

**CONTRIBUTION OF DAIRY FARMING ON LIVELIHOOD: A CASE STUDY
OF MADHYABINDU MUNICIPALITY, NAWALPUR**

A Thesis

Submitted to

**Faculty of Humanities and Social Science,
Central Department of Rural Development, Tribhuvan University**

**In Partial Fulfillment of the Requirements for the
Degree of Masters of Arts (MA)**

**In
Rural Development**

Submitted By

SITA TIWARI

Central Department of Rural Development

Tribhuvan University, Kathmandu

TU Registration No: 6-2-299-462014

Exam Roll No: 282507

August 2023

DECLARATION

I hereby declare that thesis entitled **CONTRIBUTION OF DAIRY FARMING ON LIVELIHOOD: A CASE STUDY OF MADHYABINDU MUNICIPALITY, NAWALPUR** Submitted to the Central Department of Rural Development, Tribhuvan University, is entirely my original work prepared under the guidance and supervision of my supervisor. I have made acknowledgement to all ideas and information borrowed from different sources in the course of preparing this thesis. This thesis have not been presented or submitted anywhere else for the award of any degree or for any other purposes. I assure that no part of the content of this thesis has been published in before my study.

Sita Tiwari

Degree Candidate

Date: 2080/03/20

2023/07/05

RECOMMENDATION LETTER

This is to certify that **Sita Tiwari** has prepared this Thesis entitled **CONTRIBUTION OF DAIRY FARMING ON LIVELIHOOD: A CASE STUDY OF MADHYABINDU MUNICIPALITY, NAWALPUR** under my guidance and supervision. This dissertation is prepared for partial fulfillment of the requirement for the Degree of Master of Arts in Rural Development. To the best of my knowledge, the study is original. I, therefore, recommend this thesis for final approval and acceptance.

Ratna Mani Nepal, PhD

Thesis Supervisor

Date: 2080/03/22

2023/07/07

APPROVAL LETTER

This thesis entitled **CONTRIBUTION OF DAIRY FARMING ON LIVELIHOOD: A CASE STUDY OF MADHYABINDU MUNICIPALITY, NAWALPUR** submitted by **Sita Tiwari** in partial fulfillment of the requirements for the Master of Arts (MA) in Rural Development has been approved by the evaluation committee.

Evaluation Committee

Associate Prof. Bishnu Bahadur Khatri
Head of the Department

Ratna Mani Nepal, PhD
Supervisor

Rajan Binayek Pasa, PhD
External Examiner

Date: 2080/03/27

2023/07/12

ACKNOWLEDGEMENTS

I am extremely grateful to express gratitude to my respected supervisor Assoc. Prof. Ratna Mani Nepal, PhD for his guidance, encouragement, and enduring support. I am thankful to external examiner Asst. Prof. Rajan Binayek Pasa for his constructive feedbacks. I am equally grateful to Associate Prof. Bishnu Bahadur Khatri (Head of the Department) for inspiration and suggestions.

Likewise, I would like to express my heart full thanks to staff of the Central Department of Rural Development for administrative support and inspirations for completing this work. I would like to express my heart full thanks to Tribhuvan University Central Library, Central Department of Rural Development, and their help in providing study material for literature review papers and electronic peer reviewed material and Nepal Rastra Bank, Central Bureau of Statistics and Ministry of Finance for their help in providing study material as electronic peer reviewed material and data.

I would like to thank my colleague, Anita Bhusal for the generous support in preparing the thesis and for his outstanding company at study period. I cannot even remain without thanking to my beloved Gopi Krishna Chapagain for her inspiration and support for my thesis preparation and finalization as well.

Lastly, I am very grateful to my loving friend Hira Gurung for their support during the field work. Deep and deep respect goes to my parents, family members who always inspire me to shape my higher educational voyage and career planning.

Sita Tiwari

Degree Candidate

ABSTRACT

The dairy farming plays a pivotal role in socioeconomic development, livelihood acceleration, women's empowerment, and employment generation. In this background, this study tried to analyze contribution of Dairy farming on livelihood of the farmers associated in Pach Pandab Milk Producer Cooperative, Madhyabindu Municipality-4 Nawalpur district. The objective of this study were to examine socio-economic situation of the farmers involving in dairy framing, to analyze the contribution of cooperative dairy farming on livelihood and to find out the supporting sectors to dairy farming under cooperative production system in the study area. This study used case study research design in which quantitative data were collected through 50 role model farmers and qualitative information were generated from five participants. In doing so, the study used household survey, observation and KII as techniques for data collection and generation.

The study found that most of the farmers are benefitted from dairy farming and it has been improving the livelihood of the farmers. Dairy farming is also becoming contcatalysts for women's empowerment by offering a platform for their economic and social advancement. Cooperative dairy farming brought transformation in the socio-economic life of the farmers including local people getting employment opportunities in the cooperative and cooperative dairy farming in the study area. Dairy farming is an important sector to up life livelihood in the study areas. Dairy farming has helped to reduce the problem of food deficiency and problems of malnutrition in the study area. Finally, all these transformation are becoming possible due to the dairy farming management (Feed, Shed, breed and disease) practices of the Pandab Milk Producer Cooperative as well as supporting sectors (transportation, dairy farming development and support policy, marketing milk pricing) and extension services (capacity/skill development trainings and incentives. to the farmers) offering by the local government.

However, it is necessary to increase the price of dairy product with changing price of dairy inputs including sufficient subsidies for more benefits of dairy farmers in the study area and throughout the country.

TABLE OF CONTENTS

DECLARATION	ii
RECOMMENDATION LETTER	iii
APPROVAL LETTER.....	iv
ANOWLEDGEMENTS	v
ABSTRACT.....	vi
LISTS OF TABALE.....	x
LISTS OF FIGURES	xi
ABBREVIATION/ACRONYMS.....	xii
CHAPTER I.....	1
INTRODUCTION	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem	4
1.3 Research Questions	6
1.4 Objectives of the Study	6
1.5 Significance of the Study	6
1.6 Delimitations of the Study.....	7
1.7 Organization of the Study	7
CHAPTER II.....	8
LITERATURE REVIEW	8
2.1 Impact of Dairy Farming in Nepal	8
2.1.2 Impact of Milk Production on Household Income.....	10
2.1.3 Impact of Milk Production on Household Food Security	10
2.1.4 Impact of Milk Production on Household Asset.....	11
2.2 Policy Review	11
2.3 Theoretical Review	13
2.3.1 Cooperative Farming.....	13
2.3.2 Sustainable Livelihood.....	14

2.4 Empirical Review	15
2.5 Conceptual Framework of the Study.....	21
CHAPTER III	24
RESEARCH METHODOLOGY	26
3.1 Research Design.....	24
3.2 Rational of Selection of the Study Area.....	24
3.3 Nature and Sources of Data.....	26
3.4 Universe and Sampling	26
3.5 Techniques and Tools of Data Collection	27
3.5.1 Primary Data Collection.....	27
3.5.2 Secondary Source of Data	29
3.6 Methods of Data Analysis	29
CHAPTER IV	30
DATA ANALYSIS AND PRESENTATION	30
4.1 Demographic Characteristics of the Respondents.....	30
4.2 Current Socio-Economic Status of the Respondents' Households.....	34
4.3 Contributions of Dairy Cattle Farming on Rural Livelihood.....	38
4.4 Role of Dairy Milk Cooperative.....	47
4.5 Dairy Cattle Management	49
4.6 Supporting Sector in Dairy Farming	52
4.7 Opportunities and Constraints in Dairy Farming	55
CHAPTER V	59
SUMMARY, CONCLUSION AND RECOMMENDATION.....	59
5.1 Summary of Findings	59
5.2 Discussions of Findings	60
5.3 Conclusion.....	61
5.4 Recommendations	62
5.5 Future Direction	62

REFERENCES	62
APPENDICES	68
Appendix A: Survey Questionnaires.....	68
Appendix B: KII Guideline	74
Appendix C: Observation Checklist.....	73
Appendix D: Map of the Study Area	74

LISTS OF TABLES

Table 2.1: Quantity of milking animals and milk production	8
Table 2.2: Expected Milk Collection in the Formal Sector	9
Table 4.1: Population Composition of Sampled Households	29
Table 4.2: Age and Sex-Wise Distribution of Population of Sampled Households	30
Table 4.3: Ethnic Composition of Sampled Households	31
Table 4.4: Marital Status of Sampled Households	32
Table 4.5: Religious Status of Sampled Households	32
Table 4.6: Educational Status of Sampled Households	33
Table 4.7: Main Income Source of Sampled Households	34
Table 4.8: Land Holding Size of Sampled Households	35
Table 4.9: Occupation Structure of Sampled Households	35
Table 4.10: Live-stock Patterns of Sampled Households	37
Table 4.11: Contribution of Dairy Farming in Employment Generation.....	39
Table 4.12: Contribution of Dairy Farming for Income Generation.....	39
Table 4.13: Contribution of Dairy Farming in Food Safety.....	40
Table 4.14: Contribution of Dairy Farming in Poverty Reduction	41
Table 4.15: Contribution in Women Empowerment and Self-reliant	42
Table 4.16: Mechanism of Bio-Gas Plant in the Study Area.....	44
Table 4.17: Expenditure of Dairy Income.....	45
Table 4.18: Contribution of Dairy Milk Cooperative	47
Table 4.19 Dairy Cattle Management	49
Table 4.20: Means of Milk Transportation	51
Table 4.21: Information about Dairy Strategy	52
Table 4.22: Info about Market Price	53
Table 4.23: Judgement on Price of Milk.....	53

LISTS OF FIGURES

Figure 2.1:	Conceptual Charter of Socio-Economic Contributions of Dairy Farming on Livelihood	22
Figure 4.1:	Condition of Food Sufficiency of Sample Households	36

ABBREVIATION/ACRONYMS

AI	: Artificial Insemination
BS	: Bikram Sambat
CASA	: Commercial Agriculture for Smallholders and Agribusiness
CBS	: Central Bureau of Statistics
DCO	: District Cooperative Office
DDC	: Dairy Development Cooperation
DFTQCC	: Department of Food Technology and quality Control
DLS	: Department of Livestock Service
DLSO	: District Livestock Service Office
DoA	: Development of Agriculture
DoC	: Department of Cooperatives
FAO	: Food and Agriculture Organization
GDP	: Gross Domestic Product
GoN	: Government of Nepal
MoHP	: Ministry of Health and population
MPA	: Milk Producer's Association
MPC	: Milk Producer Cooperative
NCDB	: National Cooperative Development Board
NDA	: National Dairy Association
NDDB	: National Dairy Development Board
KM	: Kilometer
Rs:	Rupees

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Livestock is a crucial part of the rural economy in Nepal, which is led by agriculture. For a developing nation like Nepal, livestock is a significant source of income and employment. One of the main sectors of animal agriculture in Nepal is dairy farming. It is crucial for the creation of employment opportunities at the local level as well as for the gross agricultural and national production. In Nepal's rural areas, dairy farming is a significant source of revenue. The socioeconomic well-being and means of subsistence of farmers are significantly influenced by dairy farming.

Activities for the development of the dairy industry in Nepal didn't start until 1952. The Food and Agriculture Organization (FAO) helped construct a Yak cheese plant in Langtang of the Rasuwa region in 1953, and this is regarded as one of the country's first initiatives in the development of its dairy industry (FAO, 2010). The dairy industry in Nepal contributes significantly to the GDP of agriculture. The agricultural and livestock sectors, which account for 28 percent of the nation's agricultural GDP, are heavily reliant on co-operatives (NRB, 2018; Tiwari & Singh, 2020). Millions of rural households dispersed across the nation benefit from the development of dairy co-operatives' robust networks and connections.

Dairy cooperatives have made a significant contribution to building a solid network and connections among the rural population across the nation. In Nepal, the cooperative sector is still developing but is already having a significant impact on the socioeconomic growth of the nation. Currently, 0.247 percent of the world's total milk production comes from the dairy industry in our nation. According to FAO (2019), Nepal produces 2.05 million metric tons of milk. A level of approximately 158.9 grams of milk per person per day is now available per capita (RAN, 2015).

According to Neupane et al. (2018), this sector is crucial for decreasing poverty since it generates job and income-generating possibilities and ensures regular financial flow from urban to rural areas. According to statistics, Nepal's population is growing at a pace of 1.35 percent annually. This hypothesis states that in order to meet the WHO's

recommended daily minimum of 250 g of milk per person by the year 2025, current milk output must rise by 4%. In contrast, the present growth rate for milk production is barely 3.09 percent year (Upadhyay et al., 2021).

In Nepal, formal development efforts for the dairy industry started in 1952. Yak cheese factory was built in 1953 at Lamtang, Rasuwa district, with assistance from the Food and Agriculture Organization (FAO). In 1954, the Department of Agriculture (DAO) established a dairy development unit, and in the village of Tusal, Kavre district, a small-scale milk processing facility was also started. A dairy development commission was established in 1955, and it became the dairy development board in 1962. Dairy Development Corporation (DDC) was founded in 1969 in order to address the increasing demand for milk in Kathmandu (Sapkota, 2010).

Biogas from livestock farms is produced in part by dairy farming. An alternative energy source, bio gas plays a significant role in lighting and cooking in rural areas. In one way, bio gas satisfies the energy needs of rural areas. It provides fertilizer for the agricultural sector, assisting organic farming. Similarly, biogas is crucial for saving time, maintaining excellent health, and safeguarding forest resources. The development of education is another benefit of dairy farming. Access to higher-quality education is a crucial component of human life, as it is necessary for people to reach their financial goals. Dairy farming enables people to make a nice living. Dairy farming enables individuals to afford a top-notch education for their kids. Similar to this, dairy farming promotes human health.

The most crucial element for human growth and success is health. Drinking milk and other dairy products promotes improved health. Animal manure can help produce agricultural productivity that is both natural and healthful. Similarly, bio-gas produced from animal waste helps maintain the ecological equilibrium. Environment refers to the physical surroundings of a person. It is a dynamic process that changes constantly. In a variety of ways, dairy farming is crucial for environmental preservation. Agriproducts, dung, and urine help to maintain a healthy, sustainable natural cycle that enhances the environment by increasing the amount of vegetation and reducing pollutants.

Dairy cattle and agricultural productivity in rural areas have a favorable link. In agricultural fields, rural folks use cattle manure as fertilizer. Organic farming can benefit

greatly from it. Similarly, crop reductions like grass, hay, etc. are helpful for feeding animals. The majority of farmers in rural areas use a mixed farming technique. There is no opportunity for crop productivity to advance without cattle compost fertilizer, and a shortage of crop leftovers leads to a shortage of animal feed. Applying cattle dung boosts crop productivity while decreasing agricultural production costs. It also minimizes the usage of artificial fertilizers. Utilizing cattle dung is crucial to increasing the fertility of agricultural soil.

Small-scale dairy production, especially in rural regions, makes a substantial contribution to the fight against poverty. Poor farmers buy agricultural inputs like fertilizer, seeds, insecticides, etc. with the money they receive from their dairy business. The dairy industry's income has aided farmers in building wealth, buying land, improving homes, and providing children with a high-quality education. For everyday use, dairy products such as milk, curd, ghee, yoghurt, cream, cheese, churpi, and panner are absolutely necessary. The consumption of dairy products promotes overall health and supports continued growth of the body and mind. So, for a better existence, regular consumption of fresh and hygienic dairy products is required. Dairy farming is a class of agriculture for long-term production of milk, which is processed for eventual sale of a dairy product.

In Nepal, the Nawalpur District is well known for its milk production. Due to the ideal climate for raising dairy cattle and the availability of marketing and transportation infrastructure, there is potential for milk production. The atmosphere is favorable for the upgraded caste of dairy animals. In fiscal year 2076–77 BS, the district produces 32,821 metric tons of milk. 75 percent of the milk in Narayangadh and Kathmandu comes from Nawalpur. In the Nawalpur district, farmers have been actively participating in milk production operations related to milk collection and processing. Farmers in the area are commercially raising enhanced cows. Currently, milk sales provide farmers with a good income (DCO, 2021).

