

**DETERMINANTS OF DAIRY FARMERS' INCOME THROUGH
COOPERATIVE FARMING: AN EVIDENCE FROM RANGPUR
DISTRICT**

MST. ATIYA FERDOUSI



**DEPARTMENT OF AGRIBUSINESS AND MARKETING
SHER-E-BANGLA AGRICULTURAL UNIVERSITY
SHER-E-BANGLA NAGAR, DHAKA -1207**

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BY**

MST. ATIYA FERDOUSI

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Approved by:

Professor Md. Mahbubul Alam, PhD
Supervisor
Dept. of Agricultural Extension and
Information System
Sher-e-Bangla Agricultural University

Professor Dr. Md. Mizanur Rahman Sarker
Co-supervisor
Dept. of Agricultural Statistics
Sher-e-Bangla Agricultural University

Dr. Sharmin Afrin
Associate professor
Chairman
Examination Committee
Department of Agribusiness and Marketing
Sher-e-Bangla Agricultural University

Email: atiya.sau01@gmail.com

Cell: +8801755344567

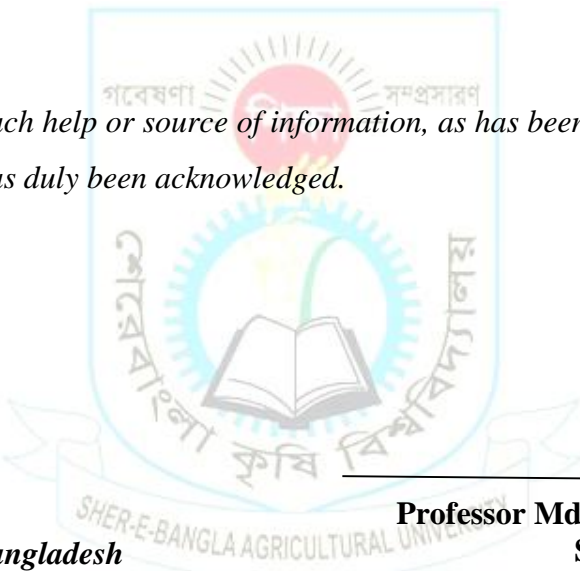
CERTIFICATE

*This is to certify that thesis entitled, “DETERMINANTS OF DAIRY FARMERS’ INCOME THROUGH COOPERATIVE FARMING: AN EVIDENCE FROM RANGPUR DISTRICT” submitted to the Faculty of Agribusiness and Management, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN AGRIBUSINESS AND MARKETING**, embodies the result of a piece of bona fide research work carried out **MST. ATIYA FERDOUSI**, Registration No. **15-06664** under my supervision and guidance. To the best of my knowledge, no part of the thesis has been submitted for any other degree or diploma.*

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

Date: 30 May

Place: Dhaka, Bangladesh



Professor Md. Mahbul Alam, PhD
Supervisor
Dept. of Agricultural Extension and
Information System
Sher-e-Bangla Agricultural University

Dedicated to
My Beloved Family

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LIST OF ACCRONYMS AND ABBREVIATIONS

BBS = Bangladesh Bureau of Statistics

BER = Bureau of Economic Research

FAO = Food and Agriculture Organization

LFS = Labour Force Survey

BRAC = Bangladesh Rural & Advancement Committee

BMPCUL= Bangladesh Milk Producers' Cooperative Union Ltd

EMPCUL= Eastern Milk Producers Cooperative Union Ltd

DANIDA = Danish Agency for Development Assistance

DLS = Department of Livestock Service

ICM = Integrated Crop Management

DTD = Danish Turkey Dairy of Denmark

UNDP = United Nations Development Program

SGSY = Swaranajayanthi Gram Swarojagar Yojana

HYV = High Yielding Variety

SPSS = Statistical Package for Social Science

% = Percentage

et al. = And others

etc. = Etcetera

No. = Number

SAU = Sher-e- Bangla Agricultural University

DETERMINANTS OF DAIRY FARMERS' INCOME THROUGH COOPERATIVE FARMING: AN EVIDENCE FROM RANGPUR DISTRICT

MST. ATIYA FERDOUSI

ABSTRACT

A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically-controlled enterprise. A dairy cooperative is owned, operated, and controlled by the dairy farmers who benefit from its services. The purpose of the study was to describe factors affecting dairy farmers' milk production value through cooperative farming, as well as to analyse the contribution of the selected characteristics of the dairy farmers to their income generation activities. The study was conducted at Mithapukur upazila under the Rangpur district. Data were collected from the randomly selected 60 cooperative dairy farmers using a structured interview schedule. Multiple Regression analysis was used to analyse data using SPSS v.23. The finding of the study stated that a significant increase in income generation is noticed through cooperative farming and the dairy farmers are able to recognize and understand new business opportunity. The study also stated that the farmers with more training received, more duration of contract and with more benefits can increase milk production value. However, entrepreneurial capacity was found to be statistically insignificant to milk production. Thus, the development in dairy farming through cooperative initiatives can play a very significant role in rural development.

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Bangladesh has a population of 169.4 million where 86.04 (50.6%) million male and 83.99 (49.4%) million are female (BBS,2021). Agriculture is the backbone of nation and it is the single largest producing sector of the economy in Bangladesh. Agriculture comprises about 14.7 % of the country's GDP and employs around 45 % of the total labour force (BER, 2017). More than 80 % of farm households are small and rely on agricultural activities for their well-being (FAO, 2015). However, farmers have a lower income of Tk. 8714 in 2017 to cover their living cost (LFS, 2017). Thus, they are interested in alternative professions and want their children to pursue alternative paths. Dairy provides a viable subsidiary occupation for the unemployed rural poor so as to raise their income earning capacities (Kulandaiswamy, 1986). Dairy farming is able to bring the well-being to the vast majority. Dairy farming is a labour-intensive productive work, which can generate employment opportunities for the rural poor, and this is one of the main objectives of rural development. Dairy farming can be the viable alternative to enhance the economic conditions of the farmers. Bangladesh Bureau of Statistics (1994), has shown that a very high percentage of cattle (50.9%) are owned by small farmers as compared to the medium farmers (37.3%) and large farmers (10.2%).

The problems of farmers are getting market information and adopting agricultural technologies in their farming. Another problem is the lack of awareness of farmer's basic rights such as the right price of their produce and negotiation power with traders. Different organizations, societies, groups or associations of the farmers have the potential to find out farmers' problem, diversify, and increase production in a sustainable manner. Dairy, fisheries and forestry are other components of agriculture with great unexplored potential. So, there is a need to pay more attention to these agriculture activities. Although the Dept. of Livestock Service (DLS) is expected to play an important role by providing available facilities and services such as artificial insemination, supplementary feed, medication, and fair pricing system to the poor farmers, no such provision has been done so far. It is not easy to access these services for the rural poor. The reason is that Government has livestock development offices in District/Thana level (administrative units) and all are established in urban area. On the other hand, lack of veterinarians, medicine, and other facilities have made the system inefficient. The poor farmers suffer from lack of capital and do not have any financial

support. These unorganized farmers are also unable to get the proper price for their products due to the seasonal and regional variations of the market price. Under these circumstances dairy cooperatives are playing a vital role in income generating activities by resource pooling, cooperating and joint marketing, which ultimately affect the socio-economic condition of the rural poor.

‘Cooperative’ can be described as a group of people that recognizes itself or is recognized by outsiders as sharing common cultural, religious or other social features, backgrounds and interests, and that forms a collective identity with shared goals. The organizations, known as the cooperative model, are most widely practiced in farming and agriculture. The cooperative covers 32% (Bibby, 2014) of global market shares in the agricultural sector. A cooperative approach to social marketing can be seen as the integration of the basic ideas of community development within a marketing framework. It is founded on the premise that local citizens can be active participants in the process. Through this collaborative participation and the resulting increased understanding, group members and groups may gain the capacity to address other issues germane to community well-being (Brown & Vega, 1996; Bryant et al., 2000; Andreasen, 1995).

