RURAL WOMEN PARTICIPATION IN LIVESTOCK REARING: A STUDY IN SOME SELECTED AREAS UNDER PABNA DISTRICT

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JUNE 2022

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BY

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REGISTRATION NO.: 15-06856

A Thesis
Submitted to the Faculty of Agribusiness Management Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE (MS)
IN
DEVELOPMENT AND POVERTY STUDIES

SEMESTER: JANUARY-JUNE, 2022

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ডেভেলপমেন্ট এন্ড পোভার্টি স্টাডিজ বিভাগ
শেরেবাংলা কৃষি বিশ্ববিদ্যালয়
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CERTIFICATE

This is to certify that the thesis entitled "**RURAL WOMEN PARTICIPATION IN LIVESTOCK REARING: A STUDY IN SOME SELECTED AREAS UNDER PABNA DISTRICT**" submitted to the Department of Development and Poverty studies, Sher-e-Bangla Agricultural University, Dhaka-1207, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (MS) in DEVELOPMENT AND POVERTY STUDIES**, embodies the result of a piece of bona fide research work carried out by **JANNATUL FIZA DISHA**, Registration No. **15-06856** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information, received during the course of this investigation has been duly acknowledged.

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Dedicated

To

My Beloved

Parents

ACKNOWLEDGEMENT

To begin, I would want to express my gratitude to Allah, the most compassionate and kindhearted, the most kind and benevolent, who deserves all praise. All thanks is due to the almighty, omnipresent, and omniscient Allah, who allowed me to continue my studies in Development and Poverty Studies and to successfully finish the research and writing of my thesis for the Master of Science in Development and Poverty Studies degree.

Now, I would like to express my inexpressible gratitude to my Supervisor ***Dr. Mohammad Mizanul Haque Kazal,*** *Professor, Department of Development and Poverty Studies, Sher-e-Bangla Agricultural University, Dhaka-1207, for his ever-inspiring guidance, scholarly comments, and constructive suggestions throughout the research process and thesis preparation. Without his insightful intellectual counsel, precise constructive criticism, and assistance, this job would never have been completed. I would like to express my gratitude to my respected Co-supervisor,* ***Fatema Sarker,*** *Associate Professor, Department of Development and Poverty Studies, Sher-e-Bangla Agricultural University, Dhaka-1207, for his proper guidance.*

I'd want to convey my appreciation to the 90 rural women who participated actively in this survey and, more significantly, helped me understand their efforts and actions linked to livestock rearing in general.

I would want to convey my heartfelt gratitude to ***Sharanon Chakma****,for his assistance throughout the data analysis procedure.*

I am at a loss for words to express my gratitude to my parents for their unwavering devotion and unflinching support.

June 2022 **JANNATUL FIZA DISHA**

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ABBREVIATION

BB	: Bangladesh Bank
BBS	: Bangladesh Bureau of Statistics
BER	: Bangladesh Economic Review
DAE	: Department of Agricultural Extension
et al.	: and others (at elli)
FAO	: Food and Agriculture Organization
GDP	: Gross Domestic Product
ILO	: International Labour Organization
Mt	: Metric Ton
NGO	: Non-Government Organization
T	: Ton
Tk.	: Taka
US	: United States
$	: Dollar

ABSTRACT

The significant role of women in various agricultural sectors cannot be denied, including livestock rearing, which involves the majority of rural women. Despite their contributions to food production, women face challenges in accessing knowledge, technology, credit and land compared to men and are rarely beneficiaries of agricultural incentives and innovation. This study aims to determine the socio-economic status of rural women involved in livestock rearing, the determinants of women participation in livestock rearing, and the barriers they faced. Primary data was collected in June to July 2022. Binary Logistic regression analysis was used to identify the determinants of women participation in livestock rearing. The results indicate that education level, experience, knowledge on livestock rearing, and extension contact have a positive impact on rural women's participation in livestock rearing, while age and family size have a negative impact. However, factors like training and membership of social organizations have no impact on participation. Challenges faced by rural women in livestock rearing include disease outbreaks, high feed costs, lack of grassland, low milk prices, limited access to credit, and a shortage of trained vaccination workers. Policies and programs should prioritize the productivity and economic empowerment of women in agriculture to ensure sustainable development.

Chapter 1

Introduction

1.1 Background Study

The agriculture sector is of paramount importance in rural Bangladesh as it serves as the primary source of livelihood for the majority of rural residents. According to the World Bank (2016), almost half of the total workforce and approximately 87% of rural households rely on agriculture for at least a portion of their income. Additionally, the agriculture sector plays a critical role in alleviating poverty in the country, especially in rural areas where poverty is prevalent. the agriculture sector contributed to a 90% reduction in poverty in Bangladesh between 2005 and 2010 (WB,2016). Moreover, agriculture serves as a vital contributor to food security by increasing production and generating employment opportunities for people, as noted by the Center for Research and Information (2014).

In developing countries, women are essential participants in agriculture and rural economies. Although the extent of their involvement may vary within and among regions, their contribution is notable regardless of national borders.

The annual production of milk in Bangladesh is estimated to be around 8.5 million metric tons, with cows accounting for a significant portion of this production. The average milk yield of indigenous cows is about 200-300 liters in a lactation period of 180-240 days while the crossbred cows in some pockets produce 800-1000 liters in a 210-240 days of lactation period (Haldar and Barua, 2003).

Rural women in Bangladesh have long played a critical role in the management of the family's livestock, including cows, goats, buffalos etc. Livestock rearing, in particular, has been an important source of income and food security for rural households. Despite the significant contributions of rural women in livestock rearing, their role in this sector has often gone unrecognized and undervalued. Women's participation in livestock management has been overlooked in the past, with the majority of research focusing on men's involvement in this sector.

The significance of women's participation in agriculture often goes unnoticed. Bose et al. (2009) concluded that women's contribution to socio-economic development

remains unclear due to prevailing social norms that favor male dominance. Additionally, agricultural support services tend to focus heavily on field crop production, overlooking small-scale agriculture such as poultry rearing, home-gardening, and small-scale aquaculture, which are predominantly female-led sectors. Women have not been able to fully benefit from recent technological advancements due to a lack of educational awareness, inadequate capital, and insufficient extension education that could enable them to participate fully in agriculture (Abdulhamid et al., 2016).

The most commonly found breeds in the nation are Native, Sahiwal, Sindhi, Holstein-Friesian, Jersey, Brahman, Red Chittagong Cattle, Pabna Cattle, and Mirkadim Cattle (Anonymous, 2018).

However, over the past few years, there has been a growing interest in understanding the role of women in livestock management and their contribution to household income and food security. Several studies have shown that women's involvement in livestock rearing has a significant impact on poverty reduction, food security, and gender empowerment.

In rural Bangladesh, agriculture and livestock are the primary sources of income and employment for rural households. Livestock rearing is an essential component of the rural economy. Cows are primarily reared for their milk, which is a significant source of nutrition for rural families. Cow milk is also used to make butter, ghee, and other dairy products, which are consumed and sold in local markets. In addition, cows are used as a source of manure for crops, which contributes to higher agricultural productivity.

Livestock rearing has been particularly important for rural women, who play a vital role in managing and caring for the family's livestock. Women's involvement in livestock rearing has been shown to have a significant impact on household income and food security. In rural Bangladesh, where poverty is prevalent, livestock rearing can provide an additional source of income for rural families. It has been shown that the income generated from livestock rearing can help households meet their basic needs, such as food, shelter, and healthcare. Livestock also acts as a safety net for underprivileged households, especially for women who own and manage livestock. They can sell their animals to cover emergency and family health expenses. In

Bangladesh, the livestock sector is crucial for survival and provides job opportunities for the unemployed, including the gathering and sale of dried dung cake by the poorest women during cooler months (Shamsuddoha, 2009).

In rural Bangladesh, it is difficult to alleviate poverty without encouraging women to participate in income-generating activities. Women who are struggling to make ends meet and trying to overcome poverty often do not receive any support from society's powerful individuals. Therefore, the investigator became interested in learning more about women's involvement in income-generating activities, including livestock rearing.

In Bangladesh, women's participation in livestock rearing has been largely unacknowledged and undervalued. The majority of research on livestock rearing has focused on men's involvement in this sector. However, recent studies have highlighted the crucial role that women play in livestock rearing and the significant impact of their involvement on household income and food security.

1.2 Justification of The Study

Livestock rearing is an integral part of the rural economy in Bangladesh and is particularly important for rural women, who are often responsible for the care and management of small animals such as chickens and goats. However, despite the critical role of livestock in rural livelihoods, there is limited research on the factors that influence women's participation in livestock rearing, particularly in the context of Bangladesh. Therefore, this study is justified on the following grounds:

Firstly, the study can help to identify the factors that affect rural women's participation in livestock rearing, which is important for developing effective policies and programs that promote gender equality and women's empowerment in rural areas. By understanding the constraints that prevent women from participating fully in livestock rearing, policymakers and development practitioners can design targeted interventions that address these barriers and support women's economic empowerment.

Secondly, the study can contribute to our understanding of the role of livestock in rural livelihoods and the gendered dynamics of livestock management. Livestock rearing is often seen as a male-dominated activity, but in reality, women play a crucial role in caring for and managing small animals. By studying women's participation in

livestock rearing, we can gain a deeper understanding of the gendered division of labor in rural areas and the ways in which women contribute to household and community economies.

Thirdly, the study can help to generate knowledge about the potential benefits of women's participation in livestock rearing for household food security, income generation, and overall well-being. Livestock rearing can be a valuable source of protein and other essential nutrients for rural households, as well as a means of generating income through the sale of animals and animal products. By promoting women's participation in livestock rearing, we can enhance household food security and contribute to poverty reduction.

Finally, the study can help to build the capacity of local researchers and development practitioners to conduct gender-sensitive research and design effective interventions that promote women's economic empowerment. By involving local researchers and practitioners in the research process, the study can help to build local research capacity and ensure that the findings are relevant and actionable at the local level.

In conclusion, the study on determinants of rural women participation in livestock rearing in Pabna district is justified on a number of grounds, including its potential to inform policy and programming, contribute to our understanding of gendered dynamics in rural areas, generate knowledge about the benefits of livestock rearing, and build local research capacity. Overall, the study has the potential to contribute to broader efforts to promote gender equality and women's empowerment in rural Bangladesh and beyond.