Panch Pandav Milk Producer Cooperative was established in B.S. 2065. 300 farmers sell milk in this Cooperative. In this Cooperative, milk is collected from minimum 1200 liters to maximum 2000 liters daily. The annual milk collection in this cooperative was 4,34,748 liter. Annual income in this cooperative Rs. 2,34,19,654. Panch Pandav Milk Producer Cooperative has contributed to improve the livelihood of the cattle farming

households. It generates daily income for farmers, provides a highly nutritious food for people, create employment opportunities for the society. Although it brings a rather high income for farmers their lines are very hard and their living standard is quite low.

1.2 Statement of the Problem

Farmers in Nepal do not possess enough land for farming. Without enough land, there is no hope of agricultural output. People in this scenario needed alternate employment and income sources. Rural residents are ignorant of modern science and technology. People don't have enough money for their kids' higher education or medical care. To buy chemical fertilizer and medications, people needed a lot of money. This allowed them to grow more crops. Due to a shortage of veterinary services, they have no chance to care for their cattle. People cannot expect a favorable return on their investments in the agricultural sector.

According to NPC's 2019 data, 60.4 percent of the population works in agriculture. Modern technology is not utilized in Nepal's traditional agriculture system. With such a traditional agricultural system, meeting the needs for food, revenue, and employment is challenging. Every day, thousands of young people in the prime of their lives leave for foreign nations in pursuit of work prospects in Nepal. Although there are many opportunities in the country, many workers leave every day. In the study region, agriculture and livestock farming are practiced by the majority of the population. People have contributed work and money to the dairy sector for a long time.

However, there is no comprehensive research on the contribution of dairy farming to their subsistence. The study field pays little attention to the opportunities, obstacles, or their solutions related to dairy farming. In this context, it is crucial to understand the role that dairy farming plays in the socioeconomic well-being of rural residents in the research area. This study is intended to explore various opportunities, restrictions, and their innovative solutions.

In search of employment possibilities, many rural residents move to urban areas. It impedes rural area development. Due to a shortage of funding, constructive activity is challenging to run. Less money is available to rural residents to invest in profitable ventures. It hinders the growth of entrepreneurship in rural areas. There is no likelihood of employment and earning activities in the rural area without the development of entrepreneurship. In rural areas, the population growth rate appears to be strong. In relation

to the rising population rate, there aren't enough economic activity. Finally, the growing population turns to agriculture for jobs and subsistence. However, due to population growth, traditional agricultural systems and technologies cannot offer enough employment opportunities.

There are many reasons to identify the role of dairying farming. Apart from dairy farming being an important sector globally, dairy farming is equally important in developing economies like Nepal, for providing nutrition support, reducing rural poverty and inequity, ensuring food security by generating employment and income for millions of rural households, and enhancing economic activities, particularly in rural areas. A dairy cattle farming is the most efficient of all farm livestock in converting feed protein and energy to food. It provides milk, butter, cheese, etc.

In this aspect, many questions are arising on role of dairy farming for overall support in farmers' livelihood by generating employment and income as well as healthy food supply for people to the make healthy society. 130,000 people are employed in the dairy industry, which also accounts for 9% of Nepal's GDP. Ninety-five percent of the 3.8 million farming households in the nation have dairy animals. But barely 500,000 (or 14 percent of milk-producing households) are simultaneously producers and sellers (CASA, 2020). Therefore, dairy farming, which is the most crucial factor for an agro-based economy and identifying its main role to improve people's living, can assist those with limited land ownership.

1.3 Research Questions

The study attempts to analyze socio-economic status and dairy cattle farmer livelihood of farmers, Madhyabindhu-4 and made an effort to respond to the following research questions.

1. How is the socioeconomic status of rural dairy cattle farmers?
2. How has dairy farming contributed to small scale dairy farmers' livelihood at the study area?
3. What are the supporting sectors to dairy farming in the study area?

1.4 Objectives of the Study

This study's main goal was to investigate how poor dairy farmers in the study area were modifying their methods of subsistence. The following list includes the study's particular

goals:

1. To examine Socio economic situation of the farmers involving in dairy framing.
2. To investigate the influence of cooperative dairy farming on living.
3. To locate out the supporting sectors to dairy farming under cooperative production system in the reading area.

1.5 Significance of the Study

A considerable portion of the population in rural areas relies on dairy farming as a primary source of income and a source of additional income. The rural livelihoods are significantly supported by dairy farming. This study is being done to examine the role dairy farming has in rural livelihood. The socioeconomic advantages of dairy production in rural areas are investigated. Similar to that study, this one aims to determine the function of cooperatives in the production of dairy milk in rural areas. The significance of this study is highlighted by the following points.

This study determines the socioeconomic way of life of farmers and helps to increase the contribution of dairy farming to rural livelihood. The study contains information regarding dairy farming, animal husbandry, and the dairy farming activities carried out by residents of Madhyabindu Municipality-4. Studying the state of dairy farming today and its contribution to the economy is crucial. It aids in highlighting the many opportunities, sentiments, and limitations faced by dairy farmers in the Nepalese economy. It provides information on current requirements for profitable dairy production. It aids in motivating farmers to engage in self-sufficient endeavors and commercial dairy production. Understanding the function and contribution of cooperatives in milk production activities is beneficial. This study has significant backing to identify dairy farming's issues and provide original solutions. Planners, decision-makers, researchers, and other organizations involved in dairy farming and related activities can also benefit from the findings of this study.

1.6 Delimitations of the Study

Each study has certain restrictions. This study was created in light of the time, financial, and other resource constraints. The study's limitations are listed below.

- a. This study is apprehensive only about small-scale dairy farming but the findings

- cannot be generalized for large scale dairy farming and country context.
- b. This study based on especially major data and subsequently minor data.
 - c. This study is managed in case study, Madhyabindhu Nawalpur and result cannot be widespread to others.
 - d. This study only shelters Madhyabindhu Municipality-4 areas and only 50 households out of 300 dairy cattle farmers had engaged for the arena study.

1.7 Organization of the Study

This study is divided into five distinct chapters. Introduction is covered in the first chapter. It comprises the study's history, problem description, objectives, significance, and study limitations. The pertinent material is included in the second chapter. The third chapter covers the research approach taken for this study. The display and analysis of data are demonstrated in the fourth chapter. The fifth and last chapter concludes with a summary of the key results, conclusions, and suggestions. The final section of the study also includes necessary references and appendices.

CHAPTER II

LITERATURE REVIEW

In this section, a quick review of significant and pertinent pieces of literature connected to the current topic has been completed. The analysis of the literature divided into five areas. First: Impact of Dairy Farming in Nepal, Second: Policy Review, Third: Theoretical Review, Fourth: Empirical Review and Fifth: Conceptual Framework of the Study.

2.1 Impact of Dairy Farming in Nepal

Every District in Nepal produces dairy products. The majority of milk is produced using conventional methods in mixed farming operations with modest non-commercial holdings. However, there has been a movement to commercialize dairy farming in recent years. Ninety-five percent of the 3.8 million farming households in the nation have dairy animals. Simply over 500,000 agricultural households engage in both production and sales, meaning that the majority of these farmers are simply producing for their own consumption.

Table 2.1:

Quantity of milking animals and milk production

Milking animals	Number	percent	Milk production (metric)	percent of Total milk Production
Cattle	1,026,135	43	643,807	35
Buffalo	1,355,384	57	1,210,422	65
Total	2,381,519	100	1,854,249	100

Source: Dairy Sector Strategy, Nepal: Casa Nepal Country Team (April 2020)

Nepal produces 72 liters of milk per person each year, which meets 80 percent of the country's yearly consumption demand of 92 liters per person¹⁹. The current shortage is thought to be 550,000 liters of fluid milk per day on average, with variations of 10 to 20 percent throughout the lean season (March to July) and the flush season (August to February). The Department of Livestock Services reports that while demand is expanding at an annual pace of 8 percent, production is only 4 percent faster than that. Without significant changes in milk production, the demand-supply gap is likely to grow over time

since supply cannot keep up with demand. This also indicates that the industry is in a very early stage, since just 14–16 percent of farmers have significant commercialization. As a result, it is extremely difficult for private dairies to obtain milk because the ratio of flush season production to lean season production is 65:35.

In comparison to India, Pakistan, and Sri Lanka, the average milk production are modest, at roughly 500 kg per cow and 859 kg per buffalo every year. The management of the milk cycle also presents a number of issues, as shown in the "flush" and "lean" seasons, when there is either an excess or a shortage of raw milk, respectively. Another significant issue is the quality of the raw milk that farmers provide to milk processors. Processors frequently complain that the milk spoils too quickly due to contamination and that the amounts of fat and solids-not-fat (SNF) are insufficient, all of which impair the milk's shelf life and processing capability.

Only 25 percent of the milk produced in total enters the formal sector to be processed into pasteurized milk, yoghurt/curd, different cheeses, butter, ghee, ice cream, and milk powder. A sign of commercialization and a potential CASA strategy would be the transfer of some of the milk's 75 percent from the informal to the formal sectors.

Table 2.2:
Expected Milk Collection in the Formal Sector

Type of Dairies	Total annual collection (metric t)	percent in the formal sector
Cottage Dairy	51,268,630	11.45
Small Dairy	89,203,810	19.93
Medium Dairy	184,987,840	41.33
Large Dairy	98,945,295	22.11
SMP	23,165,090	5.18
Total collection (Metric t)	447,570,665	25.22
Total expected milk production of formal sector (Metric tons)		1,774,844

Source: Dairy Sector Strategy, Nepal: Casa Nepal Country Team (2020)

A major challenge for dairy management is the milk cycle, which has flush and lean seasons. Whilst demand for milk is constant throughout the year, supply fluctuates considerably. This creates significant challenges for private dairies trying to procure milk, as the ratio of flush season production to lean season production is 65:35.

2.1.2 Impact of Milk Production on Household Income

The certainty of an everyday income from milk sales is a crucial aspect of the livelihood for the majority of farmers (Utiger et al., 2000). According to Urassa and Raphael's findings from 2002, the dairy industry's income or profits are primarily used for the following purposes: housing, house furnishings, construction and repair, capitalizing in other income-producing ventures, schooling, and other items (including food and fitness services). Small-scale dairy farming benefits a community in many ways, but the most tangible benefit is the increase in revenue.

Additionally, a research by Bayer and Kapunda (2006) in the southern highlands of Tanzania discovered that income from milk sales helped some smallholder households grow their dairy company, buy more land, and improve their homes (and cattle sheds). Dairy cattle ranching was identified as the most preferred source of livelihood in two Kenyan regions by Utiger et al. (2000) due to its profitability, dependability, and utility. The main advantage of dairy farming was identified as milk for domestic consumption and income, followed by manure production, direct income through the sale of livestock, meat, and self-employment, resource for bride wealth and prestige, and biofuel. The advantages of dairy farming mostly result from its consistency and dependability as a source of income.

2.1.3 Impact of Milk Production on Household Food Security

It is evident that raising dairy cattle contributes to household food security, whether directly through consumption of dairy cow products or indirectly through the use of sales proceeds to fund the purchase of other food items (Minja, 2007).

According to Lwelamira et al. (2010), dairy farming families are nutritionally better off than non-dairy farming households and are therefore comparatively more food protected. This is in addition to household income and the value of durable assets. According to the study, small-scale dairy farming may have a role to play in alleviating malnutrition because milk consumption frequency varied expressively between types of dairy farmers and non-dairy farmers.

Livestock contribute significantly to food security by reducing the impact of seasonal food availability in a variety of ways, according to FAO (1996). For instance, liquid milk that is produced seasonally and processed into goods like butter, curd, milk powder, and cheese during times of surplus can be utilized all year long. Similar to how

other food sources might be limited, meat can be processed into a variety of items including dried, cured, or smoked meat. A household can sell its milk, additional dairy products, such as dung, meat, and living animals, and use the proceeds to buy food and other household necessities.

Increased access to food and milk intake at the family glassy would reduce the malnourishment that is caused by a lack of sufficient calories, protein, vitamins, and minerals. Similar to this, it is observed that a rise in income enhances a family's capacity to buy food, helping to reduce the food insecurity that affects more than 40 percent of impoverished households in the tropics. Smallholder dairy cattle farming is one of the finest strategies to assist resource-limited farmers in generating a steady income to meet their family's requirements, including food and medical care (FAO, 1996).

2.1.4 Impact of Milk Production on Household Asset

Milk sales revenue has made a sizable financial contribution to household assets. According to a study by Lwelamira et al. (2010), dairy farming households were much better off than their peers in terms of average yearly income and relative asset worth. Additionally, a research by Bayer and Kapunda (2006) in the southern highlands of Tanzania revealed that some smallholder households were able to repair their homes and purchase assets like land because to the money they received from milk sales. Similar to how household income, the current value of durable assets, and a household's level of food security are all indicators of household welfare.

2.2 Policy Review

Dairy forming is a class of agriculture for long-term production of milk, which is processed for eventual sale of a dairy product. Activities for the development of the dairy industry in Nepal didn't start until 1952. The Food and Agriculture Organization (FAO) helped construct a Yak cheese plant in Langtang of the Rasuwa region in 1953, and this is regarded as one of the country's first initiatives in the development of its dairy industry (FAO, 2010). The history of the cow began when Gopal Bansi brought cows to Nepal some 4,000 years ago. According to Upadhyaya et al. (2001), Prime Minister of Nepal His Excellency Jung Bahadur Rana made the first move in this direction in the modern age in 1850 A.D.

The first five-year plan's implementation from 1956 to 1961 led to the creation of dairy cooperatives in Nepal. The first dairy cooperative was established in the Kavre district's Tusal village. Although dairy cooperative efforts began in the early 1960s, they weren't effective until December 1981, when DDC launched a campaign focused on milk producers by encouraging farmers to establish their own Milk Producer Associations (MPAs). The resulting MPAs served to encourage milk production and commerce without being given official legal standing.

In order to enable MPAs to operate independently, they were later changed into Milk Producers cooperative societies (MCPS) in February 1989. The Cooperative Act of 1992 governs the MPCs. These MPCs collect milk from dairy agriculturalists, inspect it for purity, deliver it to the closest milk processing facilities for sale, collect money for the milk, and then pay each milk provider farmer individually. According to a three-tiered framework, the dairy cooperatives in Nepal operate (FAO, 2010).

The Dairy Development Corporation (DDC), which was created in 1969 under the Corporation Act, has been the main body for the development of dairy products in Nepal. Small landowners that have banded together to create producers' organizations, which direct milk to DDC-run cooling centers, make up the majority of farmers who raise milk. Currently, almost 75000 farmers receive assistance from 600 MPAs in order to deliver milk to the DDC. Through the DDC's effort, which legally predicated that they be run by farmer members, twenty MPAs have been set up to operate as cooperatives. The National Cooperative Development Board was created to support the country's cooperative movement under the 1992 New Cooperative Act (Bhattarai, 2008).

The National Dairy Development Board (NDDDB) was recently established in order to coordinate dairy development in the public and commercial sectors. In order for MPA farmers and committee members to fully understand their rights, obligations, and management discipline, the board will start providing rigorous field training. Through required initiatives managed by the NDDDB, a gradual transfer of MPAs to cooperatives will be promoted, making it easier for separate milk-producing farmers to take part in the proprietorship of milk-processing facilities (Bhattarai, 2008).

According to the Government of Nepal's Dairy Development Policy-2064, this policy aims to change the traditional subsistence livestock occupation into an income-

oriented, competitive, and commercial system, address farmer ignorance of the value of producing fresh, high-quality milk, lack of necessary livestock services, and issues with milk holidays brought on by seasonal variations in milk production. Lack of physical infrastructure, technology, and skilled labor for producing modern dairy products, as well as a lack of consumer awareness about the consumption of high-quality milk and milk products, continue to be obstacles to the development of the dairy industry in Nepal. These factors are compounded by the difficulty of transporting milk due to its remote location.

2.3 Theoretical Review

Dairy firms play a vital role in rural communities, offering economic, social, and environmental benefits. They provide opportunities for self-employment, promote agricultural self-sufficiency, and contribute to community development. In this section, contributions of dairy farming on livelihood have been appraised based on cooperative farming and sustainable livelihood theoretical viewpoints.