Cooperative market approach is an adaptation and integration of the concepts that drive marketing, as well as those that drive community development processes. As defined by Wilkinson (1989, p. 247), community development is a “process by which local people, acting together for their own common good, develop the capacity to direct and coordinate the use that is made of their labor and other resources. Smallholder organization in farmer groups is seen as a possible institutional solution to overcome high transaction costs and other market failures in developing countries (Markelova et al. 2009). In addition, farmer organizations can provide important platforms for capacity building, information exchange, and innovation in rural settings (Bingen et al. 2003). Recently, the promotion of farmer collective action has gained high popularity in the context of the agri-food system transformation, as a response to stringent quality and food safety standards and new procurement systems (Narro et al. 2009). About 31.5 % population of Bangladesh is below the international poverty line (World Bank Report, 2014). However, the cooperative contribution did not achieve the desired level regarding poverty alleviation (Food & Agriculture Organization of the United Nations (FAO), 2014b; World Bank Report, 2014).

1.2 Dairy Farming and Cooperative in Bangladesh

1.2.1 Dairy farming present condition in Bangladesh

The Dairy products plays crucial role in suppling nutrients like proteins, fat, carbohydrates, vitamins and minerals in a considerable amount than any other single foods as it is highly recommended to ingest regularly by all ages of population. In 2019, milk production in Bangladesh is estimated 10.47 million tons. Forecasting the demand of milk production, Bangladesh requires at least more 10 years to be independent. The prediction says milk production in 2030 will be 18.1 million tons and the demand will rise 17.22 million tons. Production of milk, meat and eggs should increase substantially. Production growth of dairy products was large due to a mutual effect of government's importance as well as activities of the nongovernmental organizations. The dairy industry of products derived from milk has also increased, but there is still a long way to go, given that only 9% of milk reaches industrial processors, UHT milk or dairy products, while the remaining 91% It is marketed in a traditional or informal way.

The sector is therefore divided into these two sections, formal and informal. Regarding marketing, there are 4 or 5 main companies that dominate the sector, such as Milk Vita with 40% of the market share, or BRAC's Aarong and Pran with an approximate 24% share each. The rest of the quota would be occupied by Farm Fresh and other smaller producers.

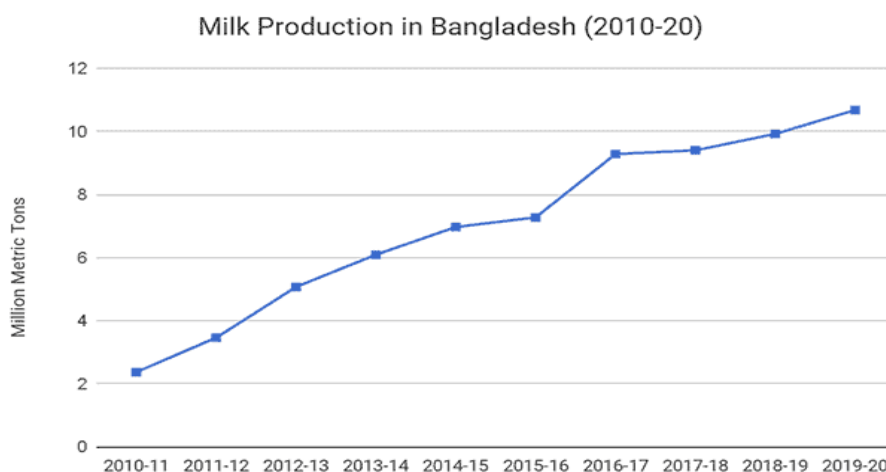


Figure 1: Dairy production growth in Bangladesh between 2010 and 2020 (source: <https://www.lightcastlebd.com/>)

1.2.2 Cooperative initiative in Bangladesh

Two fundamental social processes—cooperation and competition—are the central themes of sociological literature. For an agrarian developing nation, however, cooperation can be a powerful tool for bringing about positive socioeconomic changes for the general populace. The Cooperative Societies Act of 1904 marked the beginning of cooperation in British India, of which Bangladesh was a part. The primary objective was to offer farmers affordable finance. So, the idea of cooperation is not brand new in Bangladesh. The cooperatives experienced modest growth in popularity after achieving independence in 1971. However, it was unable to effectively achieve its fundamental goals, including the development of agriculture and the provision of income for the rural poor (Ahmed, 1989).

1.2.3 Recent development of dairy cooperative in Bangladesh

The construction of infrastructure, including transportation, storage facilities for agricultural crops, and market stability, could be the fundamental mechanisms of the cooperative. In order to do this, it must lend money to the cooperative as a whole rather than to specific cooperative members. Bangladesh Milk Producers' Cooperative Union Ltd. (BMPCUL), a newly-emerging unique sort of cooperative, acts as a dairy producers' agent for generating income rather than giving them any major amount of credit. The government established BMPCUL, a cooperative organization for poor dairy farmers, and awarded credit for setting up the industry's infrastructure, including milk processing plants, factories, veterinary services, transportation, and storage. By offering farmers low-cost inputs and ensuring fair prices for small rural milk producers, BMPCUL's initial goals were to establish a dairy basis in Bangladesh and promote rural development. In order to export milk products by railroad to the Calcutta (India) market, National Nutrients Company built a dairy facility at Lahirimohanpur in the Pabna district (now Serajganj district) in 1946 with a processing capacity of 2,000 liters of milk per day (Haque, 1998). However, the division of India and Pakistan prevented this from happening. After that, the original owner of this dairy facility sold it to a private company called Eastern Milk Producers Limited in 1952. Within a few years, the facility began producing and selling products under the brand name Milk Vita, including cheese, butter, ghee (one type of butter), and powder milk. Currently, the BMPCUL operates seven dairy processing and/or pasteurization facilities in the regions of Dhaka, Baghabarighat, Tangail, Manikganj, Tekerhat, Sreenagar, and Rangpur. Even with all-out

efforts by the company's owner, who is recognized as the country's dairying pioneer, the facility was unable to reach the level of demonstrated success. As a result, in 1965, Eastern Milk Producers Cooperative Union Limited, a newly established first milk producers' cooperative union, acquired ownership of the company (EMPCUL).

About 100 village milk producers' cooperative organizations were established in the area surrounding the Lahirimohanpur facility to collect the milk the plant required (Hanif, 1996 and Haque, 1998). Following the recommendations of the United Nations Development Program (UNDP), Danish Agency for Development Assistance (DANIDA), and Food and Agriculture Organization of the United Nations (FAO), the Government of the People's Republic of Bangladesh launched a development project in 1973 called Cooperative Dairy Complex. The plan called for building dairy farms in areas of the nation where there is an excess of milk, such as Tangail, Manikganj, Tekerhat, and Baghabarighat, as well as a Dhaka city plant. The EMPCUL changed its name to Milk Producers Cooperative Union Ltd. in 1977 after taking over all of the former dairy plant's obligations, including debts, assets, and liabilities. The products' brand name, however, didn't change. Danish Turkey Dairy of Denmark (DTD) was given a contract by the government to create designs for and establish 5 dairy factories as part of a bilateral credit deal with DANIDA. All 5 of the dairy factories were developed throughout the project period with equipment provided by DTD (1973-1978). Project expenses came to TK.155.61 million in total. Despite being a gift to the government from DANIDA, the plants were loaned to the milk union. Over 28 thousand small and landless farmers were members of the approximately 335 main milk producers' cooperatives that were located close to this plant. They provided the Milk Union, which makes butter, cheese, ice cream, milk powder, pasteurized milk, etc., with milk at a daily average rate of 6 million liters, and they marketed these goods under the name Milk Vita. The union ran a cattle development program that included providing enhanced sperm, on-the-go veterinarian care, feed, and fodder. The Primary Milk Producers Cooperative earned TK. 650 million (U.S. \$ 1 = TK.54 in the year of 2001) and issued patronage reimbursement to members in 1997–1998 since it was self-sufficient and received little to no financial help under the initiative. By delivering fresh milk and milk products to the public and expanding the income opportunities for the disadvantaged through its primary milk producer's cooperatives, The Milk Union improved the nation's health and nutrition (Haque, 1998 and Hanif, 1996).

Considering the importance of milk farming and in order to explore dairy farmers' income generation, the following objectives were formulated.

1.3 Objective of the Study

The specific objective is given below:

1. To describe factors affecting dairy farmers' income from milk production through cooperative farming,
2. To determine farmers' income from milk production through dairy farming,
3. To explore the contribution of the selected factors affecting dairy farmers' income from milk production through cooperative farming.