1.3 Objectives of The Study

a) To know the socio-economic status of livestock rearing rural women,
b) To determine the determinants of rural women participation in livestock rearing and
c) To find out the barriers faced by rural women in livestock rearing contribution

1.4 Definition of Terms

This section defines a few key concepts that were used throughout the study to help with comprehension. Their meaning and interpretation are given below for this purpose:

Respondent: Respondents are those who have answered questions for a social survey from an interviewer.

Income Generating Activities: Income-generating activities are those in which a woman earns money directly by producing, manufacturing, and selling various things.

Credit Received: It was the total amount of taka received as credit from various organizations by a respondent.

Participation on Cow Rearing: The nature and amount of women's participation in various cow rearing related activities is referred to as participation in cow rearing.

Livestock: The term livestock refers to chickens, goats, and cattle that are cared for by humans and produce freely.

Grazing Land: Grazing land is pasture land where animals graze and eat growing grass. Fallow grounds, riverbanks, canals, and road sides are all possibilities for grazing land.

Production: It refers to the annual number of livestock in a family that is reproduced, purchased, obtained excluding the number of loss and death.

Livestock Rearing Knowledge: It refers to farmers' basic knowledge of various cows, goats, buffalos, etc. management procedures, such as breeding, feeding, housing, and disease prevention and control.

Prevention of Disease: It is the process of taking certain preventive measures to ensure that animals are not infected with a specific disease or condition.

Control of Disease: It's a method or technique for controlling, eliminating, and preventing the spread of a specific illness or issue in livestock.

Age: Age can be defined as the time span between birth and the interview. It is measured in years.

Education: Education is the process of a person develops desirable information, skill and attitude through reading, writing, observation, and other associated activities. It is measured in years of formal education

Family Size: The respondent’s family size is defined as the number of individuals in the family who live and eat together, including herself, her spouse, children, brother, sisters and any other permanent dependents.

Farm Size: It refers to the land owned by a farmer, including the farmhouse on which she carried on her farming and family business, and the land is valued in terms of the farmer's complete profit. A farmer is deemed to enjoy full advantage from cultivated land that she owns or obtains for a lower price from others, and half benefit from land that she cultivated on Pabna or gave to others to grow on Pabna basis.

Family Income: It is defined as the total earning of an individual and the members of the family from agriculture and other sources (service, business) during a year. It was expressed in thousand taka.

Chapter 2

Review of Literature

The present study is concerned with the participation of women in livestock rearing. This review of literature chapter deals with the review of past studies and findings related to study. The researcher came across with some expert opinions and has tried his best to collect needful information through searching relevant studies, journals, periodicals, bulletins, leaflets, internet etc. These enhanced the researcher's knowledge for a better and clear understanding of the present study.

2.1 Reviews on women participation in agricultural activities

Damisa et al. (2007) found that the level of the disposable income, perception, tenure rights and the level of the contribution of the women to agriculture had significant impact on the women participation in agricultural production.

Mamun (2009) showed that about half (46.1%) of the respondents derived medium level participation followed by43.1% low level participation and only 10.8% were high level participation in income generation activities. It means that an overwhelming majority (89.2%) of the respondent women had medium to low level participation in income generating activities. Level of education, annual family income, organizational participation, cosmopoliteness, contact with development workers and training exposure had significant positive relationships with women participation in income generating activities but problem faced in income generating activities had significant negative relationship.

RehmanAlvi et al. (2012) showed that the ration of young illiterate married women participation in agricultural activities was greater than unmarried so that the economic condition of their family can be improved. Due to joint family system and limited livelihood opportunities only, male members were unable to fulfill the financial needs of whole family. So, women participation in agricultural activities were inevitable although women laborers got less income than male for doing the same farming activity.

Jahan (2014) revealed that majority (62.5%) of the respondent had medium participation in winter homestead vegetable cultivation as compared to 30% low participation and 7.5% high participation. The highest proportion (73.3%) of the

respondent had medium participation in summer homestead vegetable cultivation as compared to 22.5% low participation and 4.2% high participation. The highest proportion (52.5%) of the respondent had medium participation in homestead vegetable cultivation as compared to 36.7% low participation and 10.8% high participation. Correlation analysis indicated that five out of eleven independent variable namely farm size, extension contact, agricultural training, decision making role and innovativeness had significant positive relationship with their homestead vegetable cultivation.

Rahman (2015) showed that an overwhelming majority (96.36%) of rural women had very high participation in household and agricultural activities. On the basis of average daily time spent in different household and agricultural activities, women participate more in fooding, which was followed by, crop production activities, other household activities, livestock rearing, children's education, poultry rearing, housing, clothing and fisheries respectively. The findings revealed that level of education, family size and coping capacity to household shock had significant positive relationships with participation of rural women in household and agricultural activities and age showed significant negative correlation. Annual family income, exposure to communication media, husband wife relation, financial contribution to family purchase, participation in social activities, problem faced in household activities and problem faced in agricultural activities had non-significant positive relationships with participation of rural women in household and agricultural activities.

Ritu et al. (2016) showed that majority of the respondents were found to play main role with active participation in production, protection and processing while subordinate role with passive participation were found in technological and finance and marketing activities. Majority of the respondents was seen under information seeking behavior and consulting category of decision-making pattern. The participation to production and protection areas seems to have significant association with all the socio-economic and personal variables at 5% level of significance.

Tharani et al. (2016) revealed that 90% of the rural women respondents and 50% of the urban respondents participated in the agricultural activities which is a significant difference. The mean values of women participation in agricultural activities in urban

and rural areas were 77 hours and 836 hours per annum respectively. The multiple regression model for women participation in urban area found that the participation of women negatively correlated with status of employment, age and education level (p=0.000). In rural area, age and educational level were negatively influencing on women participation in agricultural activities (p=0.000).

Rashid et al. (2017) revealed that the participation of women in agriculture sector is pervasive and women have remarkable participation in crop processing, home gardening, and managing small scale livestock and fisheries. Women participation in agricultural extension service can reduce poverty; improve food security; develop family health and nutrition status, create new job opportunities and enhance efficiency of extension services.

Islam et al. (2018) found that about half (48.3%) of the rural women had low to medium participation in vegetable cultivation compared to 3.34% having high participation. Considering broadly selected 6-aspects of homestead vegetable cultivation, the rural women's participation was highest in seedbed preparation and raising of seedlings, while it was lowest in case of intercultural operation.

Tanji (2018) found that the empowerment index of the agricultural participant women was higher than average empowerment level but it was much higher for non-agricultural participant women. The empowerment index for agricultural participants was 3.56 and for non-agricultural participants was 3.76 whereas the average empowerment index for all respondents was 3.66. Besides, most of the rural women in vulnerable group were non-agricultural participants and in high group, no non-participant women were found. Again, from the weighted average of the decision-making factors it was found that, women mostly play their role in household decision-making factors.

Amena (2020) found that majority of the respondents belong to the age group of 36-50 years, 48.8% was married, 57% women had nuclear family, 33.8% of the respondent's average monthly savings was between 1000 to 3000 taka, and majority of the respondents (62.0%) rear chicken. Also revealed that family size, husband's occupation and communication device like television positively influenced women participation in homestead poultry rearing.

Auishy (2020) revealed that the higher proportion (53.3%) of the respondents had participated in vegetable cultivation and while 46.7% of women did not participate in vegetable cultivation. Among selected characteristics of the respondent's viz. education, family size, satisfaction, monthly income from vegetable cultivation, extension contact and training in vegetable cultivation had significant positive contribution to their participation in vegetable cultivation.

Basree (2020) indicated that highest proportion (78.22%) of the rural women had medium participation in homestead agroforestry compared to 8.91% having low participation. Multiple regression analysis indicated that four, out of ten independent variables namely agricultural training, knowledge, attitude and problems on homestead agroforestry of the rural women had significant contribution to their participation in homestead agroforestry. On the other hand, other selected variables age, education, family and farm size, annual incomes, organizational participation had no significant contribution to their participation in homestead agroforestry.

Sultana (2020) revealed that on average 74%, 47% and 63% women predominantly involved in vegetable production and earned Tk. 234,924.00, Tk. 102,109.71 and Tk. 135,482.37.44 in the selected Angaria, Sreerampur and Lebukhali unions. Some socio-economic characteristics of the respondent rural women like educational level, farm size, annual family income and training experience had a significant and positive relationship with their extent of participation of women in homestead vegetable production.

Ganiyu et al. (2021) showed that about half (48%) of the women farmers highly participate in extension activities. The regression result shows that extension contact is the only significant factor that influences participation in agricultural extension activities in the study area.

Sumy et al. (2021) showed that (36%) young women were engaged in small ruminant rearing (26-35 age group) and major proportion of the respondents (46%) in the study areas were primary educated. About 52% of the respondents have a family size consisting of 6-10 members. Nearly half (46%) of the women involved in rearing small ruminants earned between BDT 12,000.00 - BDT 18,000.00 per annum. The participation index implies that large proportions of women were always participating in supplying water, feeding and providing fodder and cleaning barns/corrals/pens of

small ruminants. A logistic regression analysis revealed that women's participation in household decision making process was negatively related with family size and farm size, but positively related with respondent's income ($P<0.05$) and education ($P<0.01$).

Islam et al. (2022) revealed that off-farm activities have a positive and significant impact on rural women's income. And also found that educational status, family size, work experiences, personal income, saving and training, significantly affected rural women's involvement in off-farm activities.

Sallawu et al. (2022) revealed that the positive drivers of women participation in agricultural activities were household size, marital status, level of education, farming experience, disposable income, extension service and membership of association. In the contrary, distance to farm is a negative driver of women participation in agricultural activities in the study area.

Umar et al. (2022) showed low level of women farmers participation in planning agricultural practices ($\bar{x}$=2.27). Implementation of agricultural practices among women farmers had high-level participation ($\bar{x}$=3.74).

2.2 Reviews on Women Participation in Livestock Rearing

Karim (2015) revealed that the women belonged to medium participation category constitute the highest proportion 43% followed by lowparticipation32%, no participation 16% and high participation 9%. Among the respondent women, about 75%respondent women have low to medium participation group. Multiple regression exposed that farm size, contact with service provider, education, helping of family activities and knowledge on livestock rearing were significant contributing factors.