2.3.1 Cooperative Farming

Cooperative farming is a practice in which farmers come together to collectively manage agricultural activities and share resources. It involves pooling their land, equipment, labor, and expertise to improve efficiency and productivity. Cooperative farming can offer various benefits, such as cost-sharing, increased market access, knowledge exchange, and risk reduction. By working together, farmers can achieve economies of scale, negotiate better prices for their produce, and strengthen their overall position in the agricultural industry. This collaborative approach can be particularly valuable for small-scale farmers looking to overcome challenges and improve their livelihoods.

2.3.2 Sustainable Livelihood

Academics and development professionals have had a lot of discussion on the "livelihood" term (Ellis, 2000). Most people agree that livelihood refers to the techniques and means of "making a living." However, other writers have used various definitions and examples to explore livelihood. For instance, a livelihood, according to Carney (1998), consists of the skills, possessions, both substantial and social possessions, and actions

necessary for a means of subsistence. Contrarily, according to Ellis (2000), a person's or household's way of life is determined by their activities, possessions, and access.

These definitions and interpretations all generally agree that the concept of "livelihood" refers to individuals, their resources, and how they are used in a way that affects their ability to support themselves. Generally, these definitions and interpretations share common meaning that 'livelihood' deals with people, their resources and their utilization which has an impact on the livelihood.

The income generated from dairy farming has a transformative impact on livelihoods, making life easier and more manageable. When individuals achieve financial success through dairy operations, it alleviates the burdens of daily life and creates opportunities for improved well-being. Let us explore how the income from dairy empowers individuals, enhances their quality of life, and facilitates a more prosperous daily existence. Dairy farming provides a reliable and sustainable source of income for individuals and their families. The regular sale of milk, dairy products, and livestock yields a steady stream of revenue. This financial stability brings a sense of security, as individuals have a consistent source of income to meet their daily needs, cover expenses, and plan for the future. The assurance of a stable income reduces the stress and uncertainties associated with financial constraints.

The positive ripple effects of dairy income extend beyond individual households. As more individuals experience financial success through dairy farming, it uplifts the entire community. The local economy thrives, creating employment opportunities and driving local businesses. The community benefits from improved infrastructure, better access to services, and enhanced social well-being. The collective success of dairy farmers contributes to the overall development and progress of the community as a whole.

2.4 Empirical Review

The global milk production has been steadily increasing over the years. According to the Food and Agriculture Organization (FAO), in 2020, global milk production reached approximately 858 million metric tons. The leading countries in milk production include India, the United States, China, Brazil, and Russia. Dairy trade plays a vital role in meeting the demand for dairy products globally. The major exporters of dairy products include the European Union (EU), New Zealand, the United States, Australia, and Argentina. Key

dairy products that are commonly traded include milk powder, cheese, butter, whey, and lactose.

A producers' cooperative's goal, according to Uotila and Dhanapala (1994), is to offer services to its members either for free or at a fair price. Cooperative ownership also places a strong emphasis on member producers' participation and control. Through registered membership organizations that are subject to local, state, or federal laws and regulations, individual members have the ability to affect management and policy decisions. The International Cooperative Alliance has defined the cooperative principles as voluntary and open membership, democratic governance, a cap on credit interest, an equal distribution of surplus, member training, and cooperation between cooperatives.

According to Uotila and Dhanapala (1994), cooperative organizations understand the value of member involvement and work to encourage participation in societal activities through training initiatives. In the case of community businesses, The fact that each member has just one vote is especially important because individual stockholders find it difficult to effectively manage the administration of a company unless they have a controlling position through ownership of a sufficient number of shares.

Land is likely the most significant income- making asset in the rural frugalities of Asia, according to Uotila and Dhanapala (1994). Yet, one of the main limitations of the rural Asian landscape is the lack of land and its unequal distribution. Asia's villages are home to about 60 percent of the world's farmers, but the continent only accounts for around 28 percent of the world's arable land. Compared to other developing regions, this is substantially lower. Additionally, a sizable amount of this land's limited availability is made up of holdings other than those of small farmers.

Even though they make up more than two-thirds of rural households in Asia, small farmers only have access to around 20 percent of the continent's arable land, despite the fact that conditions differ from nation to nation. In light of this, Uotila and Dhanapala (1994) found that for small farmers and laborers who lack access to land, economic activities that are not primarily focused on land, like dairying, have become essential.

According to Uotila and Dhanapala (1994), while farmers' cooperatives of all stripes are helpful in fostering rural growth, dairy collectives have unique characteristics that create them especially ideal. Among these, they can aid in the growth of isolated rural

economies, raising the standard of living for the underprivileged. The marketing of their product is the key obstacle that milk producers hope to get through by working together. There is a genuine need to have market security. Dairy farmers may band together to develop their own collecting system and milk treatment facilities in order to change their perishable primary production—which needs particular and immediate attention—into goods with longer-keeping quality for commercial use.

The majority of dairy cooperatives use a two- or three-tier system. The fundamental unit of the primary cooperative is a village, or a cluster of two or three villages. Only dairy producers who agree to provide milk only to the cooperative are eligible to join as members. While the cooperative's day-to-day operations are overseen by full-time paid staff, the group or board of the obliging, which is made up solely of elected members, makes decisions on the cooperative's affairs (Uotila & Dhanapala, 1994).

Primary-level cooperatives assemble villagers with comparable interests to work toward joint objectives. This technique can also spot potential leaders who might benefit from exposure to other community leaders as they grow in their leadership abilities. A union, which may be for a district, region, or milk shed area, is created by a collection of primary-level cooperatives. The second tier is this. In the third tier, depending on the size and administrative structure of the nation, unions' band together to establish federations at the state or national level. According to Uotila and Dhanapala (1994), the federation has the authority to take action on matters such as price policies, extension, training, regulation of imports of milk and milk products, subsidies, and credit.

According to Bebe et al. (2002), the Kenya Highlands' smallholder dairy industry is characterized by shrinking farms, the adoption of dairy breeds, and an increasing reliance on forage and concentrate purchases for feed. Purchased fodder has become crucial to the dairy industry in places like the Kiambu district, where it accounts for the majority (67%) of production costs along with commercial feeds. Smallholders in the highlands can intensify their farming methods in part by using zero-grazing technologies, especially as farms get smaller.

Nepal has experienced steady growth in milk production over the years. In 2020/2021, the total milk production reached approximately 2.81 Million MT. showing an increase from 2.64 Million MT in the previous year. The annual growth rate of milk

production in Nepal has been around 6 percent in recent years. (National Dairy Development Board, Harihar Bhawon Pulchowk, Lalitpur (<https://nddb.gov.np>)).

The average milk yield per cow/buffalo in Nepal is rather low compared to international standards. It is probable to be around 3-4 liters per day, although efforts are being made to improve this through various breeding and management involvements.

Dairy consumption in Nepal is steadily rising, driven by population growth, urbanization, and changing dietary patterns. The per capita annual milk consumption in Nepal is approximately 65 liters, which is lower compared to many developed countries.

Nepal has been actively participating in international forums and collaborating with organizations like the Food and Agriculture Organization (FAO) and International Fund for Agricultural Development (IFAD) to enhance the dairy sector's productivity and efficiency.

The study paper "The struggle for basic needs in Nepal" by Baikie, Cameron, and Seddon (2000) is based on two fieldwork sessions. Which was to assess the social and economic effects of roads. In summary, the essay discusses the struggles of the underprivileged to survive in circumstances that were not of their choosing. The knowledge, tools, and pursuits required for survival comprise a person's means of subsistence. When individuals are capable of managing stress, recovering from shocks, and maintaining or improving their skills, aid, and assistance both now and in the future without endangering the resources of the environment, their livelihoods are said to be sustainable.

Dairy farming is tied to the rural population's means of subsistence, according to Giri M. (2008) in his book "Cultural and Human Factors in Rural Development." He claimed that caring for animals is rural society's second-most important activity. Dairy cattle are given as wedding gifts by many rural families. A component of animal husbandry is dairy farming. Animal husbandry has a diverse impact on Nepal's socioeconomic sector. Agriculture and animal husbandry are therefore the main sources of income for persons living in rural areas.

As of 2010, Sapkota prepared According to the Food and Agriculture Organization's "Dairy sector study of Nepal" report, the establishment of a Yak chesse plant in Lamtang, Rasuwa district, in 1952 marked the start of organized dairy activities in Nepal. Similar to this, the history of dairy cooperatives began at Tusal village in the Kavre

area. The dairy industry has been crucial in ensuring social justice for rural disadvantaged people by supplying chances for improved employment and income development. The dairy industry makes a significant contribution to the food security of the large population because a portion of the milk produced is consumed in farm households as milk and milk products, which include both components of affluence and access to food. The stability of rural homeowners' food security because dairy animals are a crucial component of crops and an integrated form of agriculture system, in which they provide a steady stream of food and revenues for householders, they can be used as collateral for credit, sold for emergency cash needs arising due to an injury or illness of productive family members, they also provide draught power, fertilizer and pest control, contributing to total farm productivity and hence to food security.

According to Chaudhary and Upadhyaya (2013), dairy farming is a crucial component of rural life, and they also described the idea of a cooperative method to achieving farmers' shared objectives. The organization, harmony, and helpfulness of society are all fundamental goals of dairy cooperatives. Farmers have the chance to work together through cooperatives to understand and share their socioeconomic impacts. They emphasized how cooperatives aid in educating farmers about health, sanitation, and education. Additionally, it supports the advancement of women's empowerment in society.

Dahal (2011) explains how cattle are also impacted by climate change in his thesis, "Impact of Climate Change on Livelihood and Biodiversity in Rural Communities." Extreme drought had a direct impact on the development of grass species that are edible. Due to insufficient rainfall, the regeneration of pasture and woodland fodder species is also declining. The result is a scarcity of high-quality and diverse animal feed. This has impacted animals, which has further impacted milk and meat output. Due to the drought, there is less space available for raising animals and growing grass and feed. The pattern of livestock has altered due to the availability of feed, which has reduced the scarcity of fodder, water, and grazing land. As a result, the income from livestock is declining. Changing inherent illnesses in animals are being impacted by rising temperatures as well.

According to Ghosh and Maharjan (2001), Bangladesh's small dairy farmers use a cooperative system to operate their farms cooperatively and create jobs that pay better wages. The results of this study revealed that among the members of the dairy cooperative,

agriculture (crop production) is no longer the most common vocation. In actuality, the dairy business has separated itself. Another trend in the field of research has been the diversity of funding sources. Dairy has actually become a separate industry. The diversity of revenue sources has been seen as another trend in the research area. The primary and secondary jobs in rural families. Therefore, the expansion of dairy farming through cooperative initiatives is a trend that has the potential to have a large impact on rural areas. The writers explored some of the problems with milk production among dairy households and their circumstances under various milk marketing channels. They also displayed a general aspect of milk marketing in Bangladesh. The established marketing channel, through which farmers can obtain a reasonable price, is essential to the continued development of dairy production. The cost of transportation can be decreased through cooperative systems and collective marketing. The vast majority of dairy farmers are content with the cooperative marketing system. Therefore, a cooperative milk marketing system can be created with the majority of small producers in mind for the benefit of rural dairy farmers.

Hossain et al. (2005) conducted research to ascertain the general information, feeding, breeding, housing, milking, etc., costs, and returns of small dairy farms, to compare the reproductive and productive performance of crossbred and native cows, and to make recommendations for the development of small scale dairy farms. In line with this viewpoint, a structured questionnaire was used to collect empirical data. Thirty small dairy owners participated in a four-month survey in 8 Thanas in the Rangpur district as part of the study.

According to the research, farm owners make up 57 percent of the business class, with the other 43 percent falling into various groups. Only 47 percent of people picked dairying as their main line of work, while 53% did it as a side gig. There were 13.01 animals on average per farm, and 60 percent of farm owners held a higher secondary degree. The average monthly income for farmers in the study area was Tk. 4387. Farm owners possessed 85.4 percent crossbred cattle, such as Friesian and Jersey crosses, and 14.6 percent native cattle. 87 percent of farmers employed artificial insemination, and the remaining farmers used both artificial and natural methods. The daily milk production per cow/farm for a crossbred and native dairy cow was 4.27 and 1.78 liters, respectively. The cost of raising a dairy cow was calculated to be Tk. 67.5/cow/day, but the profit from doing

so was Tk. 85.2/cow/day. In the study area, crossbreeding produced a net return of Tk. 17.7/cow/day and a cost-benefit ratio of 1:2.26. The study discovered significant ($P < 0.01$) differences in the thirsty time, service per formation, calving to first service, highest and lowest milk production, and lactation period between crossbred and native dairy cows.

Additionally, non-significant variations between crossbred and indigenous animals' calving intervals were found in the study. Small dairy farms were struggling with many issues, including a lack of feeds and fodder, a high cost of concentrate, and a lack of technical know-how. Despite the challenges that owners of dairy cows face, the study discovered potential, particularly for small dairy farms. The small farmers might make a modest life by turning minor dairy farming into a profession by keeping 8–10 crossbred cows.

The dairy industry has been a force in bringing dairy foodstuffs to urban residents and luring urban wealth to rural zones. Dairy businesses have been formed as a bridge among urban and rural trade across the nation and have been effective in building a strong network between dairy producers and customers. Production of milk is a requirement for the entire dairy supply chain. Currently, Nepal produces about 0.247 percent of the total milk produced worldwide. An estimated 2.05 million metric tons of milk are produced in Nepal each year. The amount of milk per person in Nepal is approximately 158.9 grams per daytime, which is much less than the amount the World Health Organization (WHO) advises. The current milk production growth rate needs to be boosted to 4 percent annually in order to meet the WHO's recommended minimum daily per-capita milk intake of 250 g by 2025. The dairy sector accounts for the majority of Nepalese cattle production.

The agriculture and livestock sector accounts for over 28 percent of the country's GDP. However, the dairy industry only accounts for 8 percent of Nepal's total agricultural GDP. Two-thirds of the population of the nation are employed in the agricultural sector, which also boosts the GDP. According to Shingh, Kalwar, Poudel, Tiwari, and Jha (2020), Nepal's cooperative sector is still in its infancy but is already playing a significant role in the socioeconomic advancement of millions of rural families.

The literature that is currently accessible shows that rural people create livelihood strategies based on their asset portfolio while taking into account their vulnerability and how local institutions and policies have an impact on it. In various circumstances, the

backdrop for vulnerability, institutions, policies, and their connection to the activities will vary. There aren't many books on the market that discuss the dairy industry in Nepal. It appears that no research has been done on the role of dairying in rural cow dairy farming in Nawalpur district up to this point. This study only focuses on contributions of dairy cattle farming of small scale farmers on their livelihood with linking milk producing cooperatives' role in case of Madhyabindu-4, Nawalpur district. Thus, this study is empirically designed new framework in case of Nepalese context.

2.5 Conceptual Framework of the Study

For the peasants, raising livestock, especially dairy cattle, is the main source of income. Animals and their byproducts retain economic worth in the form of animal sales, milk money, fertilizer, draught, and biogas. Figure 2.1 illustrates the socioeconomic significance of these items. Economic and social impacts are divided into two categories in the diagram below.

Economic impact is concerned with the financial success an individual derives from their work, and social impact is concerned with their connections to the success of the entire society. In terms of their social effects, all the economic effects depicted in Chart 1 are interconnected, including income from the sale of animals, milk money, fertilizer, drought, and biogas. They will support initiatives that will improve lives via health and education. The following list can be used to describe some of the conceptual framework's elements.

Cattle Sale: Dairy cooperative farmers raise both native and hybrid dairy animals. Heifers are sold to consumers for market value in the cattle industry, whereas older, less productive animals are sold for a cheap price. However, a small number of calves are sold in response to customer demand for natural service.

