0)
Neighbors:	1.4 (2)	45.7 (64)	37.1 (52)	15.7 (22)

(Figures in parentheses indicate number of SRLO)

Fig. 16: Utilization of Farm Publication by SRLO in South 24 Pgs

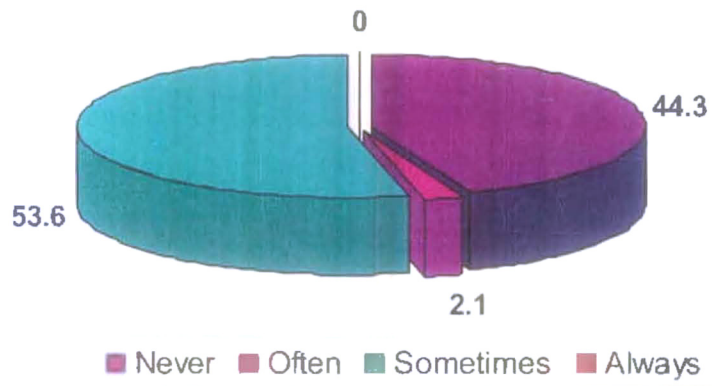


Fig. 17: Utilization of Farm Publication by SRLO in Purulia District

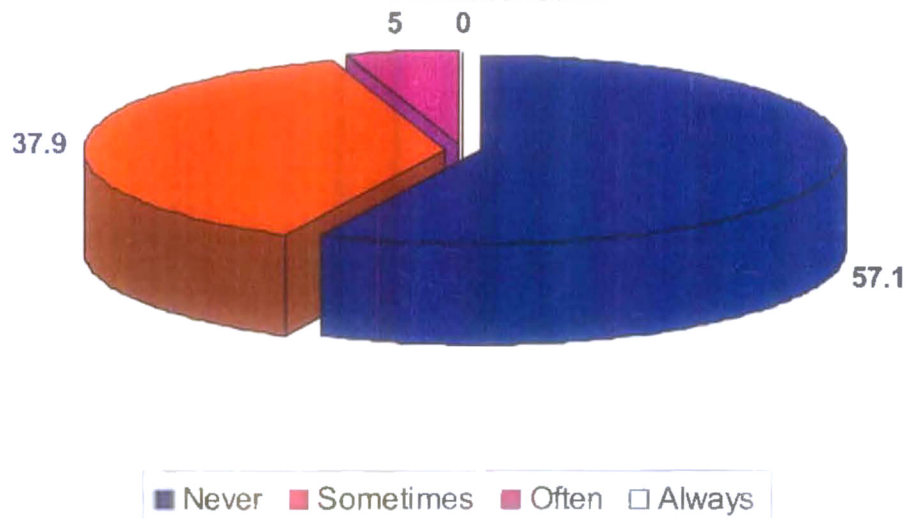


Fig. 18: Utilization of Poster by SRLO in South 24 Pgs

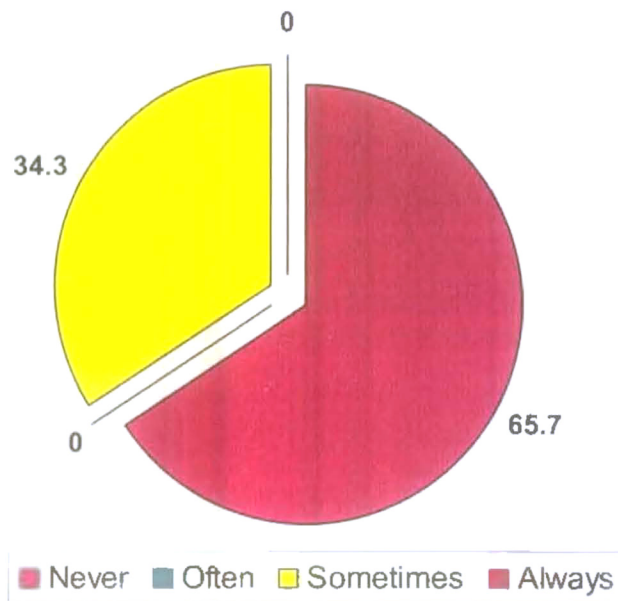
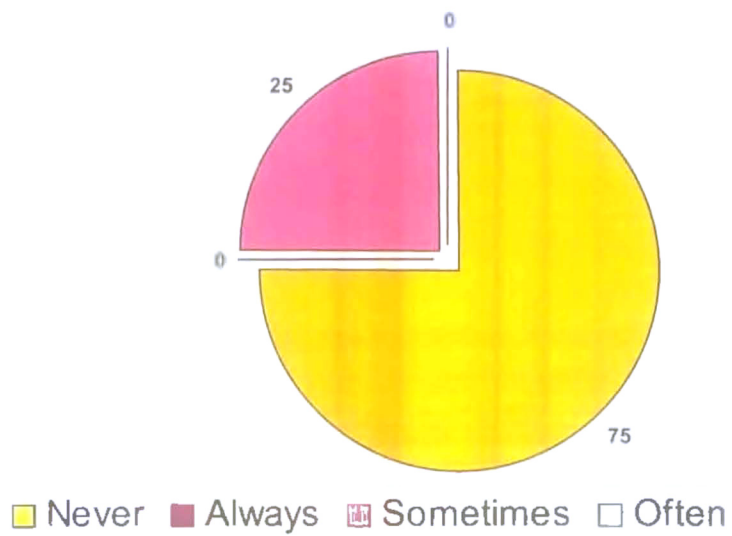
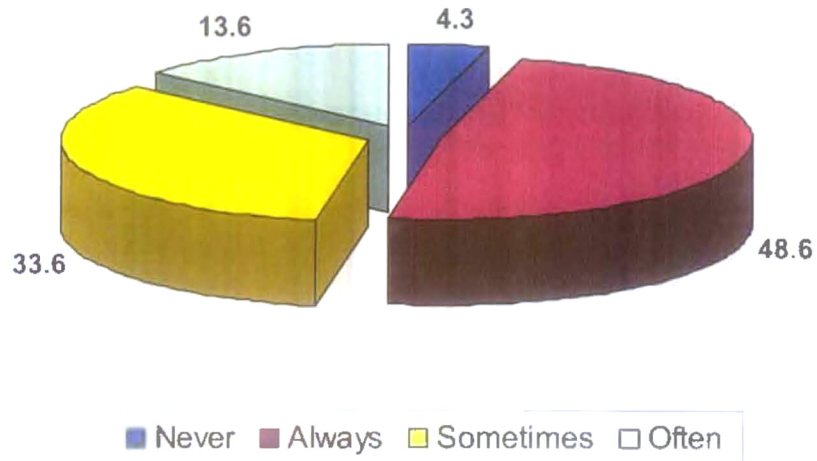


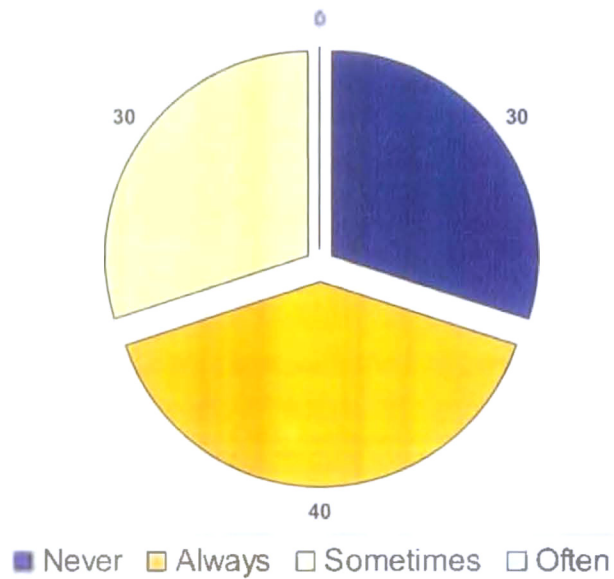
Fig. 19: Utilization Poster by the SRLO in Purulia District



**Fig. 20: Utilization of BLDO/ Veterinary Officer as information sources by SRLO in South 24 Pgs**



**Fig. 21: Utilization of BLDO/ Veterinary Officer as information sources by SRLO in Purulia**



**Distribution of SRLO according to their knowledge about reproduction practices of small ruminant livestock:**

Measurement of knowledge in this study included the test situations which emphasised on recalling of memory or information received on the small ruminant livestock practices viz. reproduction, vaccination, deworming and feeding practices under the study. The table 4.5 indicated that in case of male livestock, 69.6 per cent SRLO were having knowledge about first age of mating, whereas only 20.7 per cent SRLO knew how many times they used their male livestock for breeding purpose per week. Forty five per cent respondents knew the maximum breeding age of male livestock. Nearly eighty two (81.8) per cent SRLO said that they did not know seasonal activity of breeding. 96.8 per cent SRLO were having knowledge about castration but 66.3 per cent did not know the age of castration. In the study area nearly sixty two (61.8) per cent SRLO used closed method or burdizo castrator and only 28.6 per cent SRLO preferred open method for castration.

In case of female livestock, it was concluded that only 71.1 per cent and 77.1 per cent SRLO had no idea about duration of heat period and idea about number of service necessary per conception. In the overall study 75 per cent, 76.1 per cent, 69.3 per cent, 28.6 per cent and 34.3 per cent SRLO had knowledge about age of first heat, duration of heat interval, gestation length, kidding interval and idea about life time number of kidding of small ruminant livestock, respectively. Only 18.2 per cent, 18.9 per cent, 4.3 per cent and 16.1 per cent SRLO had knowledge about male-female ratio, distocia, stillbirth and repeat breeding, respectively. 98.2 per cent, 83.2 per cent, 78.2 per cent and 91.1 per cent SRLO had knowledge about retention of placenta, grading up, care and management before and after parturition and idea about lamb or kid management. Whereas 37.1 per cent, 96.1 per cent, 42.1 per cent and 44.6 per cent SRLO had knowledge about reproductive problem; identify heat detection, maintenance of breeding record and knowledge about crossbreeding,

respectively. The above mentioned findings represented the overall study of the area including both the districts.

The district wise findings are as follows. The table 4.5 revealed the knowledge level of SRLO in Purulia District about the reproductive practices of male livestock that majority of them (62.9%, 99.3% and 53.6%) were having knowledge about first age of mating, idea about castration, and castration by burdizo castrator, respectively. Whereas 71.4 per cent, 52.9 per cent, 83.6 per cent, 67.1 per cent and 70 per cent were not having any knowledge about number of mating necessary per week, maximum breeding age, seasonal activity of breeding, age of castration and did not used open method castration respectively.

The table also revealed the knowledge level of SRLO in South 24 Parganas district about the reproductive practices of male livestock that majority of them (76.4%, 94.3%, and 70.0%) were having knowledge about first age of mating, idea about castration and castration by burdizo castrator, respectively. Whereas 87.1 per cent, 57.1 per cent, 80.0 per cent, 60.0 per cent and 72.9 per cent were not having any knowledge about number of mating necessary per week, maximum breeding age, seasonal activity of breeding, age of castration and did not used open method castration, respectively. Nell (1998) indicated that the use of mating season was a positive predictor for full and over adoption of external parasite remedies.

It was found from the above findings that knowledge level of SRLO about castration of small ruminant was high and more or less equal in both the district. The knowledge level about first age of mating and use of burdizo castrator for castration were more among the SRLO in South 24 Parganas than that of Purulia district.

The table 4.5 revealed the knowledge level of SRLO in Purulia District about the reproductive practices of female livestock that majority of them (69.3%, 73.6%, 69.3%, 98.6%, 82.9%, 91.4%, 90.7%, 95.0% and 54.3%) were having knowledge about age at first heat, heat

interval, gestation length, idea about retention of placenta, idea about grading up of animal, care and management before and after parturition, idea about kid/ lamb management, identify heat detection of small ruminant livestock and idea about cross breeding, respectively. Whereas 65.0 per cent, 80.7 per cent, 69.3 per cent, 66.4 per cent, 78.6 per cent, 87.9 per cent, 97.9 per cent, 85.0 per cent, 56.4 per cent and 69.3 per cent were not having any knowledge about duration of heat period, number of service necessary per conception, kidding interval, life time number of kidding, male-female ratio, idea about distocia, stillbirth, repeat breeding, reproductive problem and maintenance of breeding records for better reproductive management, respectively.

The table 4.5 revealed the knowledge level of SRLO in South 24 Parganas about the reproductive practices of female livestock that majority of them (80.7%, 78.6%, 69.3%, 97.9%, 83.6%, 65.0%, 91.4%, 97.01% and 53.6%) were having knowledge about age at first heat, heat interval, gestation length, idea about retention of placenta, idea about grading up of animal, care and management before and after parturition, idea about kid/ lamb management, identify heat detection of small ruminant livestock and idea about cross breeding, respectively. Whereas 73.6 per cent, 73.6 per cent, 65.0 per cent, 85.0 per cent, 74.3 per cent, 93.6 per cent, 82.9 per cent, 69.3 per cent, and 65.0 per cent were not having any knowledge about duration of heat period, number of service necessary per conception, kidding interval, life time number of kidding, male-female ratio, idea about distocia, stillbirth, repeat breeding, reproductive problem and idea about cross breeding, respectively.

It was found from the above findings that knowledge level of SRLO about female reproduction of small ruminant livestock was more or less equal in both the district. The knowledge level about male- female ratio, idea about distocia, care and management before and after parturition, reproductive problem and idea about cross

**Table – 4.5: Distribution of SRLO according to their knowledge about reproduction practices of small ruminant livestock farming**

Sl. No.	Activities	Overall (n=280)		Purulia (n=140)		South 24 Pgs (n=140)	
		Yes	No	Yes	No	Yes	No
<b>In case of Male Livestock:</b>							
1.	Have you any knowledge about first age of mating?	69.6 (195)	30.4 (85)	62.9 (88)	37.1 (52)	76.4 (107)	23.6 (33)
2.	Do you know number of mating necessity per week?	20.7 (58)	79.3 (222)	28.6 (40)	71.4 (100)	12.9 (18)	87.1 (122)
3.	Do you know maximum breeding age?	45.0 (126)	55.0 (154)	47.1 (66)	52.9 (74)	42.9 (60)	57.1 (80)
4.	Do you know seasonal activity of breeding?	18.2 (51)	81.8 (229)	16.4 (23)	83.6 (117)	20.0 (28)	80.0 (112)
5.	Have You any idea about castration?	96.8 (271)	3.2 (9)	99.3 (139)	0.7 (1)	94.3 (132)	5.7 (8)
6.	Do you know the age of castration?	36.4 (102)	66.3 (178)	32.9 (46)	67.1 (94)	40.0 (56)	60.0 (84)
7.	Which type of method do you use for castration? i) Open method	28.6 (80)	71.4 (200)	30.0 (42)	70.0 (98)	27.1 (38)	72.9 (102)
	ii) Closed method or using burdizo castrator	61.8 (173)	38.2 (107)	53.6 (75)	46.4 (65)	70.0 (98)	30.0 (42)
<b>In Case of Female Livestock:</b>							
8.	Have you any idea about age at first heat?	75.0 (210)	25.0 (70)	69.3 (97)	30.7 (43)	80.7 (113)	19.3 (27)
9.	Do you know about duration of heat period?	28.9 (81)	71.1 (199)	35.0 (49)	65.0 (91)	22.9 (32)	77.1 (108)
10.	Do you know heat interval?	76.1 (213)	23.9 (67)	73.6 (103)	26.4 (37)	78.6 (110)	21.4 (30)
11.	Have you any idea about number of service is necessary per conception?	22.9 (64)	77.1 (216)	19.3 (27)	80.7 (113)	26.4 (37)	73.6 (103)
12.	Do you know gestation length?	69.3 (194)	30.7 (86)	69.3 (97)	30.7 (43)	69.3 (97)	30.7 (43)
13.	Do you know kidding interval?	28.6 (80)	71.4 (200)	30.7 (43)	69.3 (97)	26.4 (37)	73.6 (103)
14.	Have you any idea about life time number of kidding?	34.3 (96)	65.7 (184)	33.6 (47)	66.4 (93)	35.0 (49)	65.0 (91)
15.	Do you maintain the male and female ratio?	18.2 (51)	81.8 (229)	21.4 (30)	78.6 (110)	15.0 (21)	85.0 (119)
16.	Have you any idea about distocia?	18.9 (53)	81.1 (227)	12.1 (17)	87.9 (123)	25.7 (36)	74.3 (104)
17.	Have you any idea about stillbirth?	4.3 (12)	95.7 (268)	2.1 (3)	97.9 (137)	6.4 (9)	93.6 (131)
18.	Have you any idea about retention of placenta?	98.2 (275)	1.8 (5)	98.6 (138)	1.4 (2)	97.9 (137)	2.1 (3)
19.	Have you any idea about repeat breeding?	16.1 (45)	83.9 (235)	15.0 (21)	85.0 (119)	17.1 (24)	82.9 (116)
20.	Have you any idea about grading up of animal?	83.2 (233)	16.8 (47)	82.9 (116)	17.1 (24)	83.6 (117)	16.4 (23)
21.	Have you any idea about care and management before and after parturition?	78.2 (219)	21.8 (61)	91.4 (128)	8.6 (12)	65.0 (91)	35.0 (49)
22.	Have you any idea about kid/ lamb management?	91.1 (255)	8.9 (25)	90.7 (127)	9.3 (13)	91.4 (128)	8.6 (12)
23.	Do you know what the reasons for reproductive problems are?	37.1 (104)	62.9 (176)	43.6 (61)	56.4 (79)	30.7 (43)	69.3 (97)
24.	You have any capability to identify heat detection in your small ruminant livestock?	96.1 (269)	3.9 (11)	95.0 (133)	5.0 (7)	97.1 (136)	2.9 (4)
25.	Is maintenance of breeding records must for better result?	42.1 (118)	57.9 (162)	30.7 (43)	69.3 (97)	53.6 (75)	46.4 (65)
26.	Have you any idea about cross breeding?	44.6 (125)	55.4 (155)	54.3 (76)	45.7 (64)	35.0 (49)	65.0 (91)

(Figures in parentheses indicate number of SRLO)

breeding were more among the SRLO in Purulia district than that of South 24 Parganas district. But, knowledge about maintenance of breeding records for better reproductive management was high in South 24 Parganas district's SRLO than the district Purulia.

**Distribution of SRLO according to their knowledge about vaccination practices of small ruminant livestock:**

It was revealed from the table 4.6 that sixty five per cent SRLO had idea about vaccination but only 18.6 per cent SRLO vaccinated their livestock for prevention of diseases and 15.7 per cent SRLO preferred season for vaccination. From the study, it was found that SRLO of South 24 Parganas was having more knowledge about vaccination practices than that of Purulia district.

**Distribution of SRLO according to their knowledge about feeding practices of small ruminant livestock:**

Results revealed from the table 4.7 that maximum SRLO (96.4%) preferred tethering, 99.3 per cent respondents did not give concentrate; they only used green fodder and leaf of the tree for feeding. Whereas only 15.4 per cent, 46.4 per cent and 10.7 per cent SRLO had knowledge about ratio of concentrates and green fodder in different stage of life cycle, feeding of mineral mixture and time for stall feeding of small ruminant livestock, respectively. The individual findings of the two districts revealed that the concentrates and green fodder in different stage of life cycle (24.3%), knowledge about feeding of mineral mixture (50.7%) and idea about time of stall feeding (20.0%) was more found in Purulia district than the district South 24 Parganas (6.4%, 42.1% and 1.4%).

**Distribution of SRLO according to their knowledge about deworming practices of small ruminant livestock:**

It was concluded from the table 4.8 that seventy five per cent SRLO knew why deworming practice should be followed. 55.7 per cent, 31.8 per cent and 56.8 per cent SRLO had knowledge about the time for administer dewormer, schedule of deworming and idea about

**Table – 4.6: Distribution of SRLO according to their knowledge about vaccination practices of small ruminant livestock farming**

Sl.No.	Activities	Overall (n=280)		Purulia (n=140)		South 24 Pgs (n=140)	
		Yes	No	Yes	No	Yes	No
1.	Have you any idea about vaccination?	65.0 (182)	35.0 (98)	60.0 (84)	40.0 (56)	70.0 (98)	30.0 (42)
2.	Do you prefer any season for vaccination?	15.7 (44)	84.3 (236)	15.0 (21)	85.0 (119)	16.4 (23)	83.6 (117)
3.	Do you vaccinate your small ruminant livestock?	18.6 (52)	81.4 (228)	15.7 (22)	84.3 (118)	21.4 (30)	78.6 (110)

(Figures in parentheses indicate number of SRLO)

**Table – 4.7: Distribution of SRLO according to their knowledge about feeding practices of small ruminant livestock farming**

Sl. No.	Activities	Overall (n=280)		Purulia (n=140)		South 24 Pgs (n=140)	
		Yes	No	Yes	No	Yes	No
1.	Do you prefer tethering	96.4 (270)	3.6 (10)	92.9 (130)	7.1 (10)	100 (140)	0.00
2.	Do you give feed concentrate?	0.7 (2)	99.3 (278)	0.00 (0)	100 (140)	1.4 (2)	98.6 (138)
3.	Do you know the ratio of concentrates and green fodder in different stage of life cycle?	15.4 (43)	84.6 (237)	24.3 (34)	75.7 (106)	6.4 (9)	93.6 (131)
4.	Have you any knowledge about feeding of mineral mixture?	46.4 (130)	53.6 (150)	50.7 (71)	49.3 (69)	42.1 (59)	57.9 (81)
5.	Have you idea about time of stall feeding?	10.7 (30)	89.3 (250)	20.0 (28)	80.0 (112)	1.4 (2)	98.6 (138)

(Figures in parentheses indicate number of SRLO)

**Table – 4.8: Distribution of SRLO according to their knowledge about deworming practices of small ruminant livestock farming**

Sl. No.	Activities	Overall (n=280)		Purulia (n=140)		South 24 Pgs (n=140)	
		Yes	No	Yes	No	Yes	No
1.	Do you know why deworming practice should be followed?	75.0 (210)	25.0 (70)	74.3 (104)	25.7 (36)	75.7 (106)	24.3 (34)
2.	Do you know the time for administer dewormer?	55.7 (156)	44.3 (124)	65.7 (92)	34.3 (48)	45.7 (64)	54.3 (76)
3.	Have you any knowledge about the schedule of deworming?	31.8 (89)	68.2 (191)	32.9 (46)	67.1 (94)	30.7 (43)	69.3 (97)
4.	Have you any idea about control of external parasites?	56.8 (159)	43.2 (121)	48.6 (68)	51.4 (72)	65.0 (91)	35.0 (49)

(Figures in parentheses indicate number of SRLO)

control of external parasites respectively in overall study. The separate findings of the two districts were also more or less same.

Goswami (1987) reported in his study that majority of the livestock owners (41.59%) were having low level of knowledge about deworming, 76.99 per cent of livestock were having medium level of knowledge about cultivation of green fodder crops and 52.21 per cent were having high level of knowledge about feeding of green fodder. He further reported that majority of the livestock owners were having medium level of knowledge about vaccination against contagious diseases (54.87%) and feeding of concentrates (53.10%).

**Distribution of SRLO according to their attitude towards entrepreneurship and creativity of ruminant livestock practices:**

The creative person is one who will try to do new technologies before his / her co-farmers. A set of statements to measure the attitude and characteristics of the SRLO towards the different entrepreneurial indicators, namely leadership, need for achievement of goals, creative or innovative skills of marketing, motivation of progress, the need for autonomy and attitude towards risk were constructed with the help of Human (1997). The responses of these statements are given in the table 4.9. Near about seventy seven per cent (23.2% agreed and 53.9% strongly agreed) and sixty nine per cent (42.1% agreed 26.8% and strongly agreed) SRLO were agree to strongly agree for acceptability of new technique and steadfastness on decision about adopting new technology. Whereas 66.8 per cent (38.6% agreed 28.2% and strongly agreed) and 64.3 per cent (43.9% agreed and 20.4% strongly agreed) SRLO were agreeing to strongly agree for courage to face any adverse situation on farm and enthusiasm to keep on trying to overcome the problem and managerial ability of the available resources. But nearly to thirty per cent of the SRLO were undecided to need for achievement of goals. Eighty two per cent SRLO (38.9% agreed and 43.2% strongly agreed) had shown their interest to increase the profit of their farm by creating a new product or identifying of market for solving the new

product. Nearly forty per cent SRLO (27.9% agreed and 11.8 strongly agreed) had expressed their adaptability to exploit the fluctuating marketing environment like, festival season. Eighty six per cent SRLO (48.2% agreed and 37.9% strongly agreed) gave stress on quality products for getting good prices. 81.4 percent (37.1% strongly agreed and 44.3% agreed) and 53.2 percent (13.9% strongly agreed and 39.3% agreed) SRLO had shown their self dependent enthusiasm to adopt new technology and to help their fellow farmers respectively. Nearly fifty six per cent SRLO (28.9% agreed and 26.8% strongly agreed) relied on their experience and used to take autonomous decision without consulting other farmers.

Eighty nine per cent SRLO (55.4% agreed and 33.9% strongly agreed) adopted a new technique in their farm, whereas sixty three (50.4% agreed and 12.9% strongly agreed) had shown their willingness to increase heard size for making a more profit than to be content with a smaller but less risky profit. Nearly forty five per cent (38.2% agreed and 6.4% strongly agreed) had shown their interest to grab higher marketing demand by producing more products. 42.5 per cent (13.9% agreed and 28.6% strongly agreed) SRLO were ready to take financial help through bank loan to commence small ruminant livestock business. But seventy one per cent SRLO (6.8% disagree and 64.3% strongly disagree) were least interested for making insurance coverage of their livestock for getting compensation in any disaster. The table also showed the attitude towards entrepreneurship and creativity of the SRLO in two districts of West Bengal separately.

The table 4.9 revealed the attitude towards entrepreneurship and creativity of ruminant livestock practices of SRLO in Purulia district about 61.5 per cent (28.6% agreed and 52.9% strongly agreed) and fifty seven per cent (33.6% agreed and 23.6% strongly agreed) SRLO were agree to strongly agree for acceptability of new technique and steadfastness on decision about adopting new technology. Whereas 70.7 per cent (45.0% agreed and 25.7% strongly agreed) and

61.4 per cent (44.3% agreed and 17.1% strongly agreed) SRLO were agree to strongly agree for courage to face any adverse situation on farm and enthusiasm to keep on trying to overcome the problem and managerial ability of the available resources. Seventy eight per cent SRLO (35.0% agreed and 42.9% strongly agreed) had shown their interest to increase the profit of their farm by creating a new product or identifying of market for soling the new product. Nearly forty per cent SRLO (31.4% agreed and 8.6 strongly agreed) had expressed their adaptability to exploit the fluctuating marketing environment like, festival season. Ninety percent SRLO (45.0% agreed and 45.0% strongly agreed) gave stress on quality products for getting good prices. 78.5 percent (42.1% agreed and 36.4% strongly agreed) and 51.5 percent (42.2% agreed and 9.3% strongly agreed) SRLO had shown their self dependent enthusiasm to adopt new technology and to help their fellow farmers respectively. Nearly sixty three per cent SRLO (32.9% agreed and 30.0% strongly agreed) relied on their experience and used to take autonomous decision without consulting other farmers.

Eighty six per cent SRLO (46.4% agreed and 39.3% strongly agreed) adopted a new technique in their farm, whereas 58.6 per cent (45.0% agreed and 13.6% strongly agreed) had shown their willingness to increase herd size for making a more profit than to be content with a smaller but less risky profit. Fifty per cent (44.3% agreed and 5.7% strongly agreed) had shown their interest to grab higher marketing demand by producing more products. Only 48.5 per cent (11.4% agreed and 37.1% strongly agreed) SRLO were ready to take financial help through bank loan to commence small ruminant livestock business. But Sixty eight per cent SRLO (67.1% disagree and 0.7% strongly disagree) were least interested for making insurance coverage of their livestock for getting compensation in any disaster.

The table 4.9 found the attitude towards entrepreneurship and creativity of ruminant livestock practices of SRLO in South 24

Parganas district near about seventy three per cent (17.9% agreed and 55.0% strongly agreed) and 80.7 per cent (50.7% agreed and 30.0% strongly agreed) SRLO were agree to strongly agree for acceptability of new technique and steadfastness on decision about adopting new technology. Whereas 62.8 per cent (32.1% agreed and 30.7% strongly agreed) and 66.2 per cent (43.6% agreed and 23.6% strongly agreed) SRLO were agree to strongly agree for courage to face any adverse situation on farm and enthusiasm to keep on trying to overcome the problem and managerial ability of the available resources. Only 86.5 per cent SRLO (42.9% agreed and 43.6% strongly agreed) had shown their interest to increase the profit of their farm by creating a new product or identifying of market for soling the new product. Nearly thirty nine per cent SRLO (24.3% agreed and 15.0 strongly agreed) had expressed their adaptability to exploit the fluctuating marketing environment like, festival season. Eighty two per cent SRLO (51.4% agreed and 30.7% strongly agreed) gave stress on quality products for getting good prices. Only 84.3 percent (46.4% agreed and 37.9% strongly agreed) and 54.3 percent (35.7% agreed and 18.6% strongly agreed) SRLO had shown their self dependent enthusiasm to adopt new technology and to help their fellow farmers respectively. Whereas 48.6 per cent SRLO (25.0% agreed and 23.6% strongly agreed) relied on their experience and used to take autonomous decision without consulting other farmers.

