

# Women's Empowerment in Dairy Value Chains in Punjab, Pakistan

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**Abstract:** Empowering women in both formal and informal dairy value chains is critical to the development of the dairy sector. Women play a key role in the dairy sector and their important role in the development of the sector cannot be denied. Pakistan is dominated by the smallholder dairy sector, where women participate more than men in informal dairy value chains. Lack of credit, number of animals, lack of land, awareness, decision-making power, socio-cultural norms are major barriers for women dairy farmers to progress in formal and informal dairy value chains. Data on informal dairy value chains were collected through multi-stage sampling technique from three hundred women dairy farmers at household level from Sargodha and Hafizabad districts. Five focus group discussions were conducted with women dairy farmers involved in formal dairy value chains. The findings of the study revealed that the participation of women in informal dairy value chains to support their families is higher than in formal dairy value chains. Government and Non-government organizations(NGOs) should work together for the development of this dairy sector.

**Keywords:** Dairy Value Chains; Dairy Sector; Women Empowerment; Women Involvement

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## Introduction

Empowerment is a multifaceted concept used in many fields of social science (Sociology, Psychology, Education, Economics) and at different levels (individual, group, and community) to help people gain control over their lives (Page & Czuba, 1999). The word empowerment is a complex concept and was first used in the 17th century, and most dictionaries show a pre-twentieth-century definition of the word (Mandal, 2013). The journey of women's development began in 1975 after the First World Conference on Women in Mexico City. After that, other women's conferences started. The World

Conference on Women in Beijing in 1995, where 189 countries marked a turning point for the global gender equality agenda, pledged to provide equal rights and opportunities to all women and girls. Even after 25 years, gender inequality exists worldwide, especially in developing countries and rural areas (Duflo, 2012; Jaya Chandran, 2015). Since Pakistan's founding, women have been denied access to their fundamental liberties. Compared to males, they are not given any prestige or chances to develop as people (Bushra & Wajaha, 2015; Khan, Yusoff, and Khan, 2014).

Gender discrimination has traditionally existed in rural areas of Pakistan and their role in household income is not properly recognized. Women have less decision-making power than men regarding livestock-related activities in the dairy sector (Masood & Jamil, 2015; Ogdand & Hembade, 2014; Bain et al., 2018). The lives of women and their household earnings can be significantly improved by empowering women in the dairy industry (Khan, et al, 2015).

The growing need for healthy milk and milk products results from urbanization, Fluctuations in dietary patterns, population growth, and consumer demand. Along the dairy value chain, increased consumer demand for more milk has generated new job possibilities and income-generating enterprises (Mwambi et al., 2021, Sufyan, and Khan, 2020). Distance is a significant barrier in the dairy sector that prevents most dairy farmers from selling their whole milk to urban consumers. Although there is a significant difference in the milk price between rural and urban markets, distance is a significant factor in determining the price differential between fresh milk and milk products between rural and urban markets (ILRI, 2008, Khan, Nazam, Anjum, Khan, 2015).

The value chain refers to all the steps in primary milk production, processing, and reaching the final consumer. Value chain, according to Porter, is a term used to describe the sequence of tasks involved in producing, manufacturing, and selling a finished good (Hines, 2004). Value chain studies are crucial for describing animal husbandry's complex relationships and networks. The value chain in animal husbandry is essential for the growth of people living in rural areas (Rich et al., 2009; Naz, et al, 2019; Israr et al, 2018).

According to Zia et al. (2011), there are two types of chains called informal and formal value chains; milk is supplied to consumers through these chains. The key similarities are the supply chain setup, handling methods, sterility, and subsequent packaging (Waseem et al, 2013).

Making wooden desks for school children is also an example of a value chain that starts with the tree and ends with the wooden desk. The value chain partly shapes market access, and producers and buyers share much knowledge there. The series of tasks necessary to create a good or deliver a service is known as a value chain (Schmitz, 2005). Value chain research helps to understand distribution, linkages and benefits, and the complexities of producing and marketing products in developing countries (Rich et al., 2011; Isa et al, 2019).