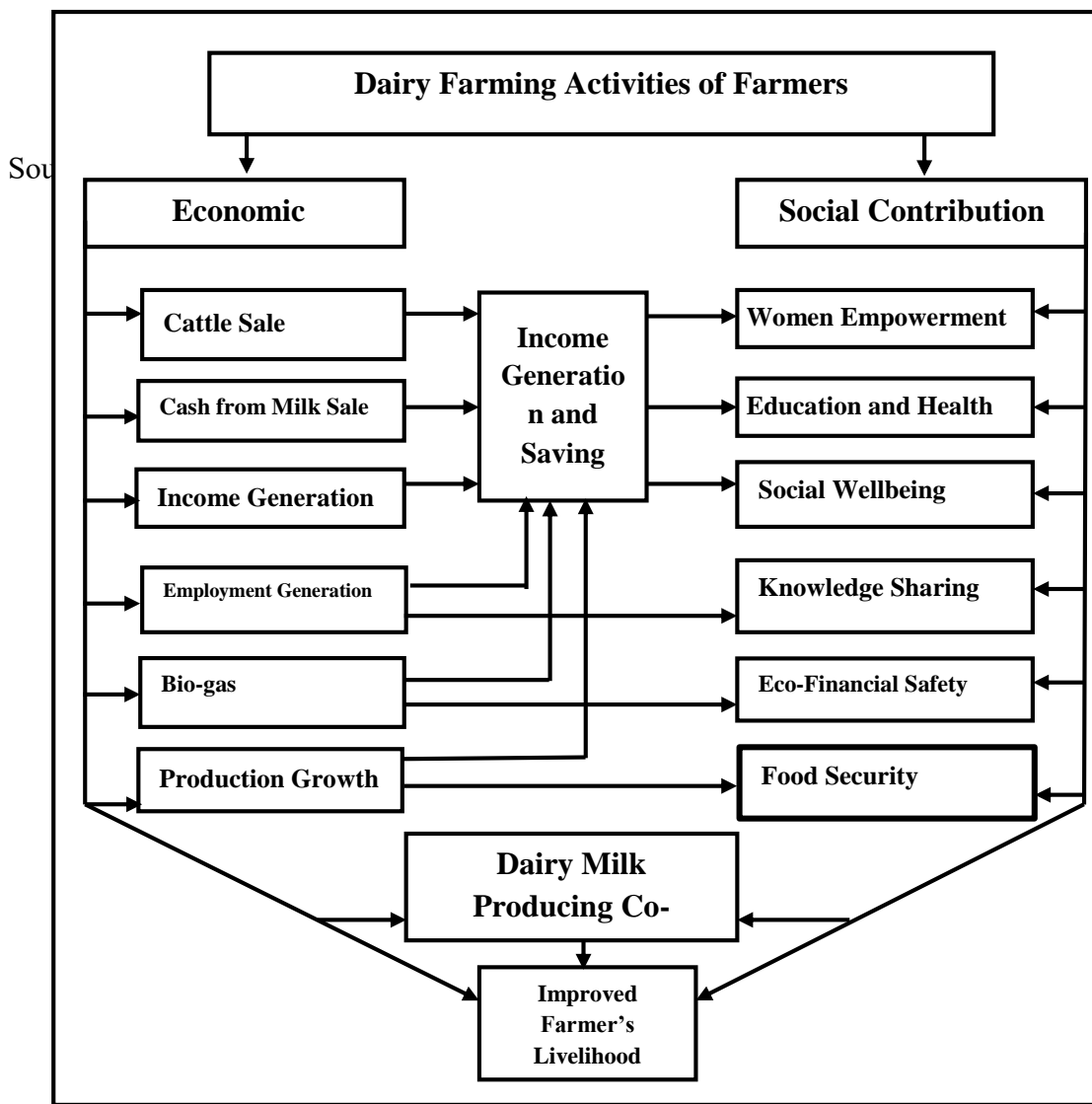
Cash from Milk Sale: Since milk is sold every day in the morning and evening, it is regarded as a cash crop for farmers. Farmers deliver their milk to Dairy Milk Producers Cooperatives (DMPC) and receive payment for it based on volume, fat, and SNF quality parameters every two weeks. Animal dung and animal slurry are used to prepare farmyard manure. Compared to chemical fertilizers, this fertilizer increases the fertility of the soil.

Draught: For pulling carts and tilling fields, sources include ox and male buffalo. Without their assistance, farmers cannot finish their fields.

Biogas: The alternative energy source for lighting and cooking in the village is biogas. It is evident in the homes of some of the dairy farmers in Madhyabindu-4 that dung decomposes and changes into combustible methane.

Employment: Labor is produced by dairy farming to do daily tasks. In Madhyabindu-4, farmers have no other options than dairy farming. Therefore, each home now has a job thanks to farming.

Figure 2.1
Conceptual Charter of Socio-Economic Contributions of Dairy Farming on Livelihood



Source: Researcher's Formulation, 2022

CHAPTER III

RESEARCH METHODOLOGY

The study demonstrates the role that dairy farming has played in the rural development of the dairy producers in Madhyabindu Municipality-4, Nawalpur district, Panch Pandab Milk Producer Cooperative. This chapter includes following sections; Research Design, Rational of the Study along with Rationale of the Selection of the Study Area, Nature and Source of Data, Universe and Sampling along with sampling procedure and sampling size, Data Collection Techniques and Tools and Data Analysis and Presentation.

3.1 Research Design

The study's plan on how to get the answers to the research questions is called the research design. It acts as the study's framework, directing the gathering and analysis of the data. The majority of the data used in this study are qualitative, and it also relies on a descriptive design of primary and secondary information gathered from the study region. The purpose of this study is to explain how dairy farming contributes to the farmers' rural livelihoods in Madhyabindu Municipality-4, Nawalpur District. A questionnaire sheet is created, and an observation check list is also constructed for gathering primary data, in order to gather all the information and necessary data from the field.

3.2 Rational of Selection of the Study Area

Nawalpur district (Appendix D) situated in Inner Madhesh of Gandaki province in Nepal. The district covers 1043 square Km. The district has separated in to 8 local bodies with 4 rural municipalities and 4 urban municipalities. The district areas politically divided 3 democratic areas. The district is occupant by Nawalparasi district in the west, Chitwan district in the east. Tanahu and Palpa district in the northern and India boarder in the south. The Nawalpur district is renowned for its natural beauty, several rotating locations, and pleasant climate. Geographically speaking, the area is plain and good for agriculture. The area is home to numerous tourist attractions and religious sites.

Narayani is main rivers of the district. Nawalpur is one of Nepal's most picturesque districts. In Nepal, agriculture and livestock raising are very well known. Many commercial farmers work in the agricultural and dairy industries. They gain from their enterprise. Main

manufacture of Nawalpur is Rice Maize and wheat. Nawalpur is famous for Jungle safari in National park and its natural beauty and sightseeing of biodiversity such as one horn Rhino, Tiger and many more, tourism spots, homestay tourism, places of worship and various cash crop cultivation. Nawalpur is a diverse city with a beautiful natural setting and a productive agricultural sector. Milk is source's primary source of revenue, homestay tourism, crop productions, dairy cattle milk etc. By growing a variety of crops, the area has developed its own personality. The district's headquarters are located in Kawasoti Bazar, which is 176 kilometers away from Kathmandu. The district has a total population of 381105, 84695 homes, and a population growth rate of 1.91. In terms of the overall population, there are 201659 women and 179446 men, with a sex ratio of 88.98 (CBS, 2021).

Madhyabindu Municipality (Appendix D) is located in Nawalpur District, Gandaki Province in Nepal. The municipality was established on 19 September 2015 by merging the existing Tamasariya, Narayani and Kolhuwa Village development committees and later Naya Belahani, Parsauni and Rakachuli VDCs are merged. The former Tamasariya VDC of Chormara Bazaar is where the municipality's administrative headquarters are located and divided into 15 wards with Geographical Area of 233.35 km² and has 14345 household and total population of 61548 out of which male 28291 (45.97) and female 33257(53.03) (CBS, 2021). According to CBS, 2021, no. of household in ward no. 4 is 716 out of which Tharu households are 406 and total no o household of Brahman and Chhetri 235. Total population of ward no. 4 is 3494 in which average family no is 4.9. At the intersection of the East-West Mahendra highway is Chormara Bazar. It is one of the district of Nawalparasi's older residential districts. The biggest market in Madhyabindu is called Arunkhola, and it is situated in Madhyabindu Ward No. 10. Arunkhola Bazar is also home to Shree Distillery Pvt. Ltd., one of Nepal's oldest breweries. Chitwan National Park includes the majority of the forest in the area. It was founded in 1973, and in 1984 it received the designation of World Heritage Site. The Narayani River divides the municipality's southern boundary, which it shares with India.

This study was conducted at Pach Pandab Milk Producer Cooperative Madhyabindu Municipality-4 Nawalpur District. The majority of the population in this region generally works in agriculture and dairy farming. Despite the lack of systematic

study on the benefits of dairy farming for rural livelihoods, the limitations, opportunities, and commercialization of dairy farming are not given any consideration.

The Pach Pandab Milk Producer Cooperative, used for the study, is situated in Madhyabindu Ward No. 4 of Nawalpur District in the southern region of the Gandaki Province of Nepal. In 2063 B.S., the Pach Pandab Milk Producer Cooperative is founded. It is recorded with the Nawalpur District's District Cooperative Office. Around 1500 liters of milk are collected daily by the 300 milk producers in Ward 4 of the Madhyabindhu Municipality. A slight distance separates Pach Pandab Milk Producer Cooperative from the Mahendra Highway. Every 15 days, the cost of milk is paid. The cost of milk is determined here by the caliber of the milk that is collected. There are three people working for this cooperative. Agriculture and livestock raising are the primary industries in the study area. Maize, wheat, and paddy are the principal food crops produced by agriculture, along with milk and potatoes. Firewood is a major source of energy for the home and is used for heating the study area and for cooking. The research region has access to the national electrical grid.

3.3 Nature and Sources of Data

The material is presented both qualitatively and quantitatively in this study. Fieldwork is done to gather data, and milk farmers from the cooperative's individual households complete a prepared questionnaire. 300 Milk producers' farmers and 200 farmers among 300 members have sell milk regularly in Pach Pandab Milk Producer Cooperative Madhyabindu Municipality-4 Nawalpur. Similarly, office of Pach Pandab Milk Producer Cooperative, The Municipality of Nawalpur, the Ward No. 4 office of Madhyabindhu, the District Livestock Service Office (DLSO), and Nawalpur will be visited in order to get the essential secondary data and information.

3.4 Universe and Sampling

The universe and sample size are crucial for the study's validity and reliability. It is impossible to explore the entire cosmos due to several limitations. In Madhyabindu Municipality, there are 15 milk producers cooperatives and one in Madhyabindu-4. Pach Pandab Milk Producer Cooperative was one of them that was picked for the study's universe. Potential study participants included the Pach Pandab Milk Producer

Cooperative's milk producers. The responders were from ward number 4 of the Madhyabindu Municipality. In this study, the 300 member houses of the Pach Pandab Milk Producer's Cooperative comprised the universe. A simple random selection procedure was used to select 50 out of a total of 300 houses for the interview survey, representing about 17% of the study's overall sample size. Generally sample size is taken around 10-15 percent if the population size is more than 100. Thus, sample size was determined 50 members¹ of Pach Pandab milk producing cooperative.

3.5 Techniques and Tools of Data Collection

Direct interviews are conducted with the respondents using a standardized questionnaire to gather primary data for the study. The researcher himself uses the questionnaire method to gather primary data from the field study as needed. Key informant interviews are conducted using both qualitative and quantitative methodologies, and highly extroverted, knowledgeable, and trustworthy individuals were selected. Thus, the tools of data collections are interview, observation, Focus group discussion and key informants interview and secondary data available in milk producer cooperative as well as other sources.

3.5.1 Primary Data Collection

The term "primary data" refers to information that has been collected directly by the researcher. The process of acquiring data through surveys, interviews, observations, and group discussions is known as primary data collection. Household surveys are a common type of primary data. Researchers can personally verify that primary data used in this method of data collecting satisfies the requirements for quality, availability, statistical power, and sampling for a given research issue.

Primary data are collected through structured questionnaire to collect the information related socio-economic status, contributions of dairy farming on livelihood and role of cooperative to support the dairy farming while quality of dairy product, feeding,

¹ Sample Size = $\frac{z^2 \times p(1-p)}{e^2} / 1 + \left(\frac{z^2 \times p(1-p)}{e^2 N} \right)$ Where, N = population size. p = the likely sample proportion. e = Margin of error (percentage in decimal form). z = z-score i.e. the z-score is the number of standard deviations in a given proportion is away from the mean and 1.96 for 95 percent confident interval. In this study, the sample size taken is calculated based on 95 percent confident interval (z-score) with around 10 percent margins error (e) and sample proportion (p) taken as around 20 percent i.e. 0.2 for 300 population size (N).

breeding, shed management, veterinary facility, grazing field through observation checklists.

i. Household Survey

Household survey is one of the most important technique for obtaining data from the respondents. This study also collected required data through household survey questionnaires which consists 29 variables (Appendix A). More specifically, variables like age, sex, population, family type, educational status, major occupation, type of the lands and land holdings, food sufficiency, cattle holdings, beneficiaries, contributions of dairy farming on farmers' livelihood, role of cooperative and prospects and constraint of dairy farming etc. were highlighted. Collected data are quantitative in nature about income generation from Dairy cattle farming, etc. More specifically, the study consists 29 variables which were re

ii. Observations

Observation is another technique of primary data collection for which observation check list were developed as a tool. The observation checklist (Appendix C) is major tool in analyzing the responsiveness followed by dairy cattle farmers according to guideline. The researcher observes various phenomena in the time of field visit for data collection in the study area by observing the primary product, performance of cattle owner, selling of local products, quality of dairy product, feeding, breeding, shed management, veterinary facility, grazing field through observation checklists in this study.

iii. Key Informants Interview

Some key informants are also introduced in the starting of the fieldwork in the point of view of the accessibility and readiness to help the researcher. During the field survey gathered information can be cross checked with the help of key informants. The Key informants' interview is taken using the KII guideline (Appendix B). Only the few people are selected as key informants such as the elderly people of local people who directly observed dairy cattle farming, former and current committee members, staff of the cooperative of dairy cattle farming, socially active, experience and knowledgeable persons. The key informants were used to collect information about the respondents' history, over

all aspects of village, education status, various case and constraints in dairy cattle farming and other related information.

3.5.2 Secondary Source of Data

As part of organizational record keeping, secondary data is gathered from data that has already been generated by huge government institutions, healthcare facilities, etc. Next, the data is pulled from a variety of other data files. The secondary information for this study has been collected from related District Dairy Development Corporation, Madhyabindhu Municipality and Ward no-4 Office, Pach Pandab dairy cooperative, TU library, CBS, Cooperative board Nepal, other papers and publication mainly for general type of information like climate, total population, topography gender role and other socio-economic status of the people as well as milk production statistics in district and country context.

3.6 Methods of Data Analysis

Data and information obtained from primary and secondary sources and adopted have been categorized, organized, and classed in accordance with needs. According to the type of data, the information gathered using various procedures and techniques is grouped and examined under several subheadings. Basic statistical procedures are used to analyze the quantitative data, together with tools like percentage, ratio, average, etc. The facts and data are displayed using various statistical measures, including percentages, bar diagrams, tables, and charts. The descriptive pattern is examined using the qualitative data. In order to analyze the data, simple statistical tools like table, frequency, percentage, average weighted average are used. Likewise, Microsoft word and Microsoft excel are used as computer facilities.

CHAPTER IV

DATA ANALYSIS AND PRESENTATION

This chapter presents the analysis of data with the estimated results in eight sections. The study region is described in the first part. Second section presents demographic information of respondents in this study. Third Section presents current socio-economic status of the respondents' households of the study area. Fourth Section has explored contributions of dairy cattle farming on rural livelihood. Fifth Section has described role of dairy milk cooperative. Six Section presents supporting sector in dairy farming. Seventh Section describes management of dairy cattle farming. Eight deals opportunities and constraints in dairy farming.

4.1 Demographic Characteristics of the Respondents

Respondents and family members profile such as population, age and sex structure, marital status, family size, etc. ethnic composition, household head etc. of sampled households presented can be helpful to understand the demographical profile of the respondent's households. Demographic structures of selected HHs are presented below.

4.1.1 Population Composition of Sampled Households

According to CBS (2021), the total HHs are 724 with total population 3849 people where no. of males are 1778 (46.19percent) and no. of female are 2071 (53.81percent) in ward number 4 of Madhyabindu Municipality. Sampled Population composition is shown in the figure 4.1

Table 4.1:
Population Composition of Sampled Households

Gender	Population	Percent
Male	116	47.35
Female	129	52.65
Total	245	100.00
Sex Ratio		89.92

Source: Field Survey, 2022

Note: *sex ratio =no. of male/no. of female x 100

On survey, 10 HHs with total population of 245 out of which 116 (47.35%) are male and 129 (52.65%) are female in the study area. The sex ratio of sample household is 89.92. Thus the data presentation shows the composition of population by gender along with sex ratio in the study area which help to analyses the population status of the study area.