Paul (2016) showed that most of the rural women (66.1%) had moderately favorable attitude while 13.6 and 20.3 percent of them had highly and poorly favorable attitude towards livestock rearing. Among the variables- education, livestock rearing experience, usages of mass media, training exposure, livestock management practices, financial facilities, and knowledge on livestock rearing were significant contributor and provided 66.1% contribution on rural women's attitude towards livestock rearing.

Imam (2020) revealed that the rural women belonged to medium participation category constitute the highest proportion 64.5% followed by low participation 19.1%

and high participation 16.4%. Regression co-efficient exposed that level of education, knowledge about livestock rearing, and extension media contact of the rural women had significant positive contribution to their participation in income generating activities through livestock rearing.

Munni (2021) showed that about half of the respondents (49%) were involved in livestock rearing at a medium level, followed by 40% at a low level, and only 11% at a high level. It indicates that the large majority of the women who responded (89%) had a medium to low level of participation in livestock rearing. Among eleven selected characteristics of the women five namely family size, credit availability, training received, extension contact, cosmopoliteness had positive significant and two namely education, farm size had negative significant contribution to their participation in livestock rearing.

2.3 Barriers to women participation in agricultural activities

Jahan (2014) showed that lack of credit was ranked first followed by lack of technical knowledge, insect and disease infestation, higher price of inputs, lack of quality seeds and seedlings, cattle and goat destroy the vegetables, lack of homestead land, lower fertility of homestead land and lower market price of products while lack of required information in time had the last position in order of ranking.

Paul (2016) showed that majority (71.2%) rural women faced medium problems on livestock rearing, while lack of grazing land positioned the 1st and environmental hazards in last position regarding problems on livestock rearing.

RehmanAlvi et al. (2016) found that women facing certain problems while performing agricultural activities such as bad attitude of owner, problem of getting wages in time and problem of working in harsh conditions of weather.

Rashid et al. (2017) found that major challenges in linking women with agricultural extension are lack of capacity, structure and policy of the extension service, patriarchal social norms, limited access of women to production inputs, lower education among women, and women's weak individual and collective agency.

Tanji (2018) revealed that seasonality and inequality of women's employment, lack of veterinary facilities and quality seeds, lack of education opportunities, training and

credit, lack of marketing and amusement facilities, social bindings, land ownership, health and sanitation and above all natural calamities.

Auishy (2020) found that lack of training facilities was the 1st problem followed by low yield and unstable price and lack of technical knowledge was the last problem.

Sallawu et al. (2022) showed that inadequate financial opportunities and inadequate access to extension services were among the serious constraints that hindered women participation in agricultural activities.

2.4 Research Gap of The Study

The discussion and review highlighted the focus of previous studies on women's participation in agricultural activities in Bangladesh, with some emphasis on women's participation in livestock rearing. However, most of these studies were conducted more than five years ago, and changes in participation may have occurred since then. Therefore, the validity of the factors influencing participation needs to be re-evaluated. In addition, the influence of other factors identified by researchers from other countries needs to be studied in the context of Bangladesh. There is a lack of integrated studies on women's participation in cow rearing in Bangladesh, which this study aims to address. The review of literature helped the researcher to redesign the methodology, overcoming the limitations of previous studies.

This study will examine women's participation in livestock rearing in Bangladesh, taking into account the current development context. The findings of this study will help policy makers understand the current situation and take programs to increase women's participation in livestock rearing, which can improve the livelihoods of people in Bangladesh. Furthermore, the updated information gathered in this study will provide useful insights for policy makers and researchers for further investigations.

Overall, the focus of previous studies on women's participation in livestock rearing in Bangladesh has been limited to certain areas, and there is a need to re-evaluate the factors influencing participation in light of changes that may have occurred. The lack of integrated studies on women's participation in livestock rearing in Bangladesh underscores the importance of this study, which will provide valuable information for policy makers and researchers.

2.5 Conceptual Framework of The Study

A well-developed research hypothesis consists of two main components: a dependent variable and an independent variable. Townsend (1953) defines a dependent variable as a factor that emerges, disappears, or changes as the researcher introduces, removes, or alters independent variables. An independent variable is a factor that the researcher manipulates to investigate its relevance to a particular phenomenon. The variables represent causes and the phenomenon represents the effect, implying a cause and effect relationship everywhere in the universe. The conceptual framework proposed by Rosenberg and Hovland (1960) was taken into account while establishing the structural arrangements for the dependent and independent variables.

This study focuses on women's participation in livestock rearing, with the dependent variable being women's participation in livestock rearing and the independent variables consisting of eight selected characteristics of the women. The perception of individuals can be influenced by the interactions among several independent variables, and it is not possible to address all independent variables in a single study. Therefore, it was necessary to limit the independent variables, including age, education level of the rural women, family size, experience, training, knowledge on livestock rearing, extension contact, and membership of social organization.

Considering the above-mentioned factors and discussions, a conceptual framework has been developed for this study, which is presented in Figure 2.1.

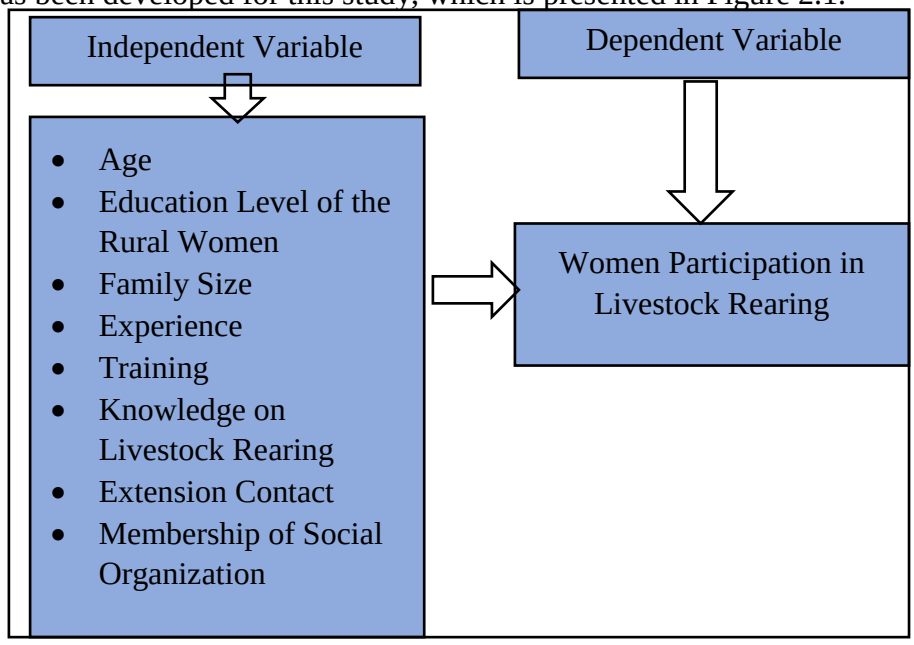

Figure 2.1 The conceptual framework study

CHAPTER 3

METHODOLOGY

3.1. Introduction

The effectiveness of research on farm management relies heavily on the research methodology employed. Adequate techniques are essential for conducting reliable research. The design of each survey is predominantly determined by the study's nature, objectives, and goals as well as the availability of necessary resources, equipment, and time. There are several data collection methods available for farm management studies. For farm business research, collecting data from individual farmers is typically necessary. Therefore, the analyst must exercise judgment in selecting appropriate data collection techniques while working within the constraints imposed by the assignment's available resources (Dillon and Hardaker 1993).

In this research, the survey approach was used for two primary reasons: first, surveys allow for quick investigations of a large number of cases, and second, their results have broader applicability. To ensure accuracy, researchers made frequent trips to the research area to collect data. In cases where information was missing or contradictory, farmers were contacted to provide the necessary information. The survey for this study was designed using the following stages.

3.2. Selection of the Study Area

Selecting the study area is a crucial aspect of conducting farm management research. The chosen region should align with the study's specific objectives and allow for cooperation with farmers. While livestock is raised throughout Bangladesh, the Pabna district is one of the most prominent areas for livestock rearing. Therefore, the research purposefully selected three Upazilas namely Sujanagar, Chatmohar, and Bera, within the Pabna district based on their high concentration of livestock rearing. In Bangladesh, districts are divided into sub-districts known as Upazila (Sarker, 2010). The Pabna district was established in 1832 and comprises nine Upazilas, eight municipalities, 81 wards, 191 mahallas, 72 union parishads, 1,321 Mouzas, and 1,540 villages (MIDP, 2008). Atgharia Upazila, Bera Upazila, Bhangura Upazila, Chatmohar Upazila, Faridpur Upazila, Ishwardi Upazila, PabnaSadarUpazila, Santhia Upazila, and Sujanagar Upazila are the nine Upazilas within the Pabna district, with a population density of 8,130 per square kilometer. Approximately 26% of the area

displays a mixed urban-rural character where not all facilities/services provided by the Upazila are available. These areas are predominantly agricultural, and over time they will likely become townships for practical purposes. The land within the Upazila area is relatively fertile, and social crime is not a significant issue (Sakil et al., 2019). The key considerations that led to the selection of the research area were:

a) The presence of a large number of livestock rearing rural women in the region;
b) The similarity in physical features of the villages that were conducive to livestock production, including topography, soil, and climatic conditions;
c) Expected ease of access to these communities; and
d) Availability of adequate communication facilities and a high level of cooperation from the respondents to obtain reliable data.

Figure 3.1: A map of Pabna district showing the study area

3.3. Sampling Technique and Sample Size

When selecting samples for research, two factors must be considered. Firstly, the sample size should be as large as possible, while still allowing for adequate degrees of freedom for statistical analysis. Secondly, the practical constraints of field research

administration, data processing, and analysis, including physical, human, and financial resources, should be taken into account. However, due to variations in technological and human environments, it is necessary to select a representative sample of the population in order to draw valid conclusions. Therefore, the objective of sampling is to choose a subset of the population that is representative of the entire population (Kabir, 2016).

Given the time, financial, and manpower constraints, it was not feasible to include all farmers in the study area. As a result, a total of 90 rural women were randomly selected for the research. The current study utilized simple random sampling to save time and costs, while still achieving the research's ultimate objectives.