A line of dairy farming successfully regulated in whole or in part through checks and licensing is known as a formal value chain. 30% of milk reaches the market from the formal chain, and dairy products are strictly checked and monitored. Both men and women participate in formal and informal value chains to market their milk. The informal value chain in the dairy industry is where unprocessed milk products are distributed. Farmers are mostly paid directly in cash, have less negotiating power, and are less engaged in marketing (Alonso et al., 2018; Isa and Palpanadan, 2020).

Large-scale corporations are in the formal value chain, and about eleven large processing plants operate in Pakistan. These milk processing companies encourage their dairy farmers to adopt new

practices that increase their productivity. In Pakistan's rural areas, companies like Nestlé and Engro Foods have established a structured system of milk collecting centers, where the milk is gathered and sent to other sub-centers. Milk is collected from dairy farmers, and farmers who supply up to 40 liters of milk per day are called commercial farmers. Pure milk is hardly available to urban consumers as the quality of raw milk is not good, as the shelf life of packaged milk is very limited due to adulteration (Isa and Lutiff, 2018). The most common additives to pure milk are the addition of water, ice, and corn flour to increase volume and whiteness and to prevent the milk from spoiling from heat. Nestlé conducts forty-one tests before processing raw milk (De Jong, 2013, Yusoff, Khan, et al, 2013). Tahir et al. (2019) also stated that the milk production system in Pakistan is influenced by farm locale, herd size, and farm practices. The absence of cold storage facilities leads to loss of milk as milk is traditionally transported long distances after production in extreme weather conditions. Two dairy companies, particularly Nestle and Engro, have played an essential role in collecting and marketing high-quality milk. Both companies installed chillers at the village level to collect and store high-quality milk. These companies organize various pieces of training for the farmers to enhance their knowledge of best farm practices and meet the growing demand for milk. Nestlé installed 2100 and Engro 1250 chillers to collect safe and high-quality milk from farmers' doorsteps at the village level for successful marketing.

According to Burke et al. (2004), the informal dairy value chain connects millions of urban customers with primarily small-scale, and distributed through different levels of small, medium, and large retailer's dairy farmers despite having low levels of technology and setup. Milk is collected, transported known as '*Dhodhi*.' Specialized retail milk establishments are used to sell milk to end users.

Pakistan has the third largest dairy industry in the world, but like other developing countries, the agriculture sector in Pakistan is dominated by small farmers. Milk is collected and marketed primarily through informal value chains with minimal excellent chain infrastructure. Absence of proper pricing mechanisms, quantity and quality of milk in these chains are a significant hindrance to the growth of this industry (Godfrey et al.,2019)

Small livestock holding is portable for poor and small households as small livestock rearing requires less investment and is a fixed asset for women compared to land as it is easier for women to acquire. Women usually own only the livestock they receive as dowry from their parents after marriage, usually small dairy animals (Bravo-Boman, 2000).Empowerment significantly affects the actual status of women in society. Every member of society will feel the advantages of women's emancipation because women make up half of the population and affect society (Shooshtari et al., 2018). However, Men have more decision-making power and control over dairy income than women and create more assets than women (Farnworth et al.,2015).

Milk has a concise shelf life. Prompt receipt of milk from farmers and access to transportation are vital requirements to market milk without spoilage properly. Rapid cooling is the primary way to preserve high-quality milk. A need for storage and transportation infrastructure frequently prevents fresh milk from reaching the market. Up to 20% of milk is wasted due to a lack of cold chain non-availability of proper cooling, chillers, and storage methods (Aziz &Slivia, 2008).

