

## **Women's Participation in Small-Scale Dairy Farming for Poverty Reduction in Bangladesh**

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### **Abstract**

*The present study focuses on the participation of rural women in small-scale dairy farming activities as a means to reduce poverty in rural areas. This study was carried out in two villages in the Mymensingh district of Bangladesh. From each village data were collected from 50 rural women involved in dairy farming practices through direct interviews using questionnaires. The results showed that in Salakandi village (V1), personal factors most significantly influenced women to start farms, but in Binpara village (V2) social factors were a greater motivation. The results revealed that women in V1 placed a higher importance on dairy farming activities and showed greater improvement in their economic well-being compared to women in V2. Thus it is suggested that women's participation in dairy farming can reduce poverty in rural areas of Bangladesh.*

**Keywords:** rural women, participation, dairy farming activities, small-scale dairy farming, poverty reduction, Bangladesh

### **1. Introduction**

Rural women play a significant role in conducting small-scale dairy farming in Bangladesh. They have full potential for achieving sustainable development and improvement of quality of life through their proactive participation in farming activities. The success of a country depends on the status and improvement of its women, not only because they represent nearly half of the population, but they also positively influence the progress of the entire population (Upadhyay & Desai, 2011). Achieving sustainable development without dynamic involvement of women in all areas, including family, society and economy is impossible: women's participation is necessary for their development (Reshadat et al., 2012). Rural women have been deprived of their rights in the family from early childhood. Most of the women in rural areas must bear the double burden of domestic work and dairy farming. The major activities related to dairy farming are normally performed by rural women in Bangladesh. They prepare food mixtures, chop straw, water and feed animals, clean the sheds, milk, and collect dung. Due to the patriarchal system of the society, their hard work and their contribution to household expenditure have been undervalued, and they do not receive proper respect for their work. Still today they remain unseen workers.

A rural woman faces different stages in her life. Before marriage, she was a daughter; after marriage she was a dependent housewife; after that a dependent mother responsible for all of the household work, including cooking and rearing children, and caring for her husband and other family members. Due to social and traditional barriers, rural women are not able to work outside of their homes. Therefore, their potential is often unrealized (Islam et al., 2012). They are disadvantaged in terms of education, independence, controlling their own assets, and household decision making (Sultana & Hossen, 2013). Today, however, rural women are becoming more conscious of their life patterns, children's education, health, and financial well-being. Rural women have become effective role players in both income-generation and household management. They are struggling hard to improve their life style and trying to overcome poverty through their participation in small-scale dairy farming.

Selling milk is the most important means by which rural women can earn money. Improved financial autonomy has boosted their bargaining power and allowed women to become more active in decision-making in the family (Hadi et al., 1997). Farming has enabled them to increase family income as well as fulfill household food needs (Batool et al., 2014). Dairy farming production contributes considerably to the advancement of the rural area (Dagula & Kiminami, 2009). Women's participation in small-scale dairy farming is an important tool in reducing poverty in rural area. The present study was undertaken to determine the participation level of rural women in dairy farming activities and to identify the impact of rural women's participation in small-scale dairy farming activities for poverty reduction in two villages of the Mymensingh district in Bangladesh.

## **2. Review of Literature and Research Framework**

Sultana (2010) researched the socio cultural dimensions of women's inequity in rural society. In matters of marriage, divorce, maintenance and inheritance, women have traditionally been denied equal rights. Aggression against women within the family is not considered as breaking the rules or affecting their self-esteem (Kamal, 1995). Afzal et al. (2009) conceptualized that although rural women played a very important task in agriculture and contributed in all operations related to crop production, still today women are faced with various traditional restraints. Hoque & Itohara (2008) stated that women are less involved in family decision than men. In rural areas, women's participation in earning activities is superior because they have large families and fewer male income earners in the family. Although Bangladeshi women make major contributions, inequality still exists between men and women in education, health, income-earning opportunities, control over assets and participation in the political process. Ahmed et al. (2011) revealed that rural women in Bangladesh have restricted access to income-earning activities and less scope to contribute to the well-being of their families due to social, cultural and religious barriers. Rural women are not allowed to participate in economic activities outside their home and are, therefore, not able to assist their families in reducing poverty. They found that participation of rural women in income-generating activities has improved the economic well-being of the family. It has also led to increased awareness of social injustice regarding dowries and violence (Rahman, 2001).