Nearly ninety three per cent SRLO (64.3% agreed and 28.6% strongly agreed) adopted a new technique in their farm, whercas 67.8 per cent (55.7% agreed and 12.1% strongly agreed) had shown their willing ness to increase heard size for making a more profit than to be content with a smaller but less risky profit. Nearly thirty nine per cent (32.1% agreed and 7.1% strongly agreed) had shown their interest to grab higher marketing demand by producing more products. Only 36.4 per cent (16.4% agreed and 20.0% strongly agreed) SRLO were ready to take financial help through bank loan to commence small ruminant livestock business. But Sixty four one per cent SRLO (61.4%

**Table – 4.9: Distribution of SRLO according to their attitude towards entrepreneurship and creativity of small ruminant livestock farming:**

Activities	Overall (n=280)					Purulia (n=140)					South 24 Parganas (n=140)				
	SD	D	UD	A	SA	SD	D	UD	A	SA	SD	D	UD	A	SA
<b>a).Leadership:</b>															
• Acceptability of a new technique (like-deworming, vaccination, sharing technique etc.),Or willingness adopted the new technique.	0.0	12.5 (35)	10.4 (29)	23.2 (65)	53.9 (151)	0.0	0.0	18.6 (26)	28.6 (40)	52.9 (74)	0.0	25.0 (35)	2.1(3)	17.9 (25)	55.0 (77)
• Steadfastness on your decision about adopting new technology	0.0	0.7 (2)	30.4 (85)	42.1 (118)	26.8 (75)	0.0	0.0	42.9 (60)	33.6 (47)	23.6 (33)	0.0	1.4 (2)	17.9 (25)	50.7 (71)	30.0 (42)
<b>b).Need for achievement of goals:</b>															
• Courage to face any adverse situation on your farm and enthusiasm to keep on trying to overcome the problem.	0.0	4.3 (12)	28.9 (81)	38.6 (108)	28.2 (79)	0.0	0.7 (1)	28.6 (40)	45.0 (63)	25.7 (36)	0.0	7.9 (11)	29.3 (41)	32.1 (45)	30.7 (43)
• Managerial ability of the available resources (like man power, money, land and management) to achieve the goals set for the farmers.	1.1 (3)	4.6 (13)	30.0 (84)	43.9 (123)	20.4 (57)	2.1 (3)	5.0 (7)	31.4 (44)	44.3 (62)	17.1 (24)	0.0	4.3 (6)	28.6 (40)	43.6 (61)	23.6 (33)
<b>c).Creative or Innovative skills of marketing:</b>															
• You are always eyeing for opportunities to increase the profit of your farm. (The creation of new products and identifying of market for selling the new product. Like, sale of wool or skin or other by product).	0.0	2.8 (8)	15.0 (42)	38.9 (109)	43.2 (121)	0.0	2.8 (4)	19.3 (27)	35.0 (49)	42.9 (60)	0.0	2.8 (4)	10.7 (15)	42.9 (60)	43.6 (61)
• Your adaptability to change the marketing environment. (If the price of chicken decline and the price of moulton /chevon increases are you able to change your farming practices to exploit higher demand (Ex: during festival season).	0.4 (1)	11.1 (31)	48.9 (137)	27.9 (78)	11.8 (33)	0.7 (1)	3.6 (5)	55.7 (78)	31.4 (44)	8.6 (12)	0.0	18.6 (26)	42.1 (59)	24.3 (34)	15.0 (21)
• Making of quality products for getting good price	0.0	1.1 (3)	12.9 (36)	48.2 (135)	37.9 (106)	0.0	0.7 (1)	9.3 (13)	45.0 (63)	45.0 (63)	0.0	1.4 (2)	16.4 (23)	51.4 (72)	30.7 (43)

d). Motivation of progress:															
• You are self dependent and have the confidence to adopt new technology.	0.0	1.1 (3)	17.5 (49)	44.3 (124)	37.1 (104)	0.0	1.4 (2)	20.0 (28)	42.1 (59)	36.4 (51)	0.0	0.7 (1)	15.0 (21)	46.4 (65)	37.9 (53)
• You have helping attitude to your fellow farmers.	0.0	5.4 (15)	41.4 (116)	39.3 (110)	13.9 (39)	0.0	5.0 (7)	42.9 (60)	42.9 (60)	9.3 (13)	0.0	5.7 (8)	40.0 (56)	35.7 (50)	18.6 (26)
e). Need for autonomy:															
• You are experienced farmers and you have trust on your own knowledge to make a important decision without consulting other peoples opinions.	1.4 (4)	10.4 (29)	32.5 (91)	28.9 (81)	26.8 (75)	2.9 (4)	4.3 (6)	30.0 (42)	32.9 (46)	30.0 (42)	0.0	16.4 (23)	35 (49)	25.0 (35)	23.6 (33)
f). Attitude towards risk:															
• Adoption of new technique in farming by a farmer	0.0	0.0	10.7 (30)	55.4 (155)	33.9 (95)	0.0	0.0	14.3 (20)	46.4 (65)	39.3 (55)	0.0	0.0	7.1 (10)	64.3 (90)	28.6 (40)
• Willingness to increase herd size for making a more profit than to be content with a smaller but less risky profit.	0.0	2.1 (6)	34.6 (97)	50.4 (141)	12.9 (36)	0.0	2.9 (4)	38.6 (54)	45.0 (63)	13.6 (19)	0.0	1.4 (2)	30.7 (43)	55.7 (78)	12.1 (17)
• Courage to produce more products when market demand is high. Or your preparedness to take a chance on higher marketing demand by producing more products.	0.7 (2)	3.9 (11)	50.7 (142)	38.2 (107)	6.4 (18)	1.4 (2)	1.4 (2)	47.1 (66)	44.3 (62)	5.7 (8)	0.0	6.4 (9)	54.3 (76)	32.1 (45)	7.1 (10)
• Your interest on making insurance of your livestock forgetting compensation in any disaster.	64.3 (180)	6.8 (19)	27.1 (76)	1.8 (5)	0.0	67.1 (94)	0.7 (1)	32.1 (45)	0.0	0.0	61.4 (86)	12.9 (18)	22.2 (31)	3.5 (5)	0.0
• You want to start your livestock business on financial help through bank loan.	11.8 (33)	2.5 (7)	43.3 (121)	13.9 (39)	28.6 (80)	17.9 (25)	0.0	33.6 (47)	11.4 (16)	37.1 (52)	5.7 (8)	5.0 (7)	52.9 (74)	16.4 (23)	20.0 (28)

(Figures in parentheses indicate number of SRLQ), Note: SD= strongly disagree (0), D= disagree (1), UD= undecided (2), A= Agree (3), SA= strongly agree (4).

disagree and 12.9% strongly disagree) were least interested for making insurance coverage of their livestock for getting compensation in any disaster.

**Distribution of SRLO according to their attitude towards small ruminant livestock practices:**

A cursory look from the table 4.10 showed that 92.5 per cent SRLO preferred natural breeding over A.I. in small ruminant farming whereas 58.9 per cent and 55.4 per cent SRLO did not know whether to adopt artificial insemination (A.I.) and cross breeding practices respectively, which might be due to lack of their knowledge about A.I. of small ruminant livestock. 72.8% SRLO believed that through scientific feeding growth rate can be increased. Only 26.8 per cent SRLO believed that there was need to vaccinate against PPR, Goat pox in small ruminant where as 52.1 per cent SRLO were undecided about vaccination. 67.2 per cent thought that external parasitic infection was one of the major problems in small ruminant farming and 66.4 per cent SRLO showed their attitude towards deworming practice. Nearly 91.8 per cent SRLO assumed that castration of small ruminant livestock was one of the most important practices. All of the SRLO opposed the fact that small ruminant did not necessarily need green fodder. Where as 26.4 per cent, 31.4 per cent and 19.6 per cent SRLO did not know whether to adopt scientific feeding through which growth can be increased, deworming practice in small ruminant farming is a good practice and external parasitic infection is one of the most important problems in small ruminant farming.

The table 4.10 revealed that, in Purulia district 87.2 per cent SRLO preferred natural breeding over A.I. in small ruminant farming whereas 60.7 per cent and 45.7 per cent SRLO did not know whether to adopt artificial insemination (A.I.) and cross breeding practices respectively, which might be due to lack of their knowledge about A.I. of small ruminant livestock. Nearly 75.7 per cent SRLO believed that through scientific feeding growth rate can be increased. Only 15.7 per cent SRLO believed that there was need to vaccinate against PPR,

Table – 4.10: Distribution of SRLO according to their attitude towards small ruminant livestock farming:

Activities	Overall (n=280)			Purulia (n=140)			South 24 Parganas (n=140)		
	D	UD	A	D	UD	A	D	UD	A
• In small ruminant farming natural breeding is a usual practice.	0.0	7.5 (21)	92.5 (259)	0.0	12.9 (18)	87.2 (122)	0.0	2.1 (3)	97.8 (137)
• In small ruminant farming Artificial Insemination is a good practice.	41.1 (125)	58.9 (165)	0.0	39.2 (55)	60.7 (85)	0.0	42.9 (60)	57.1 (80)	0.0
• Through scientific feeding growth can be increased.	0.7 (2)	26.4 (74)	72.8 (204)	0.0	24.3 (34)	75.7 (106)	1.4 (2)	28.6 (40)	70.0 (98)
• Vaccination against PPR, Goat Pox in small ruminant is not regularly needed.	21.0 (59)	52.1 (146)	26.8 (75)	29.3 (41)	55.0 (77)	15.7 (22)	12.9 (18)	49.3 (69)	37.8 (53)
• In small ruminant farming crossbreeding is a good practice.	36.1 (101)	55.4 (155)	8.6 (24)	48.3 (68)	45.7 (64)	5.7 (8)	23.5 (33)	65.0 (91)	11.4 (16)
• Deworming practice in small ruminant farming is a good practice.	2.1 (6)	31.4 (88)	66.4 (186)	4.3 (6)	25.7 (36)	70.0 (98)	0.0	37.1 (52)	62.9 (88)
• Small ruminant do not need green fodder.	100 (280)	0.0	0.0	100 (140)	0.0	0.0	100 (140)	0.0	0.0
• Castration is one of the most important practices in small ruminant farming.	0.7 (2)	7.5 (21)	91.8 (257)	1.4 (2)	12.1 (17)	86.4 (121)	0.0	2.9 (4)	97.1 (136)
• External parasitic infection is one of the most important problems in small ruminant farming.	13.2 (37)	19.6 (55)	67.2 (190)	8.5 (12)	24.3 (34)	67.2 (94)	17.8 (25)	15.0 (21)	67.1 (94)

(Figures in parentheses indicate number of SRLO), Note: D= disagree (1), UD= undecided (2), A=Agree (3),

where as 55 per cent SRLO were undecided about need of vaccination practices. Goat pox in small ruminant where fifty five per cent respondents were undecided about vaccination. 67.2 per cent thought that external parasitic infection was one of the major problems in small ruminant farming and seventy per cent SRLO showed their attitude towards deworming practice. Nearly 86.4 cent SRLO assumed that castration of small ruminant livestock was one of the most important practices. All of the SRLO (100% strongly disagreed) opposed the fact that small ruminant did not necessarily need green fodder.

The table 4.10 further revealed that, in South 24 Parganas district nearly 97.8 per cent SRLO preferred natural breeding over A.I. in small ruminant farming whereas 57.1 per cent and 65.0 per cent SRLO did not know whether to adopt artificial insemination (A.I.) and cross breeding practices respectively, which might be due to lack of their knowledge about A.I. of small ruminant livestock. Nearly seventy per cent believed that through scientific feeding growth rate can be increased. Only 37.8 per cent SRLO believed that there was need to vaccinate against PPR, Goat pox in small ruminant where as 49.3 per cent respondents were undecided about vaccination. Sixty seven per cent thought that external parasitic infection was one of the major problems in small ruminant farming and 62.9 per cent SRLO showed their attitude towards deworming practice. Nearly ninety seven per cent SRLO assumed that castration of small ruminant livestock was one of the most important practices. All of the SRLO opposed the fact that small ruminant did not necessarily need green fodder. Gupta (1976) observed that a favorable attitude towards Animal Husbandry farming leads to higher adoption.

**Distribution of SRLO according to their planning skills of small ruminant livestock practices:**

The table 4.11 described the responses of 280 SRLO about different planning skills of overall study. About ninety eight per cent (11.4% important and 86.8% very important) SRLO assumed that

training of Animal Husbandry was very important before investment of money in farm. About half of the SRLO (49.3%) expressed that training of financial management was less important before starting farming, whereas thirty one per cent (29.3% important and 2.1 % very important) agreed that the financial management training was essential for better management of farm. Nearly twenty six per cent (24.3% important and 1.4% very important) SRLO implied that low production cost would be a good practice for making more profit. Near eighty three per cent (55.0% less important and 28.2% no important) SRLO did not harbor the idea about earning of substantial profit through out the year, where as only 16.8 per cent SRLO implied that substantial profit was essential for their growth. Forty six per cent (38.2% important and 7.9% very important) SRLO embraced the idea of co-operative marketing where as 26.8 per cent SRLO showed less interest. About 70.7 per cent SRLO bore the idea that sole land right was not important factor for small ruminant farming. Most of the SRLO (77.9%) did not have any pre-plan to extend their herd size in future, whereas only 22.2 per cent (16.8% having only some idea about planning and 5.4 have some plan) started small ruminant farming with some idea or plan to extend herd size in future.

The table 4.11 described the responses of 140 SRLO about different planning skills in Purulia district. About ninety nine per cent (14.3% important and 85.0% very important) SRLO assumed that training of Animal Husbandry was very important before investment of money in farm. About 40.7 per cent SRLO (49.3%) expressed that training of financial management was less important before starting farming, whereas thirty five per cent (33.6% important and 1.4 % very important) agreed that the financial management training was essential for better management of farm. Only 36.5 per cent (33.6% important and 2.9% very important) SRLO implied that low production cost would be a good practice for making more profit. Whereas 73.6 per cent (39.3% less important and 34.3% no important) SRLO did not harbor the idea about earning of substantial profit through out the

year, where as only 26.4 per cent SRLO implied that substantial profit was essential for their growth. Sixty four per cent (52.9% important and 11.4% very important) SRLO embraced the idea of co-operative marketing where as 21.4 per cent SRLO showed less interest. About 72.1 per cent SRLO bore the idea that sole land right was not important factor for small ruminant farming. Most of the SRLO (78.6%) did not have any pre-plan to extend their herd size in future, whereas only 21.5 per cent (12.9% having only some idea about planning and 8.6 have some plan) started small ruminant farming with some idea or plan to extend herd size in future.

The table 4.11 further described the responses of 140 SRLO about different planning skills in South 24 Parganas district. About ninety seven per cent (8.6% important and 88.6% very important) SRLO assumed that training of Animal Husbandry was very important before investment of money in farm. About 57.9 per cent SRLO expressed that training of financial management was less important before starting farming, whereas thirty eight per cent (25.0% important and 2.9 % very important) agreed that the financial management training was essential for better management of farm. Only 15 per cent SRLO implied that low production cost would be a good practice for making more profit. Whereas 92.8 per cent (70.7% less important and 22.1% no important) SRLO did not harbor the idea about earning of substantial profit through out the year, where as only 7.1 per cent SRLO implied that substantial profit was essential for their growth. Twenty eight per cent (23.6% important and 4.3% very important) SRLO embraced the idea of co-operative marketing where as 32.1 per cent SRLO showed less interest. About 69.3 per cent SRLO bore the idea that sole land right was not important factor for small ruminant farming. Most of the SRLO (77.1%) did not have any pre-plan to extend their herd size in future, whereas only 22.8 per cent (20.7% having only some idea about planning and 2.1 have some plan) started small ruminant farming with some idea or plan to extend herd size in future.

**Table – 4.11 Distribution of SRL0 according to their planning skills of small ruminant livestock farming:**

Activities	Overall (n=280)			Purulia (n=140)			South 24 Parganas (n=140)		
	NI	LI	VI	NI	LI	VI	NI	LI	VI
i) Must get financial management training before you start farming.	19.3 (54)	29.3 (82)	2.1 (6)	24.3 (34)	40.7 (57)	1.4 (2)	14.3 (20)	57.9 (81)	25.0 (35)
ii) Must get farming/ animal husbandry training before invest money in your farm.	0.0 (5)	11.4 (32)	86.8 (243)	0.0 (1)	0.7 (1)	85.0 (119)	0.0 (4)	2.9 (4)	8.6 (12)
iii) Keep production cost low.	18.8 (52)	24.3 (68)	1.4 (4)	25.0 (35)	38.6 (54)	2.9 (4)	12.1 (17)	72.9 (102)	15.0 (21)
iv) Your farm must earn substantial profit for growth	28.2 (79)	16.8 (47)	0.0 (1)	34.3 (48)	39.3 (55)	0.0 (1)	22.1 (31)	70.7 (99)	7.1 (10)
v) To have sole land rights.	70.7 (198)	11.1 (31)	0.7 (2)	72.1 (101)	17.1 (24)	0.7 (1)	69.3 (97)	17.9 (25)	12.1 (17)
vi) Co-operative marketing	27.1 (76)	38.2 (107)	7.9 (22)	14.3 (20)	21.4 (30)	11.4 (16)	40.0 (56)	32.1 (45)	23.6 (33)
	No plans (218)	Only some idea (47)	Some plans (15)	No plans (110)	Only some idea (18)	Some plans (12)	No plans (108)	Only some idea (29)	Some plans (3)
If you want to extend your herd/farm size than what type of plan you think for future?	77.9 (218)	16.8 (47)	5.4 (15)	78.6 (110)	12.9 (18)	8.6 (12)	77.1 (108)	20.7 (29)	2.1 (3)

(Figures in parentheses indicate number of SRL0). Note: NI= No important (0), LI= Less important (1), I=Important (2), VI= Very important (3).

**Distribution of SRLO according to their decision making activities of small ruminant livestock practices:**

Decision making is also an integral part of planning. The table 4.12 revealed that the decisions regarding care of pregnant animal (52.1%), care about kid/lamb (53.9%), colostrum feeding (52.9%), feeding /grazing (51.4%) were taken by female members only. Women alone and jointly with husband took decision for the rest of the activities. 87.5 per cent and 84.4 per cent and 44.3 per cent SRLO did not give any decision about weaning activity, vaccination about small ruminant livestock and deworming activities, respectively. Where as 40.7 per cent, 41.4 per cent, 40.4 per cent and 46.1 per cent SRLO were taken jointly by husband and wife for care about new born kid/ lamb, colostrum feeding, choose of marketing place and time for marketing, respectively. The table also showed that castration (37.1%), deworming (24.6%), choice of marketing place (27.1%), time for marketing (22.1%) and fixed rate for sale (45.7%) were mainly decided by the male member of the family. Only 37.5 per cent female were taking decision regarding reproduction activity. In decision making activity children had no importance at all about small ruminant livestock farming. The table also showed the decision making activity of two different district's SRLO covered under study. The district wise views are as follows:

In Purulia district 50.7 per cent, 51.4 per cent, 50.7 per cent, 44.3 per cent, 48.6 per cent and 30.7 per cent SRLO took decision by female for care of pregnant animal, care about kid/ lamb, colostrum feeding, grazing/ browsing, reproduction/ breeding activities and fix rate during marketing of their products, respectively. The decision regarding castration (38.6%), choice of marketing place (35.7%), time for marketing (36.4%) and fixed rate for marketing (52.1%) were mainly decided by the male member of the family. Where as 39.3 per cent, 38.6 per cent, 37.1 per cent, 38.6 per cent, and 37.9 per cent SSRLO took decision by husband and wife jointly for care of pregnant animal, colostrum feeding, choose of marketing place, care about kid

Table -4.12. Distribution of SRLQ according to their decision making activities of small ruminant livestock farming:

Sl.No.	Activities	Overall (n=280)						Purulia (n=140)						South 24 Parganas (n=140)					
		M	F	C	H+W	F+C	NS	M	F	C	H+W	F+C	NS	M	F	C	H+W	F+C	NS
1.	Care of pregnant animal	5.4 (15)	52.1 (146)	0.0	42.5 (119)	0.0	0.0	10.0 (14)	50.7 (71)	0.0	39.3 (55)	0.0	0.0	0.7 (1)	53.6 (75)	0.0	45.7 (64)	0.0	0.0
2.	Care about kid lamb	5.4 (15)	53.9 (151)	0.0	40.7 (114)	0.0	0.0	10.0 (14)	51.4 (72)	0.0	38.6 (54)	0.0	0.0	0.7 (1)	56.4 (79)	0.0	42.9 (60)	0.0	0.0
3.	Colostrum feeding	5.7 (16)	52.9 (148)	0.0	41.4 (116)	0.0	0.0	10.7 (15)	50.7 (71)	0.0	38.6 (54)	0.0	0.0	0.7 (1)	55.0 (77)	0.0	44.3 (62)	0.0	0.0
4.	Weaning	7.1 (20)	5.4 (15)	0.0	0.0	0.0	87.5 (245)	1.4 (2)	1.4 (2)	0.0	0.0	0.0	97.1 (136)	12.9 (18)	9.3 (13)	0.0	0.0	0.0	77.9 (109)
5.	Castration	37.1 (104)	26.1 (73)	0.0	26.4 (74)	0.0	10.4 (29)	38.6 (54)	25.0 (35)	0.0	21.4 (30)	0.0	15.0 (21)	35.7 (50)	27.1 (38)	0.0	31.4 (44)	0.0	5.7 (8)
6.	Deworming	24.6 (69)	16.8 (47)	0.0	14.3 (40)	0.0	44.3 (124)	28.6 (40)	20.7 (29)	0.0	15.7 (22)	0.0	35.0 (49)	20.7 (29)	12.9 (18)	0.0	12.9 (18)	0.0	53.6 (75)
7.	Vaccination	12.5 (35)	5.0 (14)	0.0	2.1 (6)	0.0	80.4 (225)	10.0 (14)	2.9 (4)	0.0	3.6 (5)	0.0	83.6 (117)	15.0 (21)	7.1 (10)	0.0	0.7 (1)	0.0	77.1 (108)
8.	Feeding/ Grazing	7.5 (21)	51.4 (144)	0.0	35.3 (99)	5.7 (16)	0.0	15.0 (21)	44.3 (62)	0	29.3 (42)	11.4 (16)	0.0	0.0	58.6 (82)	0.0	41.4 (58)	0.0	0.0
9.	Reproduction/ Breeding	22.9 (64)	37.5 (105)	0.0	22.5 (63)	0.0	17.1 (48)	30.0 (42)	48.6 (68)	0.0	21.4 (30)	0.0	0.0	15.7 (22)	26.4 (37)	0.0	23.6 (33)	0.0	34.5 (48)
10.	Choose of marketing place	27.1 (76)	32.5 (91)	0.0	40.4 (113)	0.0	0.0	35.7 (50)	27.1 (38)	0.0	37.1 (52)	0.0	0.0	18.6 (26)	37.9 (53)	0.0	43.6 (61)	0.0	0.0
11.	Time for marketing	22.1 (62)	31.8 (89)	0.0	46.1 (129)	0.0	0.0	36.4 (51)	25.7 (36)	0.0	37.9 (53)	0.0	0.0	7.9 (11)	37.9 (53)	0.0	54.3 (76)	0.0	0.0
12.	Fix rate for sale	45.7 (128)	30.0 (84)	0.0	24.3 (68)	0.0	0.0	52.1 (73)	30.7 (43)	0.0	17.1 (24)	0.0	0.0	39.3 (55)	29.3 (41)	0.0	31.4 (44)	0.0	0.0

(Figures in parentheses indicate number of SRLQ). Key: (1) M= Independent decision by male only, (2) F= Independent decision by female only, (3) C= Independent decision by children only, (4) H+W= Joint decision by husband and wife, (5) F+C= Joint decision by female and children only, (6) NS=Non response.

lamb, and time for marketing, respectively. Only 97.1 per cent and 83.6 per cent SRLO did not take decision about weaning and vaccination activity.

In South 24 Parganas district 53.6 per cent, 56.4 per cent, 55.0 per cent, 58.6 per cent, 26.4 per cent, 37.9 per cent and 37.9 per cent SRLO took decision by female for care of pregnant animal, care about kid/ lamb, colostrum feeding, grazing/ browsing, reproduction/ breeding activities, choose of marketing place and time for marketing of their products, respectively. The decision regarding castration (35.7%), choice of marketing place (18.6%), and fixed rate for marketing (39.3%) were mainly decided by the male member of the family. Where as 45.7 per cent, 42.9 per cent, 44.3 per cent, 41.4 per cent, 43.6 per cent, 54.3 per cent and 31.4 per cent SSRLO were taken decision by husband and wife jointly for care of pregnant animal, care about kid/ lamb, colostrum feeding, grazing/ browsing, choose of marketing place, time for marketing and fixed rate for sale, respectively. Only 77.9 per cent, 53.6 per cent, 77.1 per cent and 34.5 per cent SRLO did not take decision about weaning, deworming, vaccination and reproduction or breeding activity. The decision making pattern in animal husbandry previously studied by Cravon (1963), Jhansi Rani (1981), Dubey *et al.* (1982), Verma (1984), Secma (1986), Agarwal (1987), Ghosh (1987), Rangnckar *et al.* (1990), Singh *et al.* (1990), Adhiguru *et al.* (1999).

**Distribution of SRLO according to their work distribution pattern of small ruminant livestock:**

The data presented in table 4.13 revealed that majority of the activities were regularly carried out by the female members viz., providing feed (53.2%), breeding activities (38.2%), care of lamb/kid management (69%) and housing management of small ruminant livestock (59.3%). Only (37.1%) and (47.9%) male members were involved in medication and marketing related activities respectively. It was also found that children had no role at all in the works related with small ruminant. It was further observed that in all the activities

they performed jointly by husband and wife like feeding (28.2%), breeding (19.3%), lamb management (29.3%), housing (22.5%), medication (26.4%) and marketing (34.3%).

In Purulia district majority of activities were regularly carried out by the female members viz. provided feed (53.6%), breeding activities (41.4%), care of lamb/kid management (62.9%) and housing (57.9%). Only (48.6%), and (50.0%) male members were involved in medication and marketing respectively. It was further observed that in all the activities they performed jointly by husband and wife like feeding (31.4%), lamb management (32.9%) and marketing activities (42.1%).

In South 24 Parganas district majority of activities were regularly carried out by the female members viz. provided feed (52.8%), breeding activities (35.0%), care of lamb/kid management (74.3%) and housing (60.7%). Only (25.7%), and (45.7%) male members were involved in medication and marketing respectively. It was further observed that in all the activities they performed jointly by husband and wife like feeding (25.0%), lamb management (25.7%), marketing activities (31.4%) and marketing activities (26.4%). The work distribution pattern in animal husbandry was previously studied by Ghosh and Mukhopadhyaya (1986), Adhikari (1987), Namratha (1994), Agbede *et al.* (1995), Veerana *et al.* (1998), Raj *et al.* (1999) and Saha *et al.* (2005).

**Distribution of SRLO according to their record keeping activities of small ruminant livestock farming:**

The results in table 4.14 indicated that only 30.4 per cent SRLO thought that keeping records were very important for better management of farm. In reality only twenty three per cent SRLO regularly used to keep the record. From the study it was found that more number of SRLO (25%) in South 24 Parganas used to keep records than that of Purulia district's SRLO (20.7%).

Table -4.13: Distribution of SRL0 according to their work distribution pattern of small ruminant livestock farming:

Sl.No.	Activities	Overall (n=280)						Purulia (n=140)						South 24 Parganas (n=140)					
		NS	M	F	C	H+W	Coll.	NS	M	F	C	H+W	Coll.	NS	M	F	C	H+W	Coll.
1.	Feeding	0.0	0.0	53.2 (149)	0.0	28.2 (79)	18.6 (52)	0.0	0.0	53.6 (75)	0.0	31.4 (44)	15.0 (21)	0.0	0.0	52.8 (74)	0.0	25.0 (35)	22.1 (31)
2.	Breeding	26.8 (75)	15.7 (44)	38.2 (107)	0.0	19.3 (54)	0.0	22.1 (31)	15.7 (22)	41.4 (58)	0.0	20.7 (29)	0.0	31.4 (44)	15.7 (22)	35.0 (49)	0.0	17.9 (25)	0.0
3.	Kid/ lamb management	1.1 (3)	0.7 (2)	69.0 (193)	0.0	29.3 (82)	0.0	2.1 (3)	1.4 (2)	62.9 (88)	0.0	32.9 (46)	0.7 (1)	0.0	0.0	74.3 (104)	0.0	25.7 (36)	0.0
4.	Housing	0.0	0.7 (2)	59.3 (166)	0.0	22.5 (63)	17.5 (49)	0.0	1.4 (2)	57.9 (81)	0.0	19.3 (27)	21.4 (30)	0.0	0.0	60.7 (85)	0.0	25.7 (36)	13.6 (19)
5.	Medication	0.0	37.1 (104)	14.3 (40)	0.0	26.4 (74)	22.1 (62)	0.0	48.6 (68)	14.3 (20)	0.7 (1)	21.4 (30)	15.0 (21)	0.0	25.7 (36)	13.6 (19)	0.0	31.4 (44)	29.3 (41)
6.	Marketing	0.0	47.9 (134)	13.9 (39)	0.0	34.3 (96)	3.9 (11)	0.0	50.0 (70)	7.9 (11)	0.0	42.1 (59)	0.0	0.0	45.7 (64)	20.0 (28)	0.0	26.4 (37)	7.9 (11)

(Figures in parentheses indicate number of SRL0), Key: NS= Not response - (0), M= Worked by male - (1), F= Worked by female - (2), C= Worked by children - (3), H+W= jointly worked by husband & wife - (4), Coll. = collectively worked by all family members - (5).

Table -4.14: Distribution of SRL0 according to their record keeping activities of small ruminant livestock farming:

Sl.N.	Activities	Overall (n=280)		Purulia (n=140)		South 24 Parganas(n=140)	
		Yes	No	Yes	No	Yes	No
1.	Do you think that maintenance or keeping records is very important?	30.4 (85)	69.6 (195)	32.9 (46)	67.1 (94)	27.9 (39)	72.1 (101)
2.	Do you keep any farming records?	22.9 (64)	77.1 (216)	20.7 (29)	79.3 (111)	25.0 (35)	75.0 (105)

(Figures in parentheses indicate number of SRL0), \*Financial and Breeding record.

**Distribution of SRLO according to their marketing pattern:**

As reported in table 4.15 all respondents told that they generally used to depend on available market for selling their products. When (31.4%) SRLO depended on local market; eighty five per cent SRLO used to sell their products through middle man. None of the respondents used open market in town and did not prefer value adding direct marketing. From the above survey, influence of middle man was found more in South 24 Parganas (97.1%) district than that of Purulia (71.4%) district. In Purulia district's SRLO 49.3 per cent sold their product directly in local market whereas South 24 Parganas district 13.6 per cent SRLO were sold their product directly in local market. Because, the SRLO said that in Purulia district animal market or animal hut were more popular in the state.

**Distribution of SRLO according to their adoption of improved practices in small ruminant livestock farming:**

The table 4.16 showed that (55.7%), (61.8%), (18.6%), (22.9%) and (18.6%) SRLO adopted different scientific practices like, deworming, castration by burdizo castrator, vaccination, record keeping and selective breeding respectively. All the respondents adopted the practice of colostrum feeding to new born and medicinal treatment in need in both the districts as well as in overall case. While more number of SRLO in Purulia district adopted deworming practices (65.7%) and selective breeding practices (20%) but they were well behind in the South 24 Parganas in adopting castration by burdizo castrator (70%), vaccination (21.4%), and record keeping (25%) (Fig.14&15). Nell (1998) observed in his studies that the small ruminant farmers in Qwaqwa were aware of the importance of medication technologies but they were not correct in the usage of medicine.

**Table -4.15: Distribution of SRLO according to their marketing pattern of small ruminant livestock farming:**

Sl. No.	Marketing Place	Overall (n=280)		Purulia (n=140)		South 24 Parganas (n=140)	
		Yes	No	Yes	No	Yes	No
1.	Market available?	100 (280)	0.0	100 (140)	0.0	100 (140)	0.0
2.	Local market	31.4 (88)	68.6 (192)	49.3 (69)	50.7 (71)	13.6 (19)	86.4 (121)
3.	Open marketing town	0.0	100 (280)	0.0	100 (140)	0.0	100 (140)
4.	Middle man	85.0 (238)	15.0 (42)	71.4 (100)	28.6 (38)	97.1 (138)	2.8 (4)
5.	Value adding direct marketing	0.0	100 (280)	0.0	100 (280)	0.0	100 (280)

(Figures in parentheses indicate number of SRLO)

**Table -4.16: Distribution of SRLO according to their adoption of selected practices in small ruminant livestock farming:**

Sl. No.	Name of Practices	Overall (n=280)		Purulia (n=140)		South 24 Parganas (n=140)	
		Adopted	Not adopt	Adopted	Not adopt	Adopted	Not adopt
i	Deworming	55.7 (156)	44.3 (124)	65.7 (92)	34.3 (48)	45.7 (64)	54.3 (76)
ii	Castration by Burdizzo Castrator	61.8 (173)	38.2 (107)	53.6 (75)	46.4 (65)	70.0 (98)	30.0 (42)
iii	Vaccination	18.6 (52)	81.4 (228)	15.7 (22)	84.3 (118)	21.4 (30)	78.6 (110)
iv	Feeding of Colostrum	100 (280)	0.0	100 (140)	0.0	100 (140)	0.0
v	Selective Breeding	18.6 (52)	81.4 (228)	20.0 (28)	80.0 (112)	17.1 (24)	82.9 (116)
vi	Record keeping	22.9 (64)	78.1 (216)	20.7 (29)	79.3 (111)	25.0 (35)	75.0 (105)
vii	Treatment with medicine	100 (280)	0.0	100 (140)	0.0	100 (140)	0.0

(Figures in parentheses indicate number of SRLO)

**Path analysis on the basis of relationship between adoption of selected small ruminant livestock practices and the exogenous variables (overall study):**

The result of path analysis (table 4.17) for small ruminant livestock owners (SRLO) represented the direct and indirect effects for 37 selected exogenous variables on adoption of selected animal husbandry practices.

From the table it was revealed that 'farming experience' had the largest direct effect (0.8470) on adoption of selected small ruminant farming practices followed by exogenous variables in descending order, received training (0.1904), reproductive knowledge about male livestock (0.0940), education (0.0763), family type (0.0620), mass media utilization (0.0601), vaccination (0.0583), reproductive knowledge about female livestock (0.0523), attitude towards motivation of progress (0.0459), marketing management (0.0407), urban contact (0.0330), attitude towards need for autonomy (0.0314), knowledge about deworming (0.0314), marital status (0.0284), herd size (0.0279), gender (0.0226), occupation (0.0218), communication skills (0.0188), attitude towards creative and innovative skills of marketing (0.0141), planning skills (0.0110), caste (0.0086), utilization of personal cosmopolite sources (0.0064), decision making (0.0057), total economic status (0.0037), utilization of personal localite sources (-0.0059), age (-0.007), attitude towards risk (-0.0081), attitude towards small ruminant farming (-0.0140), work distribution pattern (-0.0153), religion (-0.0155), knowledge about feeding (-0.0223), attitude towards leadership (-0.0306), social participation (-0.0435), attitude towards need for achievement of goals (-0.0442), family size (-0.0518), category (-0.0546) and family education status (-0.0749).