1.4 Justification of the Study

The study of dairy farmers' income generation through cooperative farming practice is very crucial because it creates awareness among smallholders on how funds are being used and get to decide on their wellbeing, also when cooperative participate transparency and accountability of the leaders increases hence having projects of quality standards. Smallholder organization in farmer groups is seen as a possible institutional solution to overcome high transaction costs and other market failures in developing countries (Markelova et al. 2009). In addition, farmers' organizations can provide important platforms for capacity building, information exchange, and innovation in rural settings (Bingen et al. 2003). Recently, the promotion of farmers' collective action has gained high popularity in the context of the agri-food system transformation, as a response to stringent quality and food safety standards and new procurement systems (Narro et al. 2009). This study will evaluate the factors affecting dairy farmers' income generation through cooperative farming, determine farmers' income generation through dairy farming and explore the contribution of the selected factors affecting dairy farmers' income generation through cooperative farming.

1.5 Limitation of the Study

Considering time, money, and other essential resources and to make the study convenient and meaningful from the research point of view it has become necessary to impose certain limitation as mentioned below:

- The scope of this study was restricted to four villages in the Mithapukur Upazila in the Rangpur District.
- There were several characteristics among the respondents, but only personal and socioeconomic traits were chosen for this study.
- The researcher relied on data provided by the chosen respondents during data collection to obtain information.
- Due to the fact that many farmers lack literacy, it is challenging to get precise information from them.

In order to get as much data as possible, the researcher needed to build a strong relationship with the respondents.

1.6 Assumption of the Study

The researcher made the following assumptions while conducting this study. The respondents chosen for the study were able to respond appropriately to the questions on the interview schedule

- The respondents' responses contained accurate information.
- They were open about their participation in activities that generated income.
- Data provided by the sampled respondents accurately reflected the demographics of the entire research area.
- The researcher's data were evenly dispersed and free of bias.
- The respondents were able to react to the interview questions in a suitable manner.
- The respondents were able to reply to the interview in a suitable manner.
- The researcher felt at comfortable in the local social climate. As a result, there was no bias in the information gathered from the respondents.
- The researcher who conducted the interviews was familiar with the social environment of the subject. Because of this, the information she got from the respondents was unbiased.

1.7 Definition of the Terms

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

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

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

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

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

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

Hard size: It refers to the type of cattle and number of cattle in the farm. Cattle type is cows, calves and ox.

Cost of production: Cost of production refers to all of the direct and indirect costs businesses face from manufacturing a product or providing service.

Training: Training is teaching or developing in oneself or others, any skills and knowledge or fitness that relate to specific useful competencies.

Perceived benefits: It is defined as beliefs about the positive outcomes associated with a behaviour in response to a real or perceived threat.

Entrepreneurial capacity: It means the willingness and ability to take on the challenge of starting a new venture.

CHAPTER II

REVIEW OF LITERATURE

The primary goal of this Chapter is to review several related studies in relation to the current investigation. Some of these researches might not be totally relevant to the current topic, but their analytical methods, conclusion and suggestions have a significant impact on it. The following discussion provides a review of several recent research studies that are relevant to the current study. This chapter is divided into three section that are given below:

Section 1: Cooperative Marketing.

Section 2: Income generation in Dairy Farming.

Section 3: Dairy farmer income generation through Cooperative Farming.

Section 4: Conceptual Framework of the Study

2.1 Cooperative Marketing

Barton (1989) defined cooperative is “a cooperative is user-owned and user-controlled business that distribute benefits on the basis of use”.

Hardestv (1992) defined a cooperative marketing society is an association of cultivator formed primarily for the purpose of helping the member to market their product more profitable than possible through the private trade.

Mondol (2010) stated that a cooperative is to create benefits to a group of members. Cooperative was established to adjust a malfunctioning market mechanism, which is to say that the members through the cooperative could reduce the risk taking in their farm enterprise. Cooperative marketing or cooperative in agriculture business helps the farmers to take different risk associated with the production and distribution of crops. Cooperative are strongest in the food processing industry.

Proper management of cooperative marketing can remove the interruption of intermediaries from market of agricultural product Menard (2005). Cooperative marketing in agricultural business is evident by the different studies conducted in different countries.

2.2 Income Generation through Dairy Farming

Halakatti et al. (2007) undertake a study during the year 2005-06 in Haveri District of Karnataka to understand adoption behavior, its correlates and income generation process in Swaranajayanthi Gram Swarojagar Yojana (SGSY) for rural women. It was observed that out of 13 selected independent variables, except impersonal cosmopolite all have exhibited significant relation with adoption. Further, high adopters, medium adopters and low adopters of dairy innovations differed significantly among themselves with respect to their milk production, consumption, income and employment generation.

Njau et al. (2010) found that small-scale farmers in the extended and conventional farming systems had negative entrepreneur's profits, and they were unable to recover all of their dairying-related economic expenditures. The main causes of disparities in production costs across different systems and low profitability are the high opportunity costs associated with own factors of production (land, family labor, and capital), differences in economies of scale, and institutional support (infrastructure, provision of support services like artificial insemination and veterinary services).

Kabir (1995) undertook a study to evaluate the financial success of dairy agricultural subsidies in Tangail districts. For local, cross, and cross-bred farms, the net return per farm was determined to be Tk 14463, Tk 21773, and Tk 58173 yearly, respectively. For local, cross, and cross-bred farms, the investments per taka return were Tk. 1.19, Tk. 1.27, and Tk. 1.37, respectively. Dairy cattle that were crossbred performed better overall than cows who were born locally.

Kabir (1995) conducted a study to look at the socioeconomic traits of owners of native and hybrid dairy cows to assess the relative profitability. The average milk yield per day for a cross-bred dairy cow was 6.65 liters, which was roughly twice as much as the average yield for an indigenous dairy cow. These figures, along with the slightly higher daily total cost of raising a cross-bred cow (Tk. 35.05) over an indigenous cow, indicate a roughly threefold higher net return for cross-bred dairy cows than for indigenous cows.

Rahman and Akteruzzaman (1994) demonstrated that the milk production cost per liter was Tk. 8.70, 9.22, and 12.33 for small, medium, and big herd sizes, respectively. The milk output per animal per day was 3.87, 3.37, and 2.38 liters, respectively. For small and medium herd sizes, the net returns per cow per day were Tk. 8.07 and Tk. 4.65, respectively, whereas for big herd sizes, the estimated net loss was Tk. 3.14.

Karim and Begum (1988) conducted a study in two communities in the Comilla district to determine the prevalence of women's involvement in milch cow rearing. They discovered that 42% of the cattle held by households were milch cows, with only 14% being of an upgraded type. 2.77 liters of milk were produced on average per milk cow. The average annual cost of feed, treatment, and AI for each cow is Tk. 3972, with feed costs accounting for almost 98% of that total. The net return was predicted to be Tk. 2763, whereas the annual gross return per milch cow from milk, cow manure, and ploughing was Tk. 6674.

Rahman and Raman (1991) did a study on the economic analysis of the dairy industry in four chosen villages in Bangladesh's Mymensingh district. The results demonstrated that the cost of feed was higher in milk pocket and urban areas than in rural and semi-urban locations. Feed prices are higher in Buffalo's Ahmen Bari neighborhood. For all varieties of cow, the gross return per animal was positive. Additionally good and greater net returns were seen for the HYV of cows and buffaloes.

Alam et al. (1994) conducted a comprehensive socioeconomic assessment in Bangladesh and discovered that 11.69% of the cattle were crossbred. Crossbred cows produced 91% more in returns. Cross-breed cows had a return over cash cost per lactation that was 158% higher than native cows.

Rahman (1993) conducted a study in the Tangail and Madaripur districts' Kalihati and Takerhat areas to calculate costs and returns, analyze how various factors affect yield, and assess the potential for dairy enterprises to create jobs and income in rural areas. At Kalihati, the gross cost per cow per day was Tk. 20.22, while in Takerhat regions, it was Tk. 29.34 and 4.91.

2.3 Dairy Farmer Income Generation through Cooperative Farming

Wambua (2014) outlined the many elements affecting Milk Productivity in Machakos Country. The study's evaluated the impact of social demographic factors like the farmers' age, gender, and level of education on dairy productivity levels, figuring out how much breed quality and breeding systems affect dairy productivity, looking into how much inputs affect dairy productivity, and figuring out how much adoption of new technologies affects that level of productivity. The Wamunyu Dairy Farmers' Co-operative Society conducted the study. The research design for the study was a descriptive survey. Using the cluster random sampling approach, a sample of 45 members was chosen from the society's 224 active

members. Data was gathered using a semi-structured questionnaire. The findings showed that the level of dairy productivity in the Wamunyu Dairy Farmers' Co-operative society was influenced by social demographic factors such as the age, gender, and educational status of the farmers; the breeds and breeding practices of the cattle; the availability and cost of inputs; and the adoption of technology.