4.1.2. Age and Sex-Wise Composition of Sampled Households

In addition to productivity, age affects how much food is consumed. The age of a person might have an impact on how productively they perform certain tasks. Older persons and youngsters are less engaged in productive tasks than people in their middle years. People in their middle years are more engaged in constructive pursuits. Among the various components of population composition, age and sex composition hold a prime place for demographic study. Separate data for male and female are important for various types of planning and for the analysis of other demographic characteristic.

Table 4.2:

Age and Sex-Wise Distribution of Population of Sampled Households

Age group	Male	Percent	Female	Percent	Total	Percent
0≤15	23	19.83	25	19.37	48	19.59
15≤60	79	68.10	89	68.99	168	68.57
≥ 61	14	12.07	15	11.62	29	11.84
Total	116	100	129	100	245	100

Source: Field Survey, 2022

The balance of sex affects the social and economic relationship within a community. Similarly, the age structure of the population guides many types of planning, particular planning of the community, institutions and services, manpower supply etc. The study deemed the respondents' age dispersion to be significant. The table shows that the population of sampled HHs population, 10.59 percent are below than 15 years where population of male and female is 19.83 percent and 19.37 percent respectively. Old age population is 11.84 percent, where male and female population is 12.07 percent and 11.62 percent respectively. The economically active population is 68.57 percent, in which population of male and female are 68.10 percent and 68.99 percent respectively. This analysis helps to know the population distribution and also shows status of the working age

population which guides many types of planning, particular planning of the community, institutions and services, manpower supply etc.

4.1.3. Ethnic Composition of Sampled Households

The caste and ethnicity plays important roles for socio-economic development of every society. There are 126 caste/ethnic groups reported in the census 2011. Chhetri is the largest caste/ethnic groups having 16.6 percent of the total population followed by Brahman-Hill (12.2%), Magar (7.1%), Tharu (6.6%), Tamang (5.8%), Newar (5%), Kami (4.8%), Musalman (4.4%), Yadav (4%) and Rai (2.3%). The villages where dairy farming members are inhabited by various ethnic groups are shown below.

Table 4.3:
Ethnic Composition of Sampled Households

Ethnic group	No. of household	Percentage
Brahmin/ Kshatri	19	38
Tharu	24	48
Janjati	4	8
Dalit	2	4
Others	1	2
Total	50	100

Source: Field survey 2022

The Table is to depict that out of the total sampled household of the community, Tharu are the dominant ethnic group which covers 48 percent each followed by Brahmin/Chhetri by 38 percent, Janjati by 8 percent , Dalit by 4percent and others by 2 percent . From the analysis, it is observed that Tharu is the representative caste in the study area and .then Brahmin/Kshatri seems to be second largest ethnic group in the study area while other are nominal.

4.1.4 Marital Status of Sampled Households

The study shows marital status, both married and unmarried men and women. In the study area, marital status of sampled households is presented in Table 4.4 below.

Table 4.4:
Marital Status of Sampled Households

Marital Status	Population	Percent
Married	153	62.44
Unmarried	72	29.38
Widow	14	5.71
Divorced	6	2.44
Total	245	100

Source: Field Survey, 2022.

Among 50 respondents' HHs, 62.44 percent of the respondents are found married and 29.38 percent of respondents' HHs is unmarried found. 5.71 percent people are found as widow while 2.44 percent are found as divorced people. These data shows the social marriage status in the study area.

4.1.5 Religious Status of Sampled Households

In the study area, there have been various religions of sampled households. In Nepal, majority of people are Hindu religious. Then after Buddhist people are in second position of religious group. Muslim and Christians are in minority religious groups. Others many more religious groups are in Nepal which is in minority position. Religious status of sampled households is presented in figure 4.5 below.

Table 4.5:
Religious Status of Sampled Households

Religions	No of HHs	Percent
Hindu	46	92
Buddhist	3	6
Others	1	2
Total	50	100

Source: Field Survey, 2022

Among 50 samples, 92 percent of the sampled HHs are Hindu. About 6 percent of HHs is Buddhist whereas only 2.82 percent of sample HHs are other religious group. From

the analysis, majority of population are Hindu's communities as national population survey followed by Buddhism as second largest religious.

4.2 Current Socio-Economic Status of the Respondents' Households

Socio-economic status of people are determined by education, Income sources, type of occupation, landholding size, holding size of live-stock, structure of house etc. The agricultural industry contributes more than 25 percent of Nepal's GDP, which is the foundation of its economy. Cereal crops, cattle, and forestry goods make up the main products. The raising of dairy cattle helps to contribute to the economy.

4.2.1 Educational Status of Sampled Households

Education is considered as human capital and important infrastructure of development as well. It is essential to every sphere of civilization. It is essential to every sphere of civilization. People with education have contributed significantly to engagement in various community activities. A person's engagement in any development activity is more effective if they are educated as a whole. Illiterate, literate to primary level, lower secondary to secondary level, and higher secondary and university level are the four categories used to categorize the educational level in this instance. The table below shows the respondents' and his family's educational status in the research area.

Table 4.6:
Educational Status of Sampled Households

Education Level	Male	Female	Total	Percentage
Illiterate	16	19	35	14.29
Primary education	26	31	57	23.27
Lower Secondary to Secondary	31	37	68	27.76
Higher secondary to University	43	52	95	38.78
Total	116	129	245	100

Source: Field Survey, 2022

The table 4.6 shows that out of 245 people, there are 14.29 percent of people are illiterate, 23.27 percent of people can read and write and have primary education, 27.76 percent of people have got secondary level of education, and 38.78 percent of people have

got to higher level education. From the analysis, majority of people in the study area are observed as literate population.

4.2.2. Main Source Income of Sample Households

Primary occupation of more than 65 percent Nepalese peoples of total population is agriculture. Rest of peoples is involved in business sector, services, wage labors and students and some of them are economically inactive population. In this study, it is explored that main sources of income from different occupation along with dairy cattle farming of respondent household.

Table 4.7:
Main Income Source of Sampled Households

Income from	Respondent HHs	Percent
Crop Farming	11	22
Dairy Cattle Farming	28	56
Business	5	10
Services	6	12
Total	10	100

Source: Field Survey, 2022.

In the study area, main source of income of 22 percent respondents HHs is agriculture and while main source of income of 56 percent of respondents HHs is Dairy cattle farming. There are 10 percent respondent household's which have main income source from Business and service is main source of income for 12 percent of HHs. The mainstream of the people from the learning area are involved in farming along with dairy cattle farming. But most of HHs depends on dairy cattle farming and they have not enough to maintain all of their daily needs. So, they are involved in agriculture, other business and services along with dairy cattle farming.

4.2.3 Land Holding Size of Sampled Households

Land ownership is one of the most respectable things in Nepal, and it also determines a person's ability to earn an income and provide for their family. Because more people rely on agriculture, income increases as land size increases. The major landowners in the research region are Tharu and Brahmin/Kshatri.

Table 4.8:
Land Holding Size of Sampled Households

Group	Respondents	Percentage
≤ 10 Katta	31	62
10-20 Katta	13	26
20-30 Katta	4	8
> 30 katta	2	4

Source: Field Survey, 2022

* One Katta= 0.034 He. (Approx)

Table 4.8 shows that 50percent of the sampled households have less than and equal to 10 katta which shows majority of the households have holding less than equal to 10 katta while 30 percent HHs have in between 11 to 20 katta and 10 percent HHs have in between 21 to 30 katta. A little bit people i.e. 10 percent are holding large scale of land i.e. more than 30 katta. The majority of the people from the study area have not enough land for crop production. So they are attracted to dairy farming to maintain their daily needs by generating more income in the study area.

4.2.4 Occupational Structure of Sample Households

Primary occupation of more than 65 percent Nepalese peoples of total population is agriculture. Rest of peoples is involved in business sector, services, wage labors and students. Among 245 population of respondent HHs, 76.75 percent people of the study area are economically active. 52.94 percent people are involved in agriculture, 2.05 percent in wage labor, 11.51 percent people have some private, or government services, 8.44 percent are involved in business and 18.16 percent population are student while Infant and inactive populations are around 6.90 percent.

Table 4.9:
Occupation Structure of Sampled Households

Occupation	Population	Percentage
Agriculture	143	52.94
Business	14	8.44
Service	17	11.51
Wage labour	11	2.05
Student	41	18.16
Infant and inactive	19	6.9
Total	245	100

Source: Field Survey, 2022.

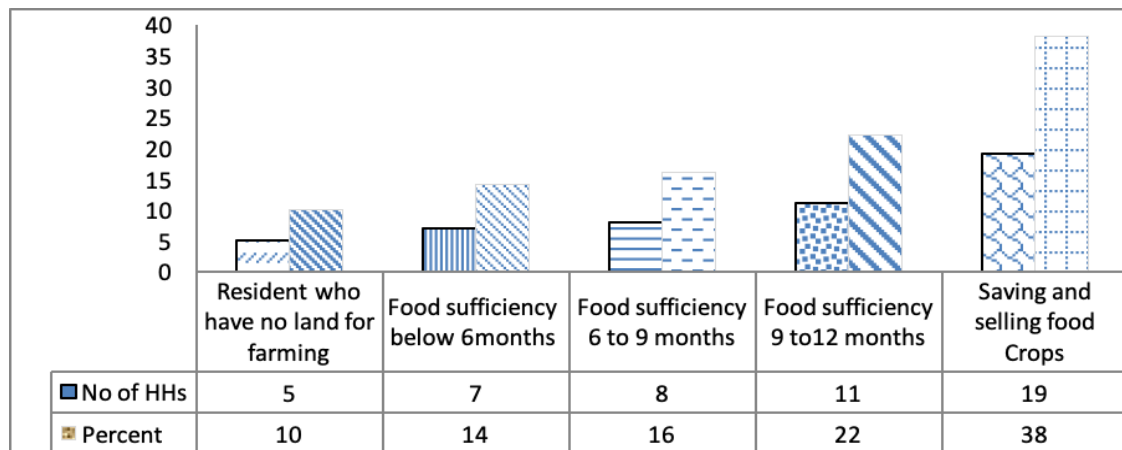
The majority of the people from the study area are involved in agriculture but agriculture isn't enough to maintain all daily needs of people. So, they are found involved in daily wage labor, business, involvement in tourism sector and services.

4.2.5 Condition of Food Sufficiency of Sample Household

Most of the people of the learning area have the scarcity of food and crop production because of low productivity of agriculture products. In spite of being farmers with occupation majorly, people are not able to produce sufficient food for whole year. The following figure 4.1 shows the condition of food sufficiency of sample household.

Figure 4.1:

Condition of Food Sufficiency of Sample Households



Source: Field Survey, 2022

In the study area, out of 50HHs, 19 HHs i.e. 38 percent are being able to save some crop production which mean they can sale some agricultural product after separated the one year's consumption for the family and 11 HHs i.e. 22 percent have sufficient food for 9 to 12 month. 8 HHs i.e. 16 percent have enough of food for their household feasting for the 6-9 months and 7 HHs i.e. 14 percent have sufficient food for below 6 months only while 5 HHs i.e.10 percent have no agricultural land and have only residential land. So, they take land in rent for crops production. The study shows that majority of households have no sufficient land to feed over all year.

4.2.6 Live-stock Rearing Patterns of Sampled Households

Animal husbandry is a crucial component of agriculture and has a significant role in both agricultural productivity and the improvement of the socioeconomic standing of linked households. Livestock is considered as a liquid asset as it can easily be converted into cash by selling them. Livestock also plays multifunctional role on farming system. They provide milk, meat, ghee, and manure for maintenance of soils. The prosperity of a family can be also judged by the no. of animals. The table shows total no. of livestock holding by each ethnic group.

Table 4.10:

Live-stock Patterns of Sampled Households

Ethnic Groups	No. of HHs	No. of Buffaloes, Cow/ ox	No. of Goats, Sheep	No. of Hens, Ducks	No. of Pig	Total no. of livestock	Average live-stock holding (Livestock/HHs)
Brahman/kshetri	19	57	58	61	0	176	9.26
Tharu	24	49	78	319	0	446	18.58
Janajati	4	11	18	126	9	164	41.00
Dalit	2	2	7	20	11	40	20.00
Others	1	7	3	7	0	17	17.00
Total	50	126	164	533	20	843	16.86

Source: Field Survey, 2022

The field survey found out that the people of the study area have average 16.86 live-stocks per household. Brahmin/Kshetri Ethnic group have average livestock holding per family is 9.26 whereas Tharu have 18.58 average live-stocks holding per family. Janajati have 41 average live-stocks holding per family whereas Dalit have least average livestock holding per family i.e. 20. Others ethnic group have 17 average live-stocks holding per family. The study shows that Brahmin and Chhetri communities are mostly involve in dairy cattle farming comparative to other ethnic groups.

4.3 Contributions of Dairy Farming on Livelihood

Women farmers, landless farmers, and poor farmers who have no or limited opportunities to engage in other activities benefit economically from dairy farming and become more independent. It encourages boosting rural productivity and production. The dairy industry is crucial. It helps to lessen the malnutrition problem. The provision of wholesome meals for the household is very vital. It helps keep the rural economy strong.

Dairy farming plays a crucial role in fostering the growth of rural entrepreneurship by providing the essential raw materials for rural manufacturing. The nation's gross domestic product has increased significantly as a result of dairy farming. In rural areas, it uses biogas to alleviate the energy problem. Biogas is crucial for environmental protection, time savings, and wellness. It has made a significant contribution to reducing the issue of rural-to-urban migration. Additionally, the researcher observed the following:

The farmers are sharing the experiences and wisdom to the young generation too. Elders, who have spent a lifetime tending to their cows and buffaloes, impart their knowledge to the younger generation, offering invaluable guidance on animal care, breeding techniques, and overall dairy management. These exchanges of wisdom ensure the preservation of traditional farming practices and help to improve the efficiency and productivity of dairy operations.

4.3.1 Contribution of Dairy Farming in Employment Generation

In rural areas, dairy farming plays a significant role in creating employment prospects. Older and younger people can find work in self-employment in dairy farming, such as in the construction and cleaning of animal sheds, milking, and transporting milk cooperative offices. Three people work in accounting and dairy farm management, among other things. Employment has been created through dairy farming in the following ways.

- i. Milk production, transportation of milk and milk products, earning of animal sheds, and feeding of dairy cattle are all jobs created by dairy farming.
- ii. It creates jobs for those who produce dairy goods including cream, yogurt, paneer, cheese, kuruni, and chhurpi, among others.
- iii. It plays a significant role in providing youth with employment opportunities and resources to help them become independent.
- iv. Management and accounting in cooperatives and dairy shops also serve to provide employment for the production of dairy products.

By using a questionnaire of a qualitative type, respondents were asked to describe the status of employment generation following their involvement in this dairy farming. The role of dairy farming in generation in the research area of Madhyabindu, Wards Number 4, is described in Table 4.11.

Table 4.11:
Contribution of Dairy Farming in Employment Generation

S.N.	Contribution Employment Generation	No of Respondent HHs	Percent
1	Yes	44	88
2	No	3	6
3	Do not understand	3	6
Total		50	100

Source: Field Survey, 2022.

According to the data, 88 percent of respondents claimed that dairy farming has contributed to job creation. 6 percent of them stated that it cannot develop jobs due to the need and equality of people. The creation of jobs in the dairy industry was unknown to 6 percent of them. The evidence demonstrates that, since its involvement in farming, dairy farming has significantly contributed to the alleviation of poverty. During the interaction, one of the farmers said that:

We have got self-employment from this work. You don't have to go to other places to work and you can hire people who work less [E. Bhusal, KII].

4.3.2 Contribution of Dairy Farming for Income Generation

Small scale dairy farming can be considered as an alternative income generating activity for the development of rural and urban poor peoples in Nepal. Dairy farming has generated income by selling of milk and milk foodstuffs increase the income level of pastoral farmers, selling of new born cattle is also the source of in the rural area and increasing income through crop production by cattle manure. Table 4.12 presents contribution of dairy farming for of income generation in the study area of Madhyabindu-4.