The residual effect has been found to be 0.0837 or, in a way, 8.37 per cent of the total variables have been left unexplained.

Further processing of the data revealed that out of 37 exogenous variables, 21 variables had their largest indirect effects through 'farming experience' which were related to age, category,

**Table- 4.17: Path Co-efficient showing the direct and indirect effect of selected independent variables on adoption of selected small ruminant livestock practices (overall study)**

<b>Independent Variables</b>	<b>Direct effect of adoption</b>	<b>Indirect effect on adoption through other independent variables</b>
(X <sub>1</sub> ) Gender	0.0226	(X <sub>28</sub> ) 0.0159 (X <sub>15</sub> ) 0.0119 (X <sub>16</sub> ) 0.0104
(X <sub>2</sub> ) Age	-0.0007	(X <sub>17</sub> ) 0.3896 (X <sub>9</sub> ) 0.0124 (X <sub>7</sub> ) 0.0117
(X <sub>3</sub> ) Category	-0.0546	(X <sub>17</sub> ) 0.1948 (X <sub>12</sub> ) 0.0590 (X <sub>22</sub> ) 0.0263
(X <sub>4</sub> ) Occupation	0.0218	(X <sub>17</sub> ) 0.1694 (X <sub>12</sub> ) 0.0362 (X <sub>18</sub> ) 0.0216
(X <sub>5</sub> ) Caste	0.0086	(X <sub>17</sub> ) 0.0932 (X <sub>12</sub> ) 0.0114 (X <sub>6</sub> ) 0.0076
(X <sub>6</sub> ) Education	0.0763	(X <sub>12</sub> ) 0.0896 (X <sub>22</sub> ) 0.0414 (X <sub>18</sub> ) 0.0379
(X <sub>7</sub> ) Marital status	0.0284	(X <sub>17</sub> ) 0.1863 (X <sub>16</sub> ) 0.0083 (X <sub>15</sub> ) 0.0063
(X <sub>8</sub> ) Religion	-0.0155	(X <sub>3</sub> ) 0.0071 (X <sub>16</sub> ) 0.0048 (X <sub>24</sub> ) 0.0036
(X <sub>9</sub> ) Family type	0.0620	(X <sub>17</sub> ) 0.2541 (X <sub>11</sub> ) 0.0120 (X <sub>12</sub> ) 0.0076
(X <sub>10</sub> ) Family size	-0.0518	(X <sub>17</sub> ) 0.2541 (X <sub>9</sub> ) 0.0378 (X <sub>12</sub> ) 0.0209
(X <sub>11</sub> ) Family education status	-0.0749	(X <sub>17</sub> ) 0.0847 (X <sub>12</sub> ) 0.0647 (X <sub>6</sub> ) 0.0389
(X <sub>12</sub> ) Received training	0.1904	(X <sub>22</sub> ) 0.0508 (X <sub>6</sub> ) 0.0359 (X <sub>26</sub> ) 0.0344
(X <sub>13</sub> ) Herd size	0.0279	(X <sub>17</sub> ) 0.1694 (X <sub>12</sub> ) 0.0971 (X <sub>22</sub> ) 0.0320
(X <sub>14</sub> ) Economic status	0.0037	(X <sub>17</sub> ) 0.1525 (X <sub>12</sub> ) 0.0761 (X <sub>18</sub> ) 0.0331
(X <sub>15</sub> ) Urban contact	-0.0330	(X <sub>17</sub> ) 0.1016 (X <sub>12</sub> ) 0.0723 (X <sub>22</sub> ) 0.0414
(X <sub>16</sub> ) Social participation	-0.0435	(X <sub>17</sub> ) 0.1186 (X <sub>12</sub> ) 0.0495 (X <sub>6</sub> ) 0.0321
(X <sub>17</sub> ) Farming experience	0.8470	(X <sub>22</sub> ) 0.0254 (X <sub>6</sub> ) 0.0186 (X <sub>18</sub> ) 0.0084
(X <sub>18</sub> ) Mass media	0.0601	(X <sub>17</sub> ) 0.1186 (X <sub>12</sub> ) 0.0993 (X <sub>6</sub> ) 0.0481
(X <sub>19</sub> ) Personal cosmopolite	0.0064	(X <sub>17</sub> ) 0.0762 (X <sub>12</sub> ) 0.0438 (X <sub>18</sub> ) 0.0216

(X <sub>20</sub> ) Personal localite	-0.0059	(X <sub>17</sub> ) 0.1609 (X <sub>12</sub> ) 0.0400 (X <sub>22</sub> ) 0.0235
(X <sub>21</sub> ) Communication skills	0.0188	(X <sub>9</sub> ) 0.0050 (X <sub>12</sub> ) 0.0019 (X <sub>26</sub> ) 0.0017
(X <sub>22</sub> ) Reproductive knowledge about male livestock	0.0940	(X <sub>17</sub> ) 0.2287 (X <sub>12</sub> ) 0.1028 (X <sub>6</sub> ) 0.0336
(X <sub>23</sub> ) Reproductive knowledge about female livestock	0.0523	(X <sub>12</sub> ) 0.1161 (X <sub>17</sub> ) 0.1101 (X <sub>22</sub> ) 0.0592
(X <sub>24</sub> ) Knowledge about feeding	-0.0223	(X <sub>17</sub> ) 0.1270 (X <sub>12</sub> ) 0.1066 (X <sub>6</sub> ) 0.0328
(X <sub>25</sub> ) Knowledge about deworming	0.0314	(X <sub>17</sub> ) 0.1609 (X <sub>12</sub> ) 0.0895 (X <sub>6</sub> ) 0.0382
(X <sub>26</sub> ) Knowledge about vaccination	0.0583	(X <sub>12</sub> ) 0.1123 (X <sub>17</sub> ) 0.0593 (X <sub>6</sub> ) 0.0379
(X <sub>27</sub> ) Attitude towards leadership	-0.0306	(X <sub>12</sub> ) 0.0552 (X <sub>5</sub> ) 0.0282 (X <sub>22</sub> ) 0.0244
(X <sub>28</sub> ) Attitude towards need for achievement of goals	-0.0442	(X <sub>12</sub> ) 0.0590 (X <sub>6</sub> ) 0.0351 (X <sub>22</sub> ) 0.0282
(X <sub>29</sub> ) Attitude towards creative and innovative skills of marketing	0.0141	(X <sub>12</sub> ) 0.0495 (X <sub>17</sub> ) 0.0339 (X <sub>6</sub> ) 0.0336
(X <sub>30</sub> ) Attitude towards motivation of progress	0.0459	(X <sub>12</sub> ) 0.0533 (X <sub>6</sub> ) 0.0374 (X <sub>17</sub> ) 0.0339
(X <sub>31</sub> ) Attitude towards need for autonomy	0.0314	(X <sub>12</sub> ) 0.0704 (X <sub>17</sub> ) 0.0678 (X <sub>6</sub> ) 0.0336
(X <sub>32</sub> ) Attitude towards risk	-0.0081	(X <sub>12</sub> ) 0.0514 (X <sub>17</sub> ) 0.0339 (X <sub>22</sub> ) 0.0282
(X <sub>33</sub> ) Attitude towards small ruminant farming	-0.0140	(X <sub>22</sub> ) 0.0282 (X <sub>12</sub> ) 0.0209 (X <sub>6</sub> ) 0.0191
(X <sub>34</sub> ) Planning skills	0.0110	(X <sub>17</sub> ) 0.1016 (X <sub>12</sub> ) 0.0628 (X <sub>6</sub> ) 0.0214
(X <sub>35</sub> ) Decision making	0.0057	(X <sub>17</sub> ) 0.1948 (X <sub>12</sub> ) 0.1028 (X <sub>22</sub> ) 0.0348
(X <sub>36</sub> ) Work distribution pattern	-0.0153	(X <sub>17</sub> ) 0.1440 (X <sub>12</sub> ) 0.1104 (X <sub>22</sub> ) 0.0376
(X <sub>37</sub> )Marketing management	0.0407	(X <sub>12</sub> ) 0.0552 (X <sub>17</sub> ) 0.0339 (X <sub>6</sub> ) 0.0153

**Residual effect = 0.0837**

occupation, caste, marital status, family type, family size, family education status, herd size, total economic status, urban contacts, social participation, mass media utilization, utilization of personal cosmopolite sources, utilization of personal localite sources, reproductive knowledge about male livestock, knowledge about feeding, deworming, planning skills, decision making and work distribution pattern.

On the other hand 10 had their largest indirect effects through 'received training' which were related to education of the respondents, reproductive knowledge about male livestock, knowledge about vaccination, attitude towards leadership, need for achievement of goals, creative and innovative skills of marketing, motivation of progress, need for autonomy, attitude towards risk and marketing management.

The table 4.17 also showed that 3 variables had their largest indirect effect through reproductive knowledge about male livestock which are received training, farming experience and attitude towards small ruminant farming.

The findings suggest that 'farming experience' has not only exerted largest direct effect on adoption of selected small ruminant livestock practices by the SRLO but a number of factors also exert their largest indirect effect through it. So farming experience has come out to be the key element which directly and indirectly promotes the adoption of selected small ruminant livestock practices by the SRLO in overall study.

**Path analysis on the basis of relationship between adoption of selected small ruminant livestock practices and the exogenous variables in Purulia district:**

The result of path analysis (table 4.18) for small ruminant livestock owners (SRLO) represented the direct and indirect effects for 37 selected exogenous variables on adoption of selected animal husbandry practices in Purulia district of West Bengal.

From the table it was revealed that 'farming experience' had the largest direct effect (0.886) on adoption of selected small ruminant farming practices followed by exogenous variables in descending order, received training (0.198), marketing management (0.146), motivation progress(0.119), deworming (0.104), vaccination (0.076), need for autonomy (0.056), reproductive knowledge about male livestock (0.056), family type (0.053), education of the respondents (0.052), planning skills (0.048), reproductive knowledge about female livestock (0.045), occupation (0.030), communication skills (0.025), attitude towards risk (0.012), marital status (0.007), urban contacts age (0.005), (0.004), gender (0.003), caste (0.003), total economic status (0.000), decision making (-0.007), mass media utilization (-0.009), herd size (-0.010), creative and innovative skills of marketing (-0.016), work distribution pattern (-0.018), attitude towards small ruminant farming (-0.021), utilization of personal cosmopolite sources (-0.022), utilization of personal localite sources (-0.022), attitude towards leadership (-0.056), knowledge about feeding (-0.058), category (-0.059), family education status (-0.067), family size (-0.071), social participation (-0.073) and need for achievement of goals (-0.105). Correlation co-efficient was not found among religion, because in Purulia district all SRLO coming from Hindu religious group.

The residual effect has been found to be 0.0463 or, in a way, 4.63 per cent of the total variables have been left unexplained.

Further processing of the data revealed that out of 37 exogenous variables, 23 had their largest indirect effects through 'farming experience' which were related to age, category, occupation, caste, marital status, family type, family size, family education status, herd size, total economic status, urban contacts, social participation, mass media utilization, utilization of personal cosmopolite sources, utilization of personal localite sources, reproductive knowledge about male and female livestock, knowledge about deworming, attitude

**Table- 4.18: Path Co-efficient showing the direct and indirect effect of selected independent variables on adoption of selected small ruminant livestock practices of Purulia district**

Independent Variables	Direct effect of adoption	Indirect effect on adoption through other independent variables
(X <sub>1</sub> ) Gender	0.003	(X <sub>28</sub> ) 0.046 (X <sub>16</sub> ) 0.011 (X <sub>24</sub> ) 0.009
(X <sub>2</sub> ) Age	0.005	(X <sub>17</sub> ) 0.487 (X <sub>28</sub> ) 0.016 (X <sub>17</sub> ) 0.013
(X <sub>3</sub> ) Category	-0.059	(X <sub>17</sub> ) 0.230 (X <sub>12</sub> ) 0.050 (X <sub>34</sub> ) 0.012
(X <sub>4</sub> ) Occupation	0.030	(X <sub>17</sub> ) 0.390 (X <sub>12</sub> ) 0.036 (X <sub>30</sub> ) 0.026
(X <sub>5</sub> ) Caste	0.003	(X <sub>17</sub> ) 0.080 (X <sub>12</sub> ) 0.042 (X <sub>30</sub> ) 0.032
(X <sub>6</sub> ) Education	0.052	(X <sub>12</sub> ) 0.091 (X <sub>13</sub> ) 0.068 (X <sub>25</sub> ) 0.053
(X <sub>7</sub> ) Marital status	0.007	(X <sub>17</sub> ) 0.160 (X <sub>28</sub> ) 0.010 (X <sub>11</sub> ) 0.008
(X <sub>8</sub> ) Religion	-	-
(X <sub>9</sub> ) Family type	0.053	(X <sub>17</sub> ) 0.239 (X <sub>25</sub> ) 0.009 (X <sub>11</sub> ) 0.006
(X <sub>10</sub> ) Family size	-0.071	(X <sub>17</sub> ) 0.160 (X <sub>08</sub> ) 0.270 (X <sub>11</sub> ) 0.009
(X <sub>11</sub> ) Family education status	-0.067	(X <sub>17</sub> ) 0.195 (X <sub>12</sub> ) 0.079 (X <sub>25</sub> ) 0.048
(X <sub>12</sub> ) Received training	0.198	(X <sub>26</sub> ) 0.046 (X <sub>25</sub> ) 0.045 (X <sub>30</sub> ) 0.040
(X <sub>13</sub> ) Herd size	-0.010	(X <sub>17</sub> ) 0.257 (X <sub>12</sub> ) 0.099 (X <sub>25</sub> ) 0.044
(X <sub>14</sub> ) Total economic status	0.000	(X <sub>17</sub> ) 0.195 (X <sub>12</sub> ) 0.059 (X <sub>30</sub> ) 0.039
(X <sub>15</sub> ) Urban contact	0.004	(X <sub>17</sub> ) 0.151 (X <sub>12</sub> ) 0.059 (X <sub>30</sub> ) 0.040
(X <sub>16</sub> ) Social participation	-0.073	(X <sub>17</sub> ) 0.115 (X <sub>12</sub> ) 0.042 (X <sub>30</sub> ) 0.040
(X <sub>17</sub> ) Farming experience	0.886	(X <sub>25</sub> ) 0.021 (X <sub>22</sub> ) 0.018 (X <sub>09</sub> ) 0.014
(X <sub>18</sub> ) Mass media	-0.009	(X <sub>17</sub> ) 0.151 (X <sub>12</sub> ) 0.067 (X <sub>30</sub> ) 0.046
(X <sub>19</sub> ) Personal cosmopolite	-0.022	(X <sub>17</sub> ) 0.151 (X <sub>12</sub> ) 0.038 (X <sub>25</sub> ) 0.027
(X <sub>20</sub> ) Personal localite	-0.022	(X <sub>17</sub> ) 0.177 (X <sub>12</sub> ) 0.026 (X <sub>25</sub> ) 0.017

(X <sub>21</sub> ) Communication skills	0.025	(X <sub>12</sub> ) 0.006 (X <sub>28</sub> ) 0.003 (X <sub>27</sub> ) 0.003
(X <sub>22</sub> ) Reproductive knowledge about male livestock	0.056	(X <sub>17</sub> ) 0.292 (X <sub>12</sub> ) 0.107 (X <sub>25</sub> ) 0.055
(X <sub>23</sub> ) Reproductive knowledge about female livestock	0.045	(X <sub>17</sub> ) 0.177 (X <sub>12</sub> ) 0.141 (X <sub>25</sub> ) 0.059
(X <sub>24</sub> ) Knowledge about feeding	-0.058	(X <sub>12</sub> ) 0.139 (X <sub>17</sub> ) 0.106 (X <sub>25</sub> ) 0.064
(X <sub>25</sub> ) Knowledge about deworming	0.104	(X <sub>17</sub> ) 0.177 (X <sub>12</sub> ) 0.085 (X <sub>30</sub> ) 0.049
(X <sub>26</sub> ) Knowledge about vaccination	0.076	(X <sub>12</sub> ) 0.121 (X <sub>17</sub> ) 0.089 (X <sub>25</sub> ) 0.061
(X <sub>27</sub> ) Attitude towards leadership	-0.056	(X <sub>12</sub> ) 0.083 (X <sub>30</sub> ) 0.074 (X <sub>25</sub> ) 0.062
(X <sub>28</sub> ) Attitude towards need for achievement of goals	-0.105	(X <sub>30</sub> ) 0.068 (X <sub>12</sub> ) 0.061 (X <sub>25</sub> ) 0.045
(X <sub>29</sub> ) Attitude towards creative and innovative skills of marketing	-0.016	(X <sub>30</sub> ) 0.066 (X <sub>12</sub> ) 0.057 (X <sub>25</sub> ) 0.042
(X <sub>30</sub> ) Attitude towards motivation of progress	0.119	(X <sub>12</sub> ) 0.081 (X <sub>25</sub> ) 0.043 (X <sub>26</sub> ) 0.036
(X <sub>31</sub> ) Attitude towards need for autonomy	0.056	(X <sub>12</sub> ) 0.081 (X <sub>30</sub> ) 0.049 (X <sub>25</sub> ) 0.045
(X <sub>32</sub> ) Attitude towards risk	0.012	(X <sub>12</sub> ) 0.059 (X <sub>30</sub> ) 0.058 (X <sub>25</sub> ) 0.039
(X <sub>33</sub> ) Attitude towards small ruminant farming	-0.021	(X <sub>17</sub> ) 0.071 (X <sub>30</sub> ) 0.037 (X <sub>25</sub> ) 0.034
(X <sub>34</sub> ) Planning skills	0.048	(X <sub>17</sub> ) 0.106 (X <sub>12</sub> ) 0.091 (X <sub>30</sub> ) 0.050
(X <sub>35</sub> ) Decision making	-0.007	(X <sub>17</sub> ) 0.204 (X <sub>12</sub> ) 0.105 (X <sub>25</sub> ) 0.035
(X <sub>36</sub> ) Work distribution pattern	-0.018	(X <sub>17</sub> ) 0.160 (X <sub>12</sub> ) 0.103 (X <sub>25</sub> ) 0.043
(X <sub>37</sub> ) Marketing management	0.146	(X <sub>17</sub> ) 0.062 (X <sub>12</sub> ) 0.038 (X <sub>25</sub> ) 0.028

**Residual effect = 0.0463**

towards small ruminant farming, planning skills, decision making, work distribution pattern and marketing management.

On the other hand 8 variables had their largest indirect effects through 'received training' which were related to education of the respondent, communication skills, knowledge about feeding, knowledge about vaccination, attitude towards leadership, attitude towards motivation of progress, attitude towards need for autonomy and attitude towards risk.

From the findings suggest that 'farming experience' has not only exerted largest direct effect on adoption of selected small ruminant livestock practices by the SRLO but a number of factors also exert their largest indirect effect through it. So farming experience has come out to be the key element which directly and indirectly promotes the adoption of selected small ruminant livestock practices by the SRLO in Purulia district.

**Path analysis on the basis of relationship between adoption of selected small ruminant livestock practices and the exogenous variables in South 24 Parganas district:**

The result of path analysis (table 4.19) for small ruminant livestock owners (SRLO) represented the direct and indirect effects for 37 selected exogenous variables on adoption of selected animal husbandry practices in South 24 Parganas district of West Bengal.

From the table it was revealed that 'farming experience' had the largest direct effect (0.707) on adoption of selected small ruminant farming practices followed by exogenous variables in descending order, mass media utilization (0.221), received training (0.176), reproductive knowledge about male (0.142), family type (0.098), marketing management (0.088), creative and innovative skills of marketing (0.083), work distribution pattern (0.062), knowledge about feeding (0.056), education of the respondents (0.050), attitude towards small ruminant farming (0.049), gender (0.043), occupation (0.024), reproductive knowledge female livestock (0.022), social participation

(0.021), knowledge about deworming (0.021), age (0.121), communication skills (0.019), utilization of personal cosmopolite sources (0.017), decision making activities (0.014), utilization of personal localite sources (0.00), total economic status (-0.003), herd size (-0.006), category (-0.016), need for autonomy (-0.024), religion (-0.026), attitude towards leadership (-0.029), planning skills (-0.033), vaccination (-0.036), motivation progress(-0.050),marital status (-0.051), caste (-0.053), need for achievement of goals (-0.059),attitude towards risk (-0.069), family size (-0.079), family education status (-0.099) and urban contacts (-0.121).

The residual effect has been found to be 0.1277 or, in a way, 12.77 per cent of the total variables have been left unexplained.

Further processing of the data revealed that out of 37 exogenous variables, 9 had their largest indirect effects through 'farming experience' and which were related to age, marital status, family type, family size, utilization of personal localite communication sources, reproductive knowledge about male livestock, knowledge about deworming, planning skills and decision making activities.

On the other hand 18 variables had their largest indirect effects through 'utilization of mass media communication sources' which were related to occupation, education of the respondents, family education status, received training, economic status, urban contacts, social participation, utilization of personal cosmopolite communication sources, reproductive knowledge about female livestock, knowledge about feeding, knowledge about vaccination, attitude towards leadership, need for achievement of goals, creative and innovative skills of marketing, motivation progress, need for autonomy, attitude towards risk and work distribution pattern.

The table 4.19 also showed that 4 variables had their largest indirect effect through 'received training' had their largest indirect effect through category, herd size, utilization of mass media sources

**Table- 4.19: Path Co-efficient showing the direct and indirect effect of selected independent variables on adoption of selected small ruminant livestock practices of South 24 Parganas district**

Independent Variables	Direct effect of adoption	Indirect effect on adoption through other independent variables
(X <sub>1</sub> ) Gender	0.043	(X <sub>15</sub> ) 0.074 (X <sub>11</sub> ) 0.030 (X <sub>10</sub> ) 0.023
(X <sub>2</sub> ) Age	0.121	(X <sub>17</sub> ) 0.431 (X <sub>9</sub> ) 0.026 (X <sub>15</sub> ) 0.015
(X <sub>3</sub> ) Category	-0.016	(X <sub>12</sub> ) 0.070 (X <sub>17</sub> ) 0.050 (X <sub>6</sub> ) 0.020
(X <sub>4</sub> ) Occupation	0.024	(X <sub>18</sub> ) 0.073 (X <sub>12</sub> ) 0.037 (X <sub>6</sub> ) 0.015
(X <sub>5</sub> ) Caste	-0.053	(X <sub>15</sub> ) 0.042 (X <sub>32</sub> ) 0.017 (X <sub>11</sub> ) 0.011
(X <sub>6</sub> ) Education	0.050	(X <sub>18</sub> ) 0.157 (X <sub>22</sub> ) 0.062 (X <sub>12</sub> ) 0.086
(X <sub>7</sub> ) Marital status	-0.051	(X <sub>17</sub> ) 0.283 (X <sub>15</sub> ) 0.031 (X <sub>2</sub> ) 0.058
(X <sub>8</sub> ) Religion	-0.026	(X <sub>11</sub> ) 0.016 (X <sub>17</sub> ) 0.014 (X <sub>15</sub> ) 0.011
(X <sub>9</sub> ) Family type	0.098	(X <sub>17</sub> ) 0.233 (X <sub>2</sub> ) 0.031 (X <sub>15</sub> ) 0.013
(X <sub>10</sub> ) Family size	-0.079	(X <sub>17</sub> ) 0.198 (X <sub>9</sub> ) 0.058 (X <sub>12</sub> ) 0.035
(X <sub>11</sub> ) Family education status	-0.099	(X <sub>18</sub> ) 0.137 (X <sub>17</sub> ) 0.092 (X <sub>12</sub> ) 0.63
(X <sub>12</sub> ) Received training	0.176	(X <sub>18</sub> ) 0.139 (X <sub>22</sub> ) 0.078 (X <sub>37</sub> ) 0.037
(X <sub>13</sub> ) Herd size	-0.006	(X <sub>12</sub> ) 0.092 (X <sub>18</sub> ) 0.082 (X <sub>22</sub> ) 0.041
(X <sub>14</sub> ) Economic status	-0.003	(X <sub>18</sub> ) 0.117 (X <sub>17</sub> ) 0.085 (X <sub>12</sub> ) 0.085
(X <sub>15</sub> ) Urban contact	-0.121	(X <sub>18</sub> ) 0.146 (X <sub>12</sub> ) 0.085 (X <sub>22</sub> ) 0.075
(X <sub>16</sub> ) Social participation	0.021	(X <sub>18</sub> ) 0.130 (X <sub>12</sub> ) 0.056 (X <sub>17</sub> ) 0.050
(X <sub>17</sub> ) Farming experience	0.707	(X <sub>2</sub> ) 0.074 (X <sub>9</sub> ) 0.033 (X <sub>22</sub> ) 0.028
(X <sub>18</sub> ) Mass media	0.221	(X <sub>12</sub> ) 0.111 (X <sub>22</sub> ) 0.068 (X <sub>17</sub> ) 0.064
(X <sub>19</sub> ) Personal cosmopolite	0.017	(X <sub>18</sub> ) 0.095 (X <sub>17</sub> ) 0.071 (X <sub>12</sub> ) 0.053

(X <sub>20</sub> ) Personal localite	0.000	(X <sub>17</sub> ) 0.127 (X <sub>18</sub> ) 0.058 (X <sub>12</sub> ) 0.053
(X <sub>21</sub> ) Communication skills	0.019	(X <sub>9</sub> ) 0.010 (X <sub>29</sub> ) 0.008 (X <sub>26</sub> ) 0.007
(X <sub>22</sub> ) Reproductive knowledge about male livestock	0.142	(X <sub>17</sub> ) 0.141 (X <sub>18</sub> ) 0.106 (X <sub>12</sub> ) 0.097
(X <sub>23</sub> ) Reproductive knowledge about female livestock	0.022	(X <sub>18</sub> ) 0.117 (X <sub>12</sub> ) 0.088 (X <sub>22</sub> ) 0.067
(X <sub>24</sub> ) Knowledge about feeding	0.056	(X <sub>18</sub> ) 0.091 (X <sub>12</sub> ) 0.070 (X <sub>22</sub> ) 0.047
(X <sub>25</sub> ) Knowledge about deworming	0.021	(X <sub>17</sub> ) 0.127 (X <sub>18</sub> ) 0.119 (X <sub>12</sub> ) 0.090
(X <sub>26</sub> ) Knowledge about vaccination	-0.036	(X <sub>18</sub> ) 0.135 (X <sub>12</sub> ) 0.104 (X <sub>17</sub> ) 0.057
(X <sub>27</sub> ) Attitude towards leadership	-0.029	(X <sub>18</sub> ) 0.033 (X <sub>12</sub> ) 0.028 (X <sub>30</sub> ) 0.025
(X <sub>28</sub> ) Attitude towards need for achievement of goals	0.059	(X <sub>18</sub> ) 0.093 (X <sub>17</sub> ) 0.057 (X <sub>12</sub> ) 0.056
(X <sub>29</sub> ) Attitude towards creative and innovative skills of marketing	0.083	(X <sub>18</sub> ) 0.093 (X <sub>17</sub> ) 0.057 (X <sub>12</sub> ) 0.056
(X <sub>30</sub> ) Attitude towards motivation of progress	-0.050	(X <sub>18</sub> ) 0.088 (X <sub>17</sub> ) 0.064 (X <sub>12</sub> ) 0.039
(X <sub>31</sub> ) Attitude towards need for autonomy	-0.024	(X <sub>18</sub> ) 0.088 (X <sub>12</sub> ) 0.060 (X <sub>22</sub> ) 0.038
(X <sub>32</sub> ) Attitude towards risk	-0.069	(X <sub>18</sub> ) 0.069 (X <sub>17</sub> ) 0.064 (X <sub>12</sub> ) 0.041
(X <sub>33</sub> ) Attitude towards small ruminant farming	0.049	(X <sub>22</sub> ) 0.041 (X <sub>12</sub> ) 0.033 (X <sub>18</sub> ) 0.027
(X <sub>34</sub> ) Planning skills	-0.033	(X <sub>17</sub> ) 0.064 (X <sub>18</sub> ) 0.044 (X <sub>22</sub> ) 0.034
(X <sub>35</sub> ) Decision making	0.014	(X <sub>17</sub> ) 0.127 (X <sub>12</sub> ) 0.100 (X <sub>18</sub> ) 0.093
(X <sub>36</sub> ) Work distribution pattern	0.062	(X <sub>18</sub> ) 0.119 (X <sub>12</sub> ) 0.114 (X <sub>17</sub> ) 0.092
(X <sub>37</sub> ) Marketing management	0.088	(X <sub>12</sub> ) 0.074 (X <sub>18</sub> ) 0.033 (X <sub>37</sub> ) 0.026

**Residual effect = 0.1277**

and marketing management of SRLO in South 24 Parganas district of West Bengal.

From the findings suggest that 'farming experience' and 'utilization of mass media communication sources' has not only exerted largest direct effect on adoption of selected small ruminant livestock practices by the SRLO but a number of factors also exert their largest indirect effect through it. So farming experience and utilization of mass media communication sources has come out to be the key element which directly and indirectly promotes the adoption of selected small ruminant livestock practices by the SRLO in Purulia district.

Goswami (2000) in his findings of path analysis reported that the first five factors having largest direct effect on adoption of selected A. H. practices in case of saline belt livestock owners were social participation, knowledge about cultivation of green fodder, personal localite, family educational status and age while mass media communication, communication skills, risk orientation, knowledge about deworming and attitude towards dairy farming exerted first five largest indirect effects.

**Path analysis on the basis of relationship between attitude of selected small ruminant livestock practices and the exogenous variables:**

The result of path analysis (table 4.20) for small ruminant livestock owner (SRLO) represented the direct and indirect effects for 30 selected exogenous variables on attitude of selected animal husbandry practices.

From the table it was revealed that 'education of the respondents' had the largest direct effect (0.236) on attitude of selected small ruminant livestock practices followed by exogenous variables in descending order, decision making (0.223), planning skills (0.222), vaccination (0.157), reproductive knowledge about male livestock (0.126), knowledge about feeding (0.116), category (0.106),

knowledge about deworming (0.105), utilization of personal cosmopolite sources (0.100), marital status (0.089), religion (0.079), decision making (0.055), communication skills (0.025), utilization of personal localite sources (0.017), mass media utilization (0.008), social participation (0.005), total economic status (-0.023), caste (-0.027), marketing management (-0.037), family size (-0.037), occupation (-0.045), farming experience (-0.046), family education status (-0.071), urban contact (-0.080), age (-0.087), reproductive knowledge about female livestock (-0.101), family type (-0.115), received training (-0.146), gender (-0.157) and herd size (-0.176).

The residual effect has been found to be 0.498 or, in a way, 49.8 per cent of the total variables have been left unexplained.

The study revealed that 13 variables had their largest indirect effects through 'education of the respondent' which were related to category, occupation, caste, family education status, economic status, social participation, utilization of mass media communication source utilization, utilization of personal cosmopolite communication sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming and vaccination.

Further processing of the data revealed that out of 30 exogenous variables, 8 had their largest indirect effects through 'work distribution pattern' which were related to family size, received training, herd size, farming experience, utilization of personal localite communication sources, planning skills, decision making and marketing management.

The findings suggest that 'education of the respondent' has not only exerted largest direct effect on attitude of selected small ruminant livestock practices by the SRLO but a number of factors also exert their largest indirect effect through it. So education of the respondent has come out to be the key element which directly and indirectly promotes the attitude of selected small ruminant livestock practices by the SRLO in overall study.