Small farms depend on intermediaries for market access because they are not linked to formal marketing networks, which results in poor profits and the exploitation of small dairy producers. Due to limitations on their mobility, women are less involved in the formal dairy value chain than males are in selling milk (Munawar et al., 2013; Oxfam, n.d)

The cost of milk is less expensive in the informal value chain than packaged milk, and the big *dhodhis* have largely absorbed changes in milk costs in rural regions (Godfrey et al., 2019).

The milk of dairy animals, especially cow and buffalo milk, is of great importance to the economy of Pakistan. Cows, buffaloes, goats, and sheep are domestic animals, and farmers generally depend on commodities like milk and meat for a better life. There are many dairy breeds of farm animals available in the country. Nilli-Ravi and Kundhi are the buffalo breeds Red Sindhi, Cholistani, and Sahiwal are the nationally popular cattle breeds. These breeds are famous for their vast potential. The average herd of farm animals is 1 to 10, usually owned by small farmers (Ashraf et al., 2013; Afzal, 2010).

Farmers living near the market may have the opportunity to sell their milk regularly compared to farmers living further away from the market. The essential transport services for dairy products are women's backs, animal transport, motorcycles, and public buses. Most of the marketed milk is adulterated with water or other ingredients, and adulteration is high due to the scarcity of milk in the dry season. Significant constraints for milk marketing include long distance to market, seasonality of milk and milk products, the short shelf life, and the absence of milk cooperatives. A large animal population, extended indigenous knowledge of animal husbandry, and a high proportion of women in milk production are among the opportunities for the growth of the dairy sector. Herd management requires more farmers than other livestock activities, such as animal watering, grazing, care of small animals, and animal health maintenance. Problems in dairy value chains vary from location to location and across production systems. Inadequate fodder sources, inexperience with artificial insemination, lack of income, and limited health facilities are significant constraints among dairy farmers. In this background, small or landless farmers usually suffer more as they cannot achieve their goals, and thus their standard of living declines. Poor dissemination of information from information sources is also a significant reason for the need for more awareness and low adoption of new and recommended practices (Arif et al., 2013; Ahmed et al., 2004). Aggressive changes are needed to make the sector flourish by organizing training to encourage farmers and their families, especially women, to participate in these activities (Leitch et al., 2014).

In Pakistan, women are essential to the dairy value chain networks, particularly at the smallholder level. Empowering women is critical to the dairy value chain's future as it provides women with sustainable livelihoods. It helps women make decisions for themselves, alleviate poverty, and generate income, inclusive growth, and economic independence. In order to strengthen women socially and economically and to bring about lasting change in their lives, the dairy industry is crucial. Poor health, rearing, and production of dairy animals, lack of decision-making power, limited training opportunities, and inadequate institutional support are the main barriers that prevent women from growing and reaping maximum returns for their efforts. The main aim of the study was also to assess the women involvement in dairy value chains. Empowering women in the dairy sector can have a major positive impact on women's lives and their household incomes. Exploring socioeconomic barriers to women's empowerment in dairy value chains was the study's second main goal. This study will be of great value to those directly or indirectly involved in research on women empowerment and their role in dairy value chain activities.

## 1. Materials and Methods

### 2.1 Study Area and Sample

Data on informal dairy value chains were collected from three hundred women rearing their own animals at the household level for dairy purposes. As Punjab is famous for dairy related activities due to its fertile lands, a sample of three hundred dairy farmers from two districts of Punjab were selected for this study.

District Sargodha and Hafizabad were selected for the study area through multi-stage random sampling technique. A sample of three hundred dairy women farmers was selected through purposive sampling to obtain rich data from the respondents. The nature of the study was descriptive.

### 2.2 Tools for Data Collection

A well-designed interview schedule was used to collect data from women dairy farmers involved in informal dairy value chains. The researcher herself conducted interviews in the local language of informal dairy women farmers to accurately capture the data.

### 2.3 Pre-Testing

Twenty pre-testing structured interviews were conducted with women farmers in informal dairy value chains. This pilot study's primary goal was to ensure that female dairy producers properly comprehended and responded to the inquiries. Errors were corrected, some questions were changed, some questions were added, and some questions were removed from the informal questionnaire after pre-testing. These modifications were made to improve data quality and obtain accurate data from respondents.