Bangladesh is a heavily populated country (Siddique, 1998) characterized by low income, unemployment, and a high rate of poverty. Siddique (1998) stated that women receive less household resources for their food, education, health and clothing than men. Although many activities were traditionally performed by rural women, they did not generate direct cash income. Household cash income is normally controlled by men and women's involvement in income-generating activities is also under their control. Reduction of poverty is not possible unless women achieve economic independence. Therefore, the emancipation of women is a significant step in overcoming poverty. Uddin et al. (2012) stated that small-scale dairy production had the potential to reduce poverty, provide food security, improve family nutrition and generate income and employment. Constraints were removed through broadcasting appropriate technology, disease prevention approaches, improved techniques for milking and feeding, artificial insemination information, and providing awareness that increased milk production and animal performance. Although rural women played a proactive role in livestock management and household decisions, their contributions were neglected and their decision-making power is still restricted. Increasing the capacity of rural women is a necessary step toward allowing them equal right and power with men (Mulugeta & Amsalu, 2014). Research has shown that microcredit has a direct effect on breaking the vicious cycle of poverty in rural areas (Shil, 2009). Grameen bank started to extend banking facilities to poor women, thus eliminating the exploitation of the poor by money lenders, and creating opportunities for self-employment of rural women in Bangladesh. They took the poorest and most vulnerable people, mostly women, and altered the cycle of low income, low savings and low investments through granting them credit, thus enabling greater income and increased savings.

Many people in developing countries lack access to financial services from institutions either for credit or savings which indicates low productivity, low per capita income, low savings and low capital accumulation. Microfinance enables stable cash flows, brings economic security and better management of spending and creates savings that generate improved standards of living to the family (Vincent, 2004). Based on previous studies, we hypothesized that personal factors that involve becoming self-dependent, social factors, which include availability of loans, and economic factors, which include poverty motivated rural women to start small-scale dairy farming. This is illustrated in Figure 1. This study also focuses on the comparative poverty between the two villages, and the strategy for breaking down poverty through participation of rural women in small-scale dairy farming.

Farming has helped rural women emerge from a patriarchal society by breaking down traditional thought and allowing them to play an active role in poverty reduction. This research is the first study to assess the level of participation and factors influencing women's participation in dairy farming in two selected villages in the Mymensingh district in Bangladesh. Furthermore, this study is the first to be concerned with the poverty reduction through women's participation in small-scale dairy farming.

### **3. Methodology of the Research**

#### **3.1 Selection of the Study Area and Data Collection**

The field study was performed in 2014 and included two villages, namely Salakandi (V1) and Binpara (V2) in the Mymensingh district of Bangladesh. These villages were selected due to the concentration of small-scale dairy farms in that area, since small farm owners constitute the population for the present study. Fifty households from each village were randomly selected for interviews. This study was based on field level primary data collected from the dairy farmers. The methods used were direct observation and interview with the respondents using interview questionnaires. Before the interview each respondent was provided a brief explanation of the purpose of the study.

#### **3.2 Participation of Rural Women in Dairy Farming Activity**

The participation of rural women in dairy farming activities was studied under the categories of feeding, breeding, livestock management, health care, purchasing, processing, and marketing, which were outlined by Lahoti et al. (2012), Arshad et al. (2013), and Rathod et al. (2011). The rural women were asked to indicate who participated in each activity on four-point Likert scale viz. participation by wife alone, participation by husband alone, participation by both husband and wife, and no participation.

#### **3.3 Percentage of Women Participation Index**

A percentage of women participation index was calculated to determine the participation rate of women in each dairy farming activity. This was based on the following formula:

Percentage of Women Participation Index (WPI) = (Actual participation of women/Full participation of women)\*100

#### **3.4 Factors Influencing Rural Women in Participation in Dairy Farming**

Factors were constructed to identify the reasons that influenced and motivated rural women to engage in small-scale dairy farming. These factors were to become self-dependent (personal factor), poverty (economic factor), and availability of loans (social factor). These variables were determined by using yes = 1 and no = 0. A multiple linear regression model was used to identify the factors influencing their participation in dairy farming. The model can be specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e_i \quad (1)$$

Where, Y = women's participation in dairy farming, X<sub>1</sub> = personal factor, X<sub>2</sub> = social factor, X<sub>3</sub> = economic factor and e<sub>i</sub> = error term,  $\beta_1, \beta_2, \beta_3$  are the coefficients

#### **3.5 Poverty Reduction Indicators**

Items related to reducing poverty were measured using a four-point Likert scale in which 1 = not at all, 2 = to some extent, 3 = to an average extent, 4 = to a great extent. These items were selected according to basic human needs and livelihood indicators.