Somda et al. (2004) focused on the traits of The Gambia's smallholder milk producers. 90 smallholder farm households provided information that was used to analyse the characteristics of milk producers and assess the activity's viability and profitability. The study identified two resource-based types of smallholder farms based on the current typology of farms and studies of gross margins at the farm level. The technique used to produce milk today is undoubtedly efficient. Inadequate institutional support and a lack of updated technology at the farm level are barriers to greater productivity. It has been established that milk production produces steady profits despite the low viability status.

Garcia et al. (2012) built on findings to identify a broad approach to considerably enhance research on and knowledge of factors influencing adoption by smallholders in developing nations. It offered a rigorous examination of the factors influencing adoption by smallholders in central Mexico. To better understand the adoption process and identify socioeconomic and farm variables, cognitive (beliefs), and social-psychological (social norms) factors associated with farmers' use of improved grassland, a detailed study was conducted with 80 farmers who are already actively using this innovation. A theoretical framework based on the Theory of Reasoned Action (TRA) was employed to analyse the data using Spearman Rank Order Correlation. The majority of farmers (92.5%) expressed a strong intention to continue using improved grassland in the coming year, which necessitates active management and resource investment. In contrast, 7.5% of farmers were unsure and expressed a weak intention, which was linked to farmers whose primary source of income came from non-farm activities as well as farmers who had only recently begun using improved grassland.

Keli (2019) determined how participation in milk processing affected smallholder farmers' milk income. The study made use of cross section data collected from a sample of 200 Makueni County smallholder dairy farmers. According to the result data, there are considerable discrepancies between milk processing participants and non-participants in terms of each person's socioeconomic status. Age, experience, sex, education, and farming as the major occupation are among the variables that have been found to have a substantial

impact on participation in milk processing. The effect estimates indicated that milk processing participation had a considerable negative impact on milk income.

Walton (2012) found the connections between participation in the dairy group and the length of membership, the assets that provide a sustainable livelihood, household income, and food security. Thus, 88 WDL members (across four membership length groups) and 23 farmers who were not members participated in a cross-sectional study. Compared to non-members and members who have been there one to three years, members who have been there longer have better milk output and herd size. Food security (range from 4 to 30%), the percentage of households with an income from dairy of more than 5,000 ksh/month (0–40%), and the number of enhanced household features (ranging from 1.7 to 3.3), were positively associated with longer membership duration. The limited inquiry into the impact of EGF value chain expansion on farm productivity among dairy producers in Embu County, Kenya, served as the impetus for the study.

Authur (2018) examined the effects of value chain extension on farm productivity, with a focus on estimating potential farm productivity and examining the potential benefits of value chain extension among EGF dairy producers in Embu County. Questionnaires were used to collect data. 44 EGF farmers who were chosen using the purposive and random sampling approaches were given the surveys. The statistical significance between revenue and feeding expenses demonstrated the results, which proved that there was farm production. According to the regression analysis, an increase in feeding expenses by one unit will result in an increase in income of 0.950 units.

2.4 Conceptual Framework of the Study

2.4.1 Training received

Prodhan and Khan (2018) reported that of the farmers' training received are positively influence their aquaculture management practices. In another study, Mazumder (2018) reported training received also positively influence farmers integrated crop management practices. So, these findings indicate the utilities of training exposure on farmers' use of different farm practices. Receiving farm management training not only influence the uses of those practices but also positively contributed to the development of knowledge (Hossain, 2017; Hossain, 2001; Mannan, 2001), change attitude (Rahman, 2010) and ultimately impact

livelihoods (Mortuza *et al.*, 2004; Waheduzzaman, 2004). Therefore, it concludes. Higher the training received in milk production higher the yield.

2.4.2 Benefits

In many ways farmer received the benefits from cooperative farming. Cooperative farming is a group-based approach where multiple small or marginal farmers form a platform through which they can extend their experiences, skills and resources for better outcomes. Porter and Phillips-Howard (1997) conducted a study in Africa and reported that cooperative farming contributed to the better livelihood of the community. Elsewhere, Minot (1986) and Kumwende & Madola (2005) suggest that most of the farmers who participated in cooperative farming experienced changes in income. Farmers also achieved higher yields due to crop diversification practices through cooperative farming (Bijman 2008). This study found that the participation in cooperative farming ensure higher benefits by the farmers.

2.4.3 Entrepreneurial capacity

Entrepreneurship is defined as the processes of emergence, behaviour and performance of entrepreneurs (Ogundele, 2005). Entrepreneurship is a capacity that helps an organisation or individual entrepreneur to perform in terms of profit, create wealth and job opportunities (Mohammad *et al.*, 2014) and reduce poverty (Osuagwu, 2002).

Das (2012) signifies the importance of developing entrepreneurial capacity among women towards their empowerment. Women with higher entrepreneurial capacity feel more economically strong and contribute the household development. Women involvement in cooperative milk farming practices enable them to improve their entrepreneurial capacity. So we conclude higher the entrepreneurial capacity of the farmers ensure higher the output of their farming practices.

2.4.4 Duration of contract

Duration of contract indicates farmers' involvement in cooperative-based dairy farming in years. Farmers with high involvement are expected to be received more benefits than non-cooperative farmers. In related research in crop science Mazumder (2018) found that farming experience was significantly contribute farmers' use of ICM practices. In another studies, such as Halim (2000), Hague and Hossain (2001), Rahman (2004) and Singh (2005) observed

that farming experience of the respondents had a significant and positive influence with the adoption of improved farm practices. Therefore, it concludes higher the duration of contract in cooperative farming ensure higher the output received by the farmers.

CHAPTER III

METHODOLOGY

Methods are crucial in scientific research. Any research methodology should enable the researcher to get accurate and trustworthy data, analyse it well, and reach the right conclusions. According to Mingers (2001), a research technique is an organized set of instructions or procedures for producing accurate and trustworthy research results. The steps and techniques employed in the research are explained in this chapter.

3.1 Local of the Study

The study was conducted at four villages of Mithapukur upazila under the Rangpur district. The districts of Bangladesh are divided into sub-districts called upazilas (Sarker, M. M. R. 2010). Four villages were selected purposively as the local of the study. The selected villages were Durgapur, Ranipukur, Dhatuliya, Jaigir. The following are the main reasons for selecting the study area:

- i. Effective communication and ease of access
- ii. Anticipated greater cooperation from the respondent because the researcher is familiar with the study region and local language
- iii. In the subject area, no previous study of this kind was conducted.

3.2 Sources of Data

For the purpose of this study, data were gathered from both primary and secondary sources. Primary data were provided from farmers, and secondary data came from a variety of public sources.

3.3 Population and Sample Size

There were 130 farmers in the selected four villages which constituted the population of the study. Using a sample size determination formula from surveysystem.com with 9% confidence interval, 60 respondents were determined as the sample of the study. For each village, respondents were calculated proportionately. The respondent was selected for interview using simple random sampling technique for four villages,

Table 3.1: Distribution of population and sample size of respondents in the selected village

Name of the Upazila	Name of the Village	Population size	Sample size
Mithapukur	Durgapur	48	22
	Ranipukur	25	12
	Dhatulia	22	10
	Jaigir	35	16
Total		130	60

3.4 Instrument for Data Collection

A cross-sectional survey method was used since the goals of this study were to test hypotheses and measure variances. As a result, data was collected through a structured interview schedule. The study adapted validated measuring items from previous studies whenever possible, keeping the aims in mind. The previously arranged interview schedule was put to the test, and any required changes were made. Closed-ended questions were used in most cases. From 20th March to 28th April 2022, the researchers collected data for this study by conducting personal interviews. The structured questionnaire was used to collect data from respondents in a face-to-face interview. The approved estimation items for each construct, along with their literature sources, were included in an English version of the interview schedule, which was attached as Appendix-A.

3.5 Variables of the Study

Receiving training, duration of the contract, capacity mean and benefits were the independent variables. Milk production value was the dependent variable of the study. The following were methods and procedures for measuring these variables:

3.5.1 Measurement of independent variables

The 4 traits of respondents listed above are the independent variables. The following methods were used to measure the independent variables. The independent variables were measured using the next techniques.

3.5.1.1 Training received

The total number of days a respondent spent in various training course throughout her life was used to calculate their training. For no training, a score of 0 was assigned. Score 1 was consider as a 1-day training received.