**Table- 4.20: Path Co-efficient showing the direct and indirect effect of selected independent variables on attitude of selected small ruminant livestock practices (overall study)**

<b>Independent Variables</b>	<b>Direct effect of attitude</b>	<b>Indirect effect on adoption through other independent variables</b>
(X <sub>1</sub> ) Gender	-0.157	(X <sub>13</sub> ) 0.039 (X <sub>12</sub> ) 0.029 (X <sub>15</sub> ) 0.029
(X <sub>2</sub> ) Age	-0.087	(X <sub>7</sub> ) 0.037 (X <sub>12</sub> ) 0.023 (X <sub>13</sub> ) 0.016
(X <sub>3</sub> ) Category	0.106	(X <sub>6</sub> ) 0.064 (X <sub>35</sub> ) 0.054 (X <sub>34</sub> ) 0.051
(X <sub>4</sub> ) Occupation	-0.045	(X <sub>6</sub> ) 0.054 (X <sub>26</sub> ) 0.045 (X <sub>34</sub> ) 0.038
(X <sub>5</sub> ) Caste	-0.027	(X <sub>6</sub> ) 0.024 (X <sub>24</sub> ) 0.021 (X <sub>34</sub> ) 0.017
(X <sub>6</sub> ) Education	0.236	(X <sub>26</sub> ) 0.081 (X <sub>34</sub> ) 0.062 (X <sub>36</sub> ) 0.060
(X <sub>7</sub> ) Marital status	0.089	(X <sub>12</sub> ) 0.032 (X <sub>13</sub> ) 0.027 (X <sub>23</sub> ) 0.023
(X <sub>8</sub> ) Religion	0.079	(X <sub>19</sub> ) 0.015 (X <sub>12</sub> ) 0.013 (X <sub>13</sub> ) 0.007
(X <sub>9</sub> ) Family type	-0.115	(X <sub>34</sub> ) 0.031 (X <sub>36</sub> ) 0.029 (X <sub>3</sub> ) 0.027
(X <sub>10</sub> ) Family size	-0.037	(X <sub>36</sub> ) 0.047 (X <sub>3</sub> ) 0.041 (X <sub>1</sub> ) 0.017
(X <sub>11</sub> ) Family education status	0.071	(X <sub>6</sub> ) 0.120 (X <sub>26</sub> ) 0.067 (X <sub>36</sub> ) 0.058
(X <sub>12</sub> ) Received training	-0.146	(X <sub>36</sub> ) 0.130 (X <sub>6</sub> ) 0.111 (X <sub>26</sub> ) 0.092
(X <sub>13</sub> ) Herd size	-0.176	(X <sub>36</sub> ) 0.170 (X <sub>26</sub> ) 0.058 (X <sub>27</sub> ) 0.058 (X <sub>6</sub> ) 0.057
(X <sub>14</sub> ) Economic status	-0.023	(X <sub>6</sub> ) 0.094 (X <sub>16</sub> ) 0.085 (X <sub>26</sub> ) 0.066
(X <sub>15</sub> ) Urban contact	-0.080	(X <sub>26</sub> ) 0.077 (X <sub>36</sub> ) 0.065 (X <sub>34</sub> ) 0.064

(X <sub>16</sub> ) Social participation	0.005	(X <sub>6</sub> ) 0.099 (X <sub>34</sub> ) 0.064 (X <sub>26</sub> ) 0.056
(X <sub>17</sub> ) Farming experience	-0.046	(X <sub>36</sub> ) 0.038 (X <sub>1</sub> ) 0.033 (X <sub>34</sub> ) 0.027
(X <sub>18</sub> ) Mass media	0.008	(X <sub>6</sub> ) 0.149 (X <sub>36</sub> ) 0.083 (X <sub>26</sub> ) 0.081
(X <sub>19</sub> ) Personal cosmopolite	0.100	(X <sub>6</sub> ) 0.052 (X <sub>26</sub> ) 0.049 (X <sub>36</sub> ) 0.045
(X <sub>20</sub> ) Personal localite	0.017	(X <sub>36</sub> ) 0.047 (X <sub>6</sub> ) 0.042 (X <sub>22</sub> ) 0.032
(X <sub>21</sub> ) Communication skills	0.025	(X <sub>34</sub> ) 0.020 (X <sub>1</sub> ) 0.014 (X <sub>6</sub> ) 0.005
(X <sub>22</sub> ) Reproductive knowledge about male livestock	0.126	(X <sub>6</sub> ) 0.104 (X <sub>36</sub> ) 0.089 (X <sub>26</sub> ) 0.088
(X <sub>23</sub> ) Reproductive knowledge about female livestock	-0.101	(X <sub>6</sub> ) 0.111 (X <sub>35</sub> ) 0.092 (X <sub>26</sub> ) 0.089
(X <sub>24</sub> ) Knowledge about feeding	0.116	(X <sub>6</sub> ) 0.101 (X <sub>34</sub> ) 0.089 (X <sub>36</sub> ) 0.085
(X <sub>25</sub> ) Knowledge about deworming	0.105	(X <sub>6</sub> ) 0.118 (X <sub>35</sub> ) 0.096 (X <sub>26</sub> ) 0.085
(X <sub>26</sub> ) Knowledge about vaccination	0.157	(X <sub>6</sub> ) 0.123 (X <sub>35</sub> ) 0.105 (X <sub>34</sub> ) 0.069
(X <sub>34</sub> ) Planning skills	0.222	(X <sub>36</sub> ) 0.067 (X <sub>6</sub> ) 0.066 (X <sub>26</sub> ) 0.049
(X <sub>35</sub> ) Decision making	0.055	(X <sub>36</sub> ) 0.116 (X <sub>26</sub> ) 0.060 (X <sub>6</sub> ) 0.059
(X <sub>36</sub> ) Work distribution pattern	0.223	(X <sub>26</sub> ) 0.074 (X <sub>34</sub> ) 0.067 (X <sub>6</sub> ) 0.064
(X <sub>37</sub> ) Marketing management	-0.037	(X <sub>36</sub> ) 0.089 (X <sub>6</sub> ) 0.047 (X <sub>34</sub> ) 0.029

**Residual effect = 0.498**

**Path analysis on the basis of relationship between knowledge of selected small ruminant livestock practices and the exogenous variables:**

The result of path analysis (table 4.21) for small ruminant livestock owners (SRLO) represented the direct and indirect effects for 25 selected exogenous variables on knowledge of selected animal husbandry practices.

From the table it was revealed that 'received training' of the respondents had the largest direct effect (0.425) on knowledge of selected small ruminant livestock practices, following by exogenous variables in descending order, education (0.211), farming experience (0.189), work distribution (0.177), urban contact (0.118), social participation (0.095), planning skills (0.088), family size (0.079), decision making (0.045), utilization of personal cosmopolite sources (0.041), occupation (0.041), utilization of personal localite sources (0.021), gender (0.014), caste (-0.005), mass media utilization (-0.020), communication skills (-0.027), marital status (-0.033), category (-0.35), religion (-0.037), age (-0.051), family type (-0.066), marketing management (-0.072), family education status (-0.083), herd size (-0.083) and total economic status (-0.088).

The residual effect has been found to be 0.3126 or, in a way, 31.26 per cent of the total variables have been left unexplained.

The study revealed that 15 variables had their largest indirect effects through 'received training' which were related to occupation, caste, education of the respondents, family education status, herd size, economic status, urban contacts, social participation, utilization of mass media sources, utilization of personal cosmopolite sources, utilization of personal localite sources, planning skills, decision making, work distribution pattern and marketing management.

Further processing of the data revealed that out of 25 exogenous variables, 4 had their largest indirect effects through

**Table- 4.21: Path Co-efficient showing the direct and indirect effect of selected independent variables on knowledge of selected small ruminant livestock practices (overall study)**

<b>Independent Variables</b>	<b>Direct effect of knowledge</b>	<b>Indirect effect on adoption through other independent variables</b>
(X <sub>1</sub> ) Gender	0.014	(X <sub>13</sub> ) 0.018 (X <sub>14</sub> ) 0.018 (X <sub>18</sub> ) 0.006 (X <sub>2</sub> ) 0.004
(X <sub>2</sub> ) Age	-0.051	(X <sub>17</sub> ) 0.087 (X <sub>10</sub> ) 0.013 (X <sub>13</sub> ) 0.007
(X <sub>3</sub> ) Category	-0.035	(X <sub>6</sub> ) 0.057 (X <sub>17</sub> ) 0.043 (X <sub>36</sub> ) 0.043 (X <sub>15</sub> ) 0.037
(X <sub>4</sub> ) Occupation	0.041	(X <sub>12</sub> ) 0.081 (X <sub>6</sub> ) 0.048 (X <sub>15</sub> ) 0.039
(X <sub>5</sub> ) Caste	-0.005	(X <sub>12</sub> ) 0.026 (X <sub>17</sub> ) 0.021 (X <sub>16</sub> ) 0.012
(X <sub>6</sub> ) Education	0.211	(X <sub>12</sub> ) 0.200 (X <sub>15</sub> ) 0.053 (X <sub>36</sub> ) 0.048
(X <sub>7</sub> ) Marital status	-0.033	(X <sub>17</sub> ) 0.042 (X <sub>13</sub> ) 0.012 (X <sub>14</sub> ) 0.010
(X <sub>8</sub> ) Religion	-0.037	(X <sub>14</sub> ) 0.011 (X <sub>37</sub> ) 0.008 (X <sub>19</sub> ) 0.006
(X <sub>9</sub> ) Family type	-0.066	(X <sub>17</sub> ) 0.057 (X <sub>10</sub> ) 0.048 (X <sub>36</sub> ) 0.023
(X <sub>10</sub> ) Family size	0.079	(X <sub>17</sub> ) 0.057 (X <sub>12</sub> ) 0.047 (X <sub>36</sub> ) 0.037
(X <sub>11</sub> ) Family education status	0.083	(X <sub>12</sub> ) 0.144 (X <sub>6</sub> ) 0.107 (X <sub>36</sub> ) 0.046
(X <sub>12</sub> ) Received training	0.425	(X <sub>36</sub> ) 0.103 (X <sub>6</sub> ) 0.099 (X <sub>15</sub> ) 0.045
(X <sub>13</sub> ) Herd size	-0.083	(X <sub>12</sub> ) 0.217 (X <sub>36</sub> ) 0.135 (X <sub>6</sub> ) 0.051
(X <sub>14</sub> ) Economic status	-0.088	(X <sub>12</sub> ) 0.170 (X <sub>6</sub> ) 0.084 (X <sub>36</sub> ) 0.067
(X <sub>15</sub> ) Urban contact	0.118	(X <sub>12</sub> ) 0.161 (X <sub>6</sub> ) 0.095 (X <sub>36</sub> ) 0.051

(X <sub>16</sub> ) Social participation	0.095	(X <sub>12</sub> ) 0.110 (X <sub>6</sub> ) 0.088 (X <sub>15</sub> ) 0.051
(X <sub>17</sub> ) Farming experience	0.189	(X <sub>36</sub> ) 0.030 (X <sub>10</sub> ) 0.024 (X <sub>15</sub> ) 0.014
(X <sub>18</sub> ) Mass media	-0.020	(X <sub>12</sub> ) 0.208 (X <sub>6</sub> ) 0.133 (X <sub>15</sub> ) 0.071
(X <sub>19</sub> ) Personal cosmopolite	0.041	(X <sub>12</sub> ) 0.098 (X <sub>6</sub> ) 0.046 (X <sub>15</sub> ) 0.38
(X <sub>20</sub> ) Personal localite	0.021	(X <sub>12</sub> ) 0.089 (X <sub>6</sub> ) 0.038 (X <sub>17</sub> ) 0.036
(X <sub>21</sub> ) Communication skills	-0.027	(X <sub>34</sub> ) 0.008 (X <sub>15</sub> ) 0.006 (X <sub>10</sub> ) 0.005
(X <sub>34</sub> ) Planning skills	0.088	(X <sub>12</sub> ) 0.140 (X <sub>6</sub> ) 0.059 (X <sub>36</sub> ) 0.053
(X <sub>35</sub> ) Decision making	0.045	(X <sub>12</sub> ) 0.229 (X <sub>36</sub> ) 0.092 (X <sub>6</sub> ) 0.053
(X <sub>36</sub> ) work distribution pattern	0.177	(X <sub>12</sub> ) 0.246 (X <sub>6</sub> ) 0.057 (X <sub>15</sub> ) 0.034
(X <sub>37</sub> ) Marketing management	-0.072	(X <sub>12</sub> ) 0.123 (X <sub>36</sub> ) 0.071 (X <sub>6</sub> ) 0.042

**Residual effect = 0.3126**

'farming experience' which were related to age, marital status, family type and family size.

The table 4.21 also showed that 2 variables had their largest indirect effect through knowledge about work distribution pattern and 1 variable had their largest indirect effect through education of small ruminant livestock owners.

The findings suggest that 'received training' has not only exerted largest direct effect on knowledge of selected small ruminant livestock practices by the SRLO but a number of factors also exert their largest indirect effect through it. So received training of the respondent has come out to be the key element which directly and indirectly promotes the knowledge of selected small ruminant livestock practices by the SRLO in overall study.

**Path analysis on the basis of relationship between communication of selected small ruminant livestock practices and the exogenous variables:**

The result of path analysis (table 4.22) for small ruminant livestock owners (SRLO) represented the direct and indirect effects for 22 selected exogenous variables on communication sources of small ruminant livestock farming practices.

From the table it was revealed that 'education of the respondents' had the largest direct effect (0.1764) on communication score of improved small ruminant livestock practices, followed by exogenous variables in descending order, education (0.1764), urban contact (0.1687), family type (0.1619), family education status (0.1299), farming experience (0.1096), occupation (0.0955), social participation (0.0775), religion (0.0591), received training (0.0538), marketing management (0.0319), decision making (0.143), total economic status (0.138), work distribution pattern (0.0136), family size (0.0033), gender (-0.0028), herd size (-0.0084), planning skills (-0.0192), caste (-0.0361), marital status (-0.0476), communication skills (-0.0482), category (-0.564) and age (-0.1244).

**Table- 4.22: Path Co-efficient showing the direct and indirect effect of selected independent variables on communication score of selected small ruminant livestock practices (overall study)**

<b>Independent Variables</b>	<b>Direct effect of Communication</b>	<b>Indirect effect on adoption through other independent variables</b>
(X <sub>1</sub> ) Gender	-0.0028	(X <sub>8</sub> ) 0.0101 (X <sub>2</sub> ) 0.0087 (X <sub>3</sub> ) 0.0062
(X <sub>2</sub> ) Age	-0.1244	(X <sub>17</sub> ) 0.0504 (X <sub>9</sub> ) 0.0324 (X <sub>4</sub> ) 0.0124
(X <sub>3</sub> ) Category	-0.0564	(X <sub>14</sub> ) 0.0773 (X <sub>6</sub> ) 0.0576 (X <sub>9</sub> ) 0.0405
(X <sub>4</sub> ) Occupation	0.0955	(X <sub>15</sub> ) 0.0788 (X <sub>14</sub> ) 0.0469 (X <sub>6</sub> ) 0.0406
(X <sub>5</sub> ) Caste	-0.0361	(X <sub>6</sub> ) 0.0176 (X <sub>17</sub> ) 0.0121 (X <sub>2</sub> ) 0.0099
(X <sub>6</sub> ) Education	0.1764	(X <sub>15</sub> ) 0.1074 (X <sub>11</sub> ) 0.0662 (X <sub>14</sub> ) 0.0552
(X <sub>7</sub> ) Marital status	-0.0476	(X <sub>17</sub> ) 0.0241 (X <sub>3</sub> ) 0.0056 (X <sub>5</sub> ) 0.0043
(X <sub>8</sub> ) Religion	0.0591	(X <sub>3</sub> ) 0.0073 (X <sub>4</sub> ) 0.0048 (X <sub>11</sub> ) 0.0039
(X <sub>9</sub> ) Family type	0.1619	(X <sub>17</sub> ) 0.0329 (X <sub>14</sub> ) 0.0276 (X <sub>35</sub> ) 0.0257
(X <sub>10</sub> ) Family size	0.0033	(X <sub>9</sub> ) 0.0988 (X <sub>17</sub> ) 0.0329 (X <sub>35</sub> ) 0.0157
(X <sub>11</sub> ) Family education status	0.1299	(X <sub>15</sub> ) 0.0859 (X <sub>35</sub> ) 0.0286 (X <sub>16</sub> ) 0.0256
(X <sub>12</sub> ) Received training	0.0538	(X <sub>15</sub> ) 0.0907 (X <sub>6</sub> ) 0.0829 (X <sub>35</sub> ) 0.0772
(X <sub>13</sub> ) Herd size	-0.0084	(X <sub>35</sub> ) 0.0672 (X <sub>15</sub> ) 0.0549 (X <sub>6</sub> ) 0.0423
(X <sub>14</sub> ) Economic status	0.138	(X <sub>15</sub> ) 0.1122 (X <sub>6</sub> ) 0.0706 (X <sub>35</sub> ) 0.0372
(X <sub>15</sub> ) Urban contact	0.1687	(X <sub>6</sub> ) 0.0794 (X <sub>14</sub> ) 0.0649 (X <sub>16</sub> ) 0.0333

(X <sub>16</sub> ) Social participation	0.0775	(X <sub>15</sub> ) 0.01026 (X <sub>6</sub> ) 0.0741 (X <sub>11</sub> ) 0.0429
(X <sub>17</sub> ) Farming experience	0.1096	(X <sub>9</sub> ) 0.0486 (X <sub>35</sub> ) 0.0329 (X <sub>15</sub> ) 0.0286
(X <sub>21</sub> ) Communication skills	-0.0482	(X <sub>15</sub> ) 0.0119 (X <sub>11</sub> ) 0.0052 (X <sub>4</sub> ) 0.0048
(X <sub>34</sub> ) Planning skills	-0.0192	(X <sub>15</sub> ) 0.0692 (X <sub>6</sub> ) 0.0494 (X <sub>35</sub> ) 0.0272
(X <sub>35</sub> ) Decision making	0.143	(X <sub>15</sub> ) 0.0453 (X <sub>6</sub> ) 0.0441 (X <sub>14</sub> ) 0.0359
(X <sub>36</sub> ) Work distribution pattern	0.0136	(X <sub>35</sub> ) 0.0744 (X <sub>14</sub> ) 0.0524 (X <sub>6</sub> ) 0.0476
(X <sub>37</sub> ) Marketing management	0.0319	(X <sub>6</sub> ) 0.0353 (X <sub>14</sub> ) 0.0345 (X <sub>35</sub> ) 0.0329

**Residual effect = 0.4556**

The residual effect has been found to be 0.4556 or, in a way, 45.56 per cent of the total variables have been left unexplained.

The study revealed that 9 variables had their largest indirect effects through 'urban contact' of respondents which were related to occupation, education of the respondent, family education status, received training, economic status, social participation, communication skills, planning skills and decision making activities of small ruminant livestock practices.

Further processing of the data revealed that out of 22 exogenous variables, 3 had their largest indirect effects through communication score about 'education' of the SRLO which were related to caste, urban contact and marketing management.

The table 4.22 also showed that 3 variables had their largest indirect effect through communication score about 'farming experience' of the SRLO which were related to marital age, status and family type.

The findings suggest that 'education of the respondents' and 'urban contact' has not only exerted largest direct effect on communication source of selected small ruminant livestock practices by the SRLO but a number of factors also exert their largest indirect effect through it. So education of the respondents and urban contact of the respondent has come out to be the key element which directly and indirectly promotes the knowledge of selected small ruminant livestock practices by the SRLO in overall study.

**Correlation of different independent variables with deworming, castration and vaccination of small ruminant livestock practices:**

The table 4.23 indicated that the adoption of deworming by the SRLO was negatively and significantly correlated with religion at 5 per cent level in SRLO of the overall study area. Where as adoption of deworming was positively and significantly correlated with mass media, reproductive knowledge about male and female livestock, knowledge about feeding and planning skills at 5% level and with

farming experience, attitude towards need for autonomy and decision making activities at 1% level. But in Purulia district adoption of deworming by the SRLO was positively and significantly correlated with farming experience, reproductive knowledge about male and female livestock and decision making at 5% level and with decision making at 1% level. In South 24 Parganas adoption of deworming by the SRLO was negatively and significantly correlated with caste at 5% level. Adoption of deworming was also positively and significantly correlated with farming experience at 5% level.

The table 4.23 also indicated that the overall adoption of castration by the SRLO was positively and significantly correlated with category, family type, family size, personal cosmopolite, attitude towards need for achievement of goals, decision making and marketing management at 5% level and with occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, farming experience, mass media sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards motivation of progress, attitude towards small ruminant farming, planning skills and work distribution pattern at 1% level. But in Purulia district adoption of castration by the SRLO was positively and significantly correlated with category, education, family type, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy and attitude towards small ruminant farming at 5% level and with occupation, caste, family education status, received training, herd size, economic status, urban contact, social participation, farming experience, mass media sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, planning skills and decision making activities at 1% level. In South 24 Parganas adoption of castration by the SRLO was negatively and significantly correlated with religion and attitude

towards leadership at 1% and 5% level respectively. Adoption of castration practice is also positively and significantly correlated with family educational status, personal localite sources, education, knowledge about feeding, vaccination, decision making and work distribution activities at 5% level and with education, social participation farming experience, mass media sources, reproductive knowledge about male livestock and knowledge about feeding, attitude towards motivation of progress at 1% level.

The table 4.23 also indicated that the overall adoption of vaccination by the SRLO was negatively and significantly correlated with gender at 1% level. Adoption of vaccination positively and significantly correlated with attitude towards small ruminant farming 5% level and with occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goals, attitude towards innovative and creative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills, decision making, work distribution pattern and marketing management at 1% level. But in Purulia district adoption of vaccination practice by the SRLO was positively and significantly correlated with caste at 5% level and with education, family educational status, received training, herd size, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards achievement of goal, attitude towards creative and innovative skills, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills, decision making and work distribution pattern at 1% level. In South 24 Parganas adoption of vaccination practices by the SRLO was negatively and significantly correlated with gender, marital status at 1% level.

**Table- 4.23: Correlation of different Independent variables with adoption of Deworming, Castration and Vaccination**

Independent variables	Dependent variable →								
	Deworming			Castration			Vaccination		
	Overall	Purulia	South 24 Pgs	Overall	Purulia	South 24 Pgs	Overall	Purulia	South 24 Pgs
(X <sub>1</sub> ) Gender	-0.03	-0.06	0.06	-0.05	-0.05	-0.09	-0.23**	-0.16	-0.33**
(X <sub>2</sub> ) Age	0.03	0.05	0.12	0.11	0.10	0.11	0.01	-0.03	-0.03
(X <sub>3</sub> ) Category	0.06	0.06	-0.12	0.12*	0.20*	0.10	0.11	0.01	0.26**
(X <sub>4</sub> ) Occupation	0.00	0.12	-0.08	0.27**	0.35**	0.16	0.18**	0.13	0.25**
(X <sub>5</sub> ) Caste	0.02	0.02	-0.17*	0.01	0.23**	-0.09	0.06	0.19*	-0.12
(X <sub>6</sub> ) Education	0.06	0.04	0.07	0.24**	0.21*	0.29**	0.36**	0.33**	0.39**
(X <sub>7</sub> ) Marital status	-0.04	-0.05	-0.02	0.06	-0.01	0.14	-0.13	0.02	-0.34**
(X <sub>8</sub> ) Religion	-0.12*	0.00	-0.12	-0.14	0.00	-0.25**	-0.08	0.00	-0.14
(X <sub>9</sub> ) Family type	0.07	-0.02	0.10	0.13*	0.20*	0.11	0.01	0.03	-0.03
(X <sub>10</sub> ) Family size	0.02	-0.04	0.03	0.12*	0.11	0.11	0.04	0.00	0.06
(X <sub>11</sub> ) Family education status	0.01	0.10	0.03	0.24**	0.23**	0.19*	0.27**	0.31**	0.27**
(X <sub>12</sub> ) Received training	0.10	0.13	0.06	0.22**	0.36**	0.09	0.65**	0.66**	0.64**
(X <sub>13</sub> ) Herd size	0.06	0.04	0.05	0.18**	0.28**	0.11	0.33**	0.36**	-0.30**
(X <sub>14</sub> ) Economic status	-0.01	-0.08	0.00	0.16**	0.29**	0.12	0.22**	0.16	0.28**
(X <sub>15</sub> ) Urban contact	0.05	0.07	0.10	0.17**	0.24**	0.11	0.22**	0.10	0.40**
(X <sub>16</sub> ) Social participation	0.01	-0.06	0.05	0.23**	0.26**	0.24**	0.22**	0.14	0.33**
(X <sub>17</sub> ) Farming experience	0.19**	0.21*	0.12	0.33**	0.40**	0.32**	0.05	0.07	0.00
(X <sub>18</sub> ) Mass media	0.12*	0.05	0.17*	0.30**	0.26**	0.36**	0.32**	0.15	0.51**
(X <sub>19</sub> ) Personal cosmopolite	0.04	0.13	0.02	0.14*	0.14	0.10	0.18**	0.10	0.28**
(X <sub>20</sub> ) Personal localite	0.04	0.04	0.01	0.20**	0.24**	0.17*	0.06	0.02	0.11
(X <sub>21</sub> ) Communication skills	0.04	0.05	0.05	-0.06	-0.03	-0.09	-0.01	0.00	-0.01
(X <sub>22</sub> ) Reproductive knowledge about male livestock	0.15*	0.20*	0.10	0.46**	0.56**	0.34**	0.41**	0.38**	0.46**

(X23) Reproductive knowledge about female livestock	0.13*	0.18*	0.05	0.33**	0.56**	0.09	0.49**	0.53**	0.45**
(X24) Knowledge about feeding	0.13*	0.11	0.10	0.24**	0.37**	0.19*	0.39**	0.45**	0.34**
(X25) Knowledge about deworming	0.08	0.14	0.01	0.34**	0.44**	0.26**	0.39**	0.37**	0.43**
(X26) Knowledge about vaccination	0.07	0.08	0.08	0.32**	0.42**	0.21*	0.62**	0.64**	0.62**
(X27) Attitude towards leadership	0.03	0.07	-0.01	0.05	0.29**	-0.17*	0.19**	0.35**	0.01
(X28) Attitude towards need for achievement of goals	0.04	0.06	0.03	0.13*	0.09	0.15	0.23**	0.22**	0.24**
(X29) Attitude towards creative and innovative skills of marketing	0.04	0.01	0.06	0.16	0.17*	0.16	0.26**	0.27**	0.24**
(X30) Attitude towards motivation of progress	0.01	0.08	-0.03	0.27**	0.20*	0.32**	0.29**	0.30**	0.28**
(X31) Attitude towards need for autonomy	0.19**	0.24	0.00	0.10	0.17*	0.03	0.27**	0.25**	0.51**
(X32) Attitude towards risk	0.06	0.09	0.02	0.02	0.10	-0.05	0.19**	0.23**	0.13
(X33) Attitude towards small ruminant farming	0.04	0.03	0.15	0.18**	0.19*	0.10	0.12*	0.13	0.13
(X34) Planning skills	0.14*	0.13	0.14	0.18**	0.35**	-0.01	0.22**	0.31**	0.10
(X35) Decision making	0.19**	0.23**	0.11	0.13*	0.13	0.19*	0.43**	0.41**	0.46**
(X36) Work distribution pattern	0.06	0.03	0.07	0.23**	0.26**	0.21*	0.43**	0.44**	0.42**
(X37) Marketing management	-0.01	-0.06	0.00	0.13*	0.13	0.15	0.20**	0.08	0.36**

N.B. \* indicates 5 per cent level of significance. \*\* indicates 1 per cent level of significance.

Adoption of vaccination is also positively and significantly correlated with category, occupation, education, marital status, family educational status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards achievement of goal, attitude towards creative and innovative skills, attitude towards motivation of progress, attitude towards need for autonomy, decision making, work distribution activities and marketing management at 1% level.

**Correlation of different independent variables with adoption of colostrum feeding, selective breeding, record keeping and treatment with medicine of small ruminant livestock practices:**

The table 4.24 indicated that the overall adoption of colostrum feeding by the SRLO was negatively and significantly correlated with gender at 1 per cent level. Where as adoption of colostrum feeding was positively and significantly correlated with urban contact, social participation, mass media, reproductive knowledge about male and female livestock and planning skills at 5% level and with age, category, occupation, marital status, family type, family size, herd size, economic status, farming experience, personal localite sources, reproductive knowledge about male livestock, knowledge about deworming, decision making and work distribution activities at 1% level. But in Purulia district adoption of colostrum feeding by the SRLO was negatively and significantly correlated with gender at 5% level. Adoption of colostrum feeding positively and significantly correlated with marital status, family size, family educational status, economic status, urban contact, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about female livestock, knowledge about deworming and work distribution at 5% level and with age, category, occupation, family type, herd size, farming experience, reproductive knowledge about male livestock and decision making at 1% level. In South 24

Parganas adoption of colostrum feeding by the SRLO was positively and significantly correlated with personal localite sources, reproductive knowledge about male livestock, knowledge about deworming, attitude towards motivation of progress and decision making activities at 5% level and with age, marital status, family type, family size and farming experience at 1% level.

The table 4.24 also indicated that the overall adoption of selective breeding by the SRLO was negatively and significantly correlated with gender and marital status at 1% level. Adoption of selective breeding by the SRLO was positively and significantly correlated with category, occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal localite sources, personal cosmopolite, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goals, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risks, planning skills, decision making activities, work distribution pattern and marketing management at 1% level. But in Purulia district adoption of selective breeding by the SRLO was positively and significantly correlated with occupation and caste at 5% level and with category, education, family education status, received training, herd size, economic status, urban contact, mass media sources, personal cosmopolite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards achievement of goals, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risks, planning skills, decision making activities, work distribution pattern and marketing management at 1% level. In South 24 Parganas adoption of selective breeding by the SRLO was negatively and significantly correlated with

gender, age, marital status at 1% level. Adoption of selective breeding is also positively and significantly correlated with family size, attitude towards small ruminant farming, planning skills at 5% level and with category, occupation, education, family educational status, received training, herd size, urban contact, social participation, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards need for achievement of goals, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risks, decision making activities, work distribution activities and marketing management at 1% level.

The table 4.24 further indicated that the overall adoption of record keeping by the SRLO was negatively and significantly correlated with gender at 1% level. Adoption of record keeping positively and significantly correlated with family type, family size 5% level and with category, occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goals, attitude towards innovative and creative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills, decision making, work distribution pattern and marketing management at 1% level. But in Purulia district adoption of record keeping by the SRLO was negatively and significantly correlated with gender at 1% level. Adoption of record keeping by the SRLO was positively and significantly correlated with occupation, social participation, personal cosmopolite sources, personal localite sources and decision making at 5% level and with caste, education, family educational status, received training, herd size, economic status, urban contact, mass media

sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goal, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills and work distribution pattern at 1% level. In South 24 Parganas adoption of record keeping by the SRLO was negatively and significantly correlated with caste, marital status at 5% level and with gender at 1% level. Adoption of record keeping is also positively and significantly correlated with occupation and attitude towards motivation of progress at 5% level and with category, education, family type, family size, family educational status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards need for achievement of goal, attitude towards creative and innovative skills for marketing, attitude towards need for autonomy, attitude towards risk, decision making, work distribution activities and marketing management at 1% level.