### 2.4 Data Analysis

After gathering the data from the respondent suitable statistical techniques and appropriate statistical tests were used to analyze the data. The result of quantitative data was presented in the form of simple frequency tables, graphs, etc.

## 2. Results and Discussion

### 3.1.1 Informal dairy value chains data

Informal data were collected from women dairy farmers of Hafizabad and Sargodha districts who were involved in dairy value chain activities at the household level and were not affiliated with any company.

**Table 1: Frequency distribution of respondents according to the types of animals in their herds**

Types of Animals	Minimum (Number)	Maximum (Number)	Mean	Std. Deviation	Ranking
Goats	1.00	13.00	3.79	3.29	1
Buffaloes	1.00	10.00	2.98	3.29	2
Cows	1.00	15.00	2.77	2.15	3
Sheep's	1.00	3.00	1.50	0.90	4

According to the study's results, the majority of the respondents keep animals like goats, buffalo, cows, and sheep in their houses. Livestock rearing is not a new occupation and has been practiced since ancient times. Most people engage in this profession to generate food and income. The mean rank order indicates the types and numbers of animals most preferred in the study area. The results showed that sheep were given low priority for rearing in the study area. An average family in

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most rural areas owns 5-6 sheep/goats and 2-3 cows/buffaloes, which help them earn thirty to forty percent of their income (Jamali, 2009). Goats are very important for small farmers in rural areas to alleviate poverty (Lohani & Bhandari, 2021). Ayode et al. (2009) also revealed that the main types of livestock reared by women are goats and Poultry.

**Table 2: Frequency distribution of the respondents regarding their monthly household income from different sources**

Sources Of Income	Minimum (Rs.)	Maximum (Rs.)	Mean (Rs.)	Total (N)
Crop sector	0.00	40000	4885.8	300
Livestock	1000	40000	11153.3	300
Other	0.00	60000	14463.3	300

In addition to other sources like government and private jobs, the majority of respondents also reported making money from agriculture and raising animals. The results of the above data reveal that the mean household income from the crop sector was Rs. 4885.6. The mean household income from the livestock sector and other sources was Rs. 11153.3 and Rs. 14463.3. Andaleeb (2017) also analyzed the relevant data and revealed that majority of the respondents mean income from crop sector was more than Rs.4500.

**Table 3: Distribution of interviewees' responses to questions about purpose of involvement in dairy value chains**

Purpose of participation	Frequency	Percentage
To earn money	149	49.7
To engaged yourself	21	7.0
To fulfill needs	130	43.3
Total	300	100.0

Results Table 3 depicts that most women (49.7%) participate in the dairy value chain to earn money, while 43.3% said they fulfilled their needs. Only 7.0% of women reported that they participate in the dairy value chain to engage themselves. Dairy farming is the largest industry in the economy of Punjab, and this sector is also considered the black gold of Pakistan and contributes to the rural economy. Livestock raising generates income and improves the quality of life of dairy farmers, and the role of rural women in Pakistan's poverty alleviation through inclusion in the dairy value chain is significant (Awan et al., 2021; Jamali, 2009; Ashraf et al., 2013; Munawar et al., 2013). Women's involvement in the dairy value chain has a favorable effect on revenue, the eradication of poverty, and gender equity.

**Table 4: Distribution of the respondents regarding the effect they feel after engaging in the dairy value chain process**

Perceived level of empowerment	Frequency	Percentage
More empower	135	45.0
More confident	144	48.0
More participation in decision making	21	7.0
Total	300	100.0
Mean (Std. dev)	1.61(0.61)	

The results in Table 4 show that 48% of farmers felt more confident and more empowered (45%) after being involved in the dairy value chain process. Only 7 percent of respondents said they felt more involved in decision-making after being involved in the dairy value chain process. Livestock assets help women increase their income and decision-making power (Bain et al., 2018).

**Table 5: Distribution of the respondents regarding their mood toward payment**

Payment Receiving	Frequency	Percentage
After a month	242	80.7
After every two week	32	10.7
Advance payments	6	2.0
At the spot	12	4.0
Other	8	2.7
Total	300	100.0

A large number of respondents (80.7%) said that they get paid for milk after one month, but most of the respondents said that they get payment from customers after much insistence for milk payment. The second highest percentage indicated that they get paid after two weeks, while 4.0 percent of respondents said they get paid on the spot. Only 2.0 percent of respondents said they receive advance payments. The results revealed that most of the smallholder dairy farmers in rural areas do not have a large number of animals due to socioeconomic background, due to which their milk production is not high. They are forced to sell their milk to neighbors and milkmen at a lower price than the market. They mostly get the milk payment from their customers after the month and sometimes customers don't pay on time.

**Table 6: Ranking of farmers regarding their involvement in livestock activities according to their means**

Livestock Activities	Mean	Std. Dev.	Ranking
Dung collection	2.56	0.72	1
Cleaning of utensils used for milking	2.52	0.68	2
Watering	2.49	0.79	3
Feeding	2.44	0.81	4
Cleaning shed	2.42	0.71	5
Milking	2.32	0.86	6
Dung cakes	2.31	0.76	7
Fodder cutting	2.22	0.76	8
Milk processing	2.18	0.90	9
Fodder carrying	2.10	0.89	10
Bathing of animals	1.98	0.83	11
Selling of milk	1.94	0.88	12
Health care of animals	1.51	0.73	13
Bringing/dry/fodder	1.50	0.78	14
Marketing/animal	1.39	0.70	15
Marketing of animal produce	1.38	0.70	16

The research's results rank the women's degree of participation in various livestock-related activities. The research findings in Table 4.1.67 highlights the activities where women have always been involved in livestock related activities, such as watering animals, feeding milk, cleaning milk vessels, making dung cakes, and cleaning sheds etc., in rural areas. The highest participation rate of rural women was in dung collection,

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and the results presented in the table show that dung collection ranked first in the ranking of rural women's involvement in livestock activities.

The above table represents the ranking of dairy women farmers according to their involvement in livestock activities as per the findings of the results. Cleaning of milking vessels falls under rank two, while watering animal activities fall under rank three, according to the table. Forage and marketing of dairy animals are the lowest among women's activities in the small-scale dairy value chain. Most men were involved in livestock-related activities outside the home, and the participation rate of women in these activities was much lower than men's.

The ranking order in the above table also strengthens the findings of Arshad et al. (2013) and Mihiret & Tadesse (2014), and they also show the ranking order of livestock activities in their findings. Khan et al. (2020) also analyzed the almost identical data and utilized ranking order to demonstrate the degree of their involvement in livestock operations. Their involvement in the grazing and sale of livestock animals was minimal. These activities are mainly carried out by men, perhaps due to cultural limitations and the demanding nature of labour.

**Table 7: Results of chi-square regarding gender role in livestock activities with the extent of change in the respondents due to involvement in dairy value chain activities**

Activities	Personal Aspect		Social Aspect		Economic Aspect	
	Chi-Square value	Sig. value	Chi-Square Value	Sig. value	Chi-square Value	Sig. value
Fodder carrying	8.393a	.078	8.497a	.014	1.255a	.534
Fodder cutting	33.874a	.000	8.241a	.016	36.906a	.000
Feeding	16.583a	.002	24.771a	.000	8.392a	.015
Watering	11.418a	.022	8.276a	.016	4.134a	.127
Cleaning shed	35.634a	.000	1.000a	.607	34.237a	.000
Dung collection	11.788a	.019	3.017a	.221	3.464a	.177
Dung cakes	19.575a	.001	1.750a	.417	32.334a	.000
Milking	2.406a	.662	14.950a	.001	3.211a	.201
Milk processing	33.890a	.000	1.815a	.403	65.345a	.000
Marketing animal	26.894a	.000	7.066a	.029	13.947a	.001
Bringing dry fodder	43.100a	.000	7.104a	.029	23.281a	.000
Bathing of animals	42.300a	.000	17.395a	.000	46.612a	.000
Cleaning of utensils used for milking	26.805a	.000	5.778a	.056	38.369a	.000
Health care of animals	19.914a	.001	19.805a	.000	10.332a	.006
Selling of milk	57.497a	.000	33.270a	.000	48.259a	.000



The results in the table show the association between different variables. The above analysis includes the chi-square testing of the association between "Variable 1 and Variable 2". The results of the variables show a positive and high association between these variables. The chi-square probability value is 0.045, which shows that there is a relationship exists between "Variable 1 and Variable 2" at 5% level of significance alpha.

Both males and females are involved in livestock related activities to make a difference in their lives. Formal and informal value chains support the extent of change at the personal, social and economic levels. The results of carrying out fodder activity with personal aspects of change show a chi-square value of 8.393. The Sig. Value is greater than 0.05, which indicates that there is no relationship exists between foraging activities and personal aspects of change. However, the association is positive, with a p-value of 0.14 in the social aspect. The chi-square value of the economic aspect and fodder-carrying activities shows Sig. Value 0.534, which is more than 0.05 which, indicates that there is no relationship between economic aspects and foraging activities. Fodder-cutting activity with personal, social and economic aspects shows that variables show a positive and high correlation between these variables as all Sig. Value is less than 0.05.

Variable feeding and watering activities show a high correlation with personal, social and economic aspects, as these activities show Sig. Value less than 0.045. Cleaning shed activity shows a high correlation with personal and economic aspects as their Sig. Value is less than 0.045 but only social aspect Sig. Value is more than 0.045, showing that Cleaning shed activity and social Aspects are unaffected. Dung collection, making dung cakes and milk processing activities show a positive and negative association between the background variables. Animal marketing, feeding of dry fodder, bathing of animals, cleaning of milking utensils and animal health care show high and significant relationships and associations between personal, social and economic aspects. The values of chi-square and Sig. value show that all the values are less than 0.05, which highlights that all of these variables are highly and strongly correlated with one another.

Sales of milk activities show a positive relationship with personal, social and economic aspects, as all the variables have Sig. Value less than 0.045. Chi-square results also supported the acceptance of hypothesis 2 of the study and that the removal of socio-economic barriers and women's involvement in livestock activities contribute to women's personal, social and economic empowerment and that It helps to increase their income.

### **3.2 Focus Group Discussions**

Five focus group discussions were conducted with 50 women dairy farmers and stakeholders associated with companies selling their milk in Okara, Pakpattan and Toba Tek Singh districts. Milk has a shelf life of 2.5 hours after collection from the animals, so there is an urgent need to transport the milk to the collection centres of the company and delay in transportation affects the quality of the milk and spoils it. Focus group discussions were conducted to examine gender roles, women's involvement and constraints that affect women's empowerment in formal dairy value chains. Key themes have been generated based on the FGDS and are discussed below to give a deeper understanding of the phenomenon under study. The respondents selected for FGDS were selling their milk to Engro, Nestlé, and Al Habib Dairy companies.

### **3.2.1 Reasons for Choosing a Company**

The main findings of the research showed that many of the farmers were selling milk to the companies because of the encouragement of their friends, family members and neighbours. Those neighbours, friends and family members mostly sold their milk to the companies, and then they also encouraged farmers who were not affiliated with the companies. They advised them to sell milk to companies for profit and also helped farmers to connect farmers with companies. Some farmers also reported that company representatives approached them personally and asked them to sell milk to their companies because they had large herd sizes and land.

### **3.2.2 Reasons for Selling Milk to Companies**

The research's findings proved that almost everyone sells their milk to the companies because the companies make regular payments, and the payments are directly transferred to their accounts. The payment is based on the quality of the milk as per the test. The respondents also stated that farmers are regularly paid for milk at a fixed price, there is no fraud in company payment, and payment is made on a weekly basis without any delay. During the months of December, January and February and March, when milk production is high due to the availability of green fodder, the company buys all the milk at a fixed price. Companies also provide both cash and deposit facilities to their dairy farmers.

### **3.2.3 Spending Income from Formal Dairy Value Chains**

The majority of the respondents claimed that income from the formal dairy value chain helped dairy farmers to meet many basic needs and save some. They say that they are also expanding their farms with this income to increase their standard of living and income.

### **3.2.4 Women's Involvement in Formal Dairy Value Chains**

Women's participation in informal dairy value chains is much higher than in formal dairy value chains as several factors influence their participation. Research findings show that livestock activities on large farms are mostly carried out by male owners and servants, and women are less involved. Women's participation in informal dairy value chains is high as they raise animals to escape poverty and support their families.

Women's involvement in the dairy marketing sector is low; hence, their involvement in formal dairy value chains is less than in informal dairy value chains. Respondents claimed to have large farms and numbered more than 50, so their involvement was invisible and limited to food processing as most of the work was done by male members and servants.

### **3.2.5 Contract Duration**

The analysis of the data illustrates that a great number of those questioned had a contract with the company to sell milk and that the duration of the contract was commonly between one and 1.5 years. The majority of the respondents also stated that their contracts were renewed after the expiry of the contract period, according to active milking animals.

### **3.2.6 Difference Between Formal and Informal Dairy Value Chains**

The findings of the study identify key differences that women dairy farmers discussed during the FGDS to provide a clear distinction between formal and informal dairy value chains.

In a formal dairy value chain, everything is preplanned, a doctor is present to take care of the animals on a daily basis, and the dairy value chain is run according to modern technology and requirements. All these things need to be taken care of in informal dairy value chains due to a lack of capital and awareness which are taken seriously in formal dairy value chains. The company helps dairy farmers in the timely collection of milk and sometimes even advance payments when needed, helping them expand their farms and increase their productivity.

The company buys milk from dairy farmers at rates below the prevailing price in villages and towns. Dairy farmers are forced to sell their milk to companies because there is no delay and fraud in this system compared to informal dairy value chains. In informal dairy value chains payment method is not regular, and the distribution of milk to customers takes a long time as each customer has a different time to collect milk and sometimes male customers come to collect milk from female farmers. In informal dairy value chains, consumers sometimes do not come home to collect milk, which affects the income of dairy women farmers. There are some months when the milk production of dairy animals increases due to the availability of green fodder, and the sale of whole milk becomes difficult during the months of December, January, February and March. The company provides benefits to women dairy farmers to collect all the milk from dairy consumers on time without any leave or delay in payment.

### 3. Conclusion and Recommendation

Rural women in formal and informal value chains play an important role in the livestock sector by working side by side with their male counterparts. Processing companies can play an important role in empowering women in dairy value chains. If the gender roles of men and women are clearly defined, and men help women manage livestock and share household responsibilities, this will help increase the productivity of women farmers.

Small-scale dairy farming can be improved by the provision of big loans. The livestock production capital should spend on the dairy sector's modernization by making private processing plants and improvements in milk collection centers. There is a need to train dairy farmers, especially women farmers in rural areas, district staff, development agents and small-scale farmers on dairy products, marketing and processing of dairy products. Training in livestock management and animal husbandry is also very important for the development of smallholder dairy farmers and the dairy sector. Government and NGOs should work together to provide training to dairy farmers after short intervals to update their knowledge and introduce new technology to improve their production. Women who complete the training sessions should be given stipends and certificates to appreciate them and to encourage other women who did not attend the training for various reasons to participate in the next training.

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