3.5.1.2 Duration of the contract

Duration of the contract of the respondent was measured by the number of years a respondent engaged in cooperative dairy farming. Score of 1 was assigned for more than five year involved in cooperative dairy farming. Otherwise, a score of 0 was assigned.

3.5.1.3 Entrepreneurial capacity

Entrepreneurial capacity was measured by using 5-point rating scale ranging from strongly agree (5) to strongly disagree (1). This scale includes four items. In order to estimate the multiple regression analysis, the weighted mean and standard deviation were calculated.

3.5.1.4 Benefits

Benefit was measured by using 5-point rating scale ranging from strongly agree (5) to strongly disagree (1). This scale includes six items. In order to estimate the multiple regression analysis, the weighted mean and standard deviation were calculated.

3.5.2 Measurement of Dependent Variable

The study's only dependent variable of the was milk production value in income generation activities through cooperative dairy farming. The following was the technique for determining the dependent variable.

Milk production value in cooperative dairy farming:

The amount of milk production per household were recorded in Kg. Price of per unit milk was collected from local markets. Thus, the value of milk production per household was calculated by multiplying the value with the price.

3.6 Data Processing and Analysis

3.6.1 Editing

We carefully checked for omission errors in the raw data. To make coding and tabulation easier, the researcher double-checked that all data was included after an interview.

3.6.2 Coding and tabulating

The researcher came up with a detailed coding approach after talking to the study supervisor and co-supervisor. A numerical score was assigned to each response. The responses from the respondents were copied to a master sheet to facilitate tabulation.

3.6.3 Categorization of data

According to the goals of the study, all of the data was tallied. For the coding process, the gathered data was divided into various groups. These categories were developed based on the potential range of each variable (max and min). In next chapter, the method and classification of a certain variable were more thoroughly investigated.

3.6.4 Method of data analysis

Statistics that are both descriptive and inferential were used to analyze the data. Descriptive statistics like frequency distribution, percentage, range, mean, and standard deviation were used to show the overall characteristics of the data set, and multiple linear regression was used to assess the proposed hypotheses. These analyses were all completed using SPSS 23.0. Each hypothesis' level of significance was assessed at a 5% level of significance.

The dependent variable was milk production value in income generation activities through cooperative dairy farming where independent variables were receiving training, duration of contract, benefits and entrepreneurial capacity. The model of the research can be presented following formula:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$$
$$\varepsilon_i = \text{Error term}$$

Y= Milk production value

β_0 = Intercept term

$\beta_1, \beta_2, \beta_3, \beta_4$ = *Coefficient* with associated with each variable,

X_1 = Duration of contract

X_2 = Receiving training

X_3 = *Benefits*

X_4 = *Entrepreneurial capacity*

ε_i = *Error term*

CHAPTER IV

RESULT AND DISCUSSION

This Chapter presents the result of this study into four sub-sections. The first section, presents respondents' characteristics of the study. The secondly section deals with the selected factors that might influence dairy farmers' income generation. The third section presents the farmers' income generation through dairy farming followed by the final section explores the contribution of the selected factors to their income generation.

4.1 Respondents' Characteristics

This section presents the characteristic of the respondent interview of this study. This section is expected to help readers to understand the demographic attribute of the respondent.

4.1.1 Age

The age of the respondent ranged from 24 to 57 years with the mean and standard deviation were 41.60 and 9.236 respectively. The respondents were divided into three categories based on their age score: young, middle and old aged. The age distribution of the respondents is presented in Table

Table 4.1. Distribution of the respondent according to their age

Categories	Frequency	Percent	Mean	STD.
Young aged (up to 35 yrs)	18	30.0	41.60	9.236
Middle aged (36 to 50 yrs)	29	48.3		
Old aged (>50 yrs)	13	21.7		
Total	60	100.0		

Source: Farmer's household survey, 2022

Table 4.1 shows that among the respondent in the study area, the medium aged category had highest proportion (48.3%) followed by the young aged (30%) and old aged (21.7%).

According to the data, middle and young- aged farmer made up the largest portion of the respondents 78.3%. Considering the status and necessity of the locality, young and middle - aged farmer are more likely than other farmer to be involved in variety of income generation. In this study, it was found that young and middle- aged farmer prefer to participate in income generation activities in order to enhance their living and socio- economic condition.

4.1.2 Level of Education

Considering the education level of respondent farmer, it was varied from 0.5 to 16 with mean and standard deviation 9.33 and 3.551, respectively. Based on their education score, the farmer was classified into four categories such as can sign only, primary education, secondary education, higher secondary education and above higher secondary education.

Table 4.2 Distribution of the Respondent to their Education

Categories	Frequency	Percent	Mean	STD.
Can sign only	4	6.7	9.33	3.5519
Primary education (1-5)	6	10.0		
Secondary education (6-10)	32	53.3		
Higher secondary education (11-12)	12	20.0		
Above higher secondary education (>13)	6	10.0		
Total	60	100.0		

Source: Farmer’s household survey, 2022

Table 4.2 shows that the majority of the respondent (53%) had a secondary education, 20% higher secondary education, 10% primary education and 10% above higher secondary education respectively. 10% farmer can sign only.

4.1.3 Annual family income

The respondent annual family income ranged 120 to 600 thousand takas with the mean and standard deviation of 1404.73 and 560.530 respectively. The respondents were divided into three categories on the basis of their annual household income: low, medium and high. The following Table shows the distribution of farmers according to their annual income.

Table 4.3 Distribution of the Respondent According to their Income

Categories	Frequency	Percent	Mean	STD
Low income (up to 150 thousand Taka)	12	20.0	1404.73	560.530
Medium income (151 to 300 thousand Taka)	32	53.3		
High income (>300 thousand Taka)	16	26.7		
Total	60	100.0		

Source: Farmer's household survey, 2022

Table 4.3 shows that more than half of the respondents 53.3% came from a medium-income family, while 20% and 26.7% were low and high-income families respectively. The average income of the study is rural youth is higher than the country's per capita income US Dollar 659 (BBS, 2017).

4.1.4 Hard size

The respondent farmer hard-size range 3 cattle to 12 cattle with the mean and standard deviation of 8.63 and 3.764 respectively. On the basis of their hard-size, the respondents were classified into three categories such as small, medium and large hard-size. The distribution of the respondents according to hard-size categories has been presented in the Table.

Table 4.4 Distribution of respondent according to Hard-Size

Categories	Frequency	Percent	Mean	STD.
Small hard-size (up to 5)	14	23.3	8.63	3.764
Medium hard-size (6 to 10)	33	55.0		
Large hard-size (>11)	13	21.7		
Total	60	100.0		

Source: Farmer’s household survey, 2022

Table 4 shows that the medium hard size had highest proportion of the respondent 55%, small hard-size categories (23.3%) and large hard-size categories 21.7%.

4.2 Factors’ Affecting Dairy Farmers Income Generation

4.2.1 Benefits of cooperative farming

Figure 2 present the 6 benefits of the cooperative farming.