The table 4.24 also indicated that the overall adoption of treatment with medicine by the SRLO was negatively and significantly correlated with gender at 5% level. Adoption of treatment with medicine positively and significantly correlated with category, urban contact, social participation, mass media sources, reproductive knowledge about female livestock, knowledge about feeding and vaccination 5% level and with age, occupation, marital status, family type, family size, herd size, economic status, farming experience, reproductive knowledge about male and livestock, knowledge about deworming, decision making activities, work distribution pattern and marketing management at 1% level. But in Purulia district adoption of treatment by medicine by the SRLO was positively and significantly correlated with marital status, mass media sources, personal

**Table- 4.24: Correlation of different Independent variables with adoption of Colostrum feeding, Selective breeding, Record keeping, Purulia, South 24 Pgs**

Dependent variable →	Colostrum feeding			Selective breeding			Record keeping			Treatment with medicine		
	Overall	Purulia	South 24 Pgs	Overall	Purulia	South 24 Pgs	Overall	Purulia	South 24 Pgs	Overall	Purulia	South 24 Pgs
(X <sub>1</sub> ) Gender	-0.21**	-0.21*	-0.15	-0.21**	-0.09	-0.34**	-0.27**	-0.26**	-0.28**	-0.14*	-0.06	-0.20*
(X <sub>2</sub> ) Age	0.45**	0.55**	0.61**	-0.11	-0.06	-0.22**	-0.11	-0.09	-0.16	0.29**	0.35**	0.42**
(X <sub>3</sub> ) Category	0.23**	0.26**	0.07	0.32**	0.26**	0.42**	0.22**	0.07	0.40**	0.15*	0.14	0.01
(X <sub>4</sub> ) Occupation	0.20**	0.44**	-0.14	0.22**	0.19*	0.26**	0.19**	0.20*	0.20*	0.17**	0.36**	-0.03
(X <sub>5</sub> ) Caste	0.11	0.09	-0.11	0.04	0.20*	-0.14	0.11	0.31**	-0.20*	0.10	0.01	-0.09
(X <sub>6</sub> ) Education	-0.07	-0.10	-0.07	0.46**	0.44**	0.48**	0.49**	0.51**	0.46**	0.02	0.01	-0.01
(X <sub>7</sub> ) Marital status	0.22**	0.18*	0.40**	-0.19**	-0.04	-0.31**	-0.15	-0.07	-0.19*	0.17**	0.19*	0.26**
(X <sub>8</sub> ) Religion	-0.06	0.00	0.02	-0.07	0.00	-0.09	-0.09	0.00	-0.10	-0.07	0.00	0.03
(X <sub>9</sub> ) Family type	0.31**	0.27**	0.33**	0.09	0.04	0.14	0.15*	0.08	0.21**	0.20**	0.15	0.24**
(X <sub>10</sub> ) Family size	0.30**	0.18*	0.28**	0.09	-0.02	0.20*	0.12*	-0.03	0.27**	0.24**	0.11	0.27**
(X <sub>11</sub> ) Family education status	0.10	0.22*	0.13	0.33**	0.40**	0.31**	0.28**	0.33**	0.34**	-0.02	0.11	0.03
(X <sub>12</sub> ) Received training	-0.01	0.01	-0.07	0.91**	0.90**	0.92**	0.68**	0.52**	0.85**	0.03	0.02	0.03
(X <sub>13</sub> ) Herd size	0.21**	0.29**	0.02	0.47**	0.47**	0.47**	0.38**	0.27**	0.49**	0.18**	0.25**	0.01
(X <sub>14</sub> ) Economic status	0.18**	0.22*	0.12	0.43**	0.34**	0.52**	0.43**	0.31**	0.53**	0.19**	0.26**	0.07
(X <sub>15</sub> ) Urban contact	0.12*	0.17*	0.00	0.38**	0.36**	0.42**	0.29**	0.25**	0.35**	0.13*	0.16	0.07
(X <sub>16</sub> ) Social participation	0.14*	0.13	0.07	0.22**	0.15	0.31**	0.24**	0.22*	0.27**	0.12*	0.08	0.10
(X <sub>17</sub> ) Farming experience	1.00**	1.00**	1.00**	0.01	0.06	-0.06	0.10	0.16	-0.03	0.68**	0.68**	0.62**
(X <sub>18</sub> ) Mass media	0.14*	0.17*	0.09	0.47**	0.35**	0.58**	0.49**	0.42**	0.56**	0.15*	0.21*	0.05
(X <sub>19</sub> ) Personal cosmopolite	0.09	0.17*	0.10	0.26**	0.25**	0.30**	0.18**	0.18*	0.24**	0.11	0.21*	0.12
(X <sub>20</sub> ) Personal localite	0.19**	0.20*	0.18*	0.19**	0.10	0.29**	0.25**	0.19*	0.31**	0.11	0.09	0.10
(X <sub>21</sub> ) Communication skills	-0.05	-0.04	-0.07	0.01	0.03	0.00	0.04	0.02	0.05	-0.02	-0.04	0.00
(X <sub>22</sub> ) Reproductive knowledge about male livestock	0.27**	0.33**	0.20*	0.54**	0.55**	0.52**	0.45**	0.46**	0.44**	0.23**	0.27**	0.17*

(X <sub>23</sub> ) Reproductive knowledge about female livestock	0.13*	0.20*	0.04	0.58**	0.68**	0.49**	0.50**	0.57**	0.42**	0.15*	0.21**	0.08
(X <sub>24</sub> ) Knowledge about feeding	0.15*	0.12	0.02	0.52**	0.67**	0.39**	0.44**	0.51**	0.35**	0.15*	0.10	0.05
(X <sub>25</sub> ) Knowledge about deworming	0.19**	0.20*	0.18*	0.46**	0.43**	0.48**	0.44**	0.46**	0.43**	0.22**	0.24**	0.18*
(X <sub>26</sub> ) Knowledge about vaccination	0.07	0.10	0.08	0.59**	0.60**	0.57**	0.47**	0.47**	0.49**	0.12*	0.21**	0.07
(X <sub>27</sub> ) Attitude towards leadership	-0.04	-0.02	-0.09	0.27**	0.43**	0.11	0.25**	0.41**	0.08	0.01	-0.01	0.04
(X <sub>28</sub> ) Attitude towards need for achievement of goals	-0.01	-0.06	0.08	0.32**	0.31**	0.33**	0.27**	0.23**	0.31**	-0.04	-0.11	0.06
(X <sub>29</sub> ) Attitude towards creative and innovative skills of marketing	0.04	-0.01	0.09	0.27**	0.28**	0.25**	0.25**	0.26**	0.24**	0.07	-0.04	0.09
(X <sub>30</sub> ) Attitude towards motivation of progress	0.04	-0.01	0.17*	0.30**	0.37**	0.26**	0.30**	0.45**	0.17*	0.06	-0.07	0.10
(X <sub>31</sub> ) Attitude towards need for autonomy	0.08	0.00	0.04	0.36**	0.38**	0.38**	0.36**	0.41**	0.34**	0.06	-0.03	0.01
(X <sub>32</sub> ) Attitude towards risk	0.04	0.01	0.09	0.28**	0.30**	0.25**	0.28**	0.26**	0.30**	0.03	0.02	0.06
(X <sub>33</sub> ) Attitude towards small ruminant farming	0.00	0.08	0.00	0.11	0.07	0.19*	0.11	0.14	0.14	-0.09	-0.05	0.02
(X <sub>34</sub> ) Planning skills	0.12*	0.12	0.09	0.32**	0.45**	0.17*	0.28**	0.41**	0.10	0.08	0.04	0.12
(X <sub>35</sub> ) Decision making	0.23**	0.23**	0.18*	0.51**	0.49**	0.57**	0.40**	0.25*	0.62**	0.22**	0.23**	0.13
(X <sub>36</sub> ) Work distribution pattern	0.17**	0.18*	0.13	0.53**	0.49**	0.58**	0.41**	0.24**	0.63**	0.22**	0.24**	0.17*
(X <sub>37</sub> ) Marketing management	0.04	0.07	-0.06	0.32**	0.24**	0.42**	0.29**	0.13	0.47**	0.16**	0.21*	0.10

N.B. \* indicates 5 per cent level of significance, \*\* indicates 1 per cent level of significance.

cosmopolite sources and marketing management at 5% level and with age, occupation, herd size, economic status, farming experience, reproductive knowledge about male and female livestock, knowledge about deworming, vaccination, decision making activities and work distribution pattern at 1% level. In South 24 Parganas adoption of treatment by medicine by the SRLO was negatively and significantly correlated with gender at 5% level. Adoption of treatment by medicine was also positively and significantly correlated with reproductive knowledge about male livestock, knowledge about feeding, deworming and work distribution pattern at 5% level and with age, marital status, family type, family size, farming experience at 1% level.

The table 4.25 also indicated that the overall adoption index by the SRLO was negatively and significantly correlated with gender (Teklewold *et al.*, 2006) at 1% level. Overall Adoption Index was positively and significantly correlated with caste and attitude towards risk at 5% level and with age (Nakade, 1971; Jha and Shakwat, 1972; Bhutia, 1974; Ibotambi, 1974; Vijay Kumar, 1976), category, (Desai, 1966; Nakade, 1971; Malhotra, 1974; Saha, 1974;), occupation, education (Hussain, 1968; and Halyal, 1968; Chug, 1986), family type (Choubey, 1972; and Somasundaram, 1976), family size (Tripathi and Garg, 1969; Alao, 1971; Sohi and Kherde, 1980; Sayeedi, 1983; and Raymundo, 1994), family educational status (Chander, 1970; Singh and Singh, 1970; Tripathi and Jati, 1971), received training, herd size (Chander, 1976), economic status (Singh, 1982), urban contact, social participation, farming experience, mass media sources (Ranganathan and Joysankara, 1976; Sawant *et al.*, 1979; Nataraju and Channegowda, 1984), personal cosmopolite sources (Ranganathan and Joysankara, 1976 and Sarkar, 1981), personal localite sources (Sarkar, 1981), reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination (Majumder and Majumder, 1967; Choubey, 1972; Chouhan, 1979; and Singh, 1982; Chug, 1986), attitude towards creative and innovative skills of marketing, attitude towards motivation of progress,

attitude towards need for autonomy (Gupta, 1997), planning skills, work distribution pattern, decision making and marketing management at 1% level.

But in Purulia district overall adoption index by the SRLO was negatively and significantly correlated with gender at 5% level. Overall Adoption Index was positively and significantly correlated with caste, social participation, attitude towards motivation of progress and attitude towards need for autonomy at 5% level and with age, category, occupation, family type, family educational status, received training, herd size, economic status, urban contact, farming experience, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, planning skill, decision making activities and work distribution pattern at 1% level. Daipuria *et al.* (2001) reported that age, education, house type, social participation, risk orientation, knowledge about technologies, personal cosmopolite sources, mass media sources, market orientation are significantly associated with the adoption of dairy practices. It was also revealed from their findings that family type, family size and caste had no significant relationship with the adoption level of the farmers.

In South 24 Parganas adoption index was negatively and significantly correlated with gender and caste at 1% level. Adoption index was also positively and significantly correlated with marital status, urban contact, attitude towards need for autonomy, attitude towards risk, planning skills and marketing management at 5% level and with age, category, education, family type, family size, family educational status, received training, herd size, economic status, social participation, farming experience, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards need for achievement of

**Table- 4.25: Correlation of different Independent variables with Adoption Index**

Dependent variable → Independent variables	Adoption Index		
	Overall	Purulia	South 24 Parganas
(X <sub>1</sub> ) Gender	-0.26**	-0.22*	-0.27**
(X <sub>2</sub> ) Age	0.34**	0.43**	0.43**
(X <sub>3</sub> ) Category	0.29**	0.27**	0.23**
(X <sub>4</sub> ) Occupation	0.27**	0.48**	0.03
(X <sub>5</sub> ) Caste	0.12*	0.17*	-0.23**
(X <sub>6</sub> ) Education	0.17**	0.11	0.24**
(X <sub>7</sub> ) Marital status	0.11	0.13	0.19*
(X <sub>8</sub> ) Religion	-0.13	0.00	-0.12
(X <sub>9</sub> ) Family type	0.30**	0.25**	0.35**
(X <sub>10</sub> ) Family size	0.29**	0.14	0.33**
(X <sub>11</sub> ) Family education status	0.20**	0.32**	0.27**
(X <sub>12</sub> ) Received training	0.32**	0.30**	0.37**
(X <sub>13</sub> ) Herd size	0.35**	0.40**	0.24**
(X <sub>14</sub> ) Economic status	0.31**	0.31**	0.31**
(X <sub>15</sub> ) Urban contact	0.25**	0.27**	0.21*
(X <sub>16</sub> ) Social participation	0.23**	0.18*	0.26**
(X <sub>17</sub> ) Farming experience	0.88**	0.91**	0.79**
(X <sub>18</sub> ) Mass media	0.35**	0.30**	0.44**
(X <sub>19</sub> ) Personal cosmopolite	0.18**	0.25**	0.23**
(X <sub>20</sub> ) Personal localite	0.25**	0.22**	0.28**
(X <sub>21</sub> ) Communication skills	-0.03	-0.02	-0.04
(X <sub>22</sub> ) Reproductive knowledge about male livestock	0.49**	0.53**	0.46**
(X <sub>23</sub> ) Reproductive knowledge about female livestock	0.37**	0.46**	0.27**
(X <sub>24</sub> ) Knowledge about feeding	0.35**	0.34**	0.25**
(X <sub>25</sub> ) Knowledge about deworming	0.39**	0.40**	0.40**
(X <sub>26</sub> ) Knowledge about vaccination	0.33**	0.35**	0.37**
(X <sub>27</sub> ) Attitude towards leadership	0.08	0.16	-0.05
(X <sub>28</sub> ) Attitude towards need for achievement of goals	0.11	0.04	0.23**
(X <sub>29</sub> ) Attitude towards creative and innovative skills of marketing	0.17**	0.12	0.23**
(X <sub>30</sub> ) Attitude towards motivation of progress	0.19**	0.17*	0.28**
(X <sub>31</sub> ) Attitude towards need for autonomy	0.24**	0.17*	0.20*
(X <sub>32</sub> ) Attitude towards risk	0.14*	0.12	0.17*
(X <sub>33</sub> ) Attitude towards small ruminant farming	0.06	0.11	0.14
(X <sub>34</sub> ) Planning skills	0.25**	0.28**	0.17*
(X <sub>35</sub> ) Decision making	0.41**	0.37**	0.45**
(X <sub>36</sub> ) Work distribution pattern	0.36**	0.32**	0.42**
(X <sub>37</sub> ) Marketing management	0.18**	0.15	0.19*

N.B. \* indicates 5 per cent level of significance, \*\* indicates 1 per cent level of significance.

goal, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, decision making activities and work distribution pattern at 1% level. Goswami (2000) reported in his study that there were significant relationships between the adoption of selected Animal Husbandry practices and family educational status, material position, herd size, attitude towards dairy farming, mass media communication, personal cosmopolitan, marketing orientation, risk orientation and social participation in case of saline belt livestock owners.

**Analysis of variance of different independent variables in relation to adoption of selected small ruminant Livestock practices:**

Table- 4.26 depicted that in case of overall adoption rate by the 'Elder (> 42 Yrs)' age group SRLO was significantly ( $P < 0.05$ ) higher than 'Most active group (31-42 Yrs)' and 'Younger Group (< 31 Yrs)'. At the same time 'Most active group (31-42 Yrs)' was significantly higher in adoption rate than 'Younger Group (< 31 Yrs)'.

Regarding adoption of selected Small Ruminant livestock practices by the SRLO in Purulia and South 24 Pgs District, same results were observed as in Overall adoption.

Table- 4.27 revealed that in case of overall adoption by the SRLO, 'Male' SRLO were having significantly ( $P < 0.01$ ) higher adoption rate than the 'Female' SRLO.

In case of Purulia district, adoption of selected Small Ruminant Livestock Practices by 'Male' SRLO was significantly ( $P < 0.05$ ) higher than the 'Female' SRLO.

But in case of South 24 Parganas district, adoption of selected Small Ruminant Livestock Practices by 'Male' SRLO was significantly ( $P < 0.01$ ) higher than the 'Female' SRLO.

Table- 4.28 depicted that in case of overall adoption rate by the 'OBC' caste group of SRLO was significantly ( $P < 0.05$ ) higher than 'SC' and 'ST' caste group of SRLO. But there were no significant differences in adoption rate amongst the 'SC' and 'ST' caste group of SRLO. At the

same time 'General' caste group of SRLO were more or less same in adoption rate with the 'SC', 'ST' and 'OBC' caste groups of SRLO.

In case of adoption by the SRLO of Purulia district, there was no significant difference in adoption rate amongst the four caste groups i.e. 'General', 'SC', 'ST' and 'OBC'.

Regarding adoption of selected Small Ruminant livestock practices by the SRLO in South 24 Pgs District, "General' caste group was significantly ( $P < 0.05$ ) higher than 'OBC' caste group. But there were no significant differences in adoption rate amongst the 'SC' and 'ST' caste group of SRLO. 'SC' and 'ST' caste group of SRLO were more or less same in adoption rate with 'General' and 'OBC' caste group of SRLO.

Table- 4.29 depicted that in case of overall adoption rate by the 'Medium-Large' and 'Small' category of SRLO was significantly ( $P < 0.05$ ) higher than 'Marginal' and 'Landless' category of SRLO. But There were no significant differences in adoption rate amongst the 'Medium-Large' and 'Small' category of SRLO; and amongst 'Marginal' and 'Landless' category of SRLO.

In case of adoption by the SRLO of Purulia district, 'Medium-Large' category of SRLO was higher in adoption rate than 'Marginal' and 'Landless' category of SRLO. But 'Small' category of SRLO was more or less similar in adoption rate with There were no significant differences amongst the 'Medium-Large', 'Marginal' and 'Landless' category of SRLO. 'Marginal' and 'Landless' category of SRLO in adoption rate.

Regarding adoption of selected Small Ruminant livestock practices by the SRLO in South 24 Pgs District, "Medium-Large' category was significantly ( $P < 0.05$ ) higher than 'Small', 'Marginal' and 'Landless' category. But There were no significant differences in adoption rate amongst the 'Small', 'Medium-Large' and 'Small' category of SRLO; and amongst 'Marginal' and 'Landless' category of SRLO.

**Table -4.26: Showing the effect of Age of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

AGE →	Young Group (<31yrs)	Most active group (31-42 yrs)	Elder group (>42 yrs)	Chi-Square	Sig.
Overall Adoption score*	1.84 c ±0.11	2.37 b ±0.14	3.03 a ±0.17	27.46	0.00
Purulia Adoption score**	1.98c ± 0.13	2.67b ± 0.28	3.52a ± 0.28	15.51	0.00
South 24 Pgs Adoption score**	1.65c ± 0.17	2.14b ± 0.11	2.57a ± 0.18	15.58	0.00

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

**Table -4.27: Showing the effect of Gender of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

GENDER →	Male	Female	Mann-Whitney U	Sig.	Kolm-SmirnZ	Sig.
Overall Adoption score*	2.9 ±0.15	2.13 ±0.1	6469.00	0.00	2.29	0.00
Purulia Adoption score**	3.08 ± 0.23	2.36 ± 0.17	1911.50	0.028	1.428	0.034
South 24 Pgs Adoption score**	2.62 ± 0.15	1.95 ± 0.11	1250.00	0.000	1.701	0.006

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

**Table -4.28: Showing the effect of Caste of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

CASTE →	General	SC	ST	F	Sig.	Chi-square	Sig.
Overall Adoption score*	2.55 ab ±0.2	2.09 b ±0.11	2.21 b ±0.19	1.964	0.12	12.55	0.01
Purulia Adoption score**	2.36a ± 0.47	2.57a ± 0.35	2.29a ± 0.23	4.22	0.01	9.795	0.02
South 24 Pgs Adoption score**	2.66a ± 0.20	2.01ab ± 0.11	2.02ab ± 0.31	3.37	0.02	10.05	0.018

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

**Table -4.29: Showing the effect of Category of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

CATEGORY →	Landless	Marginal	Small	Medium-Large	F	Sig.	Chi-square	Sig.
Overall Adoption score*	2.01 b ±0.22	2.18 b ±0.1	2.9 a ±0.22	3.46 a ±0.3	2.513	0.042	24.06	0.00
Purulia Adoption score**	2.25b ± 0.31	2.31b ± 0.17	3.23ab ± 0.33	3.44a ± 0.37	2.49	0.06	12.10	0.007
South 24 Pgs Adoption score**	1.89b ± 0.29	2.07b ± 0.11	2.35b ± 0.19	3.54a ± 0.26	3.21	0.03	10.59	0.014

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

Table- 4.30 depicted that in case of overall adoption rate by the 'Hindu' and 'Muslim' community of SRLO was significantly ( $P < 0.05$ ) higher than 'Christian' community of SRLO. But there were no significant differences in adoption rate amongst the 'Hindu' and 'Muslim' community of SRLO.

In case of adoption by the SRLO of Purulia district, all the respondents were from 'Hindu' community.

Regarding adoption of selected Small Ruminant livestock practices by the SRLO in South 24 Pgs District, "Muslim" community was significantly ( $P < 0.05$ ) higher than 'Hindu', and 'Christian' community. At the same time SRLO of 'Hindu' community was having significantly higher adoption rate than 'Christian' community SRLO. SRLO of all the community differed significantly amongst themselves in relation to adoption of improved small Ruminant Livestock Practices.

Table- 4.31 depicted that in case of overall adoption rate by the 'Widow' SRLO was significantly ( $P < 0.05$ ) higher than 'Unmarried' and 'Married' SRLO. But adoption rate by the 'Married' and 'Unmarried' SRLO was more or less same.

In case of adoption by the SRLO of Purulia district, there were no significant differences amongst 'Unmarried', 'Married' and 'Widow' SRLO in adoption rate.

Regarding adoption of selected Small Ruminant livestock practices by the SRLO in South 24 Pgs District, 'Widow' SRLO had significantly higher adoption rate than 'Married' SRLO. But 'Unmarried' SRLO was more or less same in adoption of selected Small Ruminant livestock practices with the 'Married' and 'Widow' SRLO.

Table- 4.32 depicted that in case of overall adoption rate by the SRLO having occupation 'Cultivation' was significantly ( $P < 0.05$ ) higher than 'Agriculture labour', 'Independent profession' and 'Business' occupation group. But SRLO having 'Service' occupation was more or less similar with other groups.

**Table -4.30: Showing the effect of Religion of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

RELIGION →	Hindu	Muslim	Christian	F	Sig.	Chi-Square	Sig.
Overall Adoption score*	2.4636 a ±0.09	2.99 a ±0.31	1.5 b ±0.18	2.812	0.062	13.00	0.00
Purulia Adoption score**	-	-	-	-	-	-	-
South 24 Pgs Adoption score**	2.18b ± 0.11	2.99a ± 0.32	1.45c ± 0.18	8.16	0.00	15.92	0.00

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

**Table -4.31: Showing the effect of Marital Status of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

MARITAL STATUS →	Unmarried	Married	Widow/ Widower	Chi-Square	Sig.
Overall Adoption score*	2.23 b ±0.22	2.38 b ±0.09	3.143 a ±0.32	6.12	0.05
Purulia Adoption score**	1.98a ± 0.22	2.80a ± 0.17	2.77a ± 0.37	2.793	0.247
South 24 Pgs Adoption score**	2.73ab ± 0.47	1.20b ± 0.008	3.20a ± 0.50	7.61	0.022

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

**Table no -4.32: Showing the effect of Occupation of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

OCCUPATION →	Agriculture labour	Business	Independent	Cultivation	Service	F	Sig.	Chi <sup>2</sup>	Sig.
Overall Adoption score*	2.08 b ±0.10	2.28 b ±0.35	2.16 b ±0.16	3.35 a ±0.22	2.81 ab ±0.53	9.99	0.00	27.24	0.00
Purulia Adoption score**	2.04b ± 0.14	2.50b ± 0.48	2.64b ± 0.40	3.97a ± 0.33	4.40a ± 0.53	11.29	0.00	30.84	0.00
South 24 Pgs Adoption score**	2.14ab ± 0.15	2.00ab ± 0.52	1.98ab ± 0.16	2.60a ± 0.21	1.50b ± 0.25	2.36	0.06	9.05	0.06

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

In case of adoption by the SRLO of Purulia district, 'Service' and 'Cultivation' occupation group were significantly higher in adoption rate than 'Agriculture Labour', 'Independent profession', and 'Business' occupation groups. But 'Service' and 'Cultivation' occupation groups were more or less similar and there were no significant differences in between 'Agriculture Labour', 'Independent profession', and 'Business' occupation groups.

Regarding adoption of selected Small Ruminant livestock practices by the SRLO in South 24 Pgs District, 'Cultivation' occupation group was significantly higher in adoption than 'Service' occupation group. But 'Agriculture Labour', 'Independent profession', and 'Business' occupation groups were more or less similar in adoption of selected Small Ruminant livestock practices. At the same time, 'Agriculture Labour', 'Independent profession', and 'Business' did not differ significantly with 'Cultivation' and 'Service' occupation group.

Table- 4.33 revealed that in case of overall adoption rate by the SRLO belonging to the 'Joint Family' was having significantly ( $P < 0.01$ ) higher adoption rate than the SRLO belonging to 'Nuclear Family'.

In case of Purulia district, adoption of selected Small Ruminant Livestock Practices by the SRLO belonging to 'Joint Family' was significantly ( $P < 0.01$ ) higher than the SRLO belonging to 'Nuclear Family'.

Regarding South 24 Parganas district, adoption of selected Small Ruminant Livestock Practices by the SRLO belonging to 'Joint Family' was significantly ( $P < 0.01$ ) higher than the SRLO belonging to 'Nuclear Family'.

Table- 4.34 revealed that in case of overall adoption rate by the SRLO who 'Received Training' was having significantly ( $P < 0.01$ ) higher adoption rate than the SRLO did not have 'Received Training'.

Same result in relation to adoption rate was observed in both Purulia and South 24 Parganas district.

**Table -4.33: Showing the effect of Family type of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

FAMILY TYPE →	Nuclear Family	Joint Family	Mann-Whitney U	Sig.	Kolm-Smirn Z	Sig.
Overall Adoption score*	1.99 ±0.09	2.86 ±0.13	6533.50	0.00	2.28	0.00
Purulia Adoption score**	2.21 ± 0.19	3.05 ± 0.20	1726	0.005	1.267	0.081
South 24 Pgs Adoption score**	1.85 ± 0.10	2.56 ± 0.16	1561	0.000	1.968	0.001

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

**Table -4.34: Showing the effect of Training of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

RECEIVED TRAINING →	No	Yes	Mann-Whitney U	Sig.	Kolm-Smirn Z	Sig.
Overall Adoption score*	2.2 ±0.09	3.4 ±0.15	2606.50	0.00	3.22	0.00
Purulia Adoption score**	2.44 ± 0.16	3.69 ± 0.25	769	0.000	2.197	0.00
South 24 Pgs Adoption score**	1.96 ± 0.10	3.05 ± 0.16	542	0.00	2.473	0.00

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

**Table -4.35: Showing the effect of Education of adoption**

(\*N=280 & \*\*N=140)  
(Mean ± SE)

EDUCATION →	Illiterate	Read only	Read & Write	Primary School	Middle School	High School	Graduate	F	Sig.	Chi-Square	Sig.
Overall Adoption score*	2.32bc ± 0.3	1.87c ± 0.44	2.5bc ± 0.22	1.99c ± 0.14	2.5bc ± 0.18	2.99ab ± 0.23	3.61a ± 0.29	3.362	0	30.89	0.00
Purulia Adoption score**	2.71ab ± 0.40	2.38ab ± 0.91	3.08ab ± 0.54	1.88b ± 0.22	2.87ab ± 0.25	3.14ab ± 0.41	3.61a ± 0.39	2.13	0.05	16.73	0.010
South 24 Pgs Adoption score**	1.83c ± 0.25	1.43c ± 0.26	2.32bc ± 0.23	2.06bc ± 0.18	1.93bc ± 0.19	2.85ab ± 0.24	3.61a ± 0.47	3.69	0.00	20.40	0.002

Mean value with dissimilar superscripts in columns differ significantly (P<0.05)

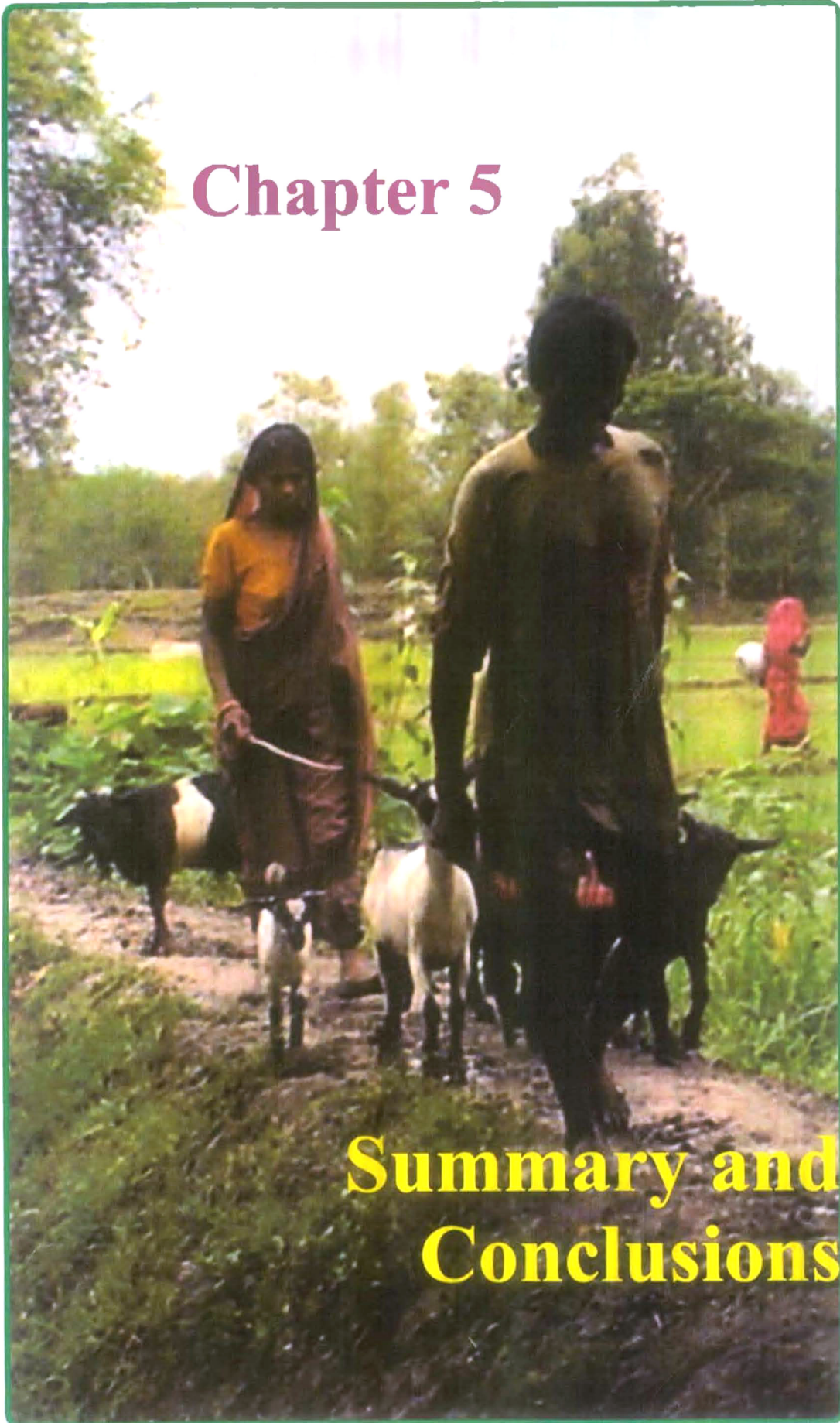
Table- 4.35 depicted that in case of overall adoption rate by the 'Graduate' category of SRLO was significantly ( $P < 0.05$ ) higher than 'Read Only' and 'Primary School' category of SRLO. But there were no significant differences in adoption rate amongst the 'Illiterate', 'Read and Write Only' and 'Middle School' category of SRLO. 'High School' category of SRLO was more or less similar in adoption rate with 'Graduate', 'Illiterate', 'Read and Write Only' and 'Middle School' category of SRLO. At the same time 'Primary School' and 'Read Only' category of SRLO was more or less same with 'Illiterate', 'Read and Write Only' and 'Middle School' category of SRLO in relation to adoption of selected Small Ruminant Livestock Practices.

In case of adoption by the SRLO of Purulia district, 'Graduate' SRLO was significantly higher in adoption rate than 'Primary' SRLO. But there was no significant difference amongst 'High School', 'Middle School', 'Read and Write', 'Read only' and 'Illiterate' SRLO in relation to adoption rate. At the same time 'High School', 'Middle School', 'Read and Write', 'Read only' and 'Illiterate' SRLO were more or less similar with 'Graduate' and 'Primary School' SRLO.