Table 3.1: Distribution of sample size of respondents in three selected Upazilas of Pabna District

District	**Upazila**	**Sample Size**
Pabna	Sujanagar	30
	Chatmohar	30
	Bera	30
Total		90

3.4. Preparation of the Survey Schedule

To gather data from the sample farms, a preliminary questionnaire was created. The questionnaire was pre-tested by conducting interviews with 30 livestock rearing rural women, taking into account the study's objectives, and any necessary revisions, additions or modifications were made before the final questionnaire was completed.

The final questionnaire comprised three sections of information. The first category was intended to collect information about the farmers' socioeconomic status. The second section included data on women's participation, while the final section was designed to elicit information about the challenges and limitations encountered by livestock farmers.

3.5. Period of the Study

Data was gathered between June 12 and July 11, 2021. By making frequent visits to the research location, information on inputs and outputs was acquired throughout this time.

3.6. Data Collection Methods

In this study, data was collected from livestock farmers through a field survey. The researcher directly collected the required data from the selected farmers after making arrangements for convenient interviews. During the interviews, systematic questions were asked, and the objectives of the study were discussed as necessary. The farmers were informed that the investigation was purely academic. After each interview, the interview schedule was reviewed to ensure accurate documentation of all relevant information. Any missed or conflicting information was corrected during follow-up visits.

3.7. Processing, Tabulation and Analysis of Data

Data collection was manually edited and coded. The collected data was then carefully assembled and examined. Also, data analysis was done with the proper software, including STATA and Microsoft Excel. It should be kept in mind that local units were where information was originally acquired. It was converted to international standard units after the necessary inspections.

3.8 Analytical Technique

Quantitative analysis is used to analysis data which helps in assessing performance and evaluating financial instruments. It encompasses regression analysis as a main techniques of measuring data. This statistical methods as an analysis technique is a set includes linear programming and data mining are two techniques for evaluating connections between a dependent variable and one or more independent variables. Analyses in tabular format was mostly used in the process because it is easy to use and understand. Descriptive statistics like mean, mode, variance, standard deviation has been used for analyzing socio-economic condition of livestock rearing rural women, and determinants of rural women participation in livestock rearing will be analyzed by using Binary logistic function.

3.8.1 Determinants of Rural Women participation in Livestock rearing

The logit model is used to address the objective, which is the determinants of rural women participation in livestock rearing, because its likelihood function is well behaved and consistently produces maximum likelihood estimate (MLE) coefficients and standard error of the estimate (Maddala, 1992). After adjusting the pertinent

model variables, the logit model calculates the likelihood that determinants of rural women participation in livestock rearing will be participated. The first step's dependent variable is described as a dichotomous variable with values of 1 for participants and 0 for non-participants.

$Ui^* = Xi'\gamma + u_i$ ..... (1)

with $U_i = \begin{cases} 1 & \text{if } U_i^* > 0 \\ 0 & \text{Otherwise} \end{cases}$

where, U_i^* is the latent variable which represents the probability of the household's decision to participation of women in livestock rearing, and takes the value '1' if there is women participation in livestock rearing '0' otherwise. The term X_i' represents explanatory variables explaining the participation decision, γ is a vector of parameters to be estimated, and u_i is the error term assumed to be independent and normally distributes as $u_i \sim N(0, 1)$.

We employed a logit model (STATA 14.2) to identify the determinants of rural women participation in livestock rearing using plot-level data. The logit model is the most suitable tool to determine the probability of whether or not to choose adoption, particularly at the plot-level data analysis (Gauchan et al, 2012).

Based on the above-mentioned theoretical model and previous study experiences (Gauchan et al, 2012; Noltze et al, 2012; Kohansal and Firoozzare, 2013; Chakma, 2021, Naeem, 2021), we selected our explanatory variables and specified a logit model as follows:

$$\mathbf{Log\left[\frac{P}{1-P}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + e}$$

Where,

P = Probability of Outcome (Participation of women in livestock rearing)

X_1 = Age (Years)

X_2 = Education level of the Rural Women (Years)

X_3 = Family Size (Numbers)

X_4 = Experience (Years)

X_5 = Training (Yes/No)

X_6 = Knowledge on Livestock rearing(Yes/No)

X_7 = Extension Contact (Yes/No)

X_8 = Membership of social organization (Yes/No)

β_0 = Intercept

β_1,....., β_8 = Co-efficient of respected independent variables;

e = Random Error.

STATA software was used to analysis the data. A probability of 10% (0.10) was utilized to reject the null hypothesis. Asterisks (***) indicate the significance of coefficient values at the 0.01 level, while two asterisks (**) indicate the significance of coefficient values at the 0.05 level and three asterisks (*) indicate the significance of coefficient values at the 0.10 level.

3.8 Variables Used

A variable is any property that may take on varied or distinct values in subsequent individual occurrences (Ezekiel and Fox, 1959). A well-structured piece of study would often have at least two significant variables, referred to as dependent and independent variables.

3.8.1 Dependent Variable

The dependent variable is the variable that is assessed in an experiment or the variables that are altered during research. In this study the dependent variable is women participation in livestock rearing.

3.8.2 Independent Variables

The independent variables are those that the researcher modifies in order to examine the dependent variables or variables that may take on changing values and thereby affect the values of other variables. The researcher chosen eight qualities of the respondent as independent variables in this study. The independent variables for this study are: (i) age; (ii) education level of the rural women; (iii) family size; (iv)experience; (v) training; (vi) knowledge on livestock rearing; (vii) extension contact and (viii) membership of social organization.

3.8.3 Measurement of Dependent Variable

Participation of women in livestock rearing was the dependent variable for the study. The variable was measured on the basis of whether the rural women participate or not participate in livestock rearing.

The women who were a participant in livestock rearing was given a score of 1 and the farmers who was a non-participation livestock rearing was given a score of 0. Thus, the rural women participation in livestock rearing was found to vary between 0 and 1.

3.8.4 Measurement of Independent Variables

It was important to measure the independent variables in order to perform the research according to the goals. The independent variables were age, education level of the rural women, family size, experience, training ,knowledge on livestock rearing, extension contact, and membership of social organization. Procedures for measuring these variables are described below:

i) Age

Age of the women was measured in terms of actual years from his birth to the time of interview, which was found on the basis of the verbal response of the rural people (Rashid, 2014). A score of one (1) was assigned for each year of one's age.

ii) Education Level of the Rural Women

Highest education level of the rural women was defined as an individual respondent's ability to read and write or the formal education obtained up to a given threshold in that family. If a responder lacked formal schooling, her score was zero (0). Each year of education was granted a score of one (1). If a responder passed the S.S.C test, he received a score of 10 for H.S.C. and so on.

iii) Family Size

Family size was measured based on their total household members. A score of one (1) was assigned for each member of the family.

iv) Experience

Experience of respondent was measured on the basis of the nature of their experience in livestock rearing. A score of one (1) was assigned for each year of one's experience.

Table 3.2: Short Description of Dependent and Independent Variables

Variable	Types	Measuring Technique
A. Dependent Variables		
Rural Women Participation In Livestock Rearing	Binary	1 for participant in livestock rearing and 0 for non-participant in livestock rearing
B. Independent Variables		
(I) Age	Continuous	1 for 1 year of age
(Ii) Education Level of The Rural Women	Continuous	1 for 1 year of schooling
(Iii) Family Size	Continuous	1 for 1 members of the family
(Iv) Experience	Continuous	1 for 1 year of experience
(V) Training	Binary	1 for participate in training and 0 for not participate in training
(Vi) Knowledge on Livestock Rearing	Binary	1 for had knowledge on livestock rearing and 0 for had no knowledge on livestock rearing
(Vii) Extension Contact	Binary	1 for discussing with extension officers and 0 for not discussing with officers
(Viii) Membership of Social Organization	Binary	1 for membership in social organization and 0 for not membership in social organization

v) Training

Training was measured based on their response to participate any training programme. Those who was attended any training programme was given score 1 otherwise 0.

vi) Knowledge on Livestock Rearing

Knowledge on livestock rearing was measured based on their response on livestock management. Those who had knowledge on livestock rearing was given score 1 otherwise 0.

vii) Extension Contact

Extension contact was measured based on their response of communication and discussion with any extension officers and staffs. Those who had extension contact was given score 1 otherwise 0.

viii) Membership of Social Organization

Membership of social organization was measured based on their response to member of any available social organization in their area. Those who was member of any available social organization was given score 1 otherwise 0.

3.9 Null Hypothesis

The current investigation tested the following null hypothesis. There is no statistically significant association between chosen farmer traits and satisfaction with agricultural progress in Bangladesh. The features in question are - age, education level of the rural women, family size, experience, training, knowledge on livestock rearing, extension contact, and membership of social organization.

CHAPTER 4

SOCIOECONOMIC STATUS OF RURAL WOMEN

Women's participation in livestock rearing in the area where the study was performed was influenced by an individual's possession of several interrelated characteristics. As

a result, it was expected that the women's characteristics would influence their involvement in livestock rearing. There were eight selected characteristics studied in the study such as age, education, family size, religion, occupation status, marital status, annual income, experience, training, knowledge on livestock rearing, extension contact, and membership of social organization is presented below.

4.1 Age

Age of the respondents have an impact on the productivity and on the better management of the agricultural system. In the current study, all types of respondents in the study region were divided into various age groups as given in Figure 4.1. The rural women were categorized into four age groups: 20-30 years old, 30-40 years old, 40-50 years old above 50 years old.