#### **3.6 Relationship between Poverty Reduction Indicators and Women's Contributions through Participation in Dairy Farming**

Pearson's correlation was used to test the relationship between poverty reduction indicators and women's contributions through participation in dairy farming.

Here, the variable of women's contribution through participation in dairy farming uses the following formula:

Women's contribution through participation in dairy farming = (Dairy farming return/Total household income) \*100

Dairy farming return = milk sales + cow dung sales + cattle sales

Total household income = husband income+ dairy farming return+ other income

All variables, such as dairy farming returns, total household income, milk sales, cow dung sales, cattle sales, husband's income and other income were considered as taka per year. One US dollar = 78 taka (Bangladeshi currency)

### **3.7 Impact of Participation in Dairy Farming on Poverty Reduction in Rural Areas**

Some selected variables, such as emerging from a patriarchal social system, economic well-being and consciousness of rural women can be expected to reduce poverty in rural area through women's participation in small-scale dairy farming.

#### **3.7.1 Explanation of the Independent Variables**

##### **3.7.1.1 Emerging from the Patriarchal Social System**

This variable has been considered, because after participation in dairy farming, rural women were able to increase their inner strength. They could express their own opinions, decisions, and feelings in front of their husband. Additionally, they feel protected against violence and their bargaining power was raised. Therefore, coming out from under a patriarchal social system can be expected to reduce poverty in rural areas. Three variables, i.e., increasing inner strength of women, control over household income and independent decision making were considered. Increasing inner strength was determined by using a five-point Likert scale ranging from 5 = strongly agree to 1 = strongly disagree. Control over household income was assessed using a three-point Likert scale ranging from 3 = full control, 2 = medium control and 1 = no control. Lastly the variable of independent decision making was calculated by using a four-point Likert scale from 4 = to a great extent to 1 = not at all.

##### **3.7.1.2 Economic Well-being**

This variable was measured by using two variables: improvement of quality of life of women and spending dairy farming money independently. A four-point Likert scale ranging from 4 = to a great extent to 1 = not at all was used to measure these variables.

##### **3.7.1.3 Consciousness of Rural Women**

After participating in dairy farming, the consciousness level of rural women increased, which is also expected to reduce poverty. This was determined by considering factors like reduced family size, which was measured using a five-point Likert scale ranging from 5 = strongly agree to 1 = strongly disagree. A multiple linear regression model was used to identify the effects of dairy farming on poverty reduction. The model can be specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e_i \quad (2)$$

Y = poverty reduction,  $X_1$  = emerging from patriarchal social system,  $X_2$  = increasing consciousness of rural women,  $X_3$  = economic well-being of rural women and  $e_i$  = error term,  $\beta_1, \beta_2, \beta_3$  are the coefficients

### **3.8 Hypothesis of the Vicious Cycle of Poverty**

It is expected that women participating in small-scale dairy farming would reduce poverty through increasing family income, savings, improving educational facilities and living standards resulting from the breakdown of low productivity, low income, low savings and poor livelihood.

### **3.9 Data Analysis**

Data were analyzed using a multiple linear regression model to measure the effects of different independent variables on dependent variables. Pearson's correlation test was also used to determine the relationship between concerned independent variables and dependent variables. Results were considered at 1%, 5%, and 10% significance levels.

## **4. Results and Discussion**

### **4.1 Participation of Rural Women in Different Dairy Farming Activities**

In general, prior to participating in small-scale dairy farming, rural women did not know about feeding, breeding, management, and health care. However, they gathered knowledge through their experience, receiving training and increasing awareness. The comparisons of the level of participation regarding different dairy farming activities between the two villages are shown in Table 1.

#### 4.1.1 Economic Activities

Rural women played a vital role in dairy farming activities as managers, decision makers and skilled workers (Randhawa & Chandra, 1993). In both villages rural women made decisions with their husbands regarding the selection of dairy animals (mean 2.64, WPI 66% in V1 and 2.56, WPI 42% in V2), and the sale and purchase of animals (mean 2.30, WPI 48% and 2.04, WPI 26% in V2). Upadhyay & Desai (2011) found that participation of rural women was observed in selection of animals (92.5%) and purchase and sale of animals (88.33%). In this study, although they made this type of decision jointly with their husbands, it is still a good sign for rural women who gained the power of involvement in decision making regarding economic aspects of dairy farming.

#### 4.1.2 Dairy Feeding Activities

Dairy animal feeding is normally performed by rural women in both villages. Data presented in Table 1 shows that in both villages, most of the activities related to feeding were performed by rural women. Among these activities their participation rates were found to be highest (100%) in preparing food mixtures in both villages. Generally, in Bangladesh rural women accept cooking as their responsibility. This might be the cause for the higher percentage of women involved in food preparation in farming. This finding agrees with Upadhyay & Desai (2011) who reported that 98.34% of farm women participated in preparing food mixtures. Chauhan (2012) found that tribal women made decisions regarding the selection of animal feed (81.67%). Table 1 shows that women from both villages were jointly involved in determining the type of animal feed (mean 2.48, WPI 56% in V1 and 2.36, WPI 44% in V2). Following their participation rate in feeding, watering the livestock was found to be second highest with 94% and 88% in V1 and V2, respectively. These findings agreed with the results reported by Ogdand & Hembade (2014), Arshad et al. (2013), Lahoti et al. (2012), Rathod et al. (2011) and Amin et al. (2010). The results (Table 1) also revealed that 80% of women in V1 and 84% women in V2 were involved in feeding green grass to dairy animals. These findings agreed with the results of Rathod et al. (2011) and Arshad et al. (2013). However in feeding grass to animals, the participation rate of women in V2 was higher than V1 because of the greater availability of green grass. It was also observed that in both villages, women did not use urea treated straw (Table 1).

#### 4.1.3 Breeding Activities

Table 1 indicates participation of rural women in breeding activities of dairy animals. In V1, if animals need artificial insemination (AI) services, the husband typically carries the animal to the AI center, although sometimes the couple goes jointly. However, in V2, they do not carry the animal to AI center due to transportation problems. Breeding activities like AI sometimes require the animal to be taken outside the home to the veterinary surgeon. This is the reason for low participation of rural women in this type of activity. In the case of newborn calves, rural women are often the primary care givers. It was observed that 94% of V1 women looked after newborn calves and 88% in V2 were involved in this activity (Table 1). These findings agreed with the results reported by Upadhyay & Desai (2011), Lahoti et al. (2012) and Rathod et al. (2011).

#### 4.1.4 Dairy Management Activities

Dairy management activities are an essential segment of operating and maintaining dairy farming. Livestock management activities are internal and include management of calves (88% in V1 and 82% in V2), maintenance of farm records (52% in V1 and 46% in V2), cleaning of animal sheds (88% in V1 and 84% in V2), cow dung collection (92% in V1 and 86% in V2), cleaning of utensils (88% in V1 and 80% in V2) and milking the animals (26% in V1 and 48% in V2). These findings agreed with the results of Lahoti et al. (2012). The participation rates of women in all types of management activities were found to be highest in V1 compared to V2, except milking the animals (Table 1). In V2, since they reared indigenous cows, it was easier for rural women to milk the cows, but in V1, they had assistance for this chore.

#### 4.1.5 Animal Health Care Activities

A high percentage of rural women in both villages took care of sick animals. It was observed that 94% in V1 and 88% in V2 (Table 1) of rural women were engaged in this activity. This indicates strong feelings for the animals and they give of their time to tend to the sick animals. These results agree with the findings reported by Kathiriya et al. (2013), Lahoti et al. (2012) and Rathod et al. (2011). Their concern with taking care of dairy animals helped them to sustain their farming interests. Following their care of sick animals, the participation index was highest in vaccinations of dairy animals (76% in V1 and 64% in V2). V1 women reared local and crossbreed cows, which is why a higher percentage of women were involved in vaccinations in V1 compared to V2.

#### **4.1.6 Purchasing, Processing and Marketing Activities**

As seen in Table 1, most women (WPI is 86% in V1 and 78% in V2) in both villages made the decisions regarding the quantity of milk to be used for personal consumption and the amount to be sold. Typically rural women have the responsibility for accommodating the nutritional needs of the family. This result is in agreement with Sarma & Payeng (2012) and Singh & Srivastava (2012). Table 1 show that in both villages women purchased feed (WPI is 46% in V1 and 44% in V2) and equipment (WPI 58% in V1 and 50% in V2). These results are in agreement with those of Lahoti et al. (2012). In neither village were the women involved in processing, preparing and marketing of milk products. From all these activities it was clear that in both villages the women controlled the dairy farming through their active participation in feeding, breeding, livestock management, health care, and purchasing activities. It was also observed that the percentage rate of women in most of the activities were higher in V1 compared to V2 (Table 1). A high percentage of women in V1 involved in these activities indicated that they were more attentive to the practices that improved their dairy farming.

#### **4.2 Factors Influencing Rural Women in Participation in Small-scale Dairy Farming**

Multiple linear regressions were run to estimate the factors that influenced rural women to start dairy farm (Table 2). The results revealed that in V1 and V2 economic factors significantly affected the starting of a small-scale dairy farm. In both villages before the onset of farming, economic conditions were poor. They could not provide sufficient and nutritious food to their children and their children could not attend school because of poor socio-economic conditions. The women thought if they started a small dairy farm near their homes, they could earn money and assist the family. Farming helped them improve their socio-economic conditions and achieve sustainable development. According to Batool et al. (2014), livestock are considered a key means by which rural people can improve their family income.

In V1 personal factors were positively and significantly related to starting a farm. However, this was not the case in V2. In V1, before starting dairy farming, housewives wanted to become self-dependent by engaging in income-generating activities. They wanted to improve their position in the family and society. They believed that they could change their conditions if they took the initiative. V1 women were willing to give their full effort to any income-generating activity in addition to maintaining their routine household responsibilities. They wanted to utilize their skills and capabilities to improve their quality of life. This increased capacity of rural women affected their livelihoods, which enabled them to participate in dairy farming activities. Therefore, becoming self-dependent was an important reason behind the onset of farming in V1.

In V2, social factors were significantly involved. After becoming involved with NGOs, they received loans and support to purchase dairy animals, which gave them the opportunity to establish farms in V2. Research indicates that rural women in Bangladesh had a small chance to participate in development activities. Furthermore, microcredit programs created an opportunity for them to take part in such activities (Afrin et al., 2008). However, in V1 this factor was found to be positive but not as significant (Table 2).

#### **4.3 Poverty after Involvement with Dairy Farming**

Small-scale dairy farming is considered a strong instrument in the improvement of the economy in Bangladesh villages. It has both developed rural livelihoods and reduced poverty (Shamsuddin et al., 2007). Here, poverty reduction indicators have been used to assess the level of poverty situation in both villages. Before participation in dairy farming, the economic conditions of both villages were poor and villagers were living in poverty. However, raising dairy animals brought vast improvements to their lives. High scores on most of the indicators suggest that V1 women have better conditions than those in V2. In V1, women were able to get out of poverty and improve their livelihood through small-scale dairy farming (Figure 2).

#### **4.4 Relationship between Women's Contributions through Participation in Dairy Farming and Poverty Reduction**

Small-scale dairy farming created opportunities for women to earn money. V1 women raised both crossbreed and local cows, but V2 women raised only local cows; therefore, productivity was higher in V1. Sustaining food security, mitigating poverty, and increasing family income were benefits achieved through dairy production (Hall et al., 2012). Earning money from farming and contributing to their family expenses was more successful in V1 than V2 (Table 3). Women are becoming more informed about educational opportunities and dairy farming helps to bear the educational expenses of their children.

They can now save money after meeting all of their basic needs. They can purchase new household items and clothing. Money is available for medicine and medical checkups. According to Downs (2007), rural women can use their income for treatment expenses, improving the quality of sanitation, maintaining health and paying their children's school fees. From dairy, they can provide milk to their children and help meet the nutritional demands of the family. Now they can eat adequate, safe, and nutritious food. Income was the most significant factor for economic well-being as well as improving the living standard and health status (Mondal et al., 2009). Dairy farming helped to raise the total household income that improved consumption patterns and livelihoods of rural families. If they need more animals, they now have the ability to purchase them. Rural women earned income from farming and contributed to the family's welfare. For this reason, gender discrimination has also been reduced. Through their contribution to the family, rural women were capable to bargain in their position and achieve their legal rights. By reducing gender discrimination, they are now living more independent lives and are involved in outside activities and decision making. Contributions of the women to the family income brought higher status, gender independence and greater bargaining power for them within the household (Ahmed et al., 2011). Women played an important role in the family in improving livelihood and reducing poverty. V1 women are happy to raise animals; they think of dairy cattle as their children. By contributing to their family's welfare, they have increased their own happiness and improved their position in the family. Therefore, participation of rural women in small-scale dairy farming has provided opportunities for income-generation and facilitated women to increase family income that helped to reduce poverty and improve the livelihood of rural women.

#### **4.5 Impact of Women's Participation in Small-scale Dairy Farming on Poverty Reduction in Rural Areas**

In V1, the lives of rural women had previously been dominated by a patriarchal social system. After marriage a woman was expected to obey all of the rules and regulations set forth by her husband. Before starting small-scale dairy farming, they were housewives with no rights to make any decisions independently, and they were not allowed to play a significant role in front of the husband. After marriage they thought their prime responsibility was giving birth, especially to sons, and cooking for the family. However, when rural women started to become involved in income-generating activities, the situation changed and continues to change. The results of regression analysis are shown in Table 4. Through their involvement with small-scale dairy farming rural women in V1 have started to earn income and support the family financially, which has changed their spending and consumption patterns and lifestyle. Improving economic well-being of rural women in V1 through small-scale dairy farming has increased their economic strength, self-sufficiency, and financial independence and helped them to improve their quality of life and get out from poverty. But in V2, due to poor socio-economic conditions, they cannot provide sufficient food to the dairy, so productivity is low and they earn less money.

After becoming involved with small-scale dairy farming, V1 rural women emerged from the patriarchal social system, which led to the reduction of poverty. Women have increased their inner strength and can protect themselves against violence through their bargaining power. Their self-determination increased after participating in dairy farming and now they can express their opinion and they have the power to spend the household income. Changing from a male-dominated society has also reduced the violence against women that kept them obedient. These are significant tools in the achievement of gender balance in society. The newly-determined controlling power of women has enabled them to utilize the household resources more efficiently and effectively in the family, both for themselves and for the benefit of their children. When the husband controlled the family, he was often unwilling to pay for his wife and children's welfare, giving the money to his parents. That was the traditional thinking of the husband, and from childhood they were raised with this mentality. After their involvement with dairy farming, V1 women were able to change this situation in the rural society. However, in V2, women still lead lives dominated by a traditional patriarchal society, and most household decisions are still made by the male members of the family. Rural women in V2 have limited participation in decision making because they are not conscious of their rights and power. They cannot express their feelings in front of their husbands, which gives them little or no participation in family matters. Their low level of inner strength, huge dependency and powerlessness hinders their coming out from patriarchal society.

Rural women in V1 are becoming more conscious of reducing their family size and ultimately reducing poverty in the family (Table 4). If the family size is large, they cannot provide sufficient and nutritious food, education and health facilities for all family members. Therefore, reducing family size has significantly affected the reduction in poverty. However, in V2, they are not aware of repeated pregnancy prevention methods, and for this reason, poverty still exists in this village.

#### **4.6 Breakdown of the Vicious Cycle of Poverty**

In V1 rural women were able to break down the cycle of poverty by increasing income, saving, improving productivity and achieving a better livelihood through participation in small-scale dairy farming (Figure 3).

#### **5. Conclusion**

The findings of the present study showed that rural women contributed to dairy farming activities through their active participation. Most of the work in regard to feeding, breeding, management, and health care activities was done by rural women in both villages, and in most cases, they managed the dairy farming. The participation in most activities was higher in V1 compared to V2. The findings revealed that personal factors significantly influenced V1 women for starting small-scale dairy farms and in V2, social factors were responsible. Dairy farming led to a marked reduction of poverty and improved livelihood among V1 rural women. Before starting dairy farming they were housewives, but after involvement, small-scale dairy farming created income-earning potential for rural women and this contributed to the family income, which led to savings, ultimately improving their lives. Through participation in dairy farming rural women in V1 were able to come out from under the patriarchal social system and removed constraints, which have historically limited their autonomy. They have established equal rights and power of women in the family. This power has facilitated rural women to control household income. As a result, women have increased their participation in economic activities. Through participation in small-scale dairy farming rural women have been able to increase their consciousness and economic levels, and thereby making a significant contribution to the well-being of the family. Ultimately, they have been able to break the cycle of poverty. Therefore, participation of rural women in small-scale dairy farming has been a key factor for poverty reduction in rural areas of Bangladesh.

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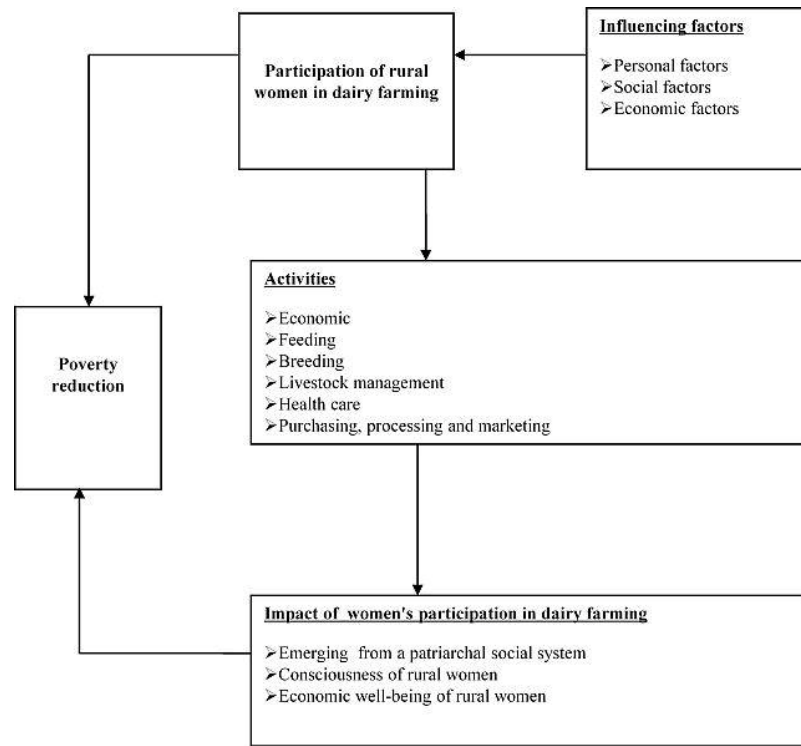


Figure 1: Conceptual Framework of the Study (Author's Construct)

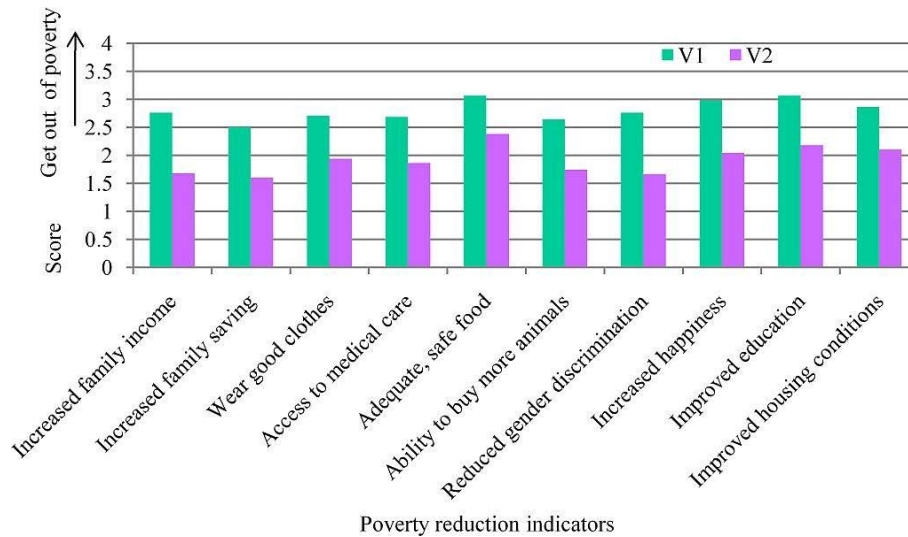


Figure 2: Poverty Reduction Indicators of V1 and V2

Note 1) Source: Primary data analysis, 2014

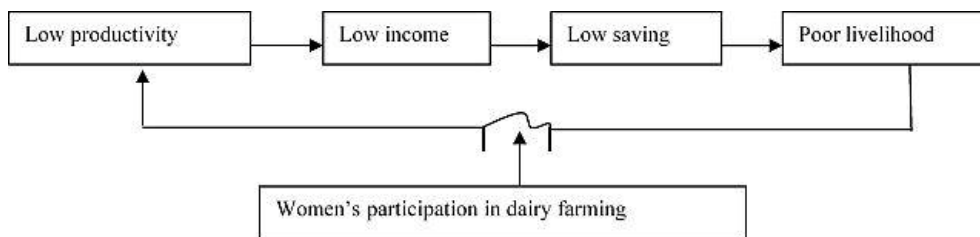


Figure 3: Breaking the Vicious Cycle of Poverty

**Table 1: Participation of Rural Women in Different Dairy Farming Activities**

Activities	Mean		t statistic	% of WPI	
	V1	V2		V1	V2
<b>Economic activities</b>					
Choosing of animals for dairying	2.64	2.56	0.010**	66	42
Sale and purchase of animals	2.30	2.04	0.038**	48	26
<b>Feeding activities</b>					
Types of feed	2.48	2.36	0.016**	56	44
Feeding of green grass to the dairy cattle	2.68	2.80	0.014**	80	84
Feeding of urea treated straw	0.00	0.00	-	0	0
Chopping of straw	2.80	2.68	0.014**	84	80
Preparing food mixture	3.00	3.00	-	100	100
Storage of green grass and straw	0.22	0.20	0.030**	6	4
Watering the livestock	2.94	2.88	0.007***	94	88
<b>Breeding Activities</b>					
Carrying animals to AI or service center	0.66	0.00	0.500	0	0
Care of newborn calves	2.94	2.88	0.007***	94	88
<b>Livestock management</b>					
Management of calves	2.88	2.74	0.016**	88	82
Maintenance of farm records	2.42	2.32	0.013**	52	46
Cleaning of animal sheds	2.88	2.84	0.004***	88	84
Cow dung collection	2.92	2.82	0.011**	92	86
Cleaning of utensils	2.82	2.72	0.011**	88	80
Milking the animals	1.34	1.90	0.109	26	48
<b>Activities of health care</b>					
Care of sick animals	2.94	2.88	0.007***	94	88
Vaccine of dairy cattle	2.74	2.44	0.037**	76	64
Cleaning and bathing cows	2.42	2.60	0.023**	46	66
<b>Purchasing, processing and marketing</b>					
Quantity of milk to be used for home consumption	2.84	2.50	0.040**	86	78
Surplus milk to be sold	2.84	2.54	0.035**	86	78
Purchasing of feeds and concentrates	2.32	2.08	0.035**	46	44
Purchasing of equipment	2.36	2.18	0.025**	58	50
Processing and preparation of milk products	0.00	0.00	-	0	0
Marketing of milk products	0.00	0.00	-	0	0

Note 1) \*\*\* indicates significance at 1% level, \*\* indicates significance at 5% level, and

\* indicates significance at 10% level. WPI = Women Participation Index

Note 2) Source: Primary data analysis, 2014

**Table 2: Factors behind the Participation of Rural Women in Dairy Farming Activities**

Independent Variables	Standardized Coefficients (Beta)		Sig.	
	V1	V2	V1	V2
(Constant)			0.000	0.000
Personal factors	0.373(2.890)	0.144 (1.138)	0.006***	0.261
Social factors	0.123(0.952)	0.246 (1.898)	0.346	0.064*
Economic factors	0.336(2.621)	0.389 (3.012)	0.012**	0.004***
R <sup>2</sup>	0.246	0.275		
Adjusted R <sup>2</sup>	0.197	0.228		
Durbin –Watson Stat	1.618	1.774		

Dependent variable: Y (Participation of rural women in dairy farming activities)

Note 1) \*\*\* indicates significance at 1% level, \*\* indicates significance at 5% level, and \* indicates significance at 10% level. t values are in parentheses.

Note 2) Source: Primary data analysis, 2014

**Table 3: Correlation between Women's Contribution through Participation in Dairy Farming and Poverty Reduction**

Dependent variable	Independent variable	V1	V2
Women's contributions through participation in small-scale dairy farming	Increased family income	0.885 (0.000***)	0.212 (0.140)
	Increased family saving	0.730 (0.000***)	0.057 (0.695)
	Wear good clothes	0.740 (0.000***)	0.002 (0.988)
	Access to medical care	0.745 (0.000***)	0.008 (0.954)
	Adequate, safe and nutritious food	0.724 (0.000***)	0.062 (0.671)
	Increased ability to buy more animals	0.777 (0.000***)	0.108 (0.456)
	Reduced gender discrimination	0.637 (0.000***)	0.151 (0.295)
	Increased happiness	0.756 (0.000***)	0.157 (0.276)
	Improved education	0.620 (0.002***)	0.046 (0.751)
	Improved housing conditions	0.574 (0.000***)	0.227 (0.113)

Note 1): \*\*\* indicates significance at 1% level and \* indicates significance at 10% level, significance values are in parenthesis

Note 2) Source: Primary data analysis, 2014

**Table 4: Impact of Small-Scale Dairy Farming on Poverty Reduction in Rural Areas**

Independent Variables	Standardized Coefficients (Beta)		Sig.	
	V1	V2	V1	V2
Constant	-	-	0.838	0.054
Coming out from patriarchal social system	0.212 (2.715)	0.207 (1.453)	0.009***	0.153
Economic well-being	0.711 (9.120)	0.219 (1.543)	0.000***	0.130
Consciousness of rural women	0.121 (2.027)	0.098 (0.696)	0.048**	0.490
R <sup>2</sup>	0.864	0.107		
Adjusted R <sup>2</sup>	0.856	0.049		
Durbin-Watson Stat	1.827	1.428		

Dependent variable: Y (Poverty reduction indicators)

Note 1) \*\*\* indicates significance at 1% level, \*\* indicates significance at 5% level, and \* indicates significance at 10% level. t values are in parenthesis.

Note 2) Source: Primary data analysis, 2014