Regarding adoption of selected Small Ruminant livestock practices by the SRLO in South 24 Pgs District, "Graduate" category was significantly ( $P < 0.05$ ) higher than 'Read only' and 'Illiterate' category. But there were no significant differences in adoption rate amongst the 'Read and Write Only', 'Primary School' and 'Middle School' of SRLO. 'High School' category of SRLO was more or less similar in adoption rate with 'Graduate', 'Read and Write Only', 'Primary School' and 'Middle School' of SRLO. At the same time 'Illiterate' and 'Read Only' SRLO were more or less same with 'Read and Write Only', 'Primary School' and 'Middle School' of SRLO in relation to adoption of selected Small Ruminant Livestock Practices.

## Chapter 5

**Summary and  
Conclusions**



## ***SUMMARY AND CONCLUSION***

Small ruminant livestock farming in West Bengal is an integral part of Animal Husbandry, providing a much important subsidiary and gainful employment, and thereby, raising the economic status of a mammoth portion of population of the state. Small ruminants (sheep and goat) are the most potential livestock of our rural as well as poor people of the society. Implementation of any improved Animal Husbandry technology in practical field depends upon the adoption behaviour of the individual who wants to implement. The present study was carried out with an aim to find out some Socio-economic, Communication characteristics, Socio-psychological and administrative activities of the Small Ruminant Livestock Owners (SRLO) that influence the adoption of some selected A.H. practices in two different agro-climatic zones of West Bengal. The adoption behaviour of the Small Ruminant Livestock Owners (SRLO) depends on knowledge and attitude of the respective farming practices, future plan of the farming, decision making activities, work distribution and marketing pattern etc. To enhance the production potential of our meat producing animals distributed through out the length and breadth of our country the only way is to introduce improved small ruminant livestock practices for mass adoption and to create the critical and necessary infrastructural facilities vital for adoption of the A.H. practices. At the same time success of any farming depends on demand of the circumstances of the society.

Keeping this in mind, the study had been conceptualized with the overall objectives to assess the existing adoption behaviour of SRLO in two agro-climatic zones of West Bengal.

### **Specific Objectives:**

1. To study the demographic profiles of small ruminant livestock owners (SRLO).

2. To study the level of adoption of the small ruminant livestock owners (SRLO) in respect of some selected practices.
3. To study the socio-economic, socio-psychological, communication and administrative characteristics of the small ruminant livestock owners (SRLO) in relation to adoption of selected practices.
4. To compare the level of adoption of selected practices of the small ruminant livestock owners (SRLO) of two different agro-climatic (saline or coastal and non-saline or red-laterite) zones of West Bengal.
5. To identify the farm level factors affecting the decision to be adopted by small ruminant livestock owners (SRLO).
6. To study the relationship of dependent variable with the independent variables.
7. To find out the key variables those influence the adoption of selected practices of SRLO.
8. To study the knowledge level of Small Ruminant Livestock Owners in relation to Animal Husbandry practices.
9. To study the work distribution pattern among the SRLO in relation to selected Animal Husbandry practices.

**Dependent variable-** adoption of selected animal husbandry practices was measured by the **“Adoption Index Method”**.

**The thirty seven independent variables selected for the study were grouped as follows:**

**Socio-Economic: (17)**

Gender, Age, Category, Occupation, Caste, Education of the respondents, Marital status, Religion, Family type, Family size, Family education status, Received training, Herd size, Economic status, Urban contact, Social participation and Farming experience.

**Communication: (4)**

Utilization of Mass Media, Utilization of Personal cosmopolite sources of information, Utilization of Personal localite sources of information and Communication skills.

**Socio-psychological: (12)**

Knowledge about reproduction of male livestock, Knowledge about reproduction of female livestock, Knowledge about feeding, Knowledge about deworming, Knowledge about vaccination, Attitude towards leadership, Attitude towards need for achievement of goals, Attitude towards creative and innovative skills of marketing, Attitude towards motivation of progress, Attitude towards need for autonomy, Attitude towards risk and Attitude towards small ruminant farming.

**Administrative: (4)**

Planning skills, Decision making, Work distribution pattern and Marketing management.

For the measurement of independent variables, scales already available were used.

The field investigation was carried out during September '05 – January '06 in Barabazar and Kashipur block of Purulia district, Patharpratima and Gosaba block of South 24 Parganas district of West Bengal. Both the districts were selected purposively for the study considering the need for availability of data and usual limitations of a student research project. Two blocks were selected randomly from each district. From each block two Gram Panchayats were selected considering highest number of small ruminant livestock population (judgment sampling). From each selected Gram Panchayat thirty five respondents were selected randomly with judgment sampling. In this process, total one hundred forty respondents were selected from each district. So, the total sample size was two hundred eighty.

An interview schedule was constructed and accordingly data were collected through personal interview. The major parameters studied were profile of respondents, small ruminant livestock rearing practices, decision making pattern, future planning of the farming, work distribution and marketing pattern.

The statistical methods used included percentage analysis, analysis of variance, co-efficient of correlation, Mann-Whitney U Test,

Kolmogorov-Smirnov Z Test, Independent sample t- test, Chi-square test and Path analysis.

**The important findings of the study are:**

- 1) Majority of SRLO were female, married and Hindu by religion. Majority of them belong to most active age group (30 - 45 yrs.) in both the district. Most of them were having agricultural labour by occupation. Greater numbers of them belong to Scheduled Caste in overall study area but in Purulia it was Other Backward Caste. They had education ranging from primary to middle school. They were mostly having 'Nuclear family' and 'upto 5 members' family size in overall study but in Purulia district majority of SRLO were having 'Joint family'. Majority of them were marginal farmers. Most of them used to reside in 'Katcha house'. Majority of them did not attend any training programme and no active social participation.
- 2) Majority of the SRLO used the mass media sources like radio, farm publication and poster or leaflet in the overall study area. In case of personal cosmopolite sources of information, maximum SRLO used BLDO / Veterinary officers, livestock owners of other villages and LDA. In personal localite sources of information, SRLO used to collect the information about small ruminant farming from their neighbors.
- 3) The majority of the SRLO in Purulia District were having ' knowledge about first age of mating, idea about castration, and castration by burdizzo castrator for male livestock, whereas, they were not having any knowledge about number of mating necessary per week, maximum breeding age, seasonal activity of breeding, age of castration. They did not use open method castration. The knowledge level about first age of mating and use of burdizzo castrator for castration were more among the SRLO in South 24 Parganas than that of Purulia district.
- 4) It was found from the study that majority of SRLO in Purulia district were having knowledge about age at first heat, heat interval, gestation length, idea about retention of placenta, idea

about grading up of animal, care and management before and after parturition, idea about kid/ lamb management, identify heat detection of small ruminant livestock and idea about cross breeding of female livestock.

- 5) The knowledge level of SRLO in South 24 Parganas about the reproductive practices of female livestock were having about age at first heat, heat interval, gestation length, idea about retention of placenta, idea about grading up of animal, care and management before and after parturition, idea about kid/ lamb management, identify heat detection of small ruminant livestock and idea about cross breeding.
- 6) It was found from the above findings that knowledge level of SRLO about female reproduction of small ruminant livestock was more or less equal in both the district. The knowledge level about male-female ratio, idea about distocia, care and management before and after parturition, reproductive problem and idea about cross breeding were more among the SRLO in Purulia district than that of South 24 Parganas district. But, knowledge about maintenance of breeding records for better reproductive management was high in South 24 Parganas district's SRLO than the district Purulia.
- 7) It was found that SRLO of South 24 Parganas was having more knowledge about vaccination practices than that of Purulia district.
- 8) The findings revealed that the concentrates and green fodder in different stage of life cycle, knowledge about feeding of mineral mixture and idea about time of stall feeding was more found in Purulia district than the district South 24 Parganas.
- 9) The majority of the SRLO knew why deworming practice should be followed. They had knowledge about the time for administer dewormer and idea about control of external parasites in overall study. But majority of the SRLO had no knowledge about feeding schedule of deworming. The separate findings of the two districts were also more or less same.

- 10) The findings revealed that the majority of the SRLO were agreed to strongly agree for acceptability of new technique and steadfastness on decision about adopting new technology. Maximum SRLO had shown their interest to increase the profit of their farm by creating a new product or identifying of market for selling the new product. Most of them were least interested for making insurance coverage of their livestock for getting compensation in any disaster.
- 11) The study showed that majority of the SRLO preferred natural breeding over A.I. Majority of the SRLO showed their attitude to adopt scientific feeding to increase the growth rate of their livestock.
- 12) Most of the SRLO assumed that training about Animal Husbandry was very important before investment of money in farm. They implied that low production cost would be a good practice for making more profit. Further they embraced the idea of co-operative marketing. They bore the idea that sole land right was important factor for small ruminant farming. Most of the SRLO did not have any pre-plan to extend their herd size in future.
- 13) The study revealed that the decisions regarding care of pregnant animal, care about kid/lamb, colostrum feeding, feeding /grazing were taken by female members only. Women alone and jointly with husband took decision for the rest of the activities. The study showed that castration, deworming, choice of marketing place, time for marketing and fixed rate for sale were mainly decided by the male member of the family. In decision making activity children had no importance at all about small ruminant livestock farming.
- 14) The majority of the activities were regularly carried out by the female members viz., providing feed, breeding activities, care of lamb/kid management and housing management of small ruminant livestock. Male members were involved mainly in medication and marketing related activities. It was further observed that some time in all the activities they performed jointly

by husband and wife like feeding, breeding, lamb management, housing, medication and marketing.

- 15) It was found that more number of SRLO in South 24 Parganas used to keep records than that of Purulia district's SRLO.
- 16) Majority of the SRLO used to sale their products through middle man, where as some SRLO depended on local market. None of the respondents used open market in town and did not prefer value adding direct marketing. Form the above survey, influence of middle man was found more in South 24 Parganas district than that of Purulia district. In Purulia district's direct marketing system is more prevalent than South 24 Parganas district.
- 17) The majority of the SRLO adopted scientific practices like; deworming practices and castration by burdizzo castrator. Whereas, maximum number of SRLO did not adopt vaccination, record keeping and selective breeding practices. All the respondents adopted the practice of colostrum feeding to new born and medicinal treatment in need in both the districts as well as in overall case.
- 18) The first five factors having largest direct effect on adoption of selected small ruminant farming practices were 'farming experience', 'received training', 'reproductive knowledge about male livestock', 'education of the respondents' and 'family type'. Farming experience has come out to be the key element which directly and indirectly promoted the adoption of selected small ruminant livestock practices by the SRLO in overall study.
- 19) The first five factors having largest direct effect on adoption of selected small ruminant farming practices were 'farming experience' 'received training', 'marketing management', 'attitude towards motivation progress' and 'knowledge about deworming'. Farming experience has come out to be the key element which directly and indirectly promoted the adoption of selected small ruminant livestock practices by the SRLO in Purulia district.

- 20) The first five factors having largest direct effect on adoption of selected small ruminant farming practices were 'farming experience', 'mass media utilization', 'received training', 'reproductive knowledge about male livestock' and 'family type'. Farming experience and utilization of mass media communication sources has come out to be the key element which directly and indirectly promoted the adoption of selected small ruminant livestock practices by the SRLO in South 24 Parganas district.
- 21) The path analysis the first five factors having largest direct effect on attitude of selected small ruminant farming practices were 'education of the respondents', 'decision making pattern', 'planning skills', 'vaccination' and 'reproductive knowledge about male livestock'. Education of the respondent has come out to be the key element which directly and indirectly promoted the attitude of selected small ruminant livestock practices by the SRLO in overall study.
- 22) The first five factors having largest direct effect on knowledge of selected small ruminant farming practices were 'received training', 'education of the respondents', 'farming experience', 'work distribution pattern' and 'urban contact' of the SRLO. Received training of the respondent has come out to be the key element which directly and indirectly promoted the knowledge of selected small ruminant livestock practices by the SRLO in overall study.
- 23) The first five factors having largest direct effect on communication source of selected small ruminant farming practices were 'education of the respondents', 'education of the respondent', 'urban contact', 'family type' and 'family education status' of the SRLO. Education of the respondents and urban contact of the respondent has come out to be the key element which directly and indirectly promoted the knowledge of selected small ruminant livestock practices by the SRLO in overall study.
- 24) From the findings of the correlation analysis it was indicated that the **overall** adoption of **deworming** by the SRLO was positively

and significantly correlated with farming experience, attitude towards need for autonomy and decision making activities. But in **Purulia** district adoption of deworming by the SRLO was positively and significantly correlated with decision making activities only. In **South 24 Parganas** adoption of deworming by the SRLO was negatively and significantly correlated with caste. Adoption of deworming was also positively and significantly correlated with farming experience.

- 25) The study indicated that the **overall** adoption of **castration** by the SRLO was positively and significantly correlated with occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, farming experience, mass media sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards motivation of progress, attitude towards small ruminant farming, planning skills and work distribution pattern. But in **Purulia** district, adoption of castration by the SRLO was positively and significantly correlated with occupation, caste, family education status, received training, herd size, economic status, urban contact, social participation, farming experience, mass media sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, planning skills and decision making activities. In **South 24 Parganas**, adoption of castration by the SRLO was negatively and significantly correlated with religion and attitude towards leadership. Adoption of castration practice was also positively and significantly correlated with education, social participation farming experience, mass media sources, reproductive knowledge about male livestock, knowledge about feeding, attitude towards motivation of progress.
- 26) The study revealed that the **overall** adoption of **vaccination** by the SRLO was negatively and significantly correlated with gender.

Adoption of vaccination was positively and significantly correlated with attitude, occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goals, attitude towards innovative and creative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills, decision making, work distribution pattern and marketing management. But in **Purulia** district, adoption of vaccination practice by the SRLO was positively and significantly correlated with education, family educational status, received training, herd size, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards achievement of goal, attitude towards creative and innovative skills, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills, decision making and work distribution pattern. In **South 24 Parganas**, adoption of vaccination practices by the SRLO was negatively and significantly correlated with gender, marital status. Adoption of vaccination was also positively and significantly correlated with category, occupation, education, marital status, family educational status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards achievement of goal, attitude towards creative and innovative skills, attitude towards motivation of progress, attitude towards need for autonomy, decision making, work distribution activities and marketing management.

- 27) The **overall** adoption of **colostrum feeding** by the SRLO was negatively and significantly correlated with gender. Where as adoption of colostrum feeding was positively and significantly correlated with age, category, occupation, marital status, family type, family size, herd size, economic status, farming experience, personal localite sources, reproductive knowledge about male livestock, knowledge about deworming, decision making and work distribution activities. But in **Purulia district**, adoption of colostrum feeding by the SRLO was positively and significantly correlated with age, category, occupation, family type, herd size, farming experience, reproductive knowledge about male livestock and decision making. In **South 24 Parganas**, adoption of colostrum feeding by the SRLO was positively and significantly correlated with age, marital status, family type, family size and farming experience.
- 28) The **overall** adoption of **selective breeding** by the SRLO was negatively and significantly correlated with gender and marital status. Adoption of selective breeding by the SRLO was positively and significantly correlated with category, occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal localite sources, personal cosmopolite, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goals, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risks, planning skills, decision making activities, work distribution pattern and marketing management. But in **Purulia** district, adoption of selective breeding by the SRLO was positively and significantly correlated with category, education, family education status, received training, herd size, economic status, urban contact, mass media sources, personal cosmopolite

sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards achievement of goals, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risks, planning skills, decision making activities, work distribution pattern and marketing management. In **South 24 Parganas**, adoption of selective breeding by the SRLO was negatively and significantly correlated with gender, age, and marital status. Adoption of selective breeding was also positively and significantly correlated with category, occupation, education, family educational status, received training, herd size, urban contact, social participation, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards need for achievement of goals, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risks, decision making activities, work distribution activities and marketing management.

- 29) The **overall** adoption of **record keeping** by the SRLO was negatively and significantly correlated with gender. Adoption of record keeping was positively and significantly correlated with category, occupation, education, family education status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goals, attitude towards innovative and creative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills,

decision making, work distribution pattern and marketing management. But in **Purulia** district, adoption of record keeping by the SRLO was negatively and significantly correlated with gender. Adoption of record keeping by the SRLO was positively and significantly correlated with caste, education, family educational status, received training, herd size, economic status, urban contact, mass media sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards leadership, attitude towards need for achievement of goal, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, attitude towards risk, planning skills and work distribution pattern. In **South 24 Parganas**, adoption of record keeping by the SRLO was negatively and significantly correlated with caste, marital status and gender. Adoption of record keeping was also positively and significantly correlated with category, education, family type, family size, family educational status, received training, herd size, economic status, urban contact, social participation, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards need for achievement of goal, attitude towards creative and innovative skills for marketing, attitude towards need for autonomy, attitude towards risk, decision making, work distribution activities and marketing management.

- 30) The **overall** adoption of **treatment with medicine** by the SRLO was negatively and significantly correlated with gender. Adoption of treatment with medicine was positively and significantly correlated with age, occupation, marital status, family type, family size and herd size, economic status, farming experience, reproductive knowledge about male and livestock, knowledge about deworming, decision making activities, work distribution pattern and marketing

management. But in **Purulia** district, adoption of treatment by medicine by the SRLO was positively and significantly correlated with age, occupation, herd size, economic status, farming experience, reproductive knowledge about male and female livestock, knowledge about deworming, vaccination, decision making activities and work distribution pattern. In **South 24 Parganas**, adoption of treatment by medicine by the SRLO was negatively and significantly correlated with gender. Adoption of treatment by medicine was also positively and significantly correlated with age, marital status, family type, family size, farming experience.

- 31) The **overall adoption index** by the SRLO was negatively and significantly correlated with gender. Overall Adoption Index was positively and significantly correlated with age, category, occupation, education, family type, family size, family educational status, received training, herd size, economic status, urban contact, social participation, farming experience, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, attitude towards need for autonomy, planning skills, work distribution pattern, decision making and marketing management. But in **Purulia** district, adoption index by the SRLO was negatively and significantly correlated with gender. In Purulia district, adoption Index was positively and significantly correlated with age, category, occupation, family type, family educational status, received training, herd size, economic status, urban contact, farming experience, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, planning skill, decision making activities and work distribution pattern. In **South 24 Parganas**,

adoption index was negatively and significantly correlated with gender and caste. Adoption index was also positively and significantly correlated with age, category, education, family type, family size, family educational status, received training, herd size, economic status, social participation, farming experience, mass media sources, personal cosmopolite sources, personal localite sources, reproductive knowledge about male and female livestock, knowledge about feeding, deworming, vaccination, attitude towards need for achievement of goal, attitude towards creative and innovative skills of marketing, attitude towards motivation of progress, decision making activities and work distribution pattern.

- 32) In case of overall study, adoption rate by the 'Elder age group' SRLO was significantly higher than 'Most active group' and 'Younger Group'. At the same time 'Most active group' was significantly higher in adoption rate than 'Younger Group'. Adoption rate of selected small ruminant livestock practices in Purulia and South 24 Pgs District, were same as in Overall adoption.
- 33) In case of overall, adoption rate of 'Male' SRLO was significantly higher than the 'Female' SRLO. In case of Purulia and South 24 Parganas district, adoption rate of selected small ruminant livestock practices by 'Male' SRLO was significantly higher than the 'Female' SRLO.
- 34) In case of overall, adoption rate of 'OBC' caste group of SRLO was significantly higher than 'SC' and 'ST' caste group of SRLO. But there were no significant differences in adoption rate amongst the 'SC' and 'ST' caste group of SRLO. At the same time 'General' caste group of SRLO was more or less same in adoption rate with the 'SC', 'ST' and 'OBC' caste groups of SRLO. In Purulia district, there was no significant difference in adoption rate amongst the four caste groups i.e. 'General', 'SC', 'ST' and 'OBC'. In adoption of selected small ruminant livestock practices in South 24 Pgs District, "General' caste group was significantly higher than 'OBC'

caste group. But there were no significant differences in adoption rate amongst the 'SC' and 'ST' caste group of SRLO. 'SC' and 'ST' caste group of SRLO were more or less same in adoption rate with 'General' and 'OBC' caste group of SRLO.

- 35) In case of overall, adoption rate of 'Medium-Large' and 'Small' category of SRLO was significantly higher than 'Marginal' and 'Landless' category of SRLO. But There were no significant differences in adoption rate amongst the 'Medium-Large' and 'Small' category of SRLO; and amongst 'Marginal' and 'Landless' category of SRLO. In Purulia district, 'Medium-Large' category of SRLO was higher in adoption rate than 'Marginal' and 'Landless' category of SRLO. But 'Small' category of SRLO was more or less similar in adoption rate. There were no significant differences amongst the 'Medium-Large', 'Marginal' and 'Landless' category of SRLO. Regarding adoption rate of selected small ruminant livestock practices by the SRLO in South 24 Pgs District, "Medium-Large' category was significantly ( $P < 0.05$ ) higher than 'Small', 'Marginal' and 'Landless' category. But There were no significant differences in adoption rate amongst the 'Small', 'Medium-Large' and 'Small' category of SRLO; and amongst 'Marginal' and 'Landless' category of SRLO.
- 36) In case of overall, adoption rate of 'Hindu' and 'Muslim' community of SRLO was significantly higher than 'Christian' community of SRLO. But there were no significant differences in adoption rate amongst the 'Hindu' and 'Muslim' community of SRLO. In case of adoption rate of Purulia district, all the respondents were from 'Hindu' community. Regarding adoption rate of selected small ruminant livestock practices by the SRLO in South 24 Pgs District, "Muslim' community was significantly higher than 'Hindu', and 'Christian' community. At the same time SRLO of 'Hindu' community was having significantly higher adoption rate than 'Christian' community SRLO. SRLO of all the

community differed significantly amongst themselves in relation to adoption of improved small ruminant livestock practices.

- 37) In case of overall, adoption rate of 'Widow' SRLO was significantly higher than 'Unmarried' and 'Married' SRLO. But adoption rate by the 'Married' and 'Unmarried' SRLO was more or less same. In case of adoption rate of Purulia district, there were no significant differences amongst 'unmarried', 'married' and 'widow' SRLO. Regarding adoption rate of selected small ruminant livestock practices in South 24 Pgs District, 'Widow' SRLO had significant higher adoption rate than 'Married' SRLO. But 'Unmarried' SRLO was more or less same in adoption rate of selected small ruminant livestock practices with the 'Married' and 'Widow' SRLO.
- 38) In case of overall, adoption rate of SRLO having occupation 'Cultivation' was significantly higher than 'Agriculture labour', 'Independent profession' and 'Business' occupation group. But SRLO having 'Service' occupation was more or less similar with other groups. In case of adoption rate of Purulia district, 'Service' and 'Cultivation' occupation group were significantly higher than 'Agriculture Labour', 'Independent profession', and 'Business' occupation groups. But 'Service' and 'Cultivation' occupation groups were more or less similar and there were no significant differences in between 'Agriculture Labour', 'Independent profession', and 'Business' occupation groups. Regarding adoption rate of selected small ruminant livestock practices in South 24 Pgs District, 'Cultivation' occupation group was significantly higher than 'Service' occupation group. But 'Agriculture Labour', 'Independent profession', and 'Business' occupation groups were more or less similar in adoption rate of selected small ruminant livestock practices. At the same time, 'Agriculture Labour', 'Independent profession', and 'Business' did not differ significantly with 'Cultivation' and 'Service' occupation group.
- 39) In case of overall, adoption rate of SRLO belonging to the 'Joint Family' was significantly higher than the SRLO belonging to

'Nuclear Family'. In case of Purulia district, adoption rate of selected small ruminant livestock practices by the SRLO belonging to 'Joint Family' was significantly higher than the SRLO belonging to 'Nuclear Family'. Regarding South 24 Parganas district, adoption rate of selected small ruminant livestock practices by the SRLO belonging to 'Joint Family' was significantly higher than the SRLO belonging to 'Nuclear Family'.

- 40) In case of overall, adoption rate of SRLO who 'Received Training' was significantly higher than the SRLO who did not have 'Received Training'. Same result in relation to adoption rate was observed in both Purulia and South 24 Parganas district.
- 41) In case of overall, adoption rate of 'Graduate' category of SRLO was significantly higher than 'Read Only' and 'Primary School' category of SRLO. But there were no significant differences in adoption rate amongst the 'Illiterate', 'Read and Write Only' and 'Middle School' category of SRLO. 'High School' category of SRLO was more or less similar in adoption rate with 'Graduate', 'Illiterate', 'Read and Write Only' and 'Middle School' category of SRLO. At the same time, 'Primary School' and 'Read Only' category of SRLO were more or less same with "Illiterate", 'Read and Write Only' and 'Middle School' category of SRLO in relation to adoption rate of selected small ruminant livestock practices. In case of adoption rate of Purulia district, 'Graduate' SRLO was significantly higher than 'Primary' SRLO. But there was no significant difference amongst 'High School', 'Middle School', 'Read and Write', 'Read only' and 'Illiterate' SRLO in relation to adoption rate. At the same time 'High School', 'Middle School', 'Read and Write', 'Read only' and 'Illiterate' SRLO were more or less similar with 'Graduate' and 'Primary School' SRLO. Regarding adoption rate of selected small ruminant livestock practices in South 24 Pgs District, "Graduate" category was significantly ( $P < 0.05$ ) higher than 'Read only' and 'Illiterate' category. But there were no significant differences in adoption rate amongst the 'Read and Write Only', 'Primary School'

and 'Middle School' of SRLO. 'High School' category of SRLO was more or less similar in adoption rate with 'Graduate', 'Read and Write Only', 'Primary School' and 'Middle School' of SRLO. At the same time 'Illiterate' and 'Read Only' SRLO were more or less same with 'Read and Write Only', 'Primary School' and 'Middle School' of SRLO in relation to adoption rate of selected small ruminant livestock practices.

**Conclusions:**

After critical analysis and investigation of the findings of the data collected during the study, the researcher came to the following conclusions:

- 1) Majority of SRLO were female, married and Hindu by religion. Majority of them belong to most active age group (30 - 45 yrs.) in both the district. Most of them were having agricultural labour by occupation. Greater numbers of them belong to Scheduled Caste in overall study area but in Purulia it was Other Backward Caste. They had education ranging from primary to middle school. They were mostly having 'Nuclear family' and 'upto 5 members' family size in overall study but in Purulia district majority of SRLO were having 'Joint family'. Majority of them were marginal farmers. Most of them used to reside in 'Katcha house'. Majority of them did not attend any training programme and no active social participation.
- 2) Majority of the SRLO used the mass media sources like radio, farm publication and poster or leaflet in the overall study area. In case of personal cosmopolite sources of information, maximum SRLO used BLDO / Veterinary officers, livestock owners of other villages and LDA. In personal localite sources of information, SRLO used to collect the information about small ruminant farming from their neighbors.
- 3) The majority of the SRLO in Purulia District were having knowledge about first age of mating, idea about castration, and castration by burdizzo castrator for male livestock. They did not use open method castration. The knowledge level about first age of mating and use of

burdizzo castrator for castration were more among the SRLO in South 24 Parganas than that of Purulia district.

4) It was found from the study that majority of SRLO in Purulia district were having knowledge about age at first heat, heat interval, gestation length, idea about retention of placenta, idea about grading up of animal, care and management before and after parturition, idea about kid/ lamb management, identify heat detection of small ruminant livestock and idea about cross breeding of female livestock.

5) The knowledge level of SRLO in South 24 Parganas about the reproductive practices of female livestock were having about age at first heat, heat interval, gestation length, idea about retention of placenta, idea about grading up of animal, care and management before and after parturition, idea about kid/ lamb management, identify heat detection of small ruminant livestock and idea about cross breeding.

6) The knowledge level of SRLO about female reproduction of small ruminant livestock was more or less equal in both the district. The knowledge level about male-female ratio, idea about distocia, care and management before and after parturition, reproductive problem and idea about cross breeding were more among the SRLO in Purulia district than that of South 24 Parganas district. But, knowledge about maintenance of breeding records for better reproductive management was high in South 24 Parganas district's SRLO than the district Purulia.

7) The SRLO of South 24 Parganas was having more knowledge about vaccination practices than that of Purulia district.

8) The feeding of concentrates and green fodder in different stage of life cycle, knowledge about feeding of mineral mixture and idea about time of stall feeding were more found in Purulia district.

9) They had knowledge about the time for administer dewormer and idea about control of external parasites in overall study. But majority of the SRLO had no knowledge about schedule of deworming. The separate findings of the two districts were also more or less same.

10) Maximum SRLO had shown their interest to increase the profit of their farm by creating a new product or identifying of market for saling the new product. Most of them were least interested for making insurance coverage of their livestock for getting compensation in any disaster.

11) Majority of the SRLO preferred natural breeding over A.I. Majority of the SRLO showed their attitude to adopt scientific feeding to increase the growth rate of their livestock.

12) Training about Animal Husbandry was very important before investment of money in farm. They implied that low production cost and co-operative marketing would be good practice for making more profit. They bore the idea that sole land right was important factor for small ruminant farming.

13) The decisions regarding care of pregnant animal, care about kid/lamb, colostrum feeding, feeding /grazing' were taken by female members only. Women alone and jointly with husband took decision for the rest of the activities. The study showed that castration, deworming, choice of marketing place, time for marketing and fixed rate for sale were mainly decided by the male member of the family. In decision making activity children had no importance at all about small ruminant livestock farming.

14) The majority of the activities were regularly carried out by the female member's viz., providing feed, breeding activities, care of lamb/kid management and housing management of small ruminant livestock. Male members were involved mainly in medication and marketing related activities. It was further observed that some time in all the activities they performed jointly by husband and wife like feeding, breeding, lamb management, housing, medication and marketing.

15) Majority of the SRLO used to sale their products through middle man. None of the respondents used open market in town and did not prefer value adding direct marketing. Form the above survey,

influence of middle man was found more in South 24 Parganas district.

16) The majority of the SRLO adopted scientific practices like; deworming practices and castration by burdizzo castrator. All the respondents adopted the practice of colostrum feeding to new born and medicinal treatment in need in both the districts as well as in overall case.

17) The first five factors having largest direct effect on adoption of selected small ruminant farming practices were 'farming experience', 'received training', 'reproductive knowledge about male livestock', 'education of the respondents' and 'family type'. Farming experience has come out to be the key element which directly and indirectly promoted the adoption of selected small ruminant livestock practices by the SRLO in overall study.

18) The first five factors having largest direct effect on adoption of selected small ruminant farming practices were 'farming experience' 'received training', 'marketing management', 'attitude towards motivation progress' and 'knowledge about deworming'. Farming experience has come out to be the key element which directly and indirectly promoted the adoption of selected small ruminant livestock practices by the SRLO in Purulia district.

19) The first five factors having largest direct effect on adoption of selected small ruminant farming practices were 'farming experience', 'mass media utilization', 'received training', 'reproductive knowledge about male livestock' and 'family type'. Farming experience and utilization of mass media communication sources has come out to be the key element which directly and indirectly promoted the adoption of selected small ruminant livestock practices by the SRLO in South 24 Parganas district.

20) The path analysis the first five factors having largest direct effect on attitude of selected small ruminant farming practices were 'education of the respondents', 'decision making pattern', 'planning skills', 'vaccination' and 'reproductive knowledge about male livestock'.

Education of the respondent has come out to be the key element which directly and indirectly promoted the attitude of selected small ruminant livestock practices by the SRLO in overall study.

21) The first five factors having largest direct effect on knowledge of selected small ruminant farming practices were 'received training', 'education of the respondents', 'farming experience', 'work distribution pattern' and 'urban contact' of the SRLO. Received training of the respondent has come out to be the key element which directly and indirectly promoted the knowledge of selected small ruminant livestock practices by the SRLO in overall study.

22) The first five factors having largest direct effect on communication source of selected small ruminant farming practices were 'education of the respondents', 'education of the respondent', 'urban contact', 'family type' and 'family education status' of the SRLO. Education of the respondents and urban contact of the respondent has come out to be the key element which directly and indirectly promoted the knowledge of selected small ruminant livestock practices by the SRLO in overall study.

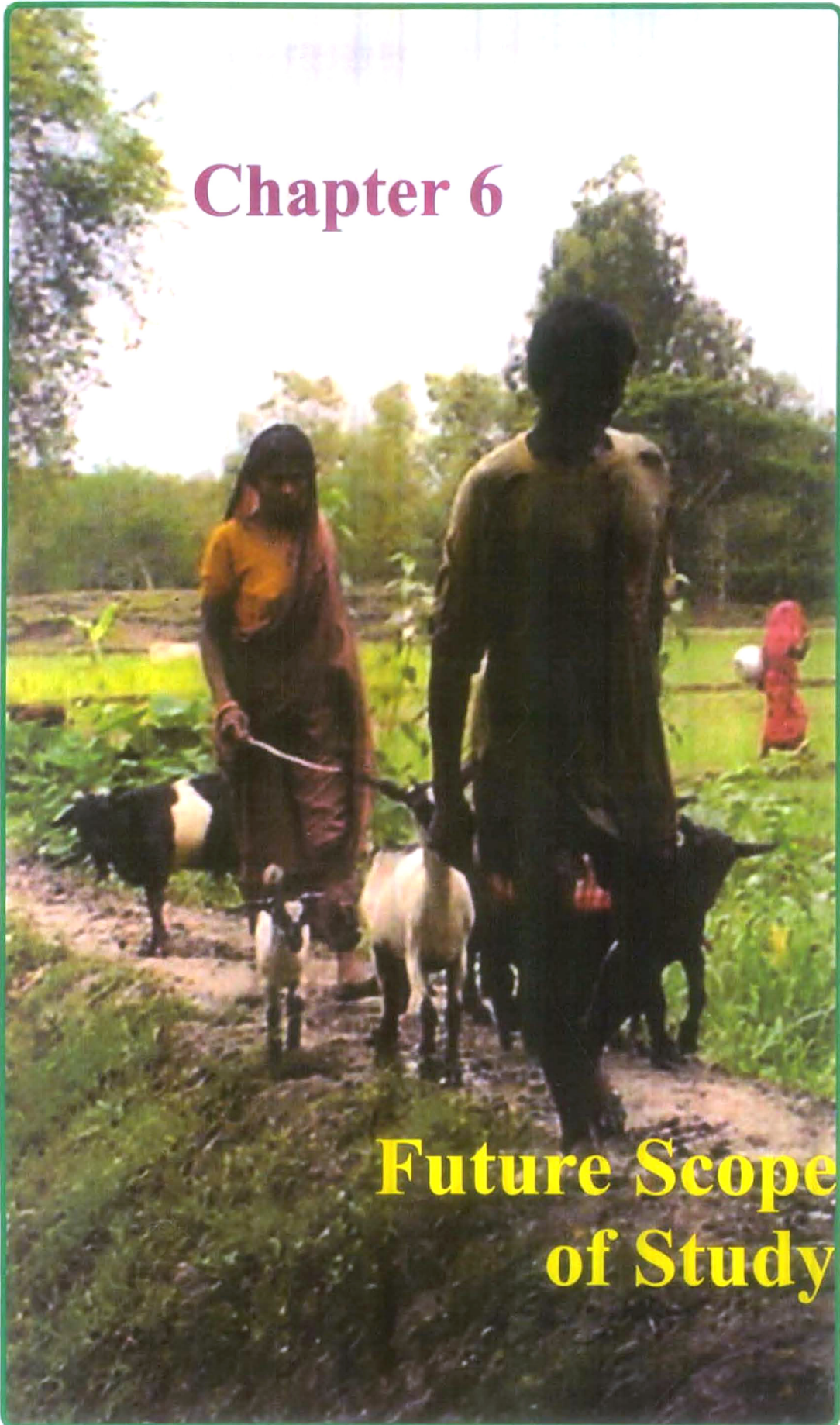
23) The adoption of total number of practices in study, viz. deworming, castration, vaccination, colostrum feeding, selective breeding, record keeping and treatment with medicine was positively and significantly correlated with mass media, reproductive knowledge about male and female livestock, knowledge about feeding and decision making in overall study.

24) In case of overall study, adoption rate by the 'Elder age group' SRLO was significantly higher than 'Most active group' and 'Younger Group'. In case of overall, adoption rate of 'Male' SRLO was significantly higher than the 'Female' SRLO. In case of overall, adoption rate of 'OBC' caste group of SRLO was significantly higher than 'SC' and 'ST' caste group of SRLO. But there were no significant differences in adoption rate amongst the 'SC' and 'ST' caste group of SRLO. At the same time 'General' caste group of SRLO was more or less same in adoption rate with the 'SC', 'ST' and 'OBC' caste groups

of SRLO. In case of overall, adoption rate of 'Medium-Large' and 'Small' category of SRLO was significantly higher than 'Marginal' and 'Landless' category of SRLO. But There were no significant differences in adoption rate amongst the 'Medium-Large' and 'Small' category of SRLO; and amongst 'Marginal' and 'Landless' category of SRLO. In case of overall, adoption rate of 'Hindu' and 'Muslim' community of SRLO was significantly higher than 'Christian' community of SRLO. But there were no significant differences in adoption rate amongst the 'Hindu' and 'Muslim' community of SRLO. In case of overall, adoption rate of 'Widow' SRLO was significantly higher than 'Unmarried' and 'Married' SRLO. But adoption rate by the 'Married' and 'Unmarried' SRLO was more or less same. In case of overall, adoption rate of SRLO having occupation 'Cultivation' was significantly higher than 'Agriculture labour', 'Independent profession' and 'Business' occupation group. But SRLO having 'Service' occupation was more or less similar with other groups. In case of overall, adoption rate of SRLO belonging to the 'Joint Family' was significantly higher than the SRLO belonging to 'Nuclear Family'. In case of overall, adoption rate of SRLO who 'Received Training' was significantly higher than the SRLO who did not have 'Received Training'. Same result in relation to adoption rate was observed in both Purulia and South 24 Parganas district. In case of overall, adoption rate of 'Graduate' category of SRLO was significantly higher than 'Read Only' and 'Primary School' category of SRLO. But there were no significant differences in adoption rate amongst the 'Illiterate', 'Read and Write Only' and 'Middle School' category of SRLO. 'High School' category of SRLO was more or less similar in adoption rate with 'Graduate', 'Illiterate', 'Read and Write Only' and 'Middle School' category of SRLO. At the same time, 'Primary School' and 'Read Only' category of SRLO were more or less same with "Illiterate", 'Read and Write Only' and 'Middle School' category of SRLO in relation to adoption rate of selected small ruminant livestock practices.

## Chapter 6

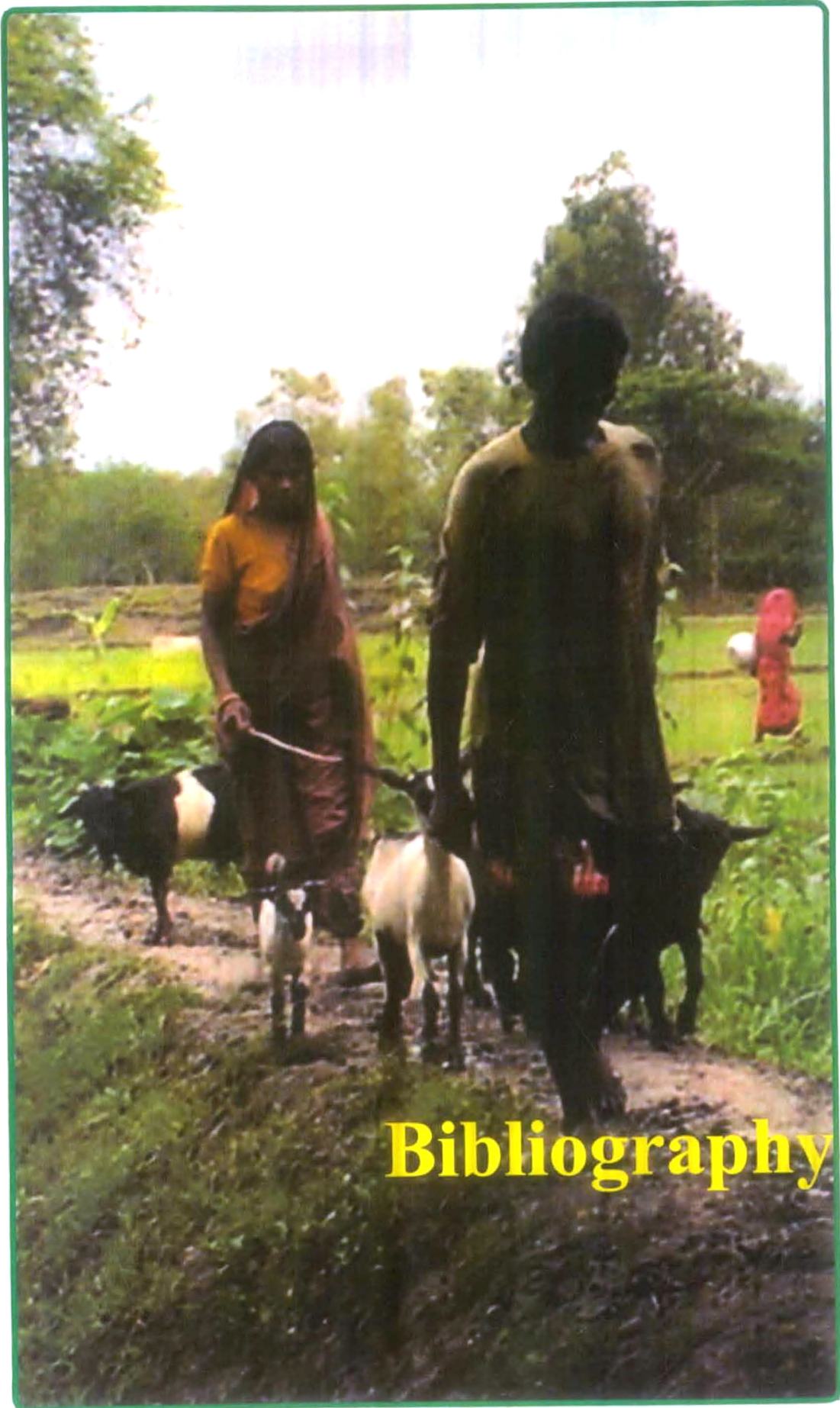
**Future Scope  
of Study**



## ***FUTURE SCOPE OF STUDY***

### **Suggested Areas of Future Research:**

- 1) A study on Training needs of the Small Ruminant Livestock Owners (SRLO) in relation to Animal Husbandry Practices need to be undertaken.
- 2) The constraints for the transfer of animal resources technology need to be studied in depth.
- 3) The extension worker should have a thorough knowledge of social and personal factors of the small ruminant livestock farmers for effective adoption of the livestock farming. These factors need to be studied in developing an effective programme planning of transfer of technology and training programme of SRLO.
- 4) The extent of influence of particular independent variable/ variables on the adoption of selected animal husbandry practices by the SRLO needs to be studied.
- 5) Study on preparation of different Scales related to adoption of Animal Husbandry Practices can be carried out.
- 6) A study of extension and communication characteristics of small ruminant livestock farming innovation need to be studied for the transfer of appropriate animal sciences technology.
- 7) The study on the adoption behaviour of SRLO needs to be undertaken for all the agro-climatic zones of West Bengal.



## Bibliography

## **BIBLIOGRAPHY**

- Adhiguru, P.; Alagesan, V. and Perumal, G. (1999). Involvement of farm women in farm and home activities - a review. *Journal of Extension Education*, **10**(3): 2500-2504.
- Adhikari, N. (1987). Economic analysis of women labour involvement in crop and livestock farming at Nuwaket District of Nepal. M.Sc. thesis in Agricultural Economics, Submitted to BSU, Philippines.
- Agarwal, K. (1987). A study on Contribution of Farm women in Animal Husbandry Enterprise. M.Sc. Thesis submitted to Indian Veterinary Research Institute, Izatnagar.
- Agbede, G. B., Teguaia, A. and Manjeli, Y. (1995). Survey on traditional poultry production in Cameroon. *Tropiculfura*, **13**(1): 22-24.
- Alao, J. A. (1971). Community structure and modernization of Agriculture. An analysis of factors influencing the adoption of farm practices among Nigerian Farmers. Dissertation Abstr. *International*, **32** (4): 2004.
- Ali, S.R. (2001). Indian poultry sector growth will accelerate in 2001. *World Poultry Elsevier*, **17**(4): 10-11.
- Allport, G. W. (1935). Attitude. In. C. Murchison (Ed.). A handbook of Social Psychology, 798-884, Worcester, Mass.: Clark Univ. Press.
- Amir, P. and Knipscheer, H. C. (1987). Application of the environment behaviour performance model in farming systems research- the case of small ruminant technology transfer. *Agricultural Administration and Extension*, **25**(3): 161- 176.
- Anand, U. and Sohal, T. S. (1984). A psychological study of the dairy farmer's attitude towards extension. *Asian Journal of Dairy Research*, **3**(3): 144-148.
- Anonymous. (2003). Statistical Abstract. Bureau of applied economics and statistics, Government of West Bengal. 251-258.
- Anonymous. (2004). District statistical Hand Book. Purulia and South 24 Parganas district, Bureau of applied Economics and Statistics, Govt. of West Bengal.

- Anonymous (1996): Status paper on strategies for improvement of animal resources in West Bengal. 9<sup>th</sup> State Conference – 17<sup>th</sup> November, 1996, Calcutta, West Bengal Veterinary Association, P. 16.
- Appley, L. A. (1969). Management in action, The Times of India Press, Bombay.
- Bagga, D. S. (1967). Diffusion and adoption of agriculture innovations. (Cited by P.R.R. Sinha and P. N. Kaul. Research in Extension Education by K. N. Singh, C.S.S. Rao and Sahay), 363.
- Bakshi, R. M. (1970). A study of the impact of Govt. milk supply scheme, Jabbalpur on the dairy farmers around Jabbalpur city. M.Sc. Thesis submitted to Jawharlal Nehru Krisha Viswa Vidyalaya, Jabbalpur.
- Bandopadhyay, A. K. (1986). A study on adoption of Rabi programme and investment pattern of additional income by farmers of Sundarban. Ph.D. thesis submitted to Bidhan Chandra Krishi Viswa Vidyalaya, West Bengal.
- Banerjee, K. S. (1976). A critical evaluation of intensive cattle development block, Vijaywada, Andhra Pradesh. M. Sc. Thesis submitted to BNC University, Kurukshertra.
- Bell, J.G. (1996). Constraints and solutions for health cover in rural poultry development. XX World's Poultry Congress, New Delhi, 2-5 Sept, 327-331.
- Berhanu, G. and Swinton, S. M. (2003). Investment in soil conservation in northern Ethiopia: The role of land tenure security and public programme, *Agricultural Economics*, **29**: 69-84.
- Bhattacharjee, P.K. (2003). A note on livestock and its product in West Bengal. *Paschim Banga*, **12**(12):10-12.
- Bhattacharya, A.; Harris, T. R.; Kvasnicka, W. G. and Vesperat, G. M. (1997). Factors influencing rates of adoption of trichomoniasis vaccine by Neveda range cattle producers. *Journal of Agricultural and Resources Economics*, **22** (1): 174-190.
- Bhattu, B. S.; Gupta, S. C. and Chopra, S. K. (1998). A study of socio-economic parameters of broiler farming in Haryana. *Indian Journal of Animal Research*, **32**(2): 111-113.
- Bhople, R. S. and Thakare, S. M. (1994). Farm information source utilization, adoption and transfer behaviour of farmers. *Rural India*, **57**(7): 153-154.

- Bhujbal, L. Y. and Kadam, I. D. (1995). Adoption of improved package of practices of pig by the farmers". *Maharashtra Journal of Extension Education*, **14**: 205.
- Bhushan, Bharat; Joginder, S. M. and Singh, Satpal. (2002). Factors affecting the constraints in adoption of biogas plants. *Indian Research Journal of Extension Education*, **2**(2): 80-81.
- Bilgrimi, S.M. (1974). The role of distribution in marketing. *Indian Journal of Marketing*, **4**(5): 25-27.
- Bose, S. P. (1962). Peasant values and innovation in India. *American Journal of Sociology*, **67**: 562.
- Carvon, R. (1963). The family role in decision making. *Journal of Cooperative Extension*, **1**(1): 23-31.
- Chand, R. and Gupta, M. L. (1966). A study of adopters of improved farm practices and their characteristics. *Indian Journal of Extension Education*, **1**(4): 258-267.
- Chander, K. (1976). Differential adoption of dairy innovations by the farmers of ICDP, Karnal (Haryana). Ph.D. Thesis submitted to Punjab University, Chandigarh.
- Chander, Satish (1970). A study of socio-economic factors affecting the adoption of AI and attitude of farmers towards the same. A dissertation submitted to the Punjab University for M.Sc. (Dairy Extension), National Dairy Research Institute, Karnal.
- Chattopadhyay, S. N. (1963). A study of some psychological correlates of adoption of innovations in farming. Ph.D. Thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Chikura, S. (1999). Assessment of the role of goats in a smallholder crop-livestock production system of Zimbabwe. A case study of Wedza communal area. pp. 114.
- Choubey, C. L. (1972). A study of the differential adoption of High yielding wheat varieties Technology as related to and influenced by selected demographic, socio-psychological and political variables in Sahore District, Madhya Pradesh. Ph.D. Thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Chouhan, J. P. (1979). A study of some socio-personal, economic and entrepreneurial role performance of milk produces of Karnal city. M.Sc. Thesis submitted to National Dairy Research Institute, Karnal.

- Chouhan, J. P. S. and Chouhan, K. N. K. (1982). Correlates of knowledge level of aspirations of high and low milk producers. *Indian Journal of Extension Education*, **18**(3&4): 40-44.
- Chug, D. S. (1986). Suitability of dairy farming technology and factors affecting knowledge and adoption. M.Sc. Thesis submitted to the G. B. Pant University of Agriculture and Technology, Pantnagar.
- Copp, J. H. (1956). Personal and social factors associated with the adoption of recommended farm practices among cattlemen. Manhattan, Nansas Agricultural Experiment Station. *Technical Bulletin*, **83**.
- Carvon, R. (1963). The family role in decision making. *Journal of Cooperative Extension*, **1**(1): 23-31.
- Cross, E.G. (1974). Goat marketing in Rhodesia. *Rhodesia Agricultural Journal*, **71**(6): 159-160.
- Daipuria, O. P.; Sharma, R. P. and Singh, V. B. (2001). To study the relationship of personal characteristics with adoption of innovations in Northern Madhya Pradesh. *Indian Research Journal of Extension Education*, **1**(1): 57-60.
- Dana, S. S. and Kanbid, B. R. (1996). Suitability of artificial insemination technology as perceived by livestock owners. *Indian Journal of Veterinary Research*, **5**(2): 51-54.
- Dana, S. S., Khandekar, N., Sharma, R. P. and Sinha, S. P. (1998). Factors affecting adoption of commercial poultry production technologies, *Indian Journal of Animal Research*, **32**(1): 1-4.
- Dana, S. S. (1998). Animal husbandry practices among santal and lodha tribes of Medinipur district of West Bengal. Ph.D. Thesis, Indian Veterinary Research Institute, Izatnagar.
- Dasgupta, S. (1968). Relative predictability of five indices of adoption of recommended farm practices. *Sociologia Ruralis*, **8**: 1-21.
- Desai, D. K. (1966). Rapporteur's report- technological change and its diffusion in agriculture. *Indian Journal of Agricultural Economics*, **21**(1): 218-229.
- Deshpandé, R., and Webster, F. E. Jr. (1989). Organizational Culture and Marketing: Defining the Research Agenda. *Journal of Marketing*, **53**(1): 3-15.

- Dubey, V. K.; Singh, S. B. and Khera, J. K. (1982). Role of rural women in Decision Making with respect to Animal Husbandry Practices. *Indian Journal of Home Science*, **14**(2): 18-21.
- Dutta, Triveni and Mishra, S. B. (2002). Correlates of level of adoption of pulse production technology. *Indian Research Journal of Extension Education*, **2**(1): 97-100.
- English, H. B. and English, A. C. (1958). A comprehensive dictionary of psychological and psychoanalytical Terms, Longmans Green Company, New York, USA.
- FAO (2003). FAO production year book and FAOSTAT Web site. ([www.fao.org](http://www.fao.org)).
- Fisher, R. A. and Yates, F. (1979). Statistical tables. Longman Group Limited, London.
- Francis J. and Mutisi C. (1997) Review of Smallholder Crop-Livestock Research in Zimbabwe: Lessons for the future. *Proceedings of the Workshop on Crop-livestock farming systems research methodologies training*, 1-12 December 1997, (Ed.) Sibanda, S, Faculty of Agriculture, University of Zimbabwe, Harare.
- Frank, B. R. (1995). Constraints limiting innovation adoption in the North Queens land beef industry. *Agricultural System*, **47**(3): 291-321.
- Ghosh, R. K.; Goswami, A. and Mazumdar, A. K. (2004) Adoption behaviour of dairy farmers in Co-operative Farming Systems. *Livestock Research for Rural Development* **16**(11). <http://www.cipav.org.co/lrrd/lrrd17/3/ghos17035.htm>
- Ghosh, B. and Mukhopadhyay, S.K. (1986). Gender differentials in the impact of technological changes in rice based farming system in India cit. in gender and poverty in India. A World Bank Country Study, New Delhi, India.
- Ghosh, P. (1987). Role of Village women in Decision Making process related to farm economic business. M.Sc. thesis Submitted to Bidhan Chandra Krishi Vishwa Vidyalaya, Mohanpur, Nadia, West Bengal.
- Ghosh, R. K. (2004). Adoption behaviour along with marketing orientation of the dairy farmers in Co-operative farming. M.V.Sc. thesis submitted to West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal.

- Gilger, J. W. (2000). Contribution and promise of human behavioural genetics. *Hum. Biol.*, **72**(1): 229-255.
- Gill, G. S. (1967). A study of various categories of adopters of improved agricultural practices in Ludhiana block. M.Sc. Thesis submitted to Punjab Agricultural University, Ludhiana.
- Goswami, A.; Sagar, R. L. and Kunzru, O. N. (1996). Factors related to knowledge about AI in Operational Research Project and Non-Operational Research Project Area. *Indian Journal of Animal Health*. **35** (2): 125-128.
- Goswami, A. (1987). A study of the knowledge level of the livestock owners about selected animal husbandry practices. M.V.Sc. thesis submitted to Indian Veterinary Research Institute, Uttar Pradesh.
- Goswami, A. (2000). The impact of extension education on the social, psychological and administrative behaviour of the livestock owners of the Sundarbans, West Bengal. Ph. D. thesis submitted to Kalyani University, West Bengal.
- Goswami, A.; and Sagar, R. L. (1998). Factors related with knowledge of the livestock owners about deworming and cultivation of green fodder. *Indian Journal of Animal Health*. **37**(1): 43-45.
- Goswami, A. and Sagar, R. L. (1998). Utilisation of mass media and personal cosmopolite sources of information as the knowledge sources of livestock owners with respect to selected animal husbandry practices. *The Indian Veterinary Journal*, **75**: 517-519.
- Goswami, A.; Roy, N.; Majumder, A. K. and Duttagupta, R. (2001). Study of the extent of adoption in animal husbandry practices among the livestock owners in non-saline belt of Sundarban. *Indian Journal of Animal Health*, **40** (2): 141-147.
- Guljart, B. (1971). Rural Development and Sociological concept: A critique. *Rural Sociology*, **36**: 31-39.
- Gunatilake, A.A.P. (1988). Live animal markets and marketing practices in Srilanka. *Animal Livestock*, **13**(9): 97-102.
- Gupta, C. L. (1976). A study of differential motives of dairy farmers of milk co-operative societies of ICDP, Karnal (Haryana) towards dairy innovations. Ph.D. Thesis submitted to Punjab Agricultural University, Ludhiana.

- Gupta, C. L. and Sohal, T. S. (1976). A scale to measure dairy farmer's attitude towards dairy farming. *Indian Journal of Extension Education*, **13**(3&4): 76.
- Gupta, V. K. and Shankar, H. (1997): Goats and the environment, *Livestock international*, **1**(3): 18-21.
- Halyal, K. G. (1968). A study of some factors affecting the rate of adoption of some improved animal husbandry practices in village around Anand, Gujrat State. M.Sc. Thesis submitted to Gujrat University.
- Halyal, K. G.; Chetani, L. M. and Popat, M. N. (1980). Adoption of improved animal husbandry practices in ICDP area of Junagarh District. *Rural India*, **43**(10&11): 225.
- Hazarika, P. (1983). A study of correlates of knowledge and adoption behaviour of the dairy farmers under I.C.D.P., Khanapara, Assam. M.Sc. thesis submitted Kurukshetra University, Kurukshetra.
- Heady, E., Hilderth, R. J. and Deans, G. W. (1937). Uncertainty, expectations and invest decision for a sample of Central Iowa Farmers. *Ames, Iowa Agricultural Experiment Station Research Bulletin*.
- Hobbs, D. J., Beal, G. M. and Bohlen (1964). The relationship of farm operations' values and attitudes to their economic performance. *Rural Sociology Report*, 33. Ames Iowa State University, USA.
- Hundal, J. S. (1976). Differential adoption of improved dairy practices affecting some economic parameters of animals and milk suppliers in the milk shed area of Ludhiana Milk Plant (Punjab). M.Sc. Thesis submitted to National Dairy Research Institute, Karnal.
- Hussain, M. A. (1968). Adoption of improved animal husbandry practices in Hyderabad district. M.Sc. Thesis submitted to Andhra Pradesh Agriculture University, Hyderabad.
- Ibotambi, S. A. (1974). A study of adoption of high yielding varieties of paddy and its associated practices by Manipur farmers. M.Sc. Thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Jha, P. N. and Shaktwat, G. S. (1972). Adoption behaviour of farmers towards hybrid Bajra cultivation. *Indian Journal of Extension Education*, **7**(1 &2): 24-29.

- Jhansi Rani, G. (1981). Decision making patterns among rural families and types of participation by rural women in selected areas of decision. M.Sc. Thesis Submitted to Andhra Pradesh Agricultural University, Hyderabad.
- Johnson, G. L. and Haver, C. B. (1953). Decision-making principles in Farm management. Lexington: *Kentucky Agricultural Experiment Station Bulletin*, 93, Lexington, USA.
- Joshi, B.R. (1991). The effects of parasitic gastroenteritis on sheep productivity under intensive grazing management in the mid-hill region of Nepal. Paper presented at IVth National Congress of Veterinary Parasitology at Anand, India, 22-24 November, 1991.
- Kakoty, H. N. (1975). To study the impact of ICDP on adoption of improved practices by dairy farmers around Gowhati city (Assam). M.Sc. Thesis submitted to Jawarlal Nehru Krishi Viswa Vidyalaya, Jabbalpur.
- Kar, L.N.; Mishra, D. and Chaudhuri, U.G. (1970). Impact of extension contacts in adoption of some selected innovations. *Indian Journal of Extension Education*, **6**(3&4): 83-86.
- Karki, N.P.S. (1985). Migratory system of sheep raising in Gandaki Zone of Nepal. Paper presented at a Livestock Workshop, held at Pakhribas Agricultural Centre, Dhankuta, Nepal.
- Kaura, M. S. (1967). A scale to measures farmer's attitude towards AI. M.Sc. Thesis submitted to Punjab Agriculture University, Hissar.
- Kohli, A. K., and Jaworski, B. J. (1990). Market Orientation: The Construct, Research Propositions, and Managerial Implications. *Journal of Marketing*, **54**(4): 1-18.
- Kolte, N. V. (1973). Social psychological correlates of farm mechanization. *Beh. Science and CD*, **7**: 58-62.
- Kulkarni, P. S. (1973). A study of socio-economic factors affecting adoption of AI in cattle in the selected villages of key village center, Nagpur. M.Sc. thesis submitted to Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabbalpur, Madhya Pradesh.
- Kumar, Vijoy (1976). Differential adoption of dairy innovations by dairy farmers in delta and upland area of Krishna district. M.Sc. Thesis submitted to BNC University, Kurukshetra.
- Kusina, N.T. and Kusina, J.F. (2001) Goat Marketing Model For Enhanced Revenue Generation By Smallholder Farmers In Zimbabwe, SAP Proceedings Vol. **28**. [www.ihh.kvl.dk/hum/php/Tsap01/D4.pdf](http://www.ihh.kvl.dk/hum/php/Tsap01/D4.pdf)

- Kusina, N.T. and Kusina, J.F. (2000) Constraints and opportunities for improved goat marketing in the Zambezi Valley of Zimbabwe with particular reference to Guruve and Muzarabani Districts of Mashonaland Central Province. pp 115.
- Lahoria, S. K. and Jaulkar, A. M. (2003). Adoption behaviour of sugar cane growers. *Indian Research Journal of Extension Education*, **3**(2): 53-55.
- Land, K. C. (1969). Principles of Path analysis. E. F. Borgatta (ed) Sociological Methodology. *Sanfrancisco: Jossey Bass*, pp. 1-37.
- Lebbie, S. H. B. and Mastapha, P. R. (1985): Goat production in the Swaziland Middleveld. In R.T. Wilson and D. Bourzat (editors). Proceedings of the Small Ruminants in African Agriculture Workshop held at ILCA, Addis Ababa, Ethiopia, 30<sup>th</sup> September to 4<sup>th</sup> October 1985:224-234.
- Malhotra, S. P. (1974). Relative importance of some socio-economic factors in adoption of agricultural innovations. *Indian Journal of Extension Education*, **10**(1&2): 74-76.
- Malik, B. S. (1978). A study of differential knowledge and adoption of Animal Husbandry innovations among cattle owners of ORP area under National Dairy Research Institute, Karnal. M.Sc. Thesis submitted to National Dairy Research Institute, Karnal.
- Malyadri, P. (1989). Poultry farming and rural development - A study. *Kurukshetra*, **37**(4): 9.
- Marincowitz, G.J.O. (1985). The Role of Needs in the Adoption and Promotion of Boar (Goat Farming). D. Inst. Agrar. Thesis, University of Pretoria, Republic of South Africa. [www.boergoats.com/clean/articles/nickerk1.htm](http://www.boergoats.com/clean/articles/nickerk1.htm) - 35k
- Marovanidze, K. (1996). An evaluation of the pilot project Agritex-French goat marketing project in Matibi 2 Area of Masvingo Province. Report February 1996; Agritex, Masvingo, Zimbabwe.
- Mathialagan, P. (1995). Animal Husbandry Extension Education manual. ICAR, New Delhi. **1**: 121-130.
- Mazumdar, A. K. and Mazumdar, P. K. (1967). Adoption and some psychological characteristics of farmers. *Indian Journal of Extension Education*, **3**(3): 138-142.
- Meena, B. S. and Malik, B. S. (1999). Farmer's knowledge and extent of adoption regarding improved fodder cultivation practices. *Journal of Dairyng, Foods & Home Science*, **18**(1): 64-66.