Table 4.12:
Contribution of Dairy Farming for Income Generation

Income Level	No of Respondent HHs	Percent
Below 50000	5	10.00
50000 to 100000	12	24.00
100000 to 200000	23	46.00
More than 200000	10	20.00
Total	50	100.00

Source: Field Survey, 2022.

The income range group (<50 thousand) of 10 percent households was less supported on dairy farming. On a regular, dairy has donated the maximum income of 20 percent out of all the four income sources as income group of more than 2 lakh income sources from dairy. From the analysis, it can be concluded that there is not higher income generated from small scale dairy farming because most of farmer has earned middle range of income. During the study, one of the role model farmers happily expressed that:

He used to sell 3 to 4 buffalo baby in a year. The price of which is Rs. 15000 to 20000. This will also increase his income [K. Chapagain, KII].

4.3.3 Contribution of Dairy Farming in Food Security

Because it directly contributes to the production of nutrient-rich food for households and indirectly through the sale of dairy products, dairy farming is crucial to ensuring food security. In this approach, creating jobs contributes to preserving food security in rural areas. It improves the health conditions and fitness of body by following.

- i. The dairy industry provides nourishing foods and lessens the malnutrition issue in rural areas.
- ii. Milk is a beneficial food for people of all ages.

Rural residents spend a big portion of their income on things like food, healthcare, electricity, and education. People who work in dairy farming are able to save money and have access to funds for basic needs. The respondents were asked to discuss dairy farming's contribution to food security. there is highly dependent on dairy product for nutritious food, respondent is categorized in 'Sufficient' and if there is less dependent on dairy products for nutritious food and usually depend on other sources, then the respondent are categorized in 'Negligible'.

Table 4.13:

Contribution of Dairy Farming in Food Safety

S.N.	Contribution of Dairy Farming in Food Safety	No of Respondent	Percent
1	Sufficient	45	90
2	Negligible	5	10
Total		50	100

Source: Field Survey, 2022.

The contribution of dairy production to food security in the study area is shown in Table 4.13. Data show that 90% of respondents believed that dairy production contributed enough to ensuring food security. 10% of them claimed that dairy production has a minimal impact on food security. According to the data, dairy farming improved food security for the majority of farmers. During the study one of the female farmers said that:

"I only sell milk from this firm, but apart from that, I also got the manure from the firm to grow vegetables, plant crops and sell some outside." which has increased production. You don't even have to buy vegetables for home use Cattle manure, often overlooked as a waste product, holds immense value as a natural fertilizer. Its application to fields not only boosts crop production but also contributes to sustainable agriculture and the protection of our food supply. By harnessing the power of cattle manure, we enhance soil health, reduce reliance on synthetic fertilizers, and promote environmentally friendly farming practices. Let us recognize the potential of this organic resource and encourage its responsible use to maximize agricultural productivity while safeguarding our ecosystems for future generations [G. Chapagain, KII].

4.3.3 Contribution of Dairy Farming in Poverty Reduction

It's crucial to use dairy farming as a tool to fight poverty. Farmers are able to meet their fundamental necessities because to dairy income. It gives rural impoverished people cash income so they may buy the things they need for their homes. In the study area, dairy income also has been reducing poverty through generating income, reducing the cost of household energy fuels and chemical fertilizers, providing essential foods for domestic uses, motivating farmers for involving in rural business. The respondents were asked to describe how their involvement in this dairy farming had reduced their level of poverty.

Table 4.14:

Contribution of Dairy Farming in Poverty Reduction

S.N.	Contribution in Food Security	No of Respondent HHs	Percent
1	Yes	44	88
2	No	3	6
3	Do not understand	3	6
Total		50	100

Source: Field Survey, 2022.

Table 4.14 details how dairy farming helps reduce poverty in the Madhyabindu study area's Wards No. 4 neighborhood. According to the research, 88% of respondents claimed that dairy farming had helped them escape poverty. 6 percent of them claimed that it couldn't end poverty and achieve equality. Six percent of them had no idea how dairy farming helps to fight poverty. The evidence demonstrates that, since its involvement in farming, dairy farming has significantly contributed to the alleviation of poverty. Poverty reduced through generating income from dairy cattle farming, saving the cost of chemical fertilizer and household's energy fuels, supplying nutritious foods, developing necessary skills and trainings as well as rural entrepreneurship. Thus dairy farming helps in poverty reduction in the study area.

4.3.5 Contribution of Dairy Farming in Women Empowerment and Self-reliant

Women make up half of the world's population. They have different experience in their fields than men have. In a developing society, women participate in economic activities at a very low rate. However, women in the study region had the chance to participate in dairy farming. Women's participation in economic decision-making has risen in the research area. Women are now able to save and spend money on their own thanks to the income from the dairy industry.

In the research area, more women are participating in cooperatives. It is well understood how important dairy farming is for the independence and emancipation of women. On a cattle farm, women handle the majority of the labor. To feed and milk the dairy cows, they rise early in the morning. The respondents were questioned on the contribution that dairy farming makes to the independence and empowerment of women. Respondents were asked to discuss their role in the empowerment and independence of women in this dairy farming industry.

Table 4.15:

Contribution in Women Empowerment and Self-reliant

S.N.	Women Empowerment and Self-reliant	No of Respondent HHs	Percent
1	More Contribution	12	24
2	Little Contribution	30	60
3	No Contribution	8	16
Total		50	100

Source: Field Survey, 2022.

If there is only dependent in income from dairy farming for their expenses and income saving, those group of women are categorized in ‘More Contribution’ and if women has produced minimal income from dairy source and usually depend on other sources, then the respondent are categorised in ‘Little Contribution’ while dairy farming has no any contribution for women empowerment and self-reliant because of their own other income source, then they are included in “No Contribution”.

Table 4.15 illustrates how dairy farming helps women become more independent and powerful. The findings showed that 16% of respondents felt that farming did not contribute to the empowerment or independence of women. Similar to this, only 60% of respondents felt that dairy farming had a small impact, while 24% felt that it had a significant impact on the empowerment and independence of women. The study revealed, it is found that majority of the farmer express favor of contribution in women empowerment and their self-reliant though it has somewhat little contributed.

4.3.6 Contribution in Energy Generation and Environmental Protection

The production of bio-gas, an alternative energy source in rural areas, is supported by dairy farming. In a biogas plant, animal waste and urine are both acceptable. Land balance is improved by biogas. Farmers are big fans of bio-gas, especially when it comes to animals. It reduces the amount of time needed for cooking, cleaning, and gathering fuel wood. Other income-generating activities are done using the time that was spent.

Bio-gas also reduces the amount of fuel wood utilized and biomass burning, which can be employed in farms to increase production and revenue. Additionally, it enhances community and individual health and hygiene while also helping to reduce the amount of money spent on fuel. Fuel availability eases pressure on forests, resulting in a decrease in deforestation and natural disasters. This offers environmentally friendly energy that supports wellness. Dairy Farming helps for Energy generation as following way.

- i. Animal waste and urine are helpful in the production of biogas. It lowers the price of other energy sources.
- ii. Biogas contributes to the development of sanitary and hygienic conditions within the home.
- iii. Agriculture receives its slurry from bio-gas. Both the expense of industrial fertilizer and organic agricultural productivity are aided.

Respondent were asked to present role in contribution in energy generation and environmental conservation in this dairy farming and presented in following table.

Table 4.16:

Mechanism of Bio-Gas Plant in the Study Area

S.N.	Mechanism of Bio Gas Plant	No of Respondent HHs	Percent
1	Households have mechanism Bio-gas	24	48
2	Households haven't mechanism Bio-gas	26	52
Total		50	100

Source: Field Survey, 2022.

The installation of the bio-gas plant in the research region is shown in Table 4.16. 52 percent of respondents have not installed a bio gas plant, whereas 48 percent of respondents had bio gas but had stopped using it. The data indicates that in the research area, the majority of households do not have biogas plants installed.

4.3.7 Contribution of Dairy Farming to uplift Socio-Economic Status

The area's primary source of income is dairy. The primary source of income in rural areas is dairy farming. Dairy farming generates revenue that people can use to support the health and education of their children. The milk farmers now work together as a collective thanks to milk cooperatives. They are now more sociable as a result. Cooperatives play a significant role in helping farmers work together to solve common socioeconomic issues. They have undergone social and cultural development as a result of the income from their dairy farming, including improvements to their houses, toilets, television, education, and involvement in social work.

It creates people's future. The purchasing power and social awareness of people rises as a result of dairy revenue. Rural-urban links are supported by dairy farming. Dairy income is used in a variety of businesses. This study aims to describe the trend of dairy revenue spending in the studied area.

Table 4.17:
Expenditure of Dairy Income

SN	Expenditure of Dairy Income	No of Respondent HHs	Percent
1	Education	43	44
2	Food	31	62
3	Health	22	44
4	Physical Assets	45	90
5.	Buying of land and building housing	3	6

Source: Field Survey, 2022.

Note: Exceeding more than 100 percent due to diversification in income for various purposes.

Data show that 62 percent of respondents used their income mostly for food, whereas 44 percent of respondents used it for educational expenses. Out of 50 households, 44 percent of respondents were used their income for health treatment and 90 percent used their income from dairy for buying physical assets while only 6percent respondent were used their income for buying of land and building housing.

The results show how farmer diversify their dairy income for their household expenditure of the respondents and most of the farmers expenses for physical assets as well as food, education and health.

4.3.8 Contribution for Increasing Socio-Cultural Value

A farmer's relationship to wealth, status, and religion is based on having at least two dairy animals. People with a large number of milking animals made more money than others. Farmyard manure, which boosts production and soil texture more consistently than artificial fertilizers, is made from animal waste.

The Hindu religion requires the consumption of Panchamrit, a sacred milk product. Cow poo makes the kitchen holy and clean even before cooking begins. At Laxmi Puja, Janai Purnima, Baisakh Purnima, and Dhani Purnima in Mansir, cows are greatly revered, whilst the buffalo is a highly helpful animal due to its high protein content and pleasant milk flavors.

4.4 Role of Dairy Milk Cooperative

Nepal is a landlocked, agricultural nation in the world. There are a ton of insignificant and underprivileged farmers. They lack the resources necessary to move their transactions along. It is challenging to meet their needs. A procedure of distribution and collection is cooperative. It is crucial in helping to solve socioeconomic issues in rural areas. Milk Cooperative has induced the milk producers to band together.

They are now more sociable as a result. Cooperatives play a significant role in helping farmers work together to solve common socioeconomic issues. They have undergone social and cultural development as a result of the income from their dairy farming, including improvements to their houses, toilets, television, education, and involvement in social work. It creates people's future.

The purchasing power and social awareness of people rises as a result of dairy revenue. The primary aim of the dairy co-operative is to help farmers enhance productivity and generate cash income. The dairy cooperative must also help its members increase milk output by offering support and input services.. The Pach Pandab Milk Co-operative has developed a number of incentives for the milk producers, which served as the centre of attraction and motivation for fulfilling members' obligation with greater interest. The duties of the dairy milk cooperative in the case of dairy farming are listed below.

- i. The cooperative assists with milk collection from the community and pays milk prices in accordance with milk quality within a set time.
- ii. It offers rural farmers training, which is a crucial and helpful instrument for promoting dairy production.
- iii. It provides loans to farmers at a cheap interest rate and aids farmers in need of finance. People can borrow money from the cooperative to expand their dairy farms.
- iv. It fosters a culture of collaboration in society.
- v. It motivates people to cooperate and find mutually beneficial solutions to their shared socioeconomic issues.
- vi. It oversees the administration of insecticides for agricultural productions and daily cattle medications.

- vii. Farmers can organize and work together thanks in large part to cooperatives.
- viii. It aids in the marketing of milk and other dairy goods made by farmers.
- ix. All of the farmers in the rural region receive the necessary information regarding market prices from it.

In rural areas, cooperatives play a significant role in milk collection, processing, and marketing. Through a variety of rural economic activities, it helps to reduce poverty. Commentaries on the cooperative's impact on the production of dairy milk in the research area were requested from the respondents. According to respondents, the cooperative's function in the dairy industry. Respondent view on role of dairy milk cooperative is presented in following table below:

**Table 4.18:
Contribution of Dairy Milk Cooperative²**

Q. N.	Contribution of Dairy Milk Cooperative	No of HHs		Percentage	
		Yes	No	Yes	No
1.	Training provided by dairy milk co-operative	35	15	70	30
2.	Facilities of medicines and services	29	21	58	42
3.	Provided quality feed products to farmers	46	4	92	8
4.	Help to supply improved breed of cattle to farmers	19	31	38	62
5.	Offer any credit to the member	43	7	86	14
6.	Loan facilities with low interest to members	27	23	54	46
7.	Satisfy provided incentives to farmers by Co-operatives	31	19	62	38
Average Percentage				65.71	34.29

Source: Field Survey, 2022.

This investigation clarifies the function of cooperation in the study region respondents' opinions. Data show that 66.71 percent of respondents receive services from cooperatives and express a positive view of the role cooperatives play in the services they provide to farmers, while 34.29 percent of respondents believe that cooperatives' current

² For each question asked for 50 respondents are included for role of cooperative at 7 headings (questions) and finally average percentage for positive and negative response for the main heading as the role of dairy milk cooperative is calculated.

role needs to be improved because farmers do not benefit from the incentives and facilities that cooperatives offer.

4.4.1 Contributions of Dairy Co-operative in Family Economy

The open ended question is asked to respondents for role of dairy cooperative in socio-economic improvement of farmer and they expressed their own different view. According to respondents, milk The cooperative has forced the milk producers to band together. They are now more sociable as a result. By assisting in the creation of revenue sources, cooperatives play a significant role in helping farmers solve their common socioeconomic challenges. The primary source of revenue in rural areas is dairy farming, which also contributes to the education and healthcare of farmer's children. They have undergone social and cultural development as a result of the income from their dairy farming, including improvements to their houses, toilets, television, education, and involvement in social work.

Dairy income increases the purchasing power and social sense of people. For these socio economic improvement, Dairy co-operative has the main role by promoting dairy farming giving incentive, helps to reach market access along with various training for dairy farming. During the observation, the researcher found that:

Likewise, agro by-products, dung, urine and litters, which converts into farmyard manure maintains sustainable positive natural cycle that improves environment by producing and maintaining more greens and control pollution. Dairy farming creates employment to work at shed, feeding, housing etc. It also creates employment at dairy cooperative for technical work, accounting, managing etc. An employer is also a good communicator through which people are in contact to get services. At last, all these directly and indirectly make an effect to the society.

4.5 Dairy Cattle Management

In Nepal, one type of agricultural is dairy farming. It significantly raises the nation's income. Dairy farming offers good career opportunities. With the aid of the income from this occupation, they can improve their socioeconomic situation. They can make money in this industry. To make money from this line of work, dairy animals must be managed and cared for. Below are some crucial cattle care practices that were seen in the study area.

Feeding of Dairy Cattle :- Feedings of Dairy cattle have to be nutritious for maintaining cattle’s health and for producing disinfected milk. Green grass and hay straw need to be managed for them. They require enough pure water. Farmers in the study area feed their cattle with green grass hay and other agricultural waste. In the research area, farmers are drawn to planting grass trees for dairy cattle. On their property, they have a variety of nutrient-rich grasses planted. Farmers are also attracted to grazing cattle in nearby grazing area. There seems 92 percent respondents have provided good quality of nutrition for their cattle in field visit.

Shed Management: The location where dairy animals are kept is a shed. Dairy animals require a goat shed. The cow shed needs to be kept tidy and equipped with enough lighting, ventilation, and water management systems. Insects, mosquitoes, and flies shouldn't exist. In rural areas, the majority of farmers build traditional shelters for their dairy cow. Farmers are fashioned using readily accessible native materials like bamboo and wood. It lowers the expense for farmers. The kind, state, and amenities of the dairy cattle sheds in the study region are displayed in Table 4.16. For their dairy cattle, 68% of respondents used conventional sheds, while 32% used more contemporary styles of animal sheds.