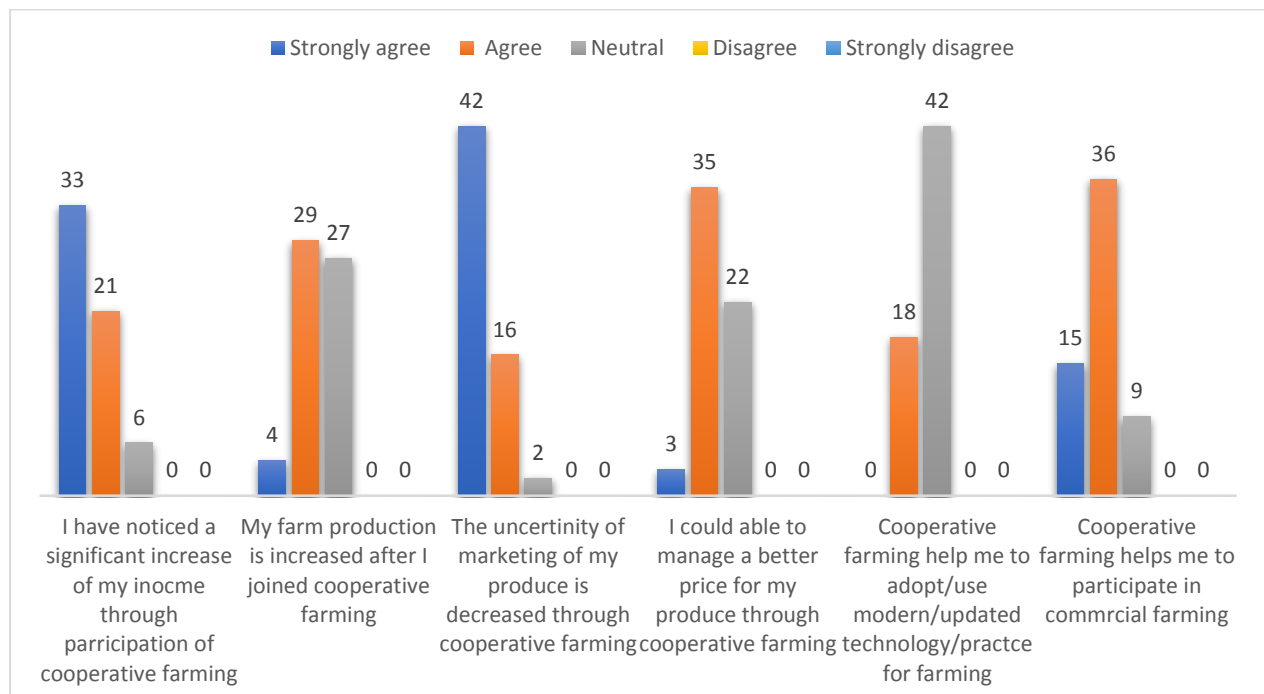


Figure 2: Benefits of cooperative farming

From this Figure hight value around 55% of the respondent had strongly agree to significant increasing of my income through participation of cooperative farming compare to

respectively 35% and 10% in agree and neutral to this question. In next question farm production is increased after I joined cooperative farming the high value 48.34% of the respondent had agree compare to 45% and 6.66% had respectively neutral and strongly agree. The question the uncertainty of marketing of my produce is decreased through cooperative farming contains the high value more than half 70% in strongly agree to the question compare to 26.67% and 3.33% respectively agree and neutral to the question. The respondent's percentage for the question able manage a better price for my produce through cooperative farming had 58.33%, 36.67% and 5% respectively agree to neutral and strongly agree. Around more than half of the respondent 70% of the respondent had neutral and 30% had agree to the question cooperative farming help to adapt modern technology for farming. And for the last question more than 60% of the respondent had agree compare to 25% and 15% respectively strongly agree to neutral.

4.2.2 Entrepreneurial capacity of cooperative farming

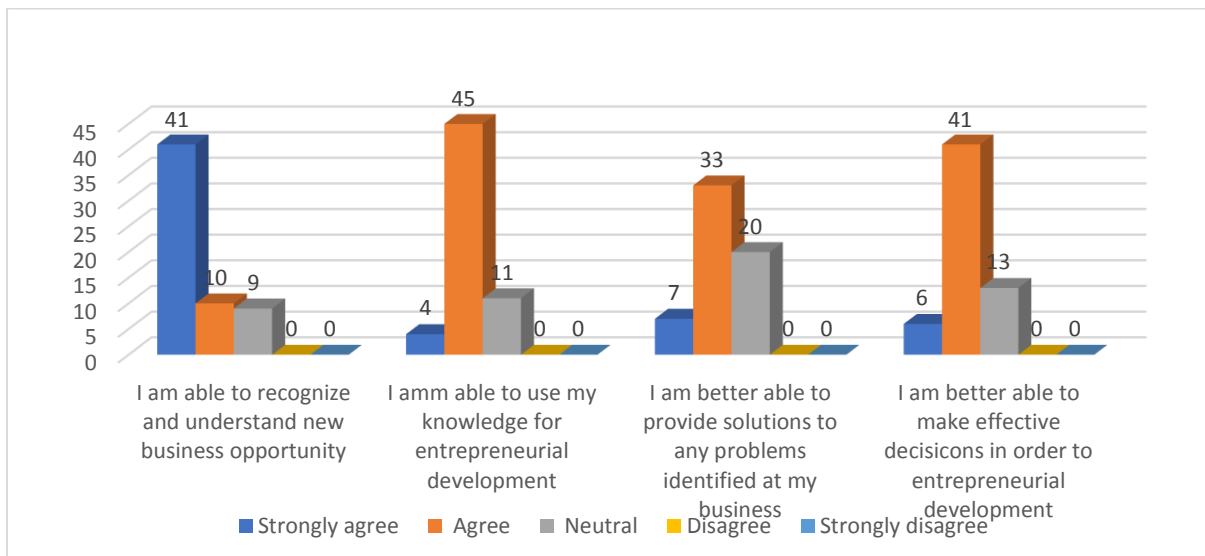


Figure 3: Entrepreneurial capacity of cooperative farming

From this Figure 3 the question entrepreneurial capacity most of the respondents highest around 41 had strongly agree with able to recognize and understand new business opportunity compare to lowest 4% had able to use my knowledge for entrepreneurial development. On the other hands 8% and 7% of the respondents had strongly agree with better able to provide solutions to any problems identified at my business and better able to make effective decisions in order to entrepreneurial development respectively.

From this Figure 3 the question entrepreneurial capacity most of the respondents highest around 45% had agree with able to use my knowledge for entrepreneurial development compare to lowest 16.67% had able to recognize and understand new business opportunity. On the other hands 41% and 33% of the respondents had agree with better able to make effective decisions in order to entrepreneurial development and with better able to provide solutions to any problems identified at my business respectively.

From this Figure 3 the question entrepreneurial capacity most of the respondents highest around 20% had neutral with better able to provide solutions to any problems identified at my business compare to lowest 9% in able to recognize and understand new business opportunity. On the other hands 13% and 11% of the respondents had neutral with better able to make effective decisions in order to entrepreneurial development and able to use my knowledge for entrepreneurial development.

4.2.3 Training received of cooperative farming

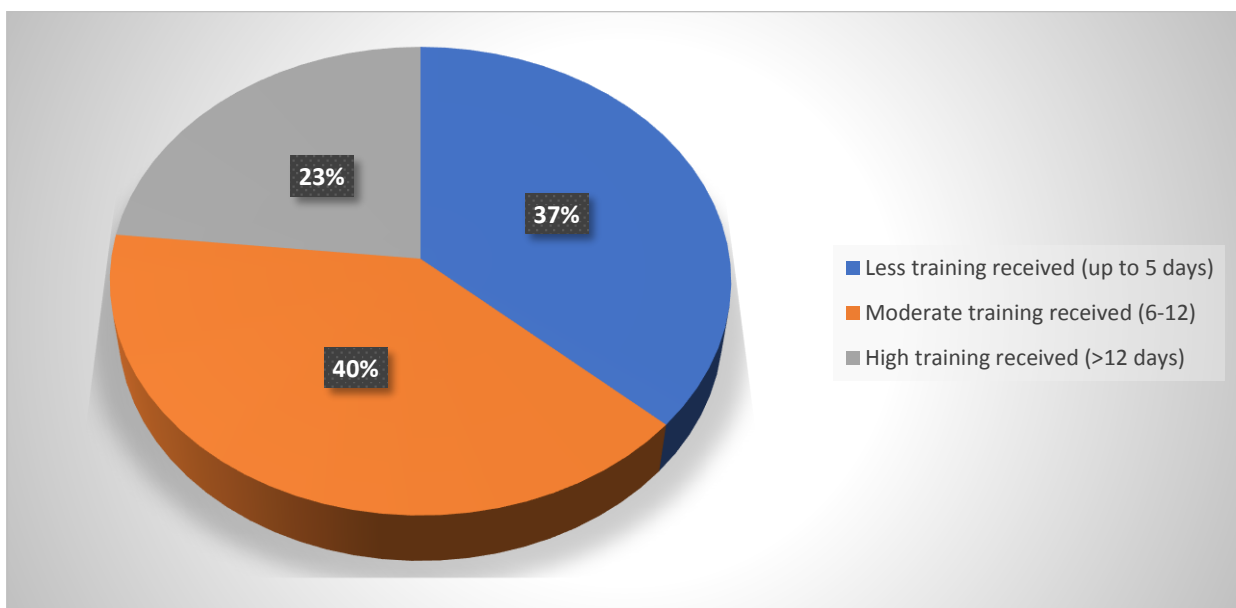


Figure 4: Received training of cooperative farming

There are three parts according to training received by the respondents which was less training, moderate training and high training. From this Figure 4 maximum value of the respondent had moderate training received which was 40% compare to lowest 23% and 37% in high training to less training. The Figure indicated that the most of the respondent received moderate training.