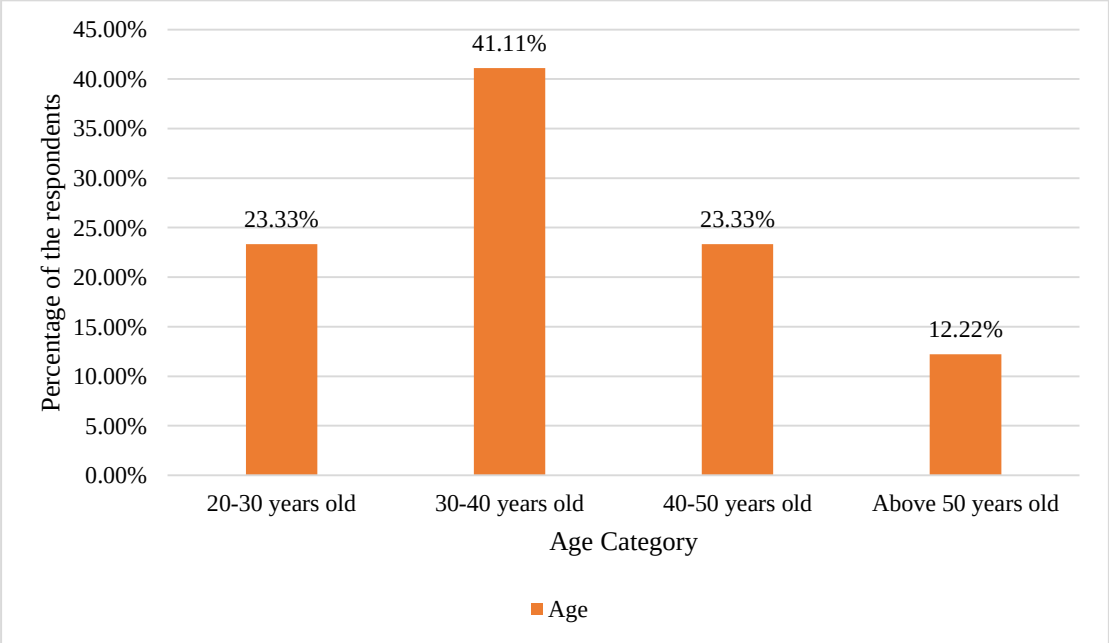

Figure 4.1: Distribution of the rural women according to their age

Out of the entire respondents about23% belonged to the age range of 20-30 years, 41% belonged to the age group of 30-40 years, 23% were 40-50 years old and 12% fell into the age category of above 50 years. This data show that majority of the rural women were in the most active age group was 30-40 years old aged indicating that they gave higher physical efforts for livestock rearing.

4.2 Education level

In the current study, all types of respondent's education level in the study region were shown in Figure 4.2. The rural women were categorized into five education level: illiterate, primary, secondary, SSC and HSC.

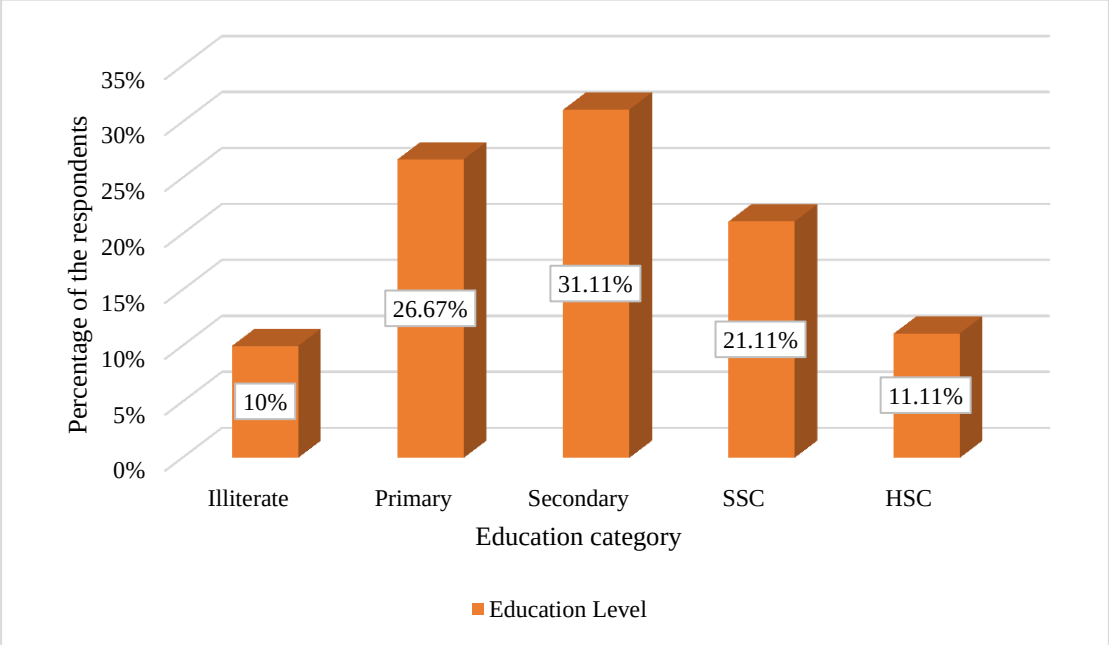

Figure 4.2: Distribution of the rural women according to their education level

Out of the entire respondents about 10% were illiterate, 27% had primary level of education, 31% had secondary level of education, 21% had completed SSC and 11% had completed HSC. This data show that majority of the rural women had secondary level education in the study area.

4.3 Family size

The family size of the respondents ranged from 4 to 7 members. Based on their family size, the respondents were classified into three categories. These categories were small (≤4 members), medium (5 to 6 members), and large (≥7 members). The distribution of the rural women according to their family size is presented in Table 4.1.

Table 4.1: Distribution of the Rural Women According to Their Family Size

Category	Basis of Categorization	Observed Range	Number of respondents	Percentage (%)	Average Family size
Small	≤4 members	(4-7)	19	21.11	5.39
Medium	5-6 members		58	64.45	
Large	≥7 members		13	14.44	
Total			90	100.00	

Table 4.1 indicated that the medium family constitutes the highest proportion (64.45%) followed by small family (21.11%), and large family (14.44%) The findings of the study reveal that majority of the farmers were medium family size. The findings from Table 4.1 indicated that average family size of the study area was 5.39.

4.4 Religion

Religion of the respondents was shown in Figure 4.3. On the basis of scores, the respondents were classified into two categories namely, yes and no.

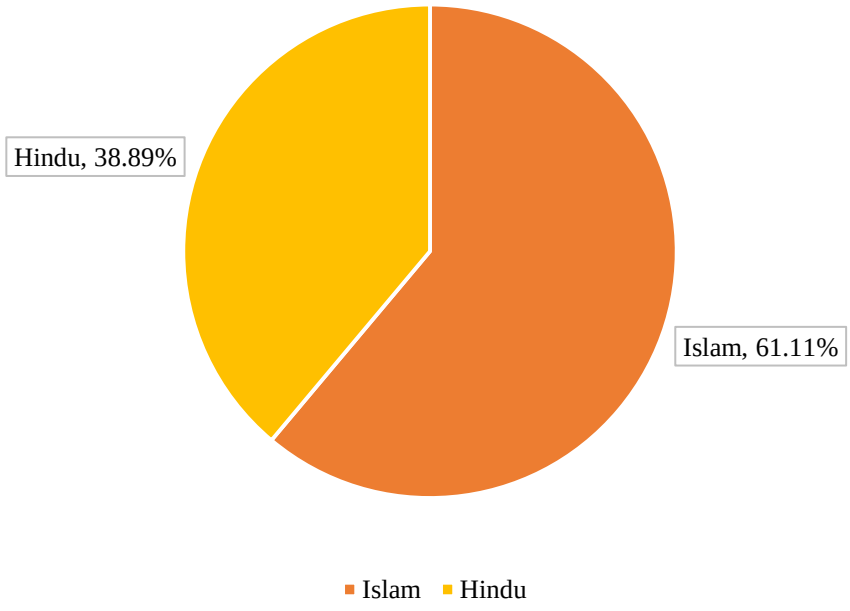

Figure 4.3: Distribution of the rural women according to their religion

Data of Figure 4.3 revealed that the majority (61.11%) of the respondents were followed Islam, whereas only 38.89% of the respondents were followed Hinduism in the study area.

4.5 Marital Status

Marital status of the respondents was shown in Figure 4.4. On the basis of scores, the respondents were classified into four categories namely, married, single, divorced and widowed.

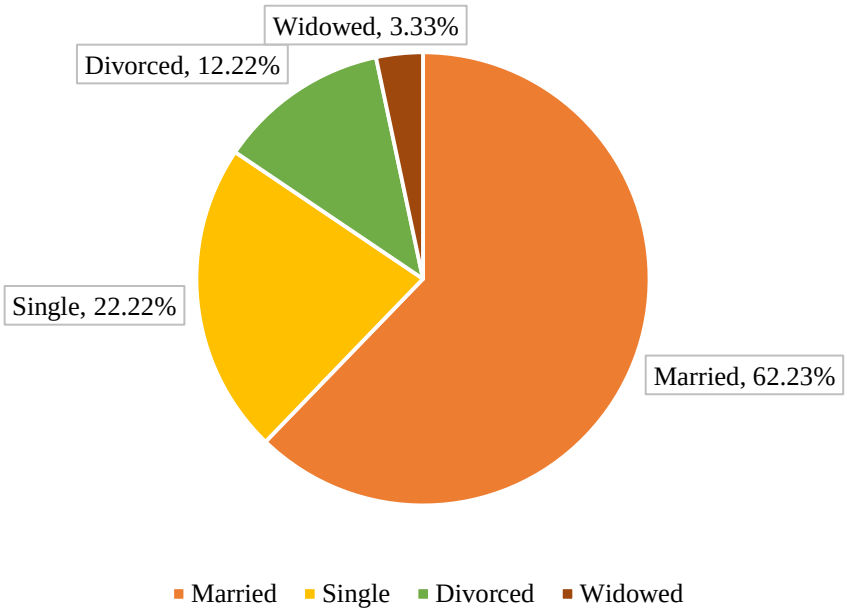

Figure 4.4: Distribution of the rural women according to their marital status

Data of Figure 4.4 revealed that the majority (62.23%) of the respondents were married, followed by22.22% of the respondents were single, 12.22% were divorced and only 3.33% were widowed in the study area.

4.6 Occupation Status

Occupation status of the respondents was shown in Figure 4.5. On the basis of scores, the respondents were classified into four categories namely, livestock, housewife, agriculture and day labor.

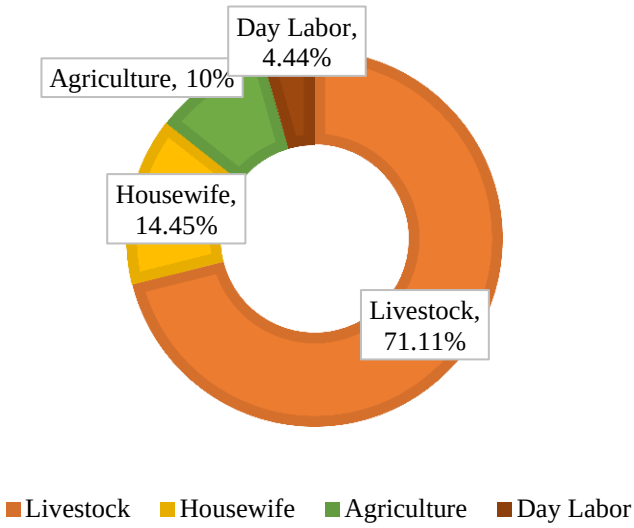

Figure 4.5: Distribution of the rural women according to their occupation status

Data of Figure 4.5 revealed that the majority (71.11%) of the respondents were involved in livestock, followed by14.45% of the respondents were housewife, 10% were involved in agriculture and only 4.44% were day labor in the study area.