Table 4.19
Dairy Cattle Management³

Checklists	No of HHs		Percentage	
	Good	Satisfactory	Good	Satisfactory
1. The qualities of dairy products	45	5	90	10
2. Breeds of dairy cattle reared by the farmers.	Local	Hybrid	Local	Hybrid
	9	41	18	82
3. Breeding Patterns	AI	Local	AI	Local
	22	28	44	56
4. Sheds type constructed for cattle	Traditional	Modern	Traditional	Modern
	29	21	58	42
5. Comfort, warmth, dryness of shed.	Better	Not Good	Better	Not Good
	31	19	62	38
6. Manure removing regularly to keep cattle clean.	Yes	No	Yes	No
	48	2	96	4
7. Use of substantial amount of bedding for cattle.	34	16	68	32

³ All of checklists are tabulated and analyzed in single table because description of each check list with table would be content lengthy. Due to language complexity, checklists (7-13) are revised in simple language without losing the sense of earlier (prepared in proposal) sentences.

Checklists	No of HHs		Percentage	
8. Minimizing injuries and easy stay for cattle in shed.	33	17	66	34
9. Visual contact with other cattle.	32	18	64	36
10. Adequate space for cattle for living.	41	9	82	18
11. Adequate feed store space	23	27	46	54
12. Sufficient milk feeding for calves	22	28	44	56
13. Nutritious food quality for cattle	46	4	92	8
14. Grazing area available for cattle	50	0	100	0
15. Veterinary Availability nearby	50	0	100	0

Source: Field Survey, 2022

As a result, it is discovered that the majority of people in the study region use traditional sheds for dairy animals. Other minimal requirements for shed management are fulfilled in most of farmer's shed as result shown in table above.

The Diseases of Dairy Cattle: If dairy animals are not given routine care, they might contract a variety of diseases. The dairy animals may endure suffering if they are not given routine care. Milk production is reduced in sick dairy animals. Farmers occasionally have to bear less when their dairy cows pass away. Farmers in rural Nepal lack scientific knowledge of the various dairy animal ailments. When illnesses strike, cattle perish. Therefore, dairy animals need frequent care. In a rural place, a dairy animal insurance facility is required. The country's enormous population of cattle is now not being met by the animal health services available. It is essential to motivate independent and auxiliary veterinarians to enhance animal health. The government could offer a credit facility to help rural areas create the first stock of medicines, vaccinations, and other necessary supplies. One veterinarian clinic and veterinary doctors have been identified in the study area, and it has been determined that all farmers in the area benefit from these veterinary services.

Breeding of Dairy Cattle: In Nepal's rural areas, the majority of farmers have adapted local breeds of cattle. The farmers raise conventional dairy cattle. But compared to contemporary hybrid dairy cattle, conventional dairy cattle produce less milk. In modern times, farmers in rural areas are drawn to artificial insemination (AI) for the breeding of cattle. AI increases milk production while decreasing several dairy cattle transmitted illnesses. AI aids in improving cow breed. However, there are not enough technicians or advanced breeding supplies in rural areas. The current breeding services ought to be affordable and accessible. It is necessary to increase awareness among rural area's farmers

about effectiveness of modern breeding of dairy cattle. According to data 44 percent of respondents were used to artificial insemination (AI) and 56 percent of respondents were used to local breeding of their dairy animals. Data implies that, farmers are not motivated with artificial insemination (AI). They said that AI practice cannot successful in this area. But they have been trying to apply artificial insemination (AI) in the study area.

4.6 Supporting Sector in Dairy Farming

Most businesses, including agriculture, have auxiliary areas. Any farmer cannot improve without help. The function of the supporting sector is crucial for the correct development of dairy farming. The various types of supporting industries are crucial. A variety of auxiliary sectors, including extension delivery services, marketing, and policy, support the promotion of this farming. For the development of the dairy industry, suitable policy design and implementation are required. Commercialization and marketing resources are equally crucial to the success of the dairy industry. To improve farming, farmers most urgently required training and incentives. Pricing milk appropriately is also necessary. It supports farmers and works to improve their economic circumstances in rural areas.

4.6.1 Transportation Facilities

Transport infrastructure is essential for moving milk and other dairy products. Collecting raw milk from a remote place is exceedingly challenging if there is no transportation infrastructure. Here, information regarding the modes of transportation in the research area is offered.

Table 4.20:
Means of Milk Transportation

SN	Means of milk Transportation	Population	Percent
1	On foot	23	46
2	By vehicle	27	54
3	Others	0	0
Total		50	100

Source: Field Survey, 2022

According to data, 46 percent of respondents were used their foot for milk

transportation and 54 percent were used any other means of transportation to collection of milk in the study area. The results explain that transportation facility is not efficient for all farmers yet.

4.6.2 Policy Formulation and its Implementation for Dairy Farming Development

The development of dairy farming requires the design of policies and their implementation. A sound policy supports the dairy industry and promotes its commercialization. The policy ought to benefit both farmers and consumers. In order to enhance milk production in rural areas, policy is crucial. The following information about government dairy policy is provided in the study area for farmers:

Table 4.21:

Information about Dairy Strategy

SN	Information of Dairy Strategy	Respondents	Percent
1	Informed to strategy	10	20
2	No informed to strategy	40	80
Total		50	100

Source: Field Survey, 2022

In accordance with the data, 20% of them were aware of the government's dairy policy, while the remaining 80 percent were not. The results show that most of the Farmers are unknown about the dairy policy of the government.

4.6.3 Marketing of Dairy Products

To buy and sell milk products, you need to have marketing facilities. Rural areas lack enough marketing infrastructure. Dairy farmers in rural areas don't know what their product is worth on the market. Households in the sample were questioned about market prices.

Table 4.22:
Info about Market Price

SN	Info about Market Price	Respondents	Percent
1	Info about Market Price	15	30
2	No info about Market Price	35	70
Total		50	100

Source: Field Survey, 2022

The information regarding market prices in the research region is displayed in the table's results. According to the statistics, 30 percent of respondents knew the market price of their product, while 70 percent were unaware of the market pricing in the research area. According to the report, the majority of farmers are not aware of market prices.

4.6.4 Milk Pricing

One of the key factors influencing the development of the dairy industry is pricing policy. For the dairy industry to succeed, a fair milk pricing policy is required. On the basis of the cost and quality of the milk, it is required to pay the farmers a suitable price for their milk. In Nepal, milk is produced at a very low cost, hence the price is quite low. Row milk should be paid according to its quality and milk production costs. The cost of milk has angered farmers in the study area. The respondents were questioned about milk prices.

Table 4.23:
Judgement on Price of Milk

SN	Judgement on Price of Milk	Population	Percent
1	Satisfied	15	30
2	Dissatisfied	35	70
Total		50	100

Source: Field Survey, 2022

The table's results display the farmers' feedback regarding the local milk price. Data show that 70 percent of respondents were unsatisfied with the price of milk in the research location, whereas 30 percent of respondents were satisfied with it. It has been shown that the majority of farmers in the research area were unhappy with the price of milk.

4.6.5 Extension Service Delivery

The provision of extension services aids farmers in commercializing their products and focusing on profit. Training, scientific knowledge transformation, skills development, and incentives are crucial tools for the dairy industry's success. In the research region, a cooperative has trained some of the farmers. To make dairy production more commercial and profit-driven, all dairy farmers must receive training.

Similar to this, the majority of farmers are ignorant of the technical aspects of their line of work. Therefore, in the studied field, technical knowledge transformation is crucial. Therefore, providing extension services is a crucial component of dairy industry development to boost employment.

4.6.6 Dairy Related Institutions

The development of the dairy industry in Nepal is being supported by numerous organized institutions. Institutions involved in the dairy industry play a specific role in commercializing the industry. The primary responsibilities of these institutions include registration of dairy enterprises, development of cooperative sector dairies, monitoring and evaluation of dairy development initiatives, maintenance of coordination between the public and private sectors, etc. Dairy Cooperatives, Dairy Development Cooperation (DDC), National Dairy Development Board (NDDDB), Department of Livestock Services (DLS), Department of Food Technology and Quality Control (DFTQC), Department of Cooperatives (DOC), National Cooperative Development Board (NCDB), and Private Sector are some of the significant dairy-related institutions in Nepal.

4.7 Opportunities and Constraints in Dairy Farming

Dairy production has been hampered by a variety of multifaceted, production system-specific constraints related to genotype, feed resources and feeding systems, access to services and inputs, low adoption of improved technologies, marketing, and a lack of clear policy support for the sector. As a result, there are both many opportunities and constraints. For additional initiatives, it is essential to characterize the current conditions in regard to productivity and health potential and constraints in a particular location. Although there are many issues and limitations impeding the growth of the dairy industry in the studied area.

4.7.1 Opportunities in Dairy Farming

In general, the following list of significant prospects is provided:

- i. Possibilities for using local resources, creating jobs, feeding livestock, using medicines, and finding sources of income.
- ii. Using traditional knowledge and skills to address the issue of food insecurity and malnutrition in rural areas.
- iii. Growing milk product demand presents profitable potential for dairy farming.
- iv. Demand for milk and milk products increases as the tourism industry expands.
- v. Government subsidies have created a favorable environment for this industry.
- vi. The dairy industry aids in the production of biogas from animal waste and urine. In addition to saving money on LP gas, it lessens reliance on forests for residential energy.
- vii. Agriculture sectors receive organic fertilizer from the dairy sector. Production of organic goods is aided. the potential to boost productivity.
- viii. creation of dairy cooperatives in both urban and rural areas. Milk and dairy products are produced and supplied by dairy cooperatives, which are significant distribution routes. Development of dairy farming is aided by private sector participation and cooperation between the public sector, cooperatives, and the private sector.
- ix. Another chance for dairy production in Nepal is to create a favorable climate. It promotes the development and production of dairy cattle.

In particular, the status of women empowerment has been increased in the study as an outcomes of the dairy farming. Women are getting self-employment and earning opportunities from the dairy farming. The study found that about 52 females are studying higher education, 10 female are actively involving in dairy farming, 20 female respondents got membership from social institutions and seven female respondents are actively involving in local politics. During the KII, some of the informants happily expressed that:

The traditional gender roles in rural societies are being challenged as women venture into the domain of livestock rearing. Previously limited to household chores, these women have now taken on the responsibilities of managing and raising cows and buffaloes.

One of the most significant outcomes of women engaging in livestock rearing is the boost to household finances. With the income generated from selling milk, dairy products, and even livestock itself, these women contribute significantly to meeting the necessary expenses at home. An unintended but positive consequence of women's involvement in the cow and buffalo farms is the decrease in the number of individuals seeking work abroad.

The rise of women-led cow and buffalo farms in rural villages signifies a significant shift in gender dynamics and economic empowerment. Through their determination and hard work, women are reshaping their lives and communities.

4.7.2 Constraints in Dairy Farming

Despite the numerous prospects, dairy farming and cattle development are subject to a number of restrictions. To promote the growth of dairy farming in rural regions, there is limited supply of the necessary inputs, such as medications, vaccines, and pasture seeds and other planting materials, equipment, technical knowledge, and better dairy stock. According to what is described below, respondents in the research region highlight a variety of dairy farming prospects and issues.

- i. High cost of labor, high transportation costs, high cost of dairy equipment, high tax load, high cost of feed and medication
- ii. There are no long-term livestock development policies in place, and dairy farming has received minimal research focus.
- iii. The collection and supply of milk and dairy products are challenged by the strike.
- iv. Dairy farming is a business that lacks capital. There is little draw for banks or other financial institutions to invest in rural areas.
- v. Lack of qualified veterinary professionals to treat dairy cattle, pricey service charges, a lack of human resources and technological support in the private sector, and insufficient fodder supplies for dairy cattle are all issues.
- vi. Low cost of manufacturing relative to the price of milk and dairy products. Milk holidays, inadequate marketing infrastructure, and middleman issues
- vii. The majority of the dairy cattle in the area are of a high cost breed.
- viii. lack of market price information and absence of regulation by the relevant government entity or agency.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

The study's important points are summarized. This study aims to quantify and assess the contribution of dairy cattle rearing to the rural subsistence of small-scale farmers in Madhyabindu Municipality-4 Nawalpur district. The majority of the farmers in the study area have benefited by raising dairy cattle. The purpose of this study is to determine the role that dairy cow farming plays in rural areas' livelihoods as well as the function that milk producing cooperatives have in promoting dairy cattle farming. The core data for this study was gathered using key informant, survey, interview, and observation techniques. Newspapers, journal articles, and other pertinent materials were researched for the secondary data. The study's summary includes the following key findings.

- i. The vast majority of homes don't have biogas plants installed inside of them. It is essential to discuss the significance of the bio-gas plant in the research domain.
- ii. In the study area, farmers are active in the livestock and agricultural sectors. They produce livestock and crops together so that farmers can successfully expand their organic production.
- iii. For rural poor people, women, and those who have little acreage for other agricultural operations, dairy farming is a particularly beneficial employment. It has made a significant contribution to the economic independence and self-reliance of women and other underprivileged communities.
- iv. The importance of cooperatives in enhancing the socioeconomic conditions of rural residents is widely acknowledged. It has aided rural residents in obtaining employment, generating income, reducing poverty, improving their health, and facilitating credit flow.
- v. In the study region, jobs are available for people to feed dairy cows, clean animal barns, make dairy products, market, and transport milk and milk products.
- vi. Farmers profit from cooperatives in a variety of ways, and the study area's rural farmers have access to training and financial options thanks to cooperatives.

- vii. Dairy farmers believe that they profit more from the income from dairy than from the income from crops in the study area.

5.2 Discussions of Findings

Dairy farming is a crucial component of rural life and exemplifies the idea of a cooperative approach for achieving farmers' shared objectives. The dairy cooperative brings order, harmony, and usefulness to society. The dairy cooperative aids in raising the farmers' understanding of health, cleanliness, and education.

Additionally, it supports the social empowerment of women and the enhancement of rural residents' socioeconomic conditions. It has benefited rural residents in terms of employment, income generation, poverty reduction, health, and credit flow.

The study's conclusions demonstrate that dairy farmers fared relatively better in terms of creating jobs, ensuring food security, earning a living, and having assets. In addition to being a major contributor to household income creation, food and nutrition security, smallholder dairy farming also serves as a source of revenue for households.

Dairy farming contributes to the diet's requirements for protein and energy, helping to fight malnutrition and a variety of nutritional deficiencies. Milk and milk products satisfied the need for household food supplies and enhanced family nutrition.

Smallholder farmers' livelihoods depend heavily on dairy farming. For rural poor people, women, and those who have less land available for other agricultural operations, dairy farming is a particularly beneficial employment. It has made a significant contribution to the economic independence of women and other resource-poor communities.

5.3 Conclusion

A crucial industry for improving the standard of living in the study region is dairy farming. It generates a variety of opportunities, including those for employment, income production, and the alleviation of poverty. As a result, rural residents in the study region have seen an improvement in their level of living. It is well recognized that dairy farming helps to reduce poverty and offer job possibilities. Dairy farming has given all family members job opportunities in the absence of other work. Dairy farming is a very essential income-oriented employment for those who have little land, no land, or are too poor to

engage in other agricultural activities. Dairy farming helps women, underdeveloped communities, and poor populations in that area become economically independent and self-sufficient. In the research area, dairy farming has contributed to fewer food shortage and malnutrition issues. The necessary food products have been provided by it. For people to maintain their physical and mental development, milk and dairy products are particularly beneficial. People in the study area now have more purchasing power thanks to it. Dairy money can be used for housing, animal sheds, property purchases, education, health, food, and savings. Agriculture and dairy farming are connected industries.

Agriculture receives compost fertilizer from dairy farming, and the cow industry receives the necessary crop leftovers from agriculture. In the research region, the cooperative's function is crucial for production, collection, processing, and marketing. The growing of dairy products contributes to improving the standard of living in rural areas. It significantly contributes to the socioeconomic development of rural residents in the research region. Dairy farming makes a significant contribution to improving the economic situation of landless women and the destitute in rural areas. In conclusion, research indicates that dairy farmers fared significantly better in terms of creating jobs, ensuring food security, earning a living, and having assets. Dairy farmers show strong signs of being more resilient to food shortages and have a high possibility of improving their socioeconomic position, as seen by, among other things, a lower reliance on nonfarm sources of income, greater housing quality, and ownership of more assets. Smallholder dairy farming plays a significant role in household food and nutrition security, household resilience, and revenue generation.

Therefore, it is crucial that initiatives for dairy development take into account the crucial part that dairy farming plays in smallholder farmers' lives and assist the dairy sector from a far wider perspective than is currently the case. It is vital to modify the old farming system in order to increase the income from dairy farming. For dairy farming to thrive properly, commercialization and diversification are required. Similar to marketing facilities, the dairy industry's development can be tracked by these indicators. In order to increase the income from dairy farming, administration of marketing facilities, technical knowledge, and the construction of veterinary loan facilities are required.

5.4 Recommendations

Cattle farmers of Pach Pandab Milk Producer Cooperative were selected to study contribution of dairy cattle farming in the rural livelihood. For rural residents to receive their fundamental needs, dairy farming is crucial. Some of the proposals are made as follows in order to position dairy farming for commercial employment.

- i. It is compulsory to increase the price of dairy product with changing price of dairy inputs for benefit of dairy farmers which attract people in the cattle farming and may help to reduce problem of poverty in the country..
- ii. To cope with unemployment problem, Government should focus on dairy cattle farming with low interest loan for who want to involve in dairy farming profession.
- iii. Subsidies in dairy farming should be provided for targeted group of dairy cattle farmers and targeted group has to be benefitted from such type of subsidies.
- iv. Government should focus on training for those farmers who want to adopt dairy farming as income generating profession for their better livelihood.
- v. Dairy farming requires the change of traditional farming systems to commercialization and diversification in order to earn higher income.

5.5 Future Direction

This study only explores the contribution of dairy farming on farmers' livelihood as case study of Panch Pandab Dairy farm taking small sample size. This study cannot be generalized for all places, climate, and geography of Nepal. In the future work can study in different location at a time having various geography and climate with large sample size including the objective of dairy farming prospectus and problem in different geographical and climatic condition in Nepal. The future work can also study importance of agronomic aspects of crop production on dairy farms.

REFERENCES

- Acharya, Y. & Khadka, S. (2017). *Growth of livestock sector in Nepal: A perspective on agriculture perspective plan*. Proceedings of the 10th National workshop on livestock and fisheries research in Nepal.
- Baikie, P. M., Camron, J. & Seddon J. (2000). *The Struggle for basic needs in Nepal*. Adroit Publishers.
- Bayer, W. & Kapunda, L. B. (2006). *Dairy cattle for poverty alleviation in Southern Tanzania*. Proceeding of the conference on International Agricultural Research for Development.11-13. <http://www.tropentag.de/2006/abstracts/full/415.pdf>
- Bhattarai, S. P. (2008). *Dairy development in Nepal*. <http://tinynepal.blogspot.com/2008/06/dairy-development-in-nepal.html>
- Carney, D. (1998). *Sustainable rural livelihoods: what contribution can we make?* London, for International Development.
- CBS (2021). *Preliminaries Report of population survey 2021*. Government of Nepal, National Planning Commission.
- Chaudhary, B. & Upadhyay, M. (2013). Socio-economic Impacts of Dairy cooperative. *Economic Journal of Development issues*, 3(4), 34-48.
- Commercial Agriculture for Smallholders and Agribusiness (CASA). (2020). *Dairy Sector Strategy – Nepal*. CASA NEPAL Country Team.
- Dahal, D. S. (2011). *Impact of Climate Change on Livelihood and Biodiversity in Rural Communities: A Case Study of Siddhi Ganesh and Neupane Community Forestry User Groups of Sindhupalchowk District of Nepal* (Unpublished MA Thesis Submitted to Tribhuvan University). Central Development of Rural Development.
- Dairy Development Corporation, (2020). *Progress Report -2020*. Dairy Development Corporation, Lainchaur, Nepal.
- DLSO (2021). Yearly progress report, District Livestock Service Office, Nawalpur.

- Ellis, F. (2000). *Rural Livelihoods and Diversity in Developing Countries*. Oxford University Press.
- FAO (1996). *State of food and Agriculture. Food and Agriculture Organization of the United Nations*. <https://www.fao.org /3/w1358e/w1358e.pdf>
- FAO (2010). *Food and Agriculture Organization of the United Nations. Dairy Sector Study of Nepal*. <http://nepalagritech.com.np/>
- FAO (2019). *Milk production across Countries*. <https://www.nddb.coop/information/stats/across>.
- Giri M. (2008). *Cultural and Human Factors in Rural Development Corporation Milk Collection Activity on Income Rural Milk Product*.
- Ghosh, A. K. & Maharjan. K. L. (2001). Development of Dairy Cooperative and Its Impacts on Milk Production and Household Income: A Study on Bangladesh Milk Producers' Cooperative Union Limited. *Journal of International Development and Cooperation*, 10(2), 193-208.
- GoN (2064). *Dairy Development Policy of Ministry of Agriculture*. Government of Nepal.
- Hossain, M. S., Shamsuddin, M., Alam, M. M., Goodger, W. J., Bari, F.Y., Ahmed, T. U., Hossain, M. M. & Khan, A. H. M. S. I. (2005). Participatory rural appraisal to identify needs and prospects of market-oriented dairy industries in Bangladesh. *Tropical Animal Health and Production*, 39, 567-581.
- Kothari, C. R. (2000). *Research Methodology: Methods and Techniques*. Wishwa Prakashan.
- Lwelamira, J., Binamungu, H. K. & Njau F. B. (2010). Contribution of Small Scale dairy farming under zero-grazing in improving household wale fare in Kanyanga ward, Karagwe district, Tanzania. *Livestock Research for Rural Development: Institute of rural development planning*, 22 (2).
- Madhyabindu Municipality Office (2078). *Municipality Profile of Madhyabindu Municipality, Nawalpur District*.

- Minja, M. G. (2007). *The contribution of smallholder dairy cattle production to household food security in Kilombero district. Tanzania* [Unpublished MSc Dissertation at Sokoine University of Agricultural, Morogoro, Tanzania.].
- Ministry of Agricultural Development [MOAD]. (2013). *Statistical Information on Nepalese Agriculture*. Government of Nepal. Agribusiness Promotion and Statistics Division.
- Ministry of Agricultural Development [MOAD]. (2015). *Statistical Information on Nepalese Agriculture*. Government of Nepal. Agribusiness Promotion and Statistics Division.
- Ministry of Agricultural Development [MOAD]. (2016). *Statistical Information on Nepalese Agriculture*. Government of Nepal. Agribusiness Promotion and Statistics Division.
- Ministry of Agricultural Development [MOAD]. (2019). *Statistical Information on Nepalese Agriculture*. Government of Nepal. Agribusiness Promotion and Statistics Division.
- Ministry of Finance (2015). *Economic Survey, Fiscal Year 2014/2015*. Government of Nepal.
- Ministry of Livestock Development (2016). *Livestock Statistics of Nepal*. Government of Nepal. Planning, Monitoring and Evaluation Division.
- Ministry of Livestock Development (2017). *Livestock Statistics of Nepal*. Government of Nepal. Planning, Monitoring and Evaluation Division.
- Ministry of Health and Population [MoHP]. (2021). *National Census Report*. Government of Nepal.
- Mwakalobo, A. & Shively, G. (2001). *Food Security and Natural Resource Management in Developing Countries*. Staff Paper No 1-12, Department of Agricultural Economic: Purdue University, West Lafayette Indiana.22pp.

- Mutagwaba, C. M. D. (2005). *Sustainability of school milk programmes*. A paper presented at the first Eastern and Southern Africa school milk conference. 27 September, 2005. Kampala, Uganda. [<http://www.fao.org>] site visited on 27/4/2010.
- Panta P. R. (2010), *Social Science Research and Thesis Writing*. Buddha Academic Publisher and Distributers Pvt. Ltd., Kathmandu Nepal.
- Pach Pandab Milk Producer Cooperative (2078). *Progress Report, 2078*.
- Sapkota, M. R. (2010). *Dairy Sector Study of Nepal*. Food and agriculture Organization of the United Nations UN Complex, Pulchowk, Nepal.
- Shrestha, R. G. (2006). *Quality Milk Collection, Constraints and approach for stakeholder of National*. Dairy Development Board, Harihar bhawan, Pulchowk.
- Shingh. S, Kalwar, C.S., Poudel, S. Tiwari, P. & Jha, S. (2020) A Study on Growth and Performance of Dairy Sector in Nepal. *International Journal of Environment, Agriculture and Biotechnology*, 5(4).<https://dx.doi.org/10.22161/ijeab.54.36> 1154
- NARC (2016). *National Agricultural Research Council Report*. Animal Breeding Division. <http://narc.gov.np/animal-breedingdivision/>
- Neupane, N., Neupane, H. & Dhital, B. (2018). A socioeconomic view of status and prospects of goat farming in rural areas of Nepal. *J. Inst. Agric. Anim. Sci*, 35:1-8
- NRB (2018). *Monetary Policy 2018/19*. Nepal Rastriya Bank.
- Tiwari, P. & Singh, S. (2020). Gender Inequality in Nepalese Agriculture: Issues Concerning Sustainability and Food Security, *International Journal of Environment, Agriculture and Biotechnology*, 5(2):451-458, DOI: <https://dx.doi.org/10.22161/ijeab.52.19>
- RAN (2015). *Benchmark survey on quality of raw and processed milk in Nepal, final report, RFP no.: NDDB/C/RFP/2072-73/01, Right to Access Nep*
- Upadhyay, N., Khanal, B., Acharya, Y. & Timsina, K. P. (2021). Nepalese legal standard of milk and common milk products and its implications. *Journal of Agriculture and Natural Resources*, 4(2), 284-294. DOI: <https://doi.org/10.3126/janr.v4i2.33924>

- Upadhyaya, R.M., Joshi, D. D. & Thapa, T.B. (2001). *History of dairy development in Nepal*. National Dairy Development Board, Nepal, 5-7.
- Urassa, J. K. & Raphael, E. (2002). *The contribution of small scale dairy farming to community welfare's case study of Morogoro municipality, Morogoro, Tanzania*. [http://www.fiuc.org]site visited on 18/3/2010.
- Utiger, C., Romney, D., Njoroge, L., Staal, S., Lukuyu, B. & Chege L. (2000). *Nutrient flows and balances in intensive crop-dairy production systems in the Kenya highlands*. In Proceedings: The 3rd All Africa Conference on Animal Agriculture and 11th Conference of the Egyptian Society of Animal Production, 6-9 November, 2000, Alexandria, Egypt. Pp89.
- Uotila M. & Dhanapala, S. B. (1994). Dairy Development through Cooperative Structure. *World Anim. Rev.*, 79 (2):16-22.
- Worldometer (2020). *Nepal Population 2020*. <https://www.worldometers.info/world-population/Nepalpopulation>

APPENDICES

Appendix A: Survey Questionnaires

Contribution of Dairy Farming on Livelihood: A Case Study of Madhyabindu Municipality,
Nawalpur

Name of Dairy Co-operative:Established:

Date: - /././2022

Time:-.:.....

I:- Demographic and Socio-Economic Status of Respondent

1.Information about Respondent

Respondent Name:

Caste/Ethnic Group:

Sex:

Age:

Education:

Religion:

Occupation:

2.Information about Respondents' Family Members

Family members	Relation to the HH Head	Sex		Age	Education	Marital Status	Occupation	Remarks
		M	F					
1								
2								
3								

3. Land Holding Size of the Sampled Households

Group	Land size in Katta	Percentage
≤ 10 Katta		
10-20 Katta		
20-30 Katta		
> 30 katta		

4. How many months does you agricultural yield sufficient?

- A. 1-3. B. 3-6. C. 6-9. D. 9-12. E. Saving for sell

5. How many livestock do you have?

S.N.	Name(types)	Number	Remarks
1	Buffalo		
2.	Cow/Ox		
3	Goat/sheep		
4	Cock/hen		
5	Pig		
6	Others		

6. Main source of Income

- a) Crop Farming () b) Dairy Cattle Farming () c) Business ()
d) Services e) Wage Labour

II. Dairy Cattle Farming for livelihood

(Survey by Structure Questionnaires for Dairy Cattle Farmer)

7. Are you a committee member of Dairy milk cooperative? Y/N.....

8. How much milk sell you daily?

A. Supporting Sectors for Dairy Farming

9. Are you satisfied with the price of milk?

- (A) Yes (B) No

10. Have your knowledge about market price?

- (A) Yes (B) No

11. What is the means of transportation of milk?

- (A) Bicycle (B) On foot (C) Others

12. Have you any information about livestock policy of government?

- (A) Yes (B) No

13. Have your knowledge about market price?

(A) Yes (B) No

14. Have you any technical knowledge about dairy cattle?

(A) Yes (B) No

B. Socio-economic Contribution on livelihood of Farmer

15. Do dairy cattle farming generate employment opportunities for your family?

(A) Yes (B) No

16. Are you satisfied with your occupation?

(A) Yes (B) No

17. Do you think poverty has been reduced by involving in this occupation?

(A) Yes (B) No C. Do not know

18. Yearly average income?

Income Level	
i. Below 50000	ii. 50000 to 100000
iii. 100000 to 200000	iv. More than 200000

19. Mainly for what purpose do you use of dairy income?

(A) Food (B) Education (C) Health
(D) Buying Physical Asset (E) Buying land and Housing

20. Have your installation bio-gas from animal farm?

(A) Yes (B) No

21. What types of role of this occupation are you found to woman empowerment and self-reliant?

(A) High Contribution (B) Little Contribution (C) No Contribution

C. Role of Cooperatives

22. Have you got any kinds of training from Co-operative?

(A) Yes (B) No

23. Have you got any facilities of medicines and services for dairy cattle from your Co-operative?
 (A) Yes (B) No
24. Do you find supply quality feed products from your co-operatives?
 (A) Yes (B) No
25. Do you get help getting improved breed of cattle to farmers from co-operatives?
 (A) Yes (B) No
26. Do you get any credit from your co-operatives?
 (A) Yes (B) No
27. Have you got loan facilities from Co-operative?
 (A) Yes (B) No
28. Do you satisfy incentives provided to farmers by Co-operatives?
 (A) Yes (B) No
29. What types of role of Co-operative are you found?

Many thanks for your kind cooperation.

Appendix B: Key Informant Interview Guideline

1. What are the benefits have you gained from dairy farming?
2. How does Dairy farming help to reduction the problems of food shortage?

3. Have you realized increased in crop production by using cattle manure instead of chemical fertilizer? What are the benefits of using cattle manure instead of chemical fertilizer?
4. Is the income from this occupation enough to meet of your families need?

5. After involving this sector, what type of improvement felt on your family' overall development?

6. What types of Contribution of dairy cattle farming for increasing Socio-Cultural Value?
.....
7. What are the problems and prospectus of dairy cattle farming in the area?
.....
8. If you have seen, what sorts of attempt you have done to promote and enhance Dairy Cattle Farming?
9. Based on your knowledge, what are the suggestions that are better to promote and develop dairy cattle farming in this area as well as national level in Nepal?
.....

Appendix C: Observation Checklist⁴

Observed on	Checklists	
1. The qualities of dairy products	<input type="checkbox"/> Good	<input type="checkbox"/> Satisfactory
2. Breeds of dairy cattle reared by the farmers.	<input type="checkbox"/> Local	<input type="checkbox"/> Hybrid
3. Breeding Patterns	<input type="checkbox"/> AI	<input type="checkbox"/> Local
4. Sheds type constructed for cattle	<input type="checkbox"/> Modern	<input type="checkbox"/> Traditional
5. Comfort, warmth, dryness of shed.	<input type="checkbox"/> Good	<input type="checkbox"/> Not Good
6. Manure removing regularly to keep cattle clean.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
7. Use of substantial amount of bedding for cattle.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
8. Minimizing injuries and easy stay for cattle in shed.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
9. Visual contact with other cattle.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
10. Adequate space for cattle for living.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
11. Adequate feed store space	<input type="checkbox"/> Yes	<input type="checkbox"/> No
12. Sufficient milk feeding for calves	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
13. Nutritious food quality for cattle	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
14. Grazing area available for cattle	<input type="checkbox"/> Yes	<input type="checkbox"/> No
15. Veterinary Availability nearby	<input type="checkbox"/> Yes	<input type="checkbox"/> No

⁴ These checklists are prepared based on international context checklists found in Websites and simplify complex language in understanding level without losing sense of the sentence

Appendix D: Map of the Study Area