4.2.4 Duration of contract of cooperative farming

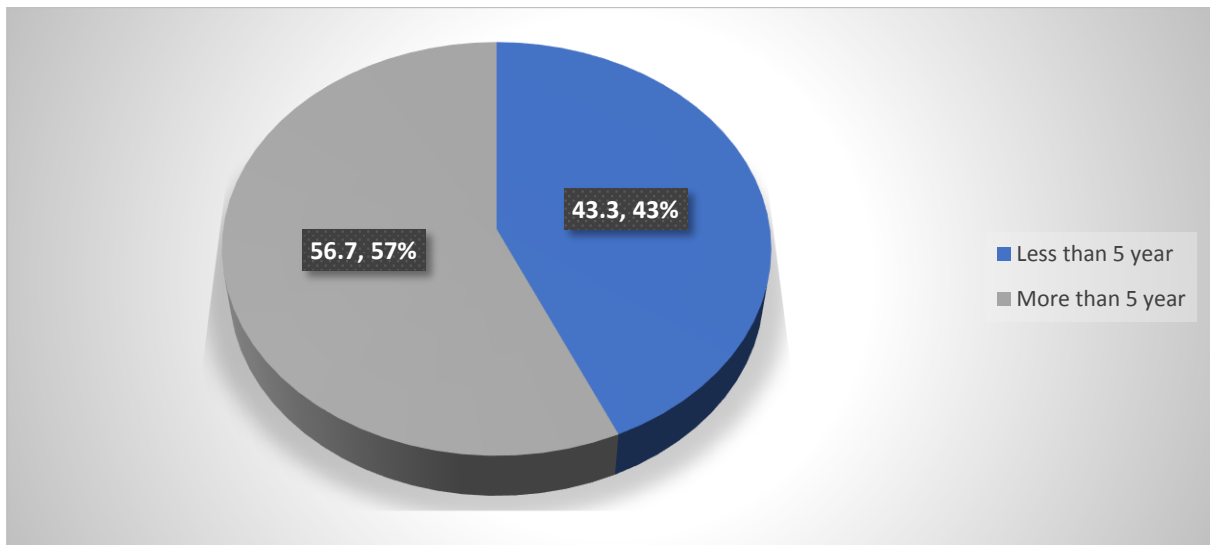


Figure 5: Duration of contract of cooperative farming

There are two parts in duration of contract in cooperative farming. Which categorized in contract less than 5 years and contact above 5 years. The Figure 5 indicates that more than half of the respondents 56.7% of the respondent had more than 5 years contract in cooperative farming compare to 43.3% of the respondent had less than 5 years contract in cooperative farming. The Figure indicate that the maximum respondent involved more than 5 years in cooperative farming.

4.3 Farmers' Income Generation Through Cooperative Dairy Farming

Farmers' income generation measured in thousand Tk per day. Result indicates on an average farmers earned Tk 2.70 thousand per day with a standard deviation 1.33. The distribution of dairy farmers according to their income generation (Figure 6) shows 40% of the farmers earn upto Tk 3000/day while around one-fifth of the farmers (20% and 18.3%) earned upto Tk 4000 and Tk 5000, respectively. Only a little less than (8.3%) earned more than Tk 6000/day.

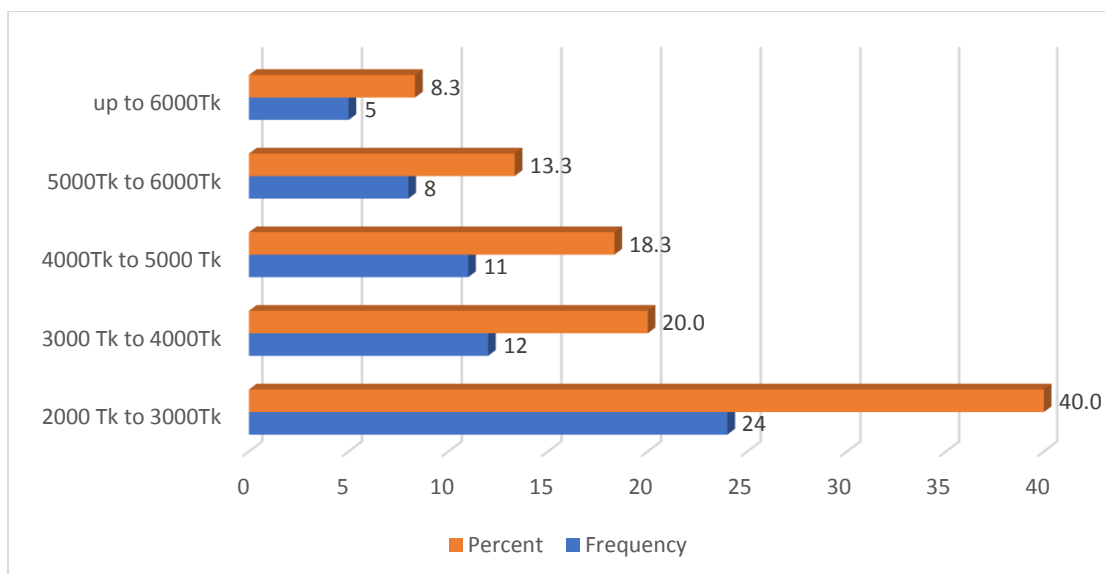


Figure 6: Farmers' income generation through cooperative dairy farming

4.4 Contribution of the Selected Factors to Dairy Farmer Income Generation Through Cooperative

Multiple regression revealed that among the four variables, three variables, namely receive in training, duration of contract and benefits, were found to be the significant positive contribution to milk producing value for cooperative dairy farming. The remaining one variable capacity mean was not significant at 5% as show in Table 4.5.

Table 4.5 Contribution of selected factors of dairy farmer income generation through cooperative

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R ²	Adj. R ²	F
	B	Std. Error	Beta					
(Constant)	-4.664	1.118		-4.172	.000	.783	.768	49.722
Receive in training	.131	.026	.451	5.013	.000			
Duration of contract	.527	.225	.197	2.348	.023			
Entrepreneu rial capacity	.323	.218	.117	1.483	.144			
Benefit	1.173	.310	.311	3.789	.000			

These variables altogether contribute 76% of the variance of the milk value (adj. R²=76%).

The overall model was found significant (F=49.72).

4.4.1 Contribution of receive in training on the milk production value by the cooperative farming

The contribution of receive in training on the milk production value was measured by testing the following null hypothesis ‘there is no contribution of receive in training on milk production value in income generation activities through cooperative dairy farming’

The significant value of the concerned variable was found 0.000. The contribution of the receive in training was significant at 5% level. So, the null hypothesis could be rejected.

From Table 4.5, unstandardized coefficients, beta was obtained .131 and standardized beta coefficient .451 which clearly represent the positive contribution to receive in training on milk production value in income generation activities through cooperative dairy farming. It can be also stated that is receive in training increased by one unit, milk production value increased by 0.451. All other factors are held constant.

This finding is also supported by previous research Mazumder (2018) found that training received also positively influence farmers production.

The higher the training received, the milk production value is higher and lower the training received the lower the milk production value.

Based on the above finding, it was concluded that cooperative dairy farmer with more training received increased milk production value.

4.4.2 Contribution of duration of contract on the milk production value by the cooperative farming

The contribution of duration of contract on milk production value was measured by testing the following null hypothesis ‘there is no contribution of duration of contract on milk production value in income generation activities through cooperative dairy farming’

The significant value of the concerned variable was found 0.023. The contribution of the duration of contract was significant at 5% level. So, the null hypothesis could be rejected.

From Table 4.5, unstandardized coefficients, beta was obtained .527 and standardized beta coefficient .197 which clearly represent the positive contribution to duration of contract on milk production value in income generation activities through cooperative dairy farming. It can be also stated that is duration of contract increased by one unit, milk production value increased by 0.197. All other factors are held constant.

This finding is also supported by previous research Halim (2000), Hague and Hossain (2001), Rahman (2004) and Singh (2005) observed that farming experience of the respondents had a significant and positive influence with the adoption of improved farm practices.

The higher the duration of contract, the milk production value is higher and lower duration of contract the lower the milk production value.

4.4.3 Contribution of benefits on milk production value by the cooperative farming

The contribution of benefits on milk production value was measured by testing the following null hypothesis ‘there is no contribution of benefit on milk production value in income generation activities through cooperative dairy farming’

The significant value of the concerned variable was found 0.000. The contribution of the benefit was significant at 5% level. So, the null hypothesis could be rejected.