4.7 Annual Household Income

Annual household income of the respondents ranged from 75 to 500thousand taka. On the basis of annual income, the respondents were classified into three categories, viz. low, medium and high annual household income. The distribution of the rural women according to annual household income are presented in Table 4.2.

Table 4.2: Distribution of the Rural Women According to Their Annual Household Income

Category	Basis of Categorization ('000 Tk.)	Observed Range ('000 Tk.)	Number of respondents	Percentage	Average Annual Household Income ('000 Tk.)
Low	up to 200	(75-500)	21	23.33	285.44
Medium	200-400		58	64.45	
High	Above 400		11	12.22	
Total			90	100.00	

Data in Table 4.2 revealed that the farmers having medium annual household income constitute the highest proportion (64.45%), while the lowest in high income was about 12.22% which was followed by low income 23.33%. The findings from Table 4.2 indicated that average annual household income of the study area was 285.44thousand Taka.

4.8 Livestock Rearing Experience

Experience of livestock rearing of the respondents ranged from 2 to 8 years. On the basis of livestock rearing experience, the respondents were classified into three categories, viz. low, medium and high annual household income. The distribution of the rural women according to livestock rearing experienceare presented in Table 4.3.

Table 4.3: Distribution of the Rural Women According to Their Livestock Rearing Experience

Category	Range (Years)	Observed Range (Years)	Number of Respondents	Percentage (%)	Average Experience (Years)
Low	≤3	(2-8)	39	43.33	4.47
Medium	4-6		31	34.45	
High	≥7		20	22.22	
Total			90	100.00	

Data in Table 4.3 revealed that the farmers having low livestock rearing experience constitute the highest proportion (43.33%), while the lowest in high experience was about 22.22% which was followed by mediumexperience34.45%. The findings from Table 4.3 indicated that average livestock rearing experience of the study area was 4.47 years.

4.9 Training Received

Training received by the rural women was shown in Figure 4.6. On the basis of training scores, the respondents were classified into two categories namely, yes and no.

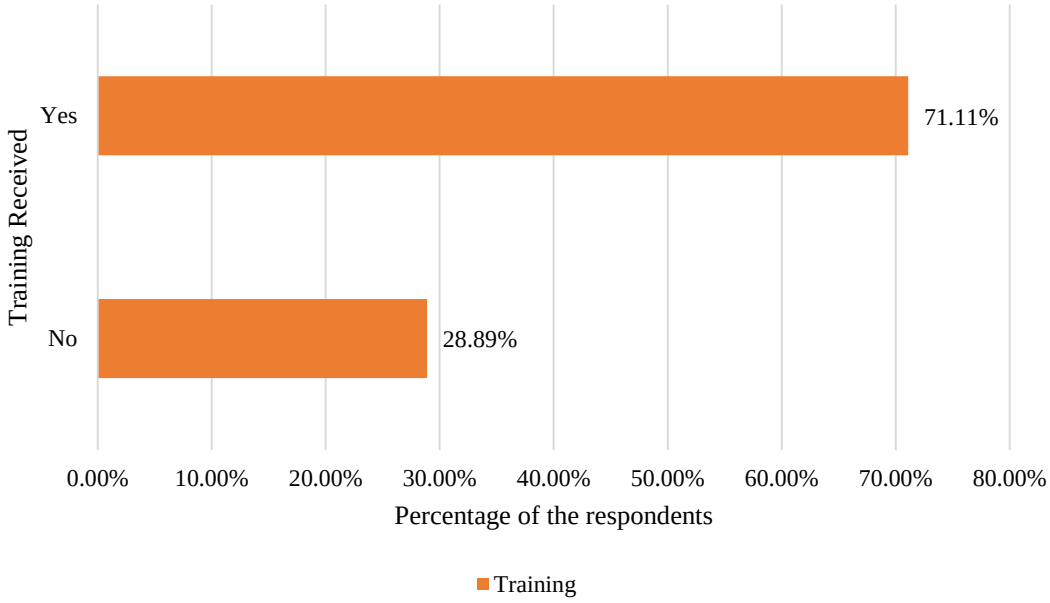

Figure 4.6: Distribution of the rural women according to training received

Data of Figure 4.6 revealed that the majority (71.11%) of the respondents had received training and only 28.89% had not received any training in the study area.

4.10 Knowledge on Livestock Rearing

Knowledge on livestock rearing of the rural women was shown in Figure 4.7. On the basis of scores, the respondents were classified into two categories namely, yes and no.

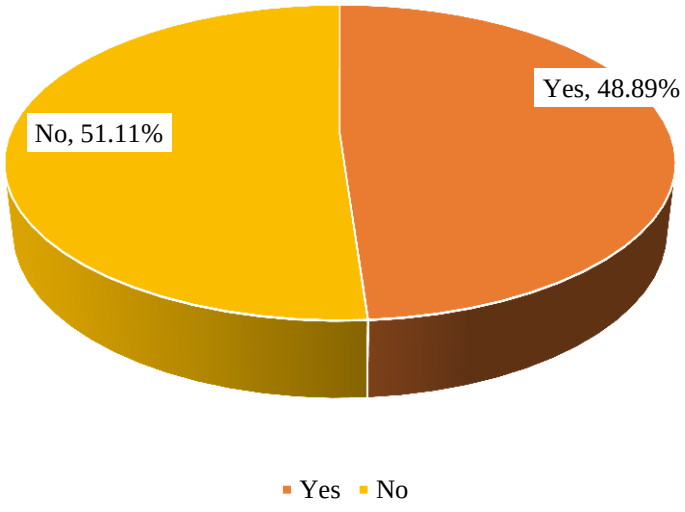

Figure 4.7: Distribution of the rural women according to their knowledge on livestock rearing

Data of Figure 4.7 revealed that the majority (51.11%) of the respondents had no knowledge on livestock rearing and about 48.89% had knowledge on livestock rearing in the study area.

4.11 Extension Contact

Extension contact by the rural women was shown in Figure 4.8. On the basis of scores, the respondents were classified into two categories namely, yes and no.

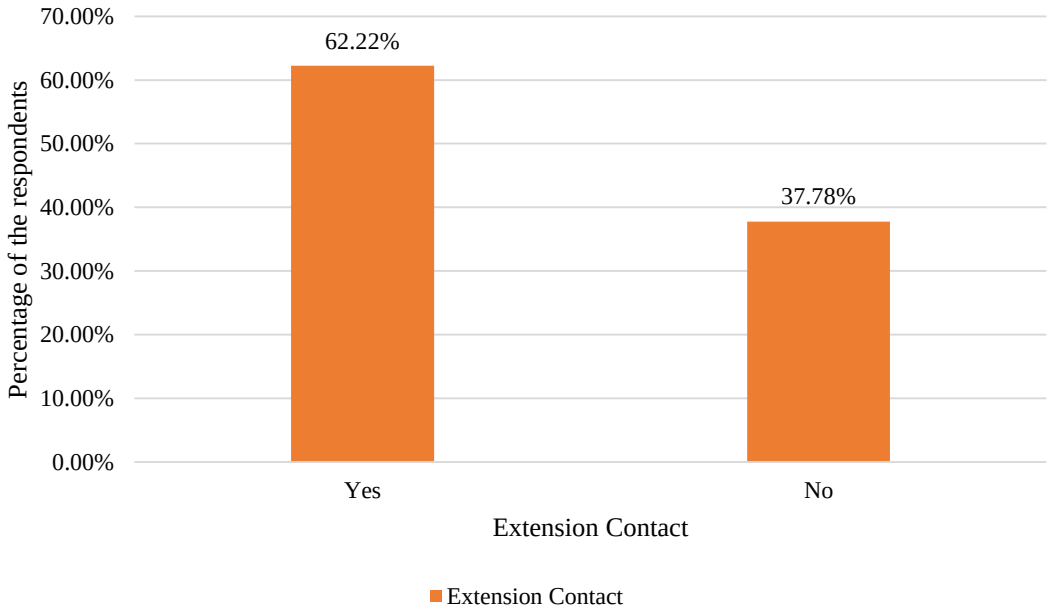

Figure 4.8: Distribution of the rural women according to extension contact

Data of Figure 4.8 revealed that the majority (62.22%) of the respondents had extension contact and about 37.78% had no extension contact in the study area.

4.12 Membership of Social Organization

There are several social organizations in the study area like, ASA, Mamata Samaj Kalyan Sangstha, Darpan, Society of Progressive Action for Needy (SOPAN), etc. Membership of social organization by the rural women was shown in Figure 4.9. On the basis of scores, the respondents were classified into two categories namely, yes and no.

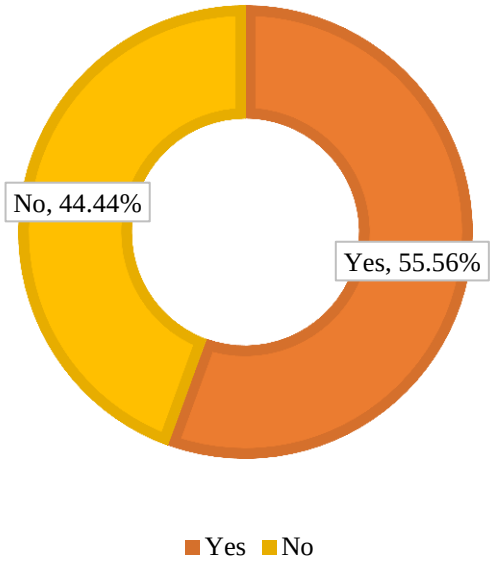

Figure 4.9: Distribution of the rural women according to their membership of social organization

Data of Figure 4.9 revealed that the majority (55.56%) of the respondents had membership of social organization and about 44.44% had no membership of social organization in the study area.

CHAPTER 5

DETERMINANTS OF RURAL WOMEN PARTICIPATION IN LIVESTOCK REARING

The purpose of this section is to find out the contribution of eight selected characteristics of the women to their participation in income generating activities through livestock rearing. Binary logistic regression coefficients were used to identify the contribution between the selected characteristics of the women which are the fundamental variables of the study and their participation in livestock rearing. In order to determine the contribution eight selected characteristics of the women farmers (age, education level of the rural women, family size, experience, training, knowledge on livestock rearing, extension contact, and membership of social organization) on participation in livestock rearing. Totest the null hypothesis about the contribution between the variables used in this study, multiple regression coefficients (β) were used. The rejection of any null hypothesis was based on a ten percent level of significance. From the analysis, it was seen that some selected characteristics had significant relationship with participation by the women in livestock rearing.

The rural women participation in livestock rearing was found to vary between 0 and 1. Based on the number of participations of rural women in livestock rearing rural women were categorized into two categories: (i) participants; and (ii) non-participants. Table 5.1 shows the distribution of rural women participants and non-participants in livestock rearing

Table 5.1: Distribution of Rural Women Participants and Non-Participants in Livestock Rearing

Category	Number of Respondents	Percentage
Participants	64	71.11
Non-participants	26	28.89
Total	90	100.00

Table 5.1 shows that, the highest proportion of the respondents were participants compared to non-participants regarding livestock rearing. About 71% respondents were participants and 29% non-participants in livestock rearing.

Binary logistic regression analysis was performed to find out the determinants of rural women participation in livestock rearing from the independent variables, as shown in Table 5.2.

Table 5.2: Binary Logistic Regression Coefficients of Contributing Determinants Related to Rural Women Participation in Livestock Rearing

Dependent Variable	**Independent Variable**	**Co-efficient**	**Standard Error**	**t-Value**	**p-Value**
Rural Women Participation in Livestock Rearing	Constant	- 0.48	2.521	- 0.19	0.848
	Age (X_1)	-0.73*	0.39	- 1.88	0.061
	Education Level Of The Rural Women (X_2)	0.69*	0.39	1.78	0.074
	Family Size (X_3)	-0.79*	0.442	- 1.78	0.074
	Experience(X_4)	0.95***	0.309	3.07	0.002
	Training(X_5)	0.41	0.793	0.52	0.606
	Knowledge On Livestock Rearing (X_6)	1.82**	0.794	2.29	0.022
	Extension Contact (X_7)	1.53**	0.765	2.01	0.045
	Membership Of Social Organization (X_8)	0.371	0.796	0.47	0.641
Log likelihood = -24.757885					
Pseudo R^2 0.54			Number of obs. 90		
Chi^2 58.69			Prob > chi^2 0.000		

*** significant at P<0.01; ** significant at P<0.05; * significant at P<0.10

The Pseudo R^2 was 0.54. It means the empirical model is 54% successful while predicting the respondents' adaptive responses against rural women participation in livestock rearing. Besides, the LR Chi^2 (58.69) was highly significant at 1% level (Table 5.2). These findings indicate, the model is valid.

5.1 Significant Contribution of Age to the Rural Women Participation in Livestock Rearing

From Logistic Regression, it was concluded that the contribution of age to the rural women participation in livestock rearing was measured by the testing the following null hypothesis;

"There is no influence of age on rural women participation in livestock rearing"

The p-value of independent variable age on rural women participation in livestock rearing was 0.061 which is significant at 10% level of significance that means we will reject the null hypothesis. The co-efficient of the age was -0.73 which indicates that age had a negative significant relationship with rural women participation in livestock rearing at 10% level of significance ($p<0.1$). Previously Rahman, 2015; and Tharani et al., 2016 found the similar result. The estimated co-efficient indicates that 1 addition years of age will decrease the rural women participation in livestock rearing by 0.73 units.

5.2 Significant Contribution of Education Level of The Rural Women to the Rural Women Participation in Livestock Rearing

From Logistic Regression, it was concluded that the contribution of education level of the rural women to the rural women participation in livestock rearing was measured by the testing the following null hypothesis;

"There is no influence of education level of the rural women on rural women participation in livestock rearing"

The p-value of independent variable education level of the rural women on rural women participation in livestock rearing was 0.074 which is significant at 10% level of significance that means we will reject the null hypothesis. The co-efficient of the education level of the rural women was 0.69 which indicates that education level of the rural women had a positive significant relationship with rural women participation in livestock rearing at 10% level of significance ($p<0.1$).Previously Karim, 2015; Rahman, 2015; Paul, 2016; Kabir et al., 2019; Auishy, 2020; Imam, 2020; Sultana, 2020; Islam et al., 2022; and Sallawu et al., 2022 found the similar result. The estimated co-efficient indicates that 1 addition years of schooling will increase the rural women participation in livestock rearing by 0.69 units.

5.3 Significant Contribution of Family Size to the Rural Women Participation in Livestock Rearing

From Logistic Regression, it was concluded that the contribution of family size to the rural women participation in livestock rearing was measured by the testing the following null hypothesis;

"There is no influence of family size on rural women participation in livestock rearing"

The p-value of independent variable family size on rural women participation in livestock rearing was 0.074 which is significant at 10% level of significance that means we will reject the null hypothesis. The co-efficient of the family size was -0.79 which indicates that family size had a negative significant relationship with rural women participation in livestock rearing at 10% level of significance ($p<0.1$). But previously Rahman, 2015; Amena, 2020; Auishy, 2020; Munni, 2021; Islam et al., 2022; and Sallawu et al., 2022 found the contradict result with this. The estimated co-efficient indicates that 1 addition of family members will decrease the rural women participation in livestock rearing by 0.79 units.

5.4 Significant Contribution of Experience to the Rural Women Participation in Livestock Rearing

From Logistic Regression, it was concluded that the contribution of experience to the rural women participation in livestock rearing was measured by the testing the following null hypothesis;

"There is no influence of experience on rural women participation in livestock rearing"

The p-value of independent variable experience on rural women participation in livestock rearing was 0.002 which is significant at 1% level of significance that means we will reject the null hypothesis. The co-efficient of the experience was 0.95 which indicates that experience had a positive significant relationship with rural women participation in livestock rearing at 1% level of significance ($p<0.01$). Previously Paul, 2016; Kabir et al., 2019; Islam yet al., 2022; and Sallawu et. al., 2022found the similar result. The estimated co-efficient indicates that 1 addition years of experience will increase the rural women participation in livestock rearing by 0.95 units.

5.5 Significant Contribution of Knowledge on Livestock Rearing to the Rural Women Participation in Livestock Rearing

From Logistic Regression, it was concluded that the contribution of knowledge on livestock rearing to the rural women participation in livestock rearing was measured by the testing the following null hypothesis;

"There is no influence of knowledge on livestock rearing on rural women participation in livestock rearing"

The p-value of independent variable knowledge on livestock rearing on rural women participation in livestock rearing was 0.022 which is significant at 5% level of significance that means we will reject the null hypothesis. The co-efficient of the knowledge on livestock rearing was 1.82 which indicates that knowledge on livestock rearing had a positive significant relationship with rural women participation in livestock rearing at 5% level of significance ($p<0.05$). Previously Karim, 2015; Paul, 2016; and Imam, 2020 found the similar result. The estimated co-efficient indicates that 1 addition of knowledge on livestock rearing will increase the rural women participation in livestock rearing by 1.82 units.

5.6 Significant Contribution of Extension Contact to the Rural Women Participation in Livestock Rearing

From Logistic Regression, it was concluded that the contribution of extension contact to the rural women participation in livestock rearing was measured by the testing the following null hypothesis;

"There is no influence of extension contact rural women participation in livestock rearing"

The p-value of independent variable extension contact on rural women participation in livestock rearing was 0.045 which is significant at 5% level of significance that means we will reject the null hypothesis. The co-efficient of the extension contact was 1.53 which indicates that extension contact had a positive significant relationship with rural women participation in livestock rearing at 5% level of significance ($p<0.05$). Previously Auishy, 2020; Imam, 2020; Munni, 2021; and Sallawu et al., 2022 found the similar result.The estimated co-efficient indicates that 1 addition of extension contact will increase the rural women participation in livestock rearing by 1.53 units.

CHAPTER 6

BARRIERS FACED BY RURAL WOMEN IN LIVESTOCK REARING

There were many problems which were faced by rural women in livestock rearing. The problems that are faced by the selected women are discussed below:

6.1 Lack of Grass Land

Lack of grassland means that farmers must rely on purchased feed, which is expensive, and this has increased the cost of livestock production. This, in turn, has made it difficult for small-scale farmers to remain competitive in the market. Additionally, the limited availability of grasslands has forced farmers to use low-quality feeds, leading to lower productivity, poor animal health, and reduced income.The primary reason for the lack of grasslands is the rapid expansion of urbanization and agriculture.Table 6.1 indicates that about 78% of the rural women (out of 64 women) faced this problem and ranked 3rd among the problems.

6.2 High Feed Cost

The high feed cost has also resulted in a decline in livestock productivity, as farmers may not be able to afford to provide the necessary amount and quality of feed required for their animals.The primary reason for the high cost of feed is the limited availability of locally produced ingredients, which has resulted in a significant dependence on imported feed ingredients.Table 6.1 indicates that about 81% of the rural women (out of 64 women) faced this problem and ranked 2nd among the problems.

6.3 Lack of Easy Access to Credit

Access to credit is essential for the growth and development of the livestock industry in Bangladesh. However, small-scale livestock farmers in the country face challenges in obtaining credit due to various factors, including lack of collateral, inadequate credit history, and complex loan application procedures. The absence of easy access to credit has hindered the growth and expansion of the livestock industry in Bangladesh. Table 6.1 indicates that about 62% of the rural women (out of 64 women) faced this problem and ranked 5th among the problems.

6.4 Lack of Trained Vaccination Workers

Vaccination is essential to prevent and control the spread of diseases among livestock, but the shortage of trained vaccination workers has hindered the vaccination programs in the country. The lack of vaccination workers is due to various factors, including a shortage of veterinary professionals, inadequate training programs, and limited financial resources. As a result, many livestock farmers are unable to access vaccination services, leaving their animals vulnerable to diseases.Table 6.1 indicates that about 58% of the rural women (out of 64 women) faced this problem and ranked 6thamong the problems.

Table 6.1: Problem Faced By the Rural Women in Livestock Rearing

Problems	Number of Respondents	Percentage (%)	Rank
Various disease attack	55	85.94	1st
High feed cost	52	81.25	2nd
Lack of grass land	50	78.13	3rd
Lower price of milk	42	65.63	4th
Lack of easy access to credit	40	62.50	5th
Lack of trained vaccination workers	37	57.81	6th

6.5 Various Disease Attack

The livestock industry in Bangladesh is facing significant challenges due to various diseases that affect livestock. Some of the most common diseases in the country include Foot and Mouth Disease (FMD), Avian Influenza, Peste des petits ruminants (PPR), and Newcastle disease. These diseases are highly contagious and can cause significant losses for livestock farmers. The impact of these diseases is not only economic but also has a severe effect on food security and the livelihoods of small-scale farmers.Table 6.1 indicates that about 86% of the rural women (out of 64 women) faced this problem and ranked 1st among the problems.

6.6 Lower Price of Milk

The lower price of milk is due to various factors, including inadequate market infrastructure, lack of price stability, and insufficient government support for the dairy sector. The lower price of milk has resulted in a decline in the profitability of dairy

farming, making it challenging for farmers to invest in their businesses and improve their production methods. Table 6.1 indicates that about 66% of the rural women (out of 64 women) faced this problem and ranked 4th among the problems.

CHAPTER 7

SUMMARY, CONCLUSION AND RECOMMENDATION

7.1 Summary

Women play a crucial role in various subsectors of agricultural production, including planting, weeding, harvesting, processing, marketing, and livestock rearing. They possess valuable knowledge about the medicinal uses of plants and are actively involved in soil conservation programs. Additionally, they shoulder most of the household labor associated with animal husbandry. Thus, to ensure effective and sustainable development, it is imperative to integrate women into planning, policies, and programs. Despite their significant contributions to food production, women have limited access to knowledge, technology, credit, and land compared to men. This disparity is due to economic suppression, social and traditional practices, and constitutional provisions that undermine gender equality. Unfortunately, women rarely benefit from agricultural incentives and innovation, which adversely affect their economic empowerment. Therefore, agriculture programs and policies should prioritize the productivity and economic empowerment of women and promote their participation. Thus, the objectives of this studies are: to know the socio-economic status of livestock rearing rural women, to determine the determinants of rural women participation in livestock rearing, and to find out the barriers faced by rural women in livestock rearing contribution.

Majority (41.11%) of the rural women were in the most active age group was 30-40 years old aged in the study area, Majority (31.11%) of the rural women had secondary level education in the study area. The average family size of the study area was 5.39.

Majority (61.11%) of the respondents were followed Islam (61.11%), married (62.23%) and involved in livestock (71.11%). The average annual household income of the study area was 285.44 thousand Taka and average livestock rearing experience of the study area was 4.47 years. Majority of the respondents had received training (71.11%), had no knowledge on livestock rearing (51.11%), had extension contact (62.22%) and had membership of social organization (55.56%) in the study area.

About 71% respondents were participants and 29% non-participants in livestock rearing. Binary logistic regression analysis was performed to find out the determinants of rural women participation in livestock rearing from the independent variables.

The Pseudo R^2 was 0.54. It means the empirical model is 54% successful while predicting the respondents' adaptive responses against rural women participation in livestock rearing. Besides, the LR Chi^2 (58.69) was highly significant at 1% level.

In order to determine the contribution eight selected characteristics of the women farmers (age, education level of the rural women, family size, experience, training, knowledge on livestock rearing, extension contact, and membership of social organization) on participation in livestock rearing.

Out of eight selected variables education level of the rural women, experience, knowledge on livestock rearing, and extension contact had a positive impact on rural women participation in livestock rearing and age, and family size had a negative impact on rural women participation in livestock rearing. Variables like training and membership of social organization had no impact on rural women participation in livestock rearing.

There were many problems which were faced by rural women in livestock rearing in the study area. Such as, various disease attack, high feed cost, lack of grass land, lower price of milk, lack of easy access to credit, and lack of trained vaccination workers.

7.2 Conclusion

In conclusion, this study revealed that the majority of rural women in the study area are in the active age group of 30-40 years and have secondary level education. Most of them followed Islam, were married, and involved in livestock rearing, with an average annual household income of 285.44 thousand Taka. The study finds that education level, experience, knowledge on livestock rearing, and extension contact have a positive impact on rural women's participation in livestock rearing, while age and family size have a negative impact. However, training and membership of social organizations have no significant impact. Additionally, the study identifies several challenges faced by rural women in livestock rearing, including diseases, high feed costs, lack of grassland, low milk prices, limited access to credit, and insufficient trained vaccination workers. These findings suggest that policies and programs aimed

at promoting rural women's participation in livestock rearing should consider these determinants and challenges to be effective and sustainable.

7.3 Recommendations

Based on the findings of the study, here are some recommendations to promote and enhance the participation of rural women in livestock rearing:

a) **Education and Training:** Provide education and training opportunities to rural women to enhance their knowledge and skills in livestock rearing. This will empower them to overcome challenges and adopt best practices for better productivity.
b) **Access to Credit:** Increase access to credit facilities for rural women to help them overcome the financial constraints that may hinder their participation in livestock rearing.
c) **Grassland Management:** Promote the use of effective grassland management techniques to overcome the challenge of limited grassland.
d) **Vaccination Services:** Provide access to trained vaccination workers to help prevent the outbreak of diseases that may harm the livestock.
e) **Price Stabilization:** Implement measures to stabilize the prices of milk to ensure that rural women receive fair prices for their products.
f) **Social Network:** Encourage rural women to participate in social organizations to enhance their networking and information-sharing capabilities.

By implementing these recommendations, it is hoped that more rural women will be empowered to participate in livestock rearing, leading to improved livelihoods and economic growth for the community.

7.4 Limitations of the study

There are several limitations of the study on determinants of rural women participation in livestock rearing in Pabna district. Some of these limitations include:

a) **Sample size:** The study was conducted on a relatively small sample size, which may not be representative of the entire population of rural women in Pabna district. This could limit the generalizability of the study's findings.
b) **Lack of longitudinal data:** The study only collected cross-sectional data, which limits the ability to establish causal relationships between the independent variables and rural women's participation in livestock rearing.

c) **Self-reported data:** The study relied on self-reported data, which may be subject to recall bias and social desirability bias. Respondents may have provided answers they believed were expected of them rather than their actual practices or experiences.

d) **Lack of qualitative data:** The study only collected quantitative data and very few qualitative data included. More qualitative data could provide more in-depth insights into rural women's experiences and perceptions related to livestock rearing.

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APPENDIX

ID #

Department of Development and Poverty Studies
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Title: Rural Women Participation in Livestock Rearing at Household level: A Study in Some Selected Areas under Pabna District

General information:

Upazila: **Union:**
Village:

Personal and socio-economic characteristics:

Sl. No.	Question's/query	Response/Answer	Code
1	Name		
2	Mobile		
3	Age		1=20-30 years, 2=30-40 years, 3=40-50 years, 4=50- above years
4	Gender		1=Male, 2=Female
5	Religion		1=Islam, 2=Hindu, 3=Christian, 4=Buddhist, 5=Other (Specify)
6	Education level		1=No education, 2=Primary level, 3=Secondary level, 4=SSC,5=HSC,6=Others
7	Household head		1=Father, 2=Husband, 3=Son, 4=Women herself, 5=Others (specify)
8	No. of family members	1= 2= 3=	1= Male 2= Female, 3= Children
9	Earning members:		1= Male 2= Female 3=Both
10	Marital status		1= Married, 2= Single, 3= Separated 4=Divorced, 5= Widowed
11	Occupation		1=Unemployed, 2=House wife, 3=Day labor, 4=service, 5=Student, 6=Others

12.	Experience		
13.	Extension Contact		1= Yes, 0= No
14.	Membership of Social Organization		1= Yes, 0= No
15.	Monthly Income		
16.	Monthly Expenditure		

Activities

Sl.No	**Activities**	**Response**	**Code**
17	Grazing of dairy cattle		1=Yes,2=No
18	Feeding of green grass		
19	Feeding of Urea Treated Straw		
20	Chopping of straw		
21	Feeding of concentrate mixture		
22	Feeding of Colostrum to calf		
23	Disposal of Cow Dung as		1=Manure,2=Fuel, 3=Biogas Production 4=Manure & Fuel
24	Insemination System		1=Artificial insemination,2=AI from livestock hospital,3=From NGO,5=village breeding bull,5=Own breeding bull
25	Treatment		1=No treatment,2=With Veterinary surgeon,3=With quaks,4-=With herbal plant resources

Production:

Sl. No.	Question's/query	Response/Answer	Code
26	Reason of involving in cow Rearing:		1=For household consumption, 2=For livelihood, 3=To supplement income, 4=Others
27	Number of Cow		1=Chickens,2=Cattle,3=Ducks,4=Goats 5=Sheep ,6=others
28	Types of cattle reared		1=Red Sindhi Cross, 2=Holstein Frisian Cross, 3=Jersey Cross, 4=Deshi
29	Vaccination		1=Yes, 2=No
30	Grass Cultivation		1=Yes, 2=No,
31	If Yes, Then What Type of grass		1=Napier,2=Local,3=Do not cultivate
32	Owner of the livestock		1=Self, 2= Father,3= Husband,4=Son,5=Relative,6=Other

Cost

33	A.Feed cost	Unit(kg)/Day	Tk/Kg	Cost/Cow
	1.Paddy Straw			
	2.Green Grass			
	3.Oil Cake			
	4.Molasses			
	5.Salt			
	B. Housing cost			
	C. Vaterinary cost			
	D. Investment cost			
	E. Tools & Equipment cost			

Return:

34		Litre/Day	Tk/Litter	Return/Cow
	Milk i)For Sell ii)For Family Consumption			
	Cowdung			
	Calf			
	Other Purpose use			
	Empty gunny bag			

Problems & Way to Eradicate it

		Response	Code
35	Major Problems		1=Lack of Grass Land,2=High feed cost,3=Lack of easy access in credit,4=Vaccination worker are not available,5=Various Dsease,6=Lower price of milk
36	Solution		1=Easy Access in credit, 2=Training ,3=Easy access in market,4=Availabilty of veterinary service ,5=Minimum Market price of milk