- Miah, Md. N. (1996). Role of women in poultry production for rural poverty alleviation in Bangladesh. XX World's Poultry Congress, New Delhi, 2-5 Sept, pp. 303-307.
- Mikkilineni, V. K. (1976). A study of adoption of a few selected dairy practices in low land and delta areas of Vijaywada Taluk, Krishna District, Andhra Pradesh. M. Sc. Thesis submitted to Kurukshetra University.
- Mulay, S. and Roy, G. L. (1965). Caste and adoption of improved farm practices. *Indian Journal of Extension Education*, **1**(2): 106-111.
- Mundra, S. N. and Batham, K. N. (1967) Impact of caste on adoption of improved farm practices. *Indian Journal of Extension Education*, **3**(3): 143.
- Murty, N. (1967). A study of some factors influencing adoption of advanced cattle breeding operations in KV blocks, Kurnool. M.Sc. thesis submitted to Andhra Pradesh Agricultural University, Hyderabad.
- Nakade, M. G. (1971). A study of impact of Key Village scheme, Jabbalpur on cattle owners around Jabbalpur. M.Sc Thesis submitted to Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabbalpur, Madhya Pradesh.
- Narmatha, N. (1994). A study on the role of women in poultry farming, M.V.Sc. Thesis, Submitted to Tamil Nadu Veterinary and Animal Sciences University, Madras, India.
- Nataraju, M. S. and Cannegowda, M. B. (1985). A comparative study of knowledge and adoption behaviour of small, marginal farmers and agricultural labourers practicing dairying. *Dairy Guide*, **7**(12): 31-39.
- Nataraju, M. S. and Channegowda, M. B. (1985). Sources of information utilized for adoption of improved dairy management practices by small, marginal farmers and agricultural labourers. *Indian Journal of Extension Education*, **21**(3&4): 99-100.
- National Commission of Agriculture (1976). Government of India, Ministry of Agriculture and Irrigation, New Delhi, Part VII (Animal Husbandry).
- Nsoso S J, Mosweu S, Malela L and Podisi B (2003b). A survey on population, distribution, management and utilisation of indigenous Tswana pigs in Southern Botswana. *Animal Genetic Resources Information* **34**:83-96. <http://www.cipav.org.co/lrrd/lrrd15/4/nsos154.htm>

- Nell, W.T. (1998). Adoption of Veterinary Surgeon Services by sheep and goat farming in Qwaqwa. Ph. D. thesis submitted to University of Orange Free State, Bloemfontein. <http://www.farmingsuccess.com/chapters.htm>
- Nsoso, S. J. Monkhei, M and Tlhwaafalo, B. E. (2004): A survey of traditional small stock farmers in Molelopo North, Kweneng district, Botswana: Demographic parameters, market practices and marketing channels. *Livestock Research for Rural Development*, **16**(12). <http://www.cipav.org.co/lrrd16/12/cont1612.htm>
- Nwafor C U (2004). Small ruminant livestock marketing in The Gambia: a socio-economic perspective. *Livestock Research for Rural Development*, **16**(24). <http://www.cipav.org.co/lrrd/lrrd16/04/nwaf16024.htm>
- Ogunfiditimi, T. O. (1981). Adoption of improved farm practices: A choice under uncertainty. *Indian Journal of Extension Education*, **17**(1&2): 30-35.
- Ogunfiditimi, T. O. (1993). Why adopters discontinued use of previously adopted innovations. *Journal of Extension Systems*, **9**(1): 86-91.
- Panes, V. G. and Sukhatme, P. V. (1967). Statistical methods for agricultural workers. Ph. D. thesis submitted to Indian Council of Agricultural Research, New Delhi.
- Pareek, U. and Singh, Y. P. (1974). Hand book of Psychological and Social Instruments (Ed.). U. Pareek and T. V. Rao, Samasthi Boroda.
- Pareek, U. and Trivedi, G. (1964). Manual of Socio-Economic Status Scale (Rural), Mansayan, Delhi.
- Patel, P. M. and Singh, K. N. (1970). Differential characteristics of adopter and non-adopter of farm planning. *Indian Journal of Extension Education*, **4**(1 & 2): 96-102.
- Pratier, A.; Lecroisey, F. and Gaunthier, J. 1996. A sector study: The goat meat commodity system of Zimbabwe. A case study of Wedza communal area, 114.
- Raj, S.M.; Bandyopadhyaya, A.K. and Ahmed, S.K.Z. (1999). Social benefits to the rural women through poultry farming. *J. Ext. Edu.*, **10**(2): 2425-2428.
- Raju, V. (1992). Correlates of adoption of recommended dairy husbandry practices. *Journal of Veterinary & Animal Sciences*, **23**(1): 34-37.
- Ranganathan, K. and Jayashankara, S. R. (1976). Information sources in adoption of crossbred dairy cattle. *Rural India*, **39**(12): 266.

- Rangnekar, D. and Rangnekar, S. (1996). 'Traditional poultry production system - A need for fresh look from rural development perspective. XX World's Poultry Congress, New Delhi, 2-5 Sept. pp. 405-408.
- Rangnekar, S., Vasiani, P. and Rangnekar, D.V. (1990). Initial report of study on women in Dairy production. BAIF Development Research Foundation, Ahmedabad.
- Ranjan, S. (1982). Dismal picture of poultry marketing. *Poultry Guide*, **19**(2): 77-80.
- Rao, Padma and Waliullah, M. (1968). A study of the extent of adoption of certain improved animal husbandry practices in Gujrat District. M.Sc. thesis submitted to Andhra Pardesh Agricultural University.
- Rath, B. B. (1978). A critical analysis of an ICDP: Progress, problems and prospects. Ph.D. Thesis submitted to HAU, Hissar.
- Ray, G. L. (1967). A study of some Agricultural and sociological factors related to high and low levels of urbanization of farmers. Ph.D. Thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Raymundo, E. D. (1994). Evaluation of the Philippine Carabao research and development Center's (PCRDC) on Farmer's training programme in the province of Cagayan (Philippines). College, Laguna (Philippines). June. 109 leaves.
- Reddy, K. V. (1987). Adoption behaviour and information sources of farmers in respect of selected dairy practices. *Journal of Research*, **15**(1): 39-45.
- Reddy, S. K. and Kivlin, J. E. (1968). Adoption of high yielding varieties, a study in three villages. *Behavioural Science and C.D.*, **2**: 121-123.
- Rehman, S. (1995). A study of social and economic aspect of livestock owning Gujjar and Bhakarwal tribes of J&K. Ph.D. thesis submitted to Indian Veterinary Research Inistitute, Izatnagar.
- Rogers, E. M. (1962). Diffusion of innovations. New York, Free Press.
- Rogers, E. M. and Shoemaker, F. F. (1971). Communication of innovations. New York, U.S.A.
- Rogers, E. M. and Stanfield, J. D. (1966). Adoption and diffusion of new products: Engineering Generalizations and Hypothesis, East

- Lansing, Michigan State University, Department of Communication (Mimeo).
- Roy, P.; Fliegel, F. C.; Kivlin, J. E. and Sen, L. K. (1968). Agricultural innovations among Indian farmers. National Institute of Community Development, Hyderabad.
- Sadamate, V.; Sinha, M. N.; Ramaiah, P. and Sumitra, K. A. (1982). Impact of integrated rural dairy extension programmes on selected production social indicators. *Indian Journal of Dairy Science*, **35**(2): 128-131.
- Sagar, R. P. and Sagar, R. L. (1996). Productivity of dairy animals of the participant and non-participant livestock owners as related to their socio-psychological characteristics. *Indian Psychological Review*, **47**(Spl. Issue): 258-262.
- Sah, A. K. and Chand, Ram (2002). Adoption of dairy innovations and their socio-economic correlates. *Journal of Extension Education*, **13**(4): 259-262.
- Saha, D. Khandekar, N. Roy, K.C. and Goswami, A. (2005). Studies on decision making pattern of rural poultry farmers. *Journal of Interacademetia*. **9**(4): 590-596.
- Saha, N. K. (1974). Adoption of agricultural practices and role of extension personnel. *Kurukshetra*, **5**(12): 46-48.
- Saini, S. P. S. (1975). A study of factors affecting adoption of selected recommended dairy practices. M. Sc. Thesis submitted to Punjab Agricultural University, Ludhiana.
- Saini, S. P. S. (1980). A study of factors affecting modernization of small farmers. Ph.D. thesis submitted to Kurukshetra University.
- Saraswati, L.S., Panda, A.V. and Perumal, P. (1987). Position of farm women in Tamil Nadu: A report on general study on farm women in Villages of Keelappovoor (Tirundveli) and Palur (South Arcot). A research project sponsored by DANIDA.
- Sarkar, A. and Bandopadhyay, A. K. (1996). Adoption of scientific farm innovations in red and laterite zone of West Bengal. *Agricultural Extension Review*, July-Aug.: 19-21.
- Sarkar, A. K. (1981). A study of communication patterns and factors affecting adoption of technology in West Bengal. Ph.D. thesis submitted to National Dairy Research Institute, Karnal.

- Sarkar, A. K. (1981). A study of communication patterns and factors affecting adoption of technology in West Bengal. Ph.D. thesis submitted to National Dairy Research Institute, Karnal.
- Sasaki, M. (1996). Policies and strategies of rural poultry development with particular reference to Asian developing countries. XX World's Poultry Congress, New Delhi, 2-5 Sept, pp. 283-289.
- Sawant, G. K.; Thorat, S. S. and Phadtare, D. K. (1979). Information sources of the adopters of crossbreeding in cattle in Pune district of Maharashtra. *Indian Journal of Extension Education*, **15**(1&2): 75.
- Saxena, A. K. (1991). "Adoption behaviour of farmers towards rainfed farming technology in progressive villages of Udaipur District of Rajasthan". M.Sc. thesis submitted to Rajasthan Agricultural University, Bikaner Campus, Udaipur.
- Sayeedi, A. G. (1983). A study of knowledge, attitude and adoption of dairy farmers towards dairy scientific activities in Jammu District (J & K State). A dissertation, submitted to Kurukshetra University, Kurukshetra.
- Scoones, I.C. 1990. Livestock populations and household economy. A case study from Southern Zimbabwe. D. Phil Dissertation, University of London. pp. 515.
- Seema, B. (1986). Role of women in decision making process of a farming community in Trivandrum district. M.Sc. Thesis submitted to KAU, Trichur.
- Sekar, C. and Srinivasan, R. (1991). Marketing of eggs in Namakkal block of Salem district, Tamil Nadu. *Poultry Adv*, **24**(4): 27-34.
- Sekhon, I. (1970). Effectiveness of Television. *Indian Journal of Extension Education*, **6**(1&2): 90-95.
- Sharma, B. K. and Singh, V. B. (2001). Correlates of adoption behaviour of mustard technology by small farmers in Manipur state. *Indian Research Journal of Extension Education*, **1**(1): 46-51.
- Sharma, D. (1994). Attitude of dairy farmers towards milk marketing practices. *Rural India*, **5**: 25-27.
- Sharma, D.K. and Singh, T.R. (1970). Participation of women in decision making process. *Indian Journal of Extension Education*, **6**(1&2): 48.

- Sharma, R. K. and Sharma, J. C. (1970). Diffusion and adoption of agricultural innovations. Research in Extension Education by K. N. Singh, C. S. S. Rao and B. N. Sahay, pp- 362.
- Sharma, S. C. (1979). A study of factors affecting adoption of technology for raising cross-bred cattle and information source pattern of different categories of farmers. Ph.D. thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Sharma, S. K. and Dey, B. K. (1970). Relative effectiveness of radio, TV as mass communication media in dissemination of agricultural information. *Indian Journal of Extension Education*, **1**(1&2): 62.
- Sharma, S. K. and Nair, G. T. (1974). A multivariate study of adoption of High Yielding Varieties of paddy. *Indian Journal of Extension Education*, **10**(1&2): 30-35.
- Sharma, S. N. (1967). A study of job preferences of A.H. extension officers in Punjab. M.Sc. thesis submitted to Punjab Agricultural University.
- Shukla, S. R. (1980). Adoption behaviour of small farmers. *Indian Journal of Extension Education*, **16** (1&2): 55-58.
- Sihag, S., Grover, I., Sihag, Z. S. (1996). Adoption of animal husbandry innovations by rural women. *Indian Journal of Animal Production Management*. **12**(1): 24-27.
- Singh, B. and Kunzru, O.N. (1985). Attitude of farmers towards goat and sheep farming. *Indian Journal of Extension Education*, **21** (1&2): 86-88.
- Singh, Baldeo and Kushwaha, R. K. (2002). Characteristics of small farmers and adoption of modern farm technology. *Indian Research Journal of Extension Education*, **2**(1): 44-47.
- Singh, Brahmjit (1964). Diffusion and adoption of innovation and social change in agriculture with small farmers. Cited by N. N. Sahay, Research in Extension Education, by K. N. Singh, C.S.S. Rao and B. N. Sahay, pp. 320.
- Singh, D. (1978). Problems of transfer of technology systems and constraints. Published by UP society of Extension Education and Rural Development, UP Institute of Agricultural Sciences, Kanpur.
- Singh, H. (1988). Marketing of poultry birds. *Indian J. of Animal Production and Management*. **4**(3&4): 133-138.

- Singh, J. N. (1982). A study of suitability of dairy farming innovations and factors associated with their adoption by cattle owners of ICDP, Gurgaon (Haryana). Ph.D. Thesis submitted to Kurukshetra University, Kurukshetra.
- Singh, K. N. and Singh, S. N. (1970). A multivariate analysis of adoption behaviour of farmers. *Indian Journal of Extension Education*, **6**(3&4): 39-45.
- Singh, K. N., Rao, C. S. S. and Sahay, B. N. (1970). Research in Extension Education for accelerating development process. First Edition. Pp- 384.
- Singh, M., Dubey, M.K., Pande, A.K. and Khare, Y.R. (2004). Factors associated with adoption of dairy management practices by DC's members. *Indian Research Journal of Extension Education*, **4** (1&2): 24-28.
- Singh, N. P. and Prasad, C. (1974). Selective perception and adoption behaviour of adult farmers. *Indian Journal of Adult Education*, **35**:14.
- Singh, S. N. (1969). A study on adoption of high yielding varieties and investment pattern of additional income by farmers of Delhi Territory. Ph.D. thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Singh, T. and Kherde, R. L. (1997). Constraints in adoption of improved dairy farming technology in dry land area. *Agricultural Extension Review*, July-August: 16-23.
- Sinha, H. S. P. and Sinha, S. K. (1980). Adoption of the High Yielding varieties of maize by the farmers of Sikkim. *Indian Journal of Extension Education*, **16**(1&2): 46-50.
- Sinha, M. N. and Sinha, P. R. R. (1974). Adoption process as operating with Artificial Insemination. *Indian Journal of Extension Education*, **10**(1&2): 36.
- Sinha, M. N., Sinha, P. R. R. and Sohal, T. S. (1974). Attributes of potential adopters of cattle feed mixtures. *Indian Journal of Extension Education*, **10**(3&4): 46.
- Sivanarayana, G. and Jayarama, Reddy, S. (1995). Constraints in the adoption of improved sheep and goat practices by the small and marginal farmers of diversified farming. *Indian Journal of Dairy Science*, **48**(4): 306-308.

- Sohal, T. S. and Grewal, I. S. (1971). Comparative role of two science system in the speed of adoption of some farm practices. *Indian Journal of Extension Education*, **7**(1&2): 10-12.
- Sohal, T. S. and Tyagi, K. C. (1978). Role of knowledge in adoption of dairy innovations. *Indian Journal of Extension Education*, **14**(3&4): 16-25.
- Sohal, T. S., Singh, J. N. and Singh, J. P. (1982). Impact of extensive extension education on the adoption of scientific dairy farming by landless rural families around Karnal (Haryana). *Indian Journal of Dairy Science*, **35**(4): 447-453.
- Sohi, J. S. and Kherde, R. L. (1980). A study of dairy adoption behaviour of small and marginal farmers in Punjab. *Indian Journal of Extension Education*, **16**(1&2): 84-86.
- Somasundaram, D. (1976). Inducing change through site- A study of some socio-psychological and communication correlates of Adoption Behaviour of the Rural Audience of site in Northern Bihar. Ph. D. Thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Suman, M. and Lal, B. (1993). Information source and adoption of improved agricultural practices in eastern Uttar Pradesh. *Rural India*, **56**(10): 194-196.
- Supe, S. V. (1969). Factors related to different degrees of rationality in decision-making among farmers. Ph.D. Thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Sushama, N. P. K.; Menon, A. G. G. and Bhaskaran, C. (1981). Adoption behaviour of selected tribes of Kerala. *Indian Journal of Extension Education*, **17**(1&2): 1-6.
- Swain, P. and Mohanty, T. (1996). Poultry farming: A means for self employment. *Poultry Guide*, **33**(12): 71-73.
- Teklewold, H., Dadi, L., Yami, A. and N Dana (2006). Determinants of adoption of poultry technology: a double-hurdle approach. *Livestock Research foe Rural Development*. **18** (3). pp 65-68.
- Tiwari, R. K.; Bisen, J. P. and Sharma, P. N. (2002). A study on knowledge and adoption of improved cattle rearing practices by the farmers in Chhattishgarh. *Indian Research Journal of Extension Education*, **2**(2): 42-45.
- Tripathi, A. and Jati, P. K. (1971). Factors inhibiting adoption of poultry farming. *Kurukshetra*, **19**(23): 16.

- Tripathi, S. L. and Garg, J. S. (1969). Socio-personal factors influencing the adoption of improved farm practices. *Allahabad Farmer*, **18**(5): 347-354.
- Trivedi, G. (1963). Measurement and analysis of socio-economic status of rural families- A study conducted in CD blocks, Kanjhawala, Delhi State. Ph.D. Thesis submitted to Indian Agricultural Research Institute, New Delhi.
- Trondsen, T and Johnston R.S, (1998). Market Orientation and Raw material control. *Journal of Market Focused Management*, **3**: 193-210
- Tyagi, K. C. (1975). Factors influencing the adoption of dairy innovations by farmers of I.C.D.P., Karnal. Paper presented at Summer Institute, National Dairy Research Institute, Karnal, on modernization of dairy farming.
- Upadhyay, M. and Gupta, P. (1987). Adoption of selected home making practices by rural women. *Indian Journal of Extension Education*, **23**(1&2): 76-78.
- Veeranna, K.C., Tripathi, H. and Mandape, M.K. (1998). Extension approach for mobilizing rural women in backyard poultry production. *Indian Farming*, **48**(3): pp. 13-15.
- Verma, L. R. and Prasad, C. (1971). Some characteristics of poultry farming adopters. *Allahabad Farmers*, **14**(3): 282.
- Verma, O. P. and Tyagi, K. C. (1993). Adoption behaviour of dairy farmers. *Indian Dairyman*, **45**(6): 233-236.
- Verma, V.K. (1984). Participation of tribal women in decision making process related to animal husbandry practices. M.Sc. Thesis Submitted to Birsa Agricultural University, Ranchi.
- Verner, C. and Gubbles, P. M. (1967). The adoption or rejection of innovation by dairy farm operators in the Grower Fraser Valley (British Columbia). Publ. *Agricultural Economics Research Com. Can. Ottawa*. **11**:78.
- Schwalbach, L. M. (1998). Veterinary Surgeon (Herd Health, Department of Animal Sciences, UOFS, Bloemfontein). [www.farming-success.com/doctoral\\_m.htm](http://www.farming-success.com/doctoral_m.htm)-21k.
- Weatherburn, C. E. (1961). A first course in Mathematical Statistics. The English Language Book Society and Cambridge University Press.

- Wilkening, E.A. (1953). Adoption of improved farm practices as related to family factors. Wisconsin Experiment Station Research. *Bulletin* **183**, Wisconsin, USA.
- Wozniak, G. D. (1984). The adoption of interrelated innovations: A human capital approach. *Review of Economics and Statistics*, Number. **66** (LXVI): pp. 70-79.
- Yadav, K. D. and Jain, N. C. (1984). Socio-economic factors influencing the adoption and non-adoption of hybrid cattle in Western MP. *Indian Journal of Extension Education*, **20**(1&2): 71.

# APPENDIX

**West Bengal University of Animal and Fishery Sciences**  
**Department of Veterinary and Animal Husbandry Extension Education**  
**37, K.B. Sarani, Belgachia, Kolkata - 700037**

**Topic:** *Adoption Behaviour of Small Ruminant Livestock Owners (SRLO) in two different agro-climatic zones of West Bengal.*

**Interview Schedule**

**A. IDENTIFICATION**

1. **Sl.No:**..... **Date:-**.....
2. **Respondent's Name:** .....
3. **Village:** .....
4. **Gram Panchayat:** .....
5. **Block:** .....
6. **District:** .....

**B. GENERAL INFORMATION**

7. **Gender:** I) Male-1  
II) Female-2
8. **Age in years** .....
9. **Category:** I) Landless II) Marginal  
III) Small IV) Medium- Large

**C. SOCIO-ECONOMIC**

10. **Occupation:** I) Agricultural labour- (1) II) Caste Occupation – (2)  
III) Business – (3) IV) Independent profession– (4)  
v) Cultivation- (5) VI) Service – (6)
11. **Caste:** I) General (1) II) Schedule Caste – (2)  
III) Schedule Tribe (3) IV) Other Backward Caste (4)
12. **Education of the respondent:** I) Illiterate – (0) II) Can read only – (1)  
III) Can read & write – (2) IV) Primary – (3)  
V) Middle School – (4) VI) High School – (5)  
VII) Graduate- (6)
13. **Marital Status:** I) Unmarried II) Married  
III) Widow/ Widower IV) Divorced
14. **Religion:** I) Hindu  
II) Muslim  
III) Christian  
IV) Others
15. **Family Type:** I) Nuclear family- (1) ii) Joint family- (2)
16. **Family Size:** I) Upto 5 members- (1) ii) More than 5 members-(2)  
I) No. of members in family : .....
- II) No. of members in family upto 4 years age.....
- III) Effective family size: .....
17. **Family Educational Status:**

	Score	Number
Illiterate	(0)	( )
Can read only	(1)	( )
Can read and write	(2)	( )
Primary	(3)	( )
Secondary	(4)	( )
Higher Secondary	(5)	( )
Graduate	(6)	( )

- 18. Herd size:** i) Number of sheep: .....  
 ii) Number of goat:

**19. Economic status:**

- a) Land: I) No Land – (0) II) Upto one hectare – (1)  
 III) Upto two hectares – (2) IV) above 2 hectares - (3)
- b) House: I) No house- (0) II) Hut- (1)  
 III) Kutcha house- (2) IV) Mixed house- (3)  
 V) Pucca house- (4) VI) Mansion- (5)
- c) Farm Power: I) No draught animal- (0)  
 II) 1-2 draught animals-(2)  
 III) 3-4 draught animals or 1 or more prestige animals- (4)  
 IV) 5-6 draught animals or tractor- (6)
- d) Material Possession: I) Bullock Cart -1 ii) Cycle -1 III) Radio - 1 IV) T V. -1  
 v) Improve Agricultural Implements -2.  
 vi) Solar light/ electricity -1

**20. Urban Contacts:**

Please, let me know how often you visit the Town / City?

Sl. No	PARTICULARS	FREQUENCY OF VISIT				
		Most often	Often	Sometimes	Rarely	Never
I	Individually	4	3	2	1	0
II	With family members	4	3	2	1	0
III	With Others	4	3	2	1	0

**21. Social participation.....**

- I) Member of one organization..... 1  
 II) Member of more than one organization.....2  
 III) Office holder.....3  
 IV) Wider public leader.....6

**22. Farming experience:**

- I) How long have you been farming? .....in years  
 II) You are already taken any training about animal husbandry farming? Yes/ No

## D. COMMUNICATION

### 23. Utilization of mass media:

Please tell me which of the following sources you have utilized for getting information about improved animal husbandry practices and how often?

Sl.No	SOURCES	FREQUENCY OF UTILIZATION				
A. Mass Media		Never (0)	Sometimes (1)	Often (2)	Always (3)	
	Radio					
	Television					
	Education Film					
	News Paper					
	Farm Publication					
	Poster					
	Demonstration					
	Exhibition / Krishi Mela					
<b>Total A</b>						
B. Personal cosmopolite		SOURCES	Never (0)	Sometimes (1)	Often (2)	Always (3)
	Specialist from Deptt. Of ARD, Govt. of WB					
	BLDO/ Veterinary Officer					
	L D A					
	Gram Sebak/ Prani bandhu					
	University extension Personnel					
	Panchayet Personnel					
	NGO					
	Bank personnel:					
	Input dealer					
	Livestock owner from other villages					
<b>Total B</b>						
C. Personal Localite		SOURCES	Never (0)	Sometimes (1)	Often (2)	Always (3)
	Other Family Members					
	Resident of the same village but other than neighbors					
	Relatives:					
	Friends					
	Neighbors:					
<b>Total C</b>						
<b>Grand Total A+B+C</b>						

## 24. COMMUNICATION SKILLS:

Sl. No	Items	Always (4)	Most often (3)	Often (2)	Sometimes (1)	Never (0)
I.	How often do you listen patiently to what others say?					
II.	How often do you encourage others to raise question?					
III.	How often do you initiate discussion?					
IV.	How often do you illustrate a point by example and anecdote?					
V.	How often do you summaries points made?					
VI.	How often do you analyse and evaluate the problem?					
VII.	How often do you take in pervasive tone with moderate pitch and with proper gesture?					

## E. SOCIO- PSYCHOLOGICAL

### 25. KNOWLEDGE ABOUT SELECTED PRACTICES:

#### a) Knowledge about reproduction:

##### In case of Male Livestock:

Sl.No.	Questions	Yes (1)	No (0)
1	Have you any knowledge about first age of mating?		
2	Do you know number of mating necessity per week?		
3	Do you know maximum breeding age?		
4	Do you know seasonal activity of breeding?		
5	Have You any idea about castration?		
6	Do you know the age of castration?		
7	Which type of method do you use for castration? i) Open method ii) Closed method or using burdizo castrator		
8	Cost per castration by open method?	Rs.	

##### In Case of Female Livestock:

Sl.No	Questions	Yes (1)	No (0)
9	Have you any idea about age at first heat?		
10	Do you know about duration of heat period?		
11	Do you know heat interval?		
12	Have you any idea about number of service is necessary per conception?		
13	Do you know gestation length?		
14	Do you know kidding interval?		
15	Have you any idea about life time number of kidding?		
16	Do you prefer any season for breeding?		
17	Do you maintain the male and female ratio?		
18	Have you any idea about distocia?		

19	Have you any idea about stillbirth?		
20	Have you any idea about retention of placenta?		
21	Have you any idea about repeat breeding?		
22	Have you any idea about grading up of animal?		
23	Have you any idea about care and management before and after parturition?		
24	Have you any idea about kid/ lamb management?		
25	Do you know the reasons for reproductive problems?		
26	Have You any capability to identify heat detection in your small ruminant livestock?		
27	Do you consider your animal pregnant when it does not come in to heat after natural service?		
28	Is maintenance of breeding records must for better result?		
29	Have you any idea about cross breeding?		

**b) Knowledge about vaccination:**

Sl.No	Questions	Yes (1)	No (0)
1	Have you any idea about vaccination?		
2	Do you prefer any season for vaccination?		
3.	Do you vaccinate your small ruminant livestock?		

**c) Knowledge about Feeding:**

Sl.No	Questions	Yes (1)	No (0)
1	Do you prefer: I) Tethering II) Free grazing		
2	Do you give feed: I) Green fodder and concentrate? II) Only green fodder.		
3	Do you know the ratio of concentrates and green fodder in different stage of life cycle?		
4	Have you any knowledge about feeding of mineral mixture?		
5	Have you idea about time of stall feeding?		
6	Time of grazing- I) Morning and afternoon. II) All day.		

**d) Knowledge about deworming:**

Sl.No.	Questions	Yes (1)	No (0)
1	Do you know why deworming practice should be followed?		
2	Do you know the time for administering dewormer?		
3	Have you any knowledge about the schedule of deworming?		
4	Have you any idea about control of internal parasites?		

**26. ATTITUDE TOWARDS ENTREPRENEURSHIP AND CREATIVITY:**

Statements	Strongly disagree (0)	Disagree (1)	Undecided (2)	Agree (3)	Strongly agree (4)
<b>a). Leadership:</b>					
• Acceptability of a new technique (like-deworming, vaccination, sharing technique etc.) Or willingness adopted the new technique.					
• Steadfastness on your decision					

about adopting new technology					
<b>b).Need for achievement of goals:</b>					
• Courage to face any adverse situation on your farm and enthusiasm to keep on trying to overcome the problem.					
• Managerial ability of the available resources (like - man power, money, land and management) to achieve the goals set for the farmers.					
<b>c).Creative or innovative skills of marketing:</b>					
• You are always eyeing for opportunities to increase the profit of your farm. (The creation of new products and identifying of market for saling the new product. Like, sale of wool or skin or other by product).					
• Your adaptability to change the marketing environment. (If the price of chicken decline and the price of mouton /chevon increases are you able to change your farming practices to exploit higher demand (Ex: during festival season).					
• Making of quality products for getting good price					
<b>d).Motivation of progress:</b>					
• You are self dependent and have the confidence to adopt new technology.					
• You have helping attitude to your fellow farmers.					
<b>e).Need for autonomy:</b>					
• You are experienced farmers and you have trust on your own knowledge to make a important decision without consulting other peoples opinions.					
<b>f). Attitude towards risk:</b>					
• Adoption of new technique in farming by a farmer					
• Willingness to increase herd size for making a more profit than to be content with a smaller but less risky profit.					
• Courage to produce more products when market demand is high. Or your preparedness to take a chance on higher marketing demand by producing more products.					
• Your interest on making insurance of your livestock forgetting compensation in any disaster.					
• You want to start your livestock business on financial help through bank loan.					

## 27. ATTITUDE TOWARDS SMALL RUMINANT FARMING:

Statements	Disagree (1)	Undecided (2)	Agree (3)
• In small ruminant farming natural breeding is a good practice.			
• In small ruminant farming Artificial Insemination is a good practice.			
• Through scientific feeding milk yield and growth can be increased.			
• Vaccination against PPR, Goat Pox in small ruminant is not needed.			
• In small ruminant farming crossbreeding is a good practice.			
• Deworming practice in small ruminant farming is a good practice.			
• Small ruminant do not need green fodder.			
• Castration is one of the most important practices in small ruminant farming.			
• External parasitic infection is one of the most important problems in small ruminant farming.			

## F. ADMINISTRATIVE

### 28. PLANNING SKILLS:

1. If you want to extend your herd/farm size than what type of plan you think for future?
  - i. No plans (not considered) (0)
  - ii. Only some idea about planning (1)
  - iii. Some plans (rough, incomplete) (2)
  - iv. Thorough plans and objective stated (3)
2. How many time is necessary for making this plan?.....days/month
3. Which financial strategies are most important for planning to make a long term success of your farm?

Statements	No imp. (0)	Less Imp.(1)	Imp. (2)	Very Imp.(3)
i) Must get financial management training before you start farming.				
ii) Must get farming/ animal husbandry training before invest money in your farm.				
iii) Keep production cost low.				
iv) Your farm must earn substantial profit for growth				
v) You must be able to honour my installments each year.				
vi) To have sold land rights.				
vi) Co-operative marketing				

**29. DECISION MAKING:**

Who make the decision about farming?

**Key:** (1) Independent decision by male only. (2) Independent decision by female only.  
 (3) Independent decision by children only. (4) Joint decision by husband and wife.  
 (5) Joint decision by female and children only. (6) Non response.

Sl. No.	Activities	Decision Making 1, 2, 3, 4, 5, 6
1.	Care of pregnant animal	
2.	Care about kid lamb	
3.	Colostrum feeding	
4.	Weaning	
5.	Castration	
6.	Deworming	
7.	Vaccination	
8.	Feeding/ Grazing	
9.	Reproduction/ Breeding	
10.	Choose of marketing place	
11.	Time for marketing	
12.	Fix rate for sale	

**30. WORK DISTRIBUTION PATTERN:**

Would you tell me who is the family member regularly carried out this work regarding to small ruminant farming.

**Key:** (0) – Not response (1) – worked by male (2) – Worked by female  
 (3) – Worked by children (4) – Jointly worked by husband & wife  
 5) – Jointly worked by female & children  
 (6) – Collectively worked by all family members

Sl.No.	Activities	Worked done by: 0, 1, 2, 3, 4, 5, 6	Take time			Total time
			Male	Female	Children	
1.	Feeding					
2.	Breeding					
3.	Kid/ lamb management					
4.	Housing					
5.	Medication					
6.	Marketing					

**31. MARKETING MANAGEMENT:**

- Are there output markets available within an accessible distance from your farm?  
Yes/ No
- Which market place you prefer for sale your small ruminants?

Market place	Live Sheep	Live Goat	Meat	Wool	Skin
Local market					
Open marketing town					
Local meat shop					
Co-operative					
Value adding direct marketing					

**G. ADOPTION**

**32. ADOPTION OF IMPROVED PRACTICES IN SMALL RUMINANT FARMING:**

<b>Sl. No.</b>	<b>Name of Practices</b>	<b>Whether you have adopted or not</b>	<b>From which year you have adopted</b>
<b>I</b>	Deworming		
<b>ii</b>	Castration by Burdizzo Castrator		
<b>iii</b>	Vaccination		
<b>iv</b>	Feeding of Colostrum		
<b>V</b>	Selective Breeding		
<b>vi</b>	Record keeping		
<b>vii</b>	Treatment with medicine		