From Table 4.5, unstandardized coefficients, beta was obtained 1.17 and standardized beta coefficient .31 which clearly represent the positive contribution to benefits on milk production value in income generation activities through cooperative dairy farming. It can be also stated that is benefits increased by one unit, milk production value increased by 0.311. All other factors are held constant.

The previous findings also support this finding of Minot (1986) and Kumwende & Madola (2005) support that most of the farmers who participated in cooperative farming experienced changes in income. Farmers also achieved higher yields due to crop diversification practices through cooperative farming (Bijman 2008).

Higher the participation in cooperative farming higher the benefits by the farmers.

CHAPTER VI
SUMMARY OF FINDINGS, CONCLUSIONS AND
RECOMMENDATIONS

5.1 Major Findings

5.1.1 Selected factors that influence dairy farmers' income generation through cooperative farming

Age

Highest proportion (48.3%) of the respondent was under the middle-aged category compared to (30%) young aged and (21.7%) old aged. The standard deviation was 9.23 and mean was 41.60.

Education

Almost all of the farmers had a different level of education. Among them 53.3% of the respondent were comprised of secondary education, 20% had higher secondary education, 10% primary education, 6.7% could sign only, and the rest 10% were above higher secondary education level.

Annual income

The annual family income of the respondent ranged 120 to 600 (*000*) Tk. The highest proportion (53.3%) of dairy farmers had medium family income, meaning they earned 151 to 300 TK. The lower family income farmers, 20% and 26.7% had high family income. As the average annual family income of the farmers in the studies area was 1404.73.

Herd size

The highest proportion (55%) of the respondent had medium herd-size compare with 23.3% having small herd-size and 21.7% had large herd-size.

Training received

A large number of farmers 40% did moderate training with 37% having low training and 23% having high training.

Duration of contract

A large number of farmers 56.7% involved with more the 5 years contract and 43.3% involved less than 5 years.

Benefits

Highest value around 55% of the respondent had strongly agree, 35% and 10% agree and neutral, respectively at the first question was increased of income through participation of cooperative farming. 48.34% of the respondent had agree, 45% and 6.66% had respectively neutral and strongly agree for the question was farm production is increased after joining cooperative farming. The question the uncertainty of the marketing of my produce is decreased through cooperative farming contains 70% strongly agree, 26.67% and 3.3% respectively agree and neutral to the question. Able to manage a better price for my produce through cooperative farming had 58%, 36.67% and 5% respectively agree, neutral and strongly agree of the respondent to the question. Cooperative farming help to adopt modern technology for farming 70% respondent had neutral and 30% agree to the question. And the last question 60% respondent had agreed compare to 25% and 15% respectively strongly agree to neutral.

Entrepreneurial capacity

68.33% of the respondent were strongly agree, 16.67% and 15% agree and neutral respectively of the question was able to recognize and understand new business opportunity. 75% of the respondent had agree, 6.67% and 18.33% respectively strongly agree and neutral for the question was able to use knowledge for entrepreneurial development. 55% of the respondent had agree, 33.34% and 11.66% respectively neutral and strongly agree for able to provide solutions to any problems identify my business. 68.33% of the respondents had agree, 10% and 21.67% respectively strongly agree and neutral for the question able to make effective decisions in order to entrepreneurial development.

5.1.2 Milk production value in income generation activity through cooperative farming

40% of the farmers earned up to Tk 3000/day, 20% and 18.3% earned up to Tk 4000 and Tk 5000, respectively. 8.3% earned more than Tk 6000 day.

5.1.3 Contribution of the factor of dairy farmer income generation through cooperative

Multiple regression analysis revealed that 4 selected factors altogether explained 76% ($R^2=0.76$) of the variance of milk production value. Among the factors, received training, duration of contract and benefits were found to be positive and significantly contributed to milk production value while rest of the factors were found to be non-significant.

5.2 Conclusions

Dairy has emerged as a parallel occupation beside crops, particularly among the study dairy cooperative members. Dairy farming is one of the lucrative ways of income diversification for rural people. The trend of dairy farming through cooperative initiatives can play a very significant role in rural development.

Concerning household economy, the income of cooperative households increased than that of the non-cooperative household, also higher than the national figures. This improvement in income is made possible because most of the dairy farmers joining the cooperatives are generating a substantial income from the dairy farming. The benefits from cooperatives increase the incomes those living in rural areas.

Poverty is mostly confined to those who are at the lowest ranks of the society. It is this section of the society that has benefited the most from the dairy cooperatives. The regular income earned from the sale of milk has enlarged their perception on savings and investment and also enhanced their levels of aspiration. Thus, dairy cooperatives in Bangladesh are providing a viable means of income generation.

This study demonstrates the utility of farmers' involvement in dairy farming through cooperatives, received training in various dairy management practices and farmers' entrepreneurial capacity to increase their farm income and thus livelihoods. In a way, cooperative dairy farming can play a pivotal role in promoting the growth of the dairy sector, as well as fostering rural development in general.

5.3 Recommendations

- i. The research was conducted only in Mithapukur upazila in Rangpur district. To justify the current research findings, it is important to make scope for more research in other regions.
- ii. The study was based on cooperative dairy farmers. Further studies may be conducted in other areas of agricultural business-like crop and fisheries.
- iii. Cooperative farming is not a well-known concept to all. Ministry of Agriculture can take different initiatives to familiarize cooperative farming to among farmers.
- iv. This study explored the determinants of farmers in income generation through dairy farming. Further exploration can be conducted to better understand the impact of income generation on the livelihoods of farmers involved in cooperative dairy farming.

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APPENDICES

Sher-e-Bangla Agricultural University Department of Agribusiness and Marketing

Interview schedule on

Determinants Of Dairy Farmers' Income Through Cooperative Farming: An Evidence From Rangpur District.

Sl No.

Name: Father's/Spouse's Name:

Village: Union:

Upazila: District:

(Please answer the following questions. Your answers will be kept confidential and only be used aggregately for academic purposes only)

1. **Age:** Please indicate your present age? (in years)
2. **Education:** Please indicate your educational qualification.
 - a. Can't read and write
 - b. Can sign only
 - c. Read upto class
3. **Family size:** Please mention your total number of family:
 - a. Adult:
 - b. Children:
4. **Annual family income:** Please indicate your last year annual income from your family.

Sl No	Sources of Income	Amount ('000 Taka)
Agricultural Sources		
1	Crop	
2	Fisheries	
3	Livestock	
Non-agricultural Sources		
4	Service/Job	
5	Business	
6	Labour	
7	Remittance	
8	Others (if any, please specify.....)	

5. **Farm size:** Please indicate the number of cattle you have in your farm.

Type of cattle	No. of cattle
Cows	
Calves	
Ox	
Total	

6. **Cost of production:** Please indicate the cost of production.

Items	Monthly	Yearly	Total
Infrastructure cost			
Feeding cost			
Treatment cost			
Labour cost			
Variable cost			
Total			

7. **Experience in cooperative farming:** How many years have you been engaged in cooperative farming? (in years)

8. **Receive of training:** Have you received any training on your farming? Yes/No.

If yes, please specify the name and duration of training.

Sl. No.	Name of the training	Year of receiving the training	Name of the organization offered the training	Duration of the training (days)
1.				
2.				
3.				
4.				

9. **Duration of Contract:** a) Less than 5 year b) More than 5 years

10. **Milk production per day:** Please indicate production status of your farm.

Disposition of milk produced	Volume (Lt) or Weight (Kg)	Price/unit	Values (volume*price)
Family use			
Fed to calves			
Other uses			
Milk sold			
Total			

11. **Benefit of cooperative farming:** Please indicate your agreement or disagreement with the following statements.

Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
i) I have noticed a significant increase of my income					

through participation of CF					
ii) My farm production is increased after I join to CF					
iii) The uncertainty of marketing of my produce is decreased through CF					
iv) I could able to manage a better price for my produce through CF					
v) Cooperative farming help me to adopt /use modern/updated technology/practice for my farming					
vi) CF helps me to participate in commercial farming					

12. **Entrepreneurial capacity:** Please indicate your agreement or disagreement with the following statements.

Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
i) I am able to recognize and understand new business opportunities					
ii) I am able to use my knowledge for entrepreneurial development					
iii) I am better able to provide solutions to any problems identified at					

my business.					
iv) I am better able to make effective decisions in order to entrepreneurial development					

13. **Intention to continue with cooperative farming:** Do you want to continue with cooperative farming in near future? Yes/ No

Thank you for your patience and time.

Contact No.: