IMPACT OF MICROCREDIT IN ENHANCING FOOD SECURITY OF RURAL HOUSEHOLDS IN BANGLADESH

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CERTIFICATE

This is to certify that thesis entitled, ***"IMPACT OF MICROCREDIT IN ENHANCING FOOD SECURITY OF RURAL HOUSEHOLDS IN BANGLADESH"*** *submitted to the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of* ***MASTER OF SCIENCE IN MANAGEMENT AND FINANCE,*** *embodies the result of a piece of bona fide research work carried out* ***NAWSHIN SHAHARIN TOMA****, Registration No.* ***15-06709*** *under my supervision and guidance. 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.

Dated:30 April,2023

Place: Dhaka, Bangladesh

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Dedicated to

My Beloved Family

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Nawshin Shaharin Toma
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LIST OF ACCRONYMS AND ABBREVIATIONS

%= Percentage
ATT= Average Treatment Effect on the Treated
et al.= And others
etc.= Etcetera
FAO= Food and Agriculture Organization
FCS= Food Consumption Score
IGAs= Income Generating Activities
MFIs= Micro-Financial Institutions
NBFIs= Non-Bank Financial Institutions
NGO= Non-Governmental Organization
No.= Number
P=Probability
PPP= Public Private Partnership
PSM= Propensity Score Matching
RMC= Rural Microcredit
SAU= Sher-e- Bangla Agricultural University
SDG= Sustainable Development Goal
UN= United Nations
WHO= World Health Organization

ABSTRACT

The main objective of this study was to assess the impact of microcredit on the food security status of rural households in Bangladesh. Primary data was collected from Comilla and Chandpur districts of Bangladesh due to availability of microcredit borrowers. Data were collected purposively from 200 respondents through face-to-face interviews during January to June, 2022. Descriptive and econometric models were used to analyzed the data. Probit regression model, Food Consumption Score (FCS) and Propensity Score Matching (PSM) technique were used to obtain the objectives of the study. Probit regression model was used to assess the factors influencing access to microcredit. FCS method was used to assess the food security status of microcredit borrowers and non-borrowers and PSM was used to evaluate the impact of microcredit in enhancing food security of rural households. The findings indicated that gender, age, agricultural land, family, household size, non-farm income source of household and training influence access to microcredit positively, in opposite education, occupation, earning member and annual income influenced access to microcredit negatively whereas gender, age, land, family, household size, non-farm income, annual income and training were significant at 5% level of significance and education, occupation, earning member, training were significant at 1% level of significance. The results also revealed that there is a significant difference of FCS with 1% level of significance between microcredit borrowers and non-borrowers and FCS is higher for non-borrowers compared to borrowers. The PSM result revealed that microcredit program has reduced the food security status of the borrowers by 17.564 and 6.04 unit based on Nearest Neighbor (NN) and Radius matching method. Inadequate credit availability and inefficient credit utilization could be the cause. The study suggests that microcredit program should be design to promote sustainable livelihood of rural households and regular monitoring and evaluation are essential to assess the impact on food security. In addition, it is recommended that microcredit intervention with social support programs can have a holistic impact on improving food security and well-being of rural households.

CHAPTER 1

INTRODUCTION

1.1. Background

Bangladesh is one of the most densely populated countries in the world with an estimated 165 million people living in an area of 147,570 square kilometers (BBS, 2022). In Bangladesh, 66% of people live in rural areas (World Bank, 2015). Bangladesh employs approximately 50% of its population primarily through agriculture, with more than 70% of its land dedicated to crop cultivation, with rice, jute, wheat, tea, pulses, oil-seed, vegetables, and fruits being the most important crops (FAO, 1996). In addition, large numbers of small and marginal farms with low financial resources make up Bangladesh's agricultural sector (Wadud, 2013). A number of negative circumstances, such as adverse climatic conditions, low agricultural productivity, and poverty, have a negative impact on local agricultural production. These factors are likely to contribute to widespread food insecurity among the population (FAO, 2008). Socioeconomic progress and stability are also impacted by food insecurity.

Evidence suggests that food security was a concern thousands of years ago. For example, central governments in ancient China and ancient Egypt were known to release food from storage during famines. Food security is defined as all people having physical, social, and economic access to sufficient, safe, and nutritious food at all times that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996). The World Health Organization represents that there are three pillars that determine food security: food availability, food access, and food use and misuse (WHO, 2004). Then the FAO compiles a fourth pillar: the stability of the first three dimensions of food security over time (FAO, 2006). In 2009, the World Summit on Food Security stated that the "four pillars of food security are availability, access, utilization, and stability"(FAO, 2009).

Although the nation has steadily increased food production, food insecurity remains a significant issue, largely due to poverty (Sharmin, 2014). Numerous factors, including job loss, a lack of access to land, a lower level of education and work, single-parent

households, unstable income levels, and having a low income of family head, are connected to the situation of food insecurity (FAO, 2008). According to World Bank, Bangladesh is particularly vulnerable to food insecurity due to a multitude of demographic, socioeconomic, and ecological issues. The food security of Bangladesh is becoming more and more at risk due to the country's high and growing food prices as well as the limited supply of food on the global market (Wadud, 2013). FAO acknowledged that Bangladesh can achieve food security through increased agricultural productivity, employment and self-employment, which provide opportunities for income and enable the purchase of food (FAO, 2013). The state of nutrition is also concerning. According to the Multiple Indicator Cluster Survey (2019), the proportion of wasting is still 9.8%. The Food Insecurity Experience Scale estimates the national prevalence of food insecurity to be 31.5% (UN, 2021). High dependency on local agriculture leads households to occasional unemployment and seasonal variations in food security. However, income from non-agricultural sources, such microcredit-based initiatives, could protect people from such seasonal food insecurity (Islam et al. 2016).

Since 1970, microcredit has gained in significance as a tool for eradicating poverty and improving food security in Bangladesh. In addition to the immediate decrease of poverty, microcredit helped its borrowers to build assets that contributed to long-term sustainability. As an experimental effort, the Grameen Bank launched microcredit programs in Bangladesh in 1976 and microcredit was initiated by Bangladeshi banking innovator Professor Dr. Muhammad Yunus. The majority of non-governmental organizations (NGOs) that offer microcredit are non-bank financial institutions (NBFIs). Large microfinance operations are supported by a number of government ministries or divisions, and a number of commercial banks have set up windows for microloan applications (Mazumder and Lu, 2015). Today more than 3000 NGOs, commercial banks, and specialized financial institutions operate programs, with poor rural women serving as their primary target market.

Even though the government has provided social safety net programs, 30 percent of population of Bangladesh was impoverished as of June 2020, rising from 21 percent in June 2019 (FAO, 2021). The present social safety nets and social protection initiatives (such as old age allowance, widowed allowance, educational stipend for the disabled students, and Vulnerable Group Feeding (VGF)) are insufficient to help the rural poor in Bangladesh (Ali et al. 2017). Some money lenders in rural areas of Bangladesh are

taking full advantage of this restriction by providing loans to the underprivileged at high rates of interest with limited repayment periods. Such actions prevent the poor from making investments in production and service-related firms that could grow into income activities (Haque et al. 2017). For instance, small-scale initiatives have been created that focus on the rural poor, the disadvantaged, and the vulnerable to increase food security (Chilimba et al. 2020).

1.2. Problem of the Study

Bangladesh as a nation recently elected to migrate from the Millennium Development Goals to the Sustainable Development Goals (SDGs) regarding policy. The second goal of SDGs is "Zero hunger," where countries are expected to work toward eradicating hunger, achieving food security and better nutrition, and advancing sustainable agriculture. Over the past 20 years, poverty has significantly decreased in Bangladesh, but severe food insecurity still exists (Rahman and Salim, 2013). According to a study by the Economist Intelligence Unit, Bangladesh ranked 80th out of 116 countries in the Global Food Security Index (Economist, 2022). Poor households in rural Bangladesh receive the majority of their income from agriculture, which exposes them to seasonality in agriculture production, poverty, and spending (Rahman and Salim, 2013). Non-agricultural income could protect households from temporary food insecurity, but they might not have the financial ability to expand into more profitable employment opportunities that could boost food security, especially during hard economic times. Even when overall food supplies are adequate, households with low incomes and limited access to finance are at risk of going without food (Islam et al. 2016).

Microcredit is a form of micro-loans to the underprivileged, impoverished borrowers who typically lack collateral, steady employment and a verifiable credit history with a view to supporting entrepreneurship, income generation and poverty alleviation (Yunus, 2008). Microcredit is considered as one of the effective tools to alleviate poverty which provides credit facilities to the poor for pursing Income Generating Activities (IGAs) without collateral (Mahmud et al., 2017). Researchers reported that the poor rural women became successful in uplifting their living-standard in terms of social and economic aspects because of their participation in the microcredit programs (Mahmud et al., 2017). Microcredit programs are designed to reduce poverty by enhancing the food security of low-income households, with a particular emphasis on

the impoverished women. (Haque, 2021). Microcredit programs were also criticized by the researchers for its failure to reach the ultra-poor (Ahmed, 2009). It is necessary to know the answers of the following questions an appropriate direction.

1. What are the factors that influence the participation of rural households in microcredit programs?
2. Which group is higher in case of food security status between microcredit borrower and non-borrower group?
3. Is there any relationship between microcredit and food security?
4. What is the impact of microcredit on food security of rural households?
5. What are obstacles that are faced by microcredit borrowers?

1.3. Justification of the Study

Microcredit was created to fill a critical gap in the provision of credit that was not being met by formal institutions. Without it, landless rural households would not be able to obtain credit and would instead be trapped in the informal credit system. Improved food security for rural poor people has been one of the main driving motivations for the development of microcredit from its foundation (Islam et al. 2016). The country has implemented a number of micro-interventions to ensure food security, including micro financing (Chilimba et al. 2020). Many researchers (Haque, 2021; Debnath et al. 2019; Akhter & Cheng, 2020; Sharmin, 2014) focused to find out the impact of microcredit on women empowerment. Another group of researchers (Ali et al. 2017; Chugtai et al. 2015; Shonchoy & Kurosaki, 2013) tried to find out the link between microcredit and poverty alleviation. Haque et al. (2017) explored to find out the relation of microcredit with household income, expenditure and savings. Islam et al. (2016) focused on the impact of microcredit for food security including children and women between the age of 15 to 49 and exclude the male borrowers, while Berg et al. (2020) explored the impact of microcredit on seasonal famine in Northern part of Bangladesh. Ali, et al. (2017) and Hussain et al. (2017) found that microcredit program participation is inefficient for poverty alleviation. Mazumder and Lu (2015) found that microcredit participation helps to contribute better quality of life. Shonchoy & Kurosaki, (2013) and Haque et al. (2017) identified that microcredit has a positive relation with income, spending and savings. Few other researchers (Bidisha et al. 2017; Islam et al. 2016; Khanom, 2014; Wadud, 2013) found that microcredit participation increased the food security of

microcredit borrowers. Mounirou & Lokonon, (2022) also explored relationship between microcredit and food security and found that microcredit had a favorable impact on food consumption but no impact on food security.

Most of the above-mentioned empirical studies observed the impact of microcredit on food security of microcredit borrowers and non-borrowers without concerning both gender and those studies were surveyed focusing on only women borrowers. Concerning this issue, this study seeks to assess the factors influencing access to microcredit of rural households, and to explore the food security status of microcredit borrowers and non-borrowers including both gender: male and female, and to evaluate the effect of microcredit on food security status of rural households in some selected areas of Bangladesh. It also seeks to inform policymakers on the relevance and contribution of microcredit programs in poverty alleviation and welfare improvement of Bangladesh.

1.4. Specific Objectives

It was assumed that the microcredit intervention would boost the purchasing power of microcredit borrowers and allow them to achieve food security. The specific objectives of the study are as follows:

1. To find out the factors affecting the participation in microcredit program;
2. To assess the food security status of microcredit borrowers and non-borrowers; and
3. To determine the effect of microcredit on food security status of the households.

1.5. Limitations

Microcredit programs are available in all divisions of Bangladesh. However, due to time and financial constraints, data for this study was only gathered from two districts in the Chittagong division. Future studies could include more study areas that take into account socioeconomic and regional factors in order to generalize the accurate findings.

1.5. Organization of the thesis

The rest of the thesis is structured as follows: A review of the literature is presented in Chapter 2. The materials and methods are provided in Chapter 3. The results and discussion are outlined in Chapter 4. The constraints faced by microcredit borrower is provided in Chapter 5. The summery, conclusion and recommendation are provided in Chapter 6.

CHAPTER 2

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.

Haque (2021) concentrated on underprivileged women from rural Bangladesh who used microcredit to improve their standard of living. The main goal of the study was to evaluate the effect of microcredit on the food security status of rural poor women. Primary data was gathered from landless, marginal, and small borrowers from Gazipur and Mymensingh districts of Bangladesh. The samples were selected using the simple random sampling technique and the analysis was conducted by applying the Propensity Score Matching (PSM) method. The opinions of the borrowers regarding the contribution of microcredit to improving their level of food security were evaluated using binary logistic regression. The results of this study demonstrated that the utilization of microcredit increased household food expenditures significantly. However, the study only considered the female farm workers.

Ali et al. (2017) investigated the use of microcredit for the development and poverty alleviation in rural Bangladesh. The purpose of this qualitative research study was to evaluate the efficiency of microfinance programs and identify the causes of the high level of poverty among microfinance recipients in the Bogura district of Bangladesh. The results of the study showed that poor women were physically and verbally harassed and that microfinance programs were inefficient due to excessive interest rates, insufficient loans, unproductive use of loans, staff corruption, weak abilities, and weekly repayment schedules. Chronic poverty is also a result of a lack of employment opportunities, access to education, healthcare, and social safety nets; natural calamities; the dowry system; and escalating prices for basic daily necessities.

Islam et al. (2016) explored the impact of microcredit on a variety of food security indicators, including household calorie availability, dietary diversity indicators, and anthropometric status of women and children between the ages of 15 and 49. According to the study, involvement in microcredit programs boosts calorie availability at both the intense and extensive margins, but does not promote dietary diversity or have any significant effects on anthropometric measurements. According to the authors, the effect of microcredit participation on food security may not be linear. Micro credit may initially have little effect on food security before improving in the long run. The findings of the study helped to clarify why various short term microcredit evaluations do not always positive effects.

Bidisha et al. (2017) focused the role of credit in food security and dietary diversity in Bangladesh. Authors employed a propensity score matching and an instrumental variable technique to address any selection bias. Result showed that households with access to credit likely to have better food security and more varied diets. Households with access to credit typically consumed more calories per person. According to various dietary diversity scores, including the food consumption score and the household dietary diversity score, households with access to credit tended to score higher than those without it.

Agarwal (2018) focused on the ability of SDG 5 (Gender Equality) to contribute to household food security as well as its shortcomings. Findings indicated that women's access to land and natural resources could considerably improve women's capacity to produce and obtain food. Its shortcomings included a failure to acknowledge forests and fisheries as important sources of food and a lack of attention to the production challenges faced by women farmers.

Mazumder & Lu (2015) examined the impact of microcredit on basic rights and standard of living. About 300 microloan recipients and 200 control respondents were surveyed. Propensity score matching, multiple regression, factor analysis, descriptive statistics, and treatment effect models were all used in the analysis. It appeared that microfinance expanded the fundamental rights of respondents and contributed to a better quality of life; receivers of non-governmental microloans consistently experience more favorable effects.

Haque et al. (2017) evaluated the impact of microfinance on household income, spending, and savings. The study focused on borrowers who had successfully completed at least three loan cycles. A household level survey (N=3000) was conducted to collect data from respondents who received microcredit from ASA, which is known as one of the biggest NGOs. The authors found that microcredit program of ASA had a considerable favorable influence on household income, expenditures, and savings using multiple regression. In addition, the study showed that raising household income, spending, and savings depends significantly on education level. As a result, the ASA microcredit program helped in disadvantaged rural and urban households of Bangladesh to compete more effectively and to raise their standard of life.

Banerjee et al. (2015) presented the findings of a randomized evaluation of a microcredit program for group lending in Hyderabad, India. A lender operated in 52 randomly chosen communities, which increased microcredit usage by 8.4 percentage points. Consumption did not greatly rise, but small business investments and current business profits rose. Spending on durable products grew, however spending on "temptation goods" decreased. No appreciable changes were discovered in the areas of women's empowerment, education, or health.

Chilimba et al. (2020) examined the effect of microfinance program participation on household food security in Malawi. Micro activities, including micro-financing, that focused on the poor, vulnerable, and marginalized individuals have grown in importance in development agendas. Because of this, it was crucial to evaluate how micro activities, like microfinance programs, affect welfare measures like food security. Cross-sectional data from Malawi's Third Integrated Household Survey, conducted in 2010–2011, were used in the study. By employing Heckman selection model the study showed that participation in microcredit had positive influence on food security.

Debnath et al. (2019) stated the factors affecting ability of rural women household to acquire microcredit and how this has an effect on rural women's empowerment in Bangladesh. In two sites in Bangladesh, 300 women's families participated in a face-to-face survey that was performed in 2018. Descriptive statistics and econometric models were applied to accomplish the objective. According to the study's findings,

family size had a positive and substantial impact on accessibility to the microcredit program, whereas higher yearly income had an adverse relationship with accessibility. The empirical findings showed that microcredit borrowers have more control over their personal savings. The results of the regression analysis also showed that women's legal awareness and participation in household decision making process are significantly and favorably affected by microcredit program.

Berg et al. (2020) examined the effects of microfinance membership on the ability of household to cope with the seasonal famine known as Monga using the Instrumental variable estimate technique which offered a way to remove biasness. Evidence demonstrated that participation in micro lending enhanced food security during Monga, especially for the poorest households, who were barely able to survive. However, the improvements in food security were not primarily due to higher income since microcredit did not make it easier for people to relocate in search of job or lessen their reliance on forced labor sales. The data are in consistent with consumption smoothing being the main driver of improvements in food security for MFI households during the famine season.

Khanom (2014) assessed the impacts of the RMC (Rural Microcredit) on poverty alleviation. This study presented the findings from a survey of 68 RMC households from 18 Unions throughout 5 Districts. The findings of survey indicated a negligible rise in income levels. Despite being a requirement of the program, it was also discovered that just over half of the participants did not receive any instruction in the skills necessary for engaging in income-generating activities (IGAs). The study also found that beneficiaries were not happy with the interest rates, and the majority of RMC participants agreed that the rates were too high and should be lowered. The survey results do show that the RMC was successful in increasing food intake and poverty alleviation.

Chugtai et al. (2015) evaluated the efficiency of microfinance in reducing poverty in Pakistan. Structured questionnaires were used for primary data collection of the study. Multiple liner regression and paired t-tests were used to analyze the data that had been gathered. The findings indicated that microfinance had a significant positive influence

on children's educational outcomes and the financial health of businesses. Housing and the enterprise's ability to smooth out income had not been affected.

Mounirou & Lokonon (2022) evaluated the impact of microcredit on food security in Benin, West Africa. Data were collected from the Comprehensive Food Security and Vulnerability Analysis (CFSVA) of Benin. To measure household food security, two indicators were used: food consumption classes (poor, acceptable, and within limits) and food security classes (severe, moderate, within limits, and food security). The authors used an extended ordered probit regression because of the ordered nature of the various categories of these two indicators and the fact that access to microcredit is not random and may be due to selection bias (unobservable factors may affect financial inclusion). The results also showed that access to microcredit had a beneficial impact on the categories of food consumption but had a negative impact on the categories of food security. For instance, having access to microcredit reduced the risk that a household would only consume a little amount of food or consume food that was of poor quality. Additionally, employing microcredit for food purchases had a favorable impact on food consumption but no impact on food security.

Hussain et al. (2017) evaluated the effectiveness of MFIs and assess the socioeconomic effects of microcredit initiatives. Descriptive statistics were employed to evaluate panel data from more than 2500 households. The results showed that microcredit program had been successful in giving households the ability to create jobs and in raising the potential for income development, both of which helped to reduce poverty. Due to the lack of a direct connection between the microcredit program and non-labor income sources like remittances, the welfare impact of participation in the microcredit program was more obvious on household labor income than on total household income. The participating households at the lower end of the income distribution appeared to have benefited more than those at the upper end and implied that involvement in microcredit programs has an equalizing effect.

Akhter & Cheng (2020) explored the empowerment performance of microcredit recipients compared to non-recipients in the same socioeconomic context. Regression analysis and propensity score matching methods were used in this study. The empirical findings included not only involvement in the accessibility of microcredit but also some

qualitative traits of women's empowerment. According to the results, microcredit had a substantial impact on raising participation in general decision-making, legal awareness, independent movements, and mobility, as well as on improving living standards to support long-term women's empowerment.

Wadud (2013) examined the impact of microcredit on farm productivity, output, and food security using farm level survey data from Rangpur, Dinajpur, Bogra and Rajshahi districts of Bangladesh. The survey was carried out on 682 farms, of which 450 were recipients of microcredit and the remaining 232 were non-recipient. The Cobb-Douglas stochastic frontier, data envelopment analysis (DEA), inefficiency effects model, and propensity score matching (PSM) methodologies were used to evaluate the effects of microcredit on farm performance, output, and food security. Results indicated that microcredit had a positive effect on agricultural income, which could ultimately help to reduce poverty and to increase food security. The average income of farms that received microcredit is 9.46% greater than the average revenue of non-recipient farmers.

Sharmin (2014) explored the efficiency and capacity of microcredit in improving livelihood status and empowerment of women in rural Bangladesh. Sen's Capability Approach was employed in the study to assess the potentiality of microcredit to reduce poverty aids and enhance food security of its participants. The results demonstrated that microcredit could improve women capacity to achieve food security by providing them with a variety of social and economic solutions to their vulnerabilities.

Annim & Frempong (2018) looked at the connections between dietary variety, household income, and credit availability. Authors employed the Food Diversity Index and Food Consumption Score to simulate dietary diversity. The analysis employed data from the fourth and fifth rounds of the Ghana Living Standards Survey, with respective sample sizes of 5779 and 8312 households. An instrumental variable estimate technique was used in order to address the endogeneity between household nutritional status and income/credit. Results of the study indicated that access to credit helped to consume a varied diet and the findings also supported the hypothesis that there was a causal link between dietary diversity and income.

Negera et al. (2019) conducted the study to identify local informal institutions and their functions in ensuring household food security in Ethiopia. Data on local institution membership and food consumption were gathered and analyzed using mixed methods research. To determine the function of neighborhood institutions in ensuring the food security of households, a logit model was used. The findings indicated that 45.1% of households experienced food insecurity. Several local organizations helped microcredit borrowers to escape food insecurity, and several were found to decrease their food security.

This study makes a significant marginal contribution to the existing body of literature on microcredit and food security in rural households in Bangladesh. While several related studies have explored the impact of microcredit on poverty alleviation, women's empowerment, and various socioeconomic outcomes, this study focuses specifically on the effect of microcredit on food security, taking into account both male and female participants.

This study contributes to the existing knowledge on the determinants of financial inclusion in rural areas by investing the factors influencing participation in microcredit programs. The study aims to assess the food security status of both microcredit borrowers and non-borrowers, including both genders. This comprehensive analysis will provide a clearer picture of the food security situation in rural Bangladesh, considering the perspectives of various segments of the population. By evaluating the effect of microcredit on the food security status of rural households, this research fills a crucial gap in the literature. The findings will shed light on the role of microcredit in enhancing food security and address whether microcredit interventions are effective in improving the purchasing power and overall food availability of households. The findings of this study will inform policymakers and microcredit providers about the relevance and contribution of microcredit programs in poverty alleviation and improving the welfare of rural communities in Bangladesh. The study's insights into the factors influencing microcredit participation and the impact on food security will guide the formulation of evidence-based policies and interventions to enhance financial inclusivity, promote sustainable agriculture, and address food insecurity.

Overall, this study's marginal contribution lies in its comprehensive analysis of the factors influencing microcredit participation, its assessment of the food security status

of microcredit borrowers and non-borrowers (including both genders), and its evaluation of the effect of microcredit on the food security of rural households. By addressing these gaps in the existing literature, the study will provide valuable insights to policymakers, microcredit providers, and researchers, aiding in the formulation of effective strategies to improve food security and promote the overall well-being of rural households in Bangladesh and other similar contexts.

CHAPTER 3

METHODOLOGY

This chapter represents the methodology of the study. Methodology outlines the way in which research to be taken and identify the methods and describes the identifying methods for calculating specific result. This study was carried out by using primary data collected from selected areas of Bangladesh to evaluate the impact of microcredit on food security. A chronological description of the methodology for the study is presented below.

3.1. Study Areas and Sampling Technique

The study used multistage sampling technique. First, two districts namely Comilla and Chandpur were selected considering the time, budget, and accessibility of the researcher. Second, five upazillas namely Haziganj, Shahrasti, and Kachua upazillas in the Chandpur district and Muradnagar and Laksham in the Comilla district were selected purposively due to availability of microcredit borrowers. A total of 200 respondents were surveyed, of which 110 were microcredit recipients and rest of them were non-recipients (did not receive microcredit). A purposive sampling method was followed in selecting samples and collecting data from respondents. The data was collected from January to June of 2022.

Table 1. Sample Distribution

SL No.	**District**	**Upazilla**	**No. of microcredit borrower**	**No. of microcredit non-borrower**	**Total no. of household**
1	Chandpur	Haziganj	22	18	40
2	Chandpur	Kochua	25	15	40
3	Chandpur	Shahrasti	18	22	40
4	Comilla	Laksham	26	14	40
5	Comilla	Muradnagar	19	21	40
Total			110	90	200

Source: Field survey, 2022

3.2. Data Collection

In this study, primary data was collected through face to face interviews using a structured interview schedule. Primary data were collected in terms of respondents' demographic profile, asset ownership, the number of earning members in the household, training, technology adoption, household income, expenditure, remittance, credit management, distance from highway, and level of food consumption. The collected data was entered into an Excel spreadsheet and then imported into STATA for analysis.

3.3. Analytical Techniques

Data were analyzed using both descriptive and econometric modeling to accomplish the objectives of this study.

3.3.1. Factors Influencing Access to Microcredit

Probit regression model has been employed in this study to evaluate the variables influencing access to microcredit program. Many response variables are binary by nature, requiring either yes or no (or 1/0) response. Ordinary least square (OLS) regression model has been shown to inappropriate when the response variables are discrete. For this reason, Probit regression model become more suitable when dealing with such situation.

The probit model restricts the predicted probabilities to lie between 0 and 1. Additionally, it loosens the restriction that the effect of the independent variable is constant for all expected values of the dependent variable. The probit model is preferable to logit models in small samples. The probit model makes the assumption that while we only observe the values of 0 and 1 for the dependent variable Zi, there is a latent, unobserved continuous variable Zi* that determines the value of Zi. For this study, the probit model is preferred and used to determine the factors that influencing access to microcredit program.

Suppose the response variable *Zi* is binary with only two possible outcomes denoted as 1 and 0. Consider also a vector of regressors *Xi*, which are assumed to influence *Zi*. Specifically, we assume that the model takes the form:

$$Pr(Zi = |1|) = \Phi(Xi' \gamma)$$

Where Pr denotes probability, *Zi* is the binary choice variable, that is access to microcredit, Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution, "|" is the symbol stands of conditional on and γ is a vector of unknown parameters.

It is assumed that Z^* can be specified as follows:

$Zi^* = \gamma_0 + \sum_{n=1}^{N} \gamma n\, Xni + ui$

And that:

Zi=1 if Zi*>0 and otherwise Zi=0

Where Xi represents a vector of explanatory variables, γ is a vector of unknown parameters and *ui* is a random disturbance term. *N* is the total sample size. The unknown parameters are estimated by the method of maximum likelihood.

The availability of microcredit to rural households is the dependent variable for the current study. Microcredit accessibility cannot be quantified directly, instead it is determined by looking at observations of household borrowings, such as whether or not households borrowed microcredit. The decision of the household to engage in the microcredit program may be influenced by several factors. The explanation of the independent variables (Xi) used in the model are given in Table 2.

Table 2. Description of Independent variables

Independent Variable	**Description**	**Hypothesis**
Gender	1 if the respondent is male, 0 otherwise.	(+/-)
Age	Age of the household head expressed in years	(+/-)
Education	Education of household head expressed in years	(+/-)
Household size	Total number of members in the family	(+)
Type of family	1 if joint family, 0 otherwise.	(+)
Occupation	1 if primary occupation is agriculture, 0 otherwise.	(+/-)
Agricultural land	Total amount of land under crop cultivation expressed in decimal (247 decimal = 1 hectare)	(+)
No of earning member	Total number of earning member in the family	(-)

Training	1 if the respondent received training on farming, 0 otherwise.	(+)
Non-farm income source	1 if the respondent has non-farm sources of income, 0 otherwise.	(-)
Income	Annual income from farming and non-farming sources in '000 BDT (1 USD = 105 BDT at the time of analysis)	(-)

3.3.2. Measurement of Food Security Status

This study employed food consumption score (FCS) to assess household level food security. The World Food Program (WFP) developed the FCS (WFP, 2008). The FCS is a composite measure based on dietary diversity, food frequency, and the relative nutritional value of various food groups. The FCS collects information at the household level on the variety and frequency of food groups consumed during the previous seven days. This information is then weighted based on the relative nutritional value of the food groups consumed. It is a potent proxy for food intake and food security since it combines food diversity and frequencies. A household's food consumption can be further categorized based on this score into one of three groups: poor, borderline, or acceptable (WFP, 2008).

The respondent is questioned about how frequently each food group and item had been consumed in the household over the previous week. The consumption frequencies are added together and multiplied by the standardized food group weight to determine FCS. According to the nutrition density of each food category, the WFP has determined the weighting of the food groups which is shown in Table 3.

Table 3. The Standard Food Group and Current Standard Weights

SL NO	FOOD ITEMS	FOOD GROUPS	Weight
1	Maize, maize porridge, rice, sorghum, millet pasta, bread and other cereals	Main staples	2
2	Beans, Peas, Groundnuts and cashew nuts	Pulses	3
3	Vegetables, leaves	Vegetables	1
4	Fruits	Fruit	1
5	Beef, goat, poultry, pork, eggs and fish	Meat and Fish	4
6	Milk, yogurt and other dairy	Milk	4

7	Sugar and sugar products, honey	Sugar	0.5
8	Oils, fats and butter	Oil	0.5
9	Spices, tea, coffee, salt, fish power, small amount milk for tea	Condiments	0

Source: WFP (2008)

Then the WFP's recommended cut-offs (WFP, 2008) can be applied to the food consumption score to further categorize households as having poor, borderline, or acceptable food consumption. These cut-offs consider the poor and borderline categories as food insecure whereas the acceptable category is food secure. Classification of household based on FCS in context of Bangladesh is shown in Table 4.

Table 4. Classification of Household Food Security Status based on FCS

FCS	PROFILES
0-28	Poor
28-42	Borderline
>42	Accepted

Source: Bidisha et al. (2017)

3.3.3. Impact of Microcredit on Food Security

In this study, the PSM (Propensity Score Matching) technique has been used to assess the impact of microcredit on food security. PSM is widely used by the researchers for impact analysis (Sejuti,2021; Mazumder and Lu, 2015; Islam et al. 2016; Bidisha et al. 2017; Wadud, 2013). Rural families without access to microcredit were identified as the "control group," while rural households who received support were identified as the "treatment group". We analyzed the data by utilizing propensity score matching (PSM) method established by Rosenbaum and Rubin in order to address the question regarding the comparability of participant and comparison groups (1983). The main purpose of using PSM is to match groups of participants to non-participants.

Impact assessment in this study includes comparing the results of the treatment group, or those who received the microcredit program intervention, and the control group, or those who did not. Matching the control group's unit with the treatment group is essential in the PSM strategy. The nearest neighbor (NN) matching method and radius matching techniques have been employed for this purpose. The impact of the program is then determined by the difference between the two groups.

$$ATT = E(Y_1 - Y_0 \mid \mathrm{X}, \mathrm{I} = 1) = E(Y_1 \mid \mathrm{X}, \mathrm{I} = 1) - \mathrm{E}(Y_0 \mid \mathrm{X}, \mathrm{I} = 1)$$

Here, ATT is the average impact of treatment on the treated and Y_1 and Y_0 represent the outcomes (FCS) of the treatment group and outcome (FCS) of the control group respectively. X is the independent variables, I is the treatment indicator (I = 1 if the household received microcredit). A positive (negative) value of ATT suggests that rural microcredit participants have higher (lower) outcome variable than non-participants.

CHAPTER 4
RESULTS AND DISCUSSION

4.1. Description of Household Characteristics

4.1.1. Gender

Gender is one of the variables that can determine the credit utilization of households. As indicated in Table 5, out of the 200 households, 57% were male and the remaining 43% were female. Out of 110 microcredit borrower households, 73.64% were male and 26.36% were female. On the other hand, out of the 90 microcredit non-borrower households, 36.67% were male and 63.33% were female. There was statistically difference between male and female on credit utilization.

4.1.2. Type of Family

Of the total sampled households, 58.5% households were belonged to joint family and the remaining 41.5% were belonged to nuclear family. Among the microcredit borrowers, 80% were joint family whereas 20% of them were nuclear family. On the other hand, 32.22% were joint family and 63.33% were nuclear family among microcredit non-borrower group. There was statistically difference between joint and nuclear family on credit utilization.

4.1.3. Occupation

Of the total sampled households, 49% households were engaged to agriculture as main occupation and the remaining 51% were engaged to non-agriculture as main occupation. Among the microcredit borrowers, 51% were involved in agriculture whereas 59% of them were involved in non-agriculture occupation. On the other hand, 52.22% were involved in agriculture and 47.78% were involved in non-agriculture occupation among microcredit non-borrower group.

4.1.4. Non-farm Income

Non-farm income plays an important role in affecting the credit utilization of rural households. Of the total sampled households, 74% households had non-farm income source and the remaining 26% households did not have any non-farm income source. Among the microcredit borrowers,70% households had non-farm income source whereas 30% of them did not have non-farm income source. On the other hand, 78.89%

households had non-farm income source and 21.11% did not have non-farm income among microcredit non-borrower group.

4.1.5. Training

Of the total sampled households, 42.5% households got skill development training and the remaining 57.5 did not get no training. Among the microcredit borrowers, 59% got skill development training whereas 41% of them did not get training. On the other hand, 22.22% households got training and 77.78% did not get training among microcredit non-borrower group.

Table 5. Descriptive Statistics of Sample Households (Dummy Variables)

Variable	**Borrowers (110)**		**Non-borrowers (90)**		**Total (200)**		**t value**
	N	**%**	**N**	**%**	**N**	**%**	
Gender							1.97
Male	81	73.64%	33	36.67%	114	57%	
Female	29	26.36%	57	63.33%	86	43%	
Family							2.39
Joint	88	80%	29	32.22%	117	58.5%	
Nuclear	22	20%	61	67.78%	83	41.5%	
Occupation							-0.28
Agriculture	51	46.36%	47	52.22%	98	49%	
Non-agriculture	59	53.64%	43	47.78%	108	51%	
Nonfarm Income							6.75
Yes	77	70%	71	78.89%	148	74%	
No	33	30%	19	21.11%	52	26%	
Training							-2.11
Yes	65	59%	20	22.22%	85	42.5%	
No	45	41%	70	77.78%	115	57.5%	

Source: Field Survey, 2022

4.1.6. Age

Table 6 indicated that the overall mean age of the sampled households was 37.78 years. The mean age of the microcredit borrower and non-borrower group was 40.32 years and 34.67 years, respectively.

4.1.7. Education

The result discloses that the overall mean of the educational level of sampled households was 8.58 years. While the mean educational attainment of microcredit borrowers and non-borrowers was 6.85 years and 10.7 years, respectively.

4.1.8. Earning member

The overall mean of the earning member of the sampled households was 1.59. The mean of the earning member of microcredit borrower group was 1.24. On the other hand, the mean of the earning member of non-borrower group was 2.02.

4.1.9. Household size

Household size is an important factor for determining the credit utilization of rural households. The overall mean of household size of sampled households was 5.46. The mean of household size of microcredit borrower and non-borrower group was 6.12 and 4.65, respectively.

4.1.10. Land size

Land size plays an important role for determining the credit utilization of rural households. The overall mean of land size of the sampled households was 31.82 decimals. The mean of land size of microcredit borrower and non-borrower group was 38.9 and 23.17 decimals, respectively.

4.1.11. Annual Income

The overall mean of annual income of the sampled households was 133.94 thousand Taka. The mean of annual income of microcredit borrower and non-borrower group was 136.52 and 130.78 thousand Taka, respectively.

Table 6. Descriptive Statistics of Sample Households (Continuous Variable)

Variables	Borrower (110)		Non-borrower (90)		Overall Mean	t value
	Mean	SD	Mean	SD		
Age	40.32	8.24	34.67	6.17	37.78	5.54
Education	6.85	3.62	10.7	3.39	8.58	-8.02
Earning member	1.24	0.43	2.02	0.69	1.59	-9.34
Household size	6.12	1.28	4.65	1.14	5.46	8.58
Land size	38.9	20.11	23.17	12.09	31.82	6.83
Annual Income	130.78	36.19	136.52	47	133.94	-1.50

Source: Field Survey, 2022

4.2. Factors Influencing Access to Microcredit

To measure the factors like gender, age, education, occupation, land, family type, household size, earning member, non-farm income source, annual income and training influencing access to microcredit, binary probit regression model was used. In this regression model, participation in credit programs was considered as dependent variable which had two categories (microcredit borrower=1 and microcredit non-borrower=0).

Table 7. Estimated Co-efficient and their Related Statistics

Variable	Coef.	Std. Err.	Z	P>|z|	dy/dx
Gender	0.786	0.323	2.43**	0.015	0.101
Age	0.054	0.023	2.32**	0.020	0.007
Education	-0.141	0.049	-2.88***	0.004	-0.018
Occupation	-1.191	0.413	-2.88***	0.004	-0.139
Land	0.020	0.010	2.01**	0.045	0.002
Family	0.761	0.343	2.22**	0.026	0.098
Household size	0.3870	0.6281	2.30**	0.021	0.053
Earning member	-1.44	0.299	-4.85***	0.000	-0.186
Non-farm income	0.692	0.365	1.97**	0.049	0.089
Annual income	-0.013	0.004	-2.01**	0.045	-0.002
Training	1.51	0.466	3.25***	0.001	0.148
Constant	-2.45	1.05	-2.31**	0.021	
Total Observation:200; R^2=0.66 N.B: *** indicate 1% level of significance and ** indicate 5% level of significance					

Source: Field Survey, 2022

4.2.1. Gender

The marginal value of gender was 0.101 which was significant at 5% level of significance. It indicates that male borrowers have 10% more probability of access to microcredit compared to female borrowers. Male people usually have social and political power and dominate in ownership. On the other hand, female have no control over financial resources and the nature of their financial activities restrict their access to microcredit. Moreover, the result indicates that male headed households are more likely to access credit than female headed households.

4.2.2. Age

The marginal value of age was 0.007 which was significant at 5% level of significance. It indicates that considering all other factors constant, one year increment of age would increase probability of access to microcredit by 0.7%. As older people are more experienced and have better social network and associations with formal credit institutions, they have more access to credit from MFIs.

4.2.3. Education

The marginal value of education -0.018 which was significant at 1% level of significance. It indicates that considering all other factors constant, one year increment of education would decrease probability of access to microcredit by 1.8%. Educated people have more ability to analyze costs and benefits and to get and information. That's why they are reluctant access to microcredit due to higher interest rates.

4.2.4. Occupation

The marginal value of occupation was -0.139 which was significant at 1% level of significance. It indicates that the people who are engaged in agricultural sector have 13.9% less probability of access to microcredit compared to the people who are not engaged in agriculture. Agriculture based households earn from the sale of both crop and livestock and reduce their food consumption cost by consuming their own agricultural goods. That's why they are less likely access to microcredit than non-agricultural based households.

4.2.5. Land

The marginal value of land was 0.002 which was significant at 5% level of significance. It indicates that considering all other factors constant, one decimal increment of land would accelerate probability of access to microcredit by 0.2%. It implies that the larger the cultivated land, the farmers utilize more inputs such as labor, fertilizers, seed, pesticides etc. that demand additional capital that would be obtained through microcredit.

4.2.6. Family

The marginal value of family was 0.098 which was significant at 5% level of significance. It indicates that joint families have 9.8% more probability of access to

microcredit compared to nuclear families. It indicates that joint families self-insufficiency in terms of food consumption because joint families consume more than nuclear families. For this reason, joint families are more likely access to microcredit than nuclear families.

4.2.7. Household size

The marginal value of household size was 0.053 which was significant at 5% level of significance. It indicates that considering all other factors constant, one member increment of household would intensify probability of access to microcredit by 5.3%. It indicates that larger number of family members provides additional labor force to participate in production that require financial capital through microcredit.

4.2.8. Earning member

The marginal value of earning member was -0.186 which was significant at 1% level of significance. It indicates that considering all other factors constant, one earning member increment of household would decline probability of access to microcredit by 18.6%. Households with excess labor supply do not face liquidity constraints whereas households with limited labor supply need to borrow to cover liquidity constraints.

4.2.9. Non-farm income

The marginal value of occupation was 0.089 which was significant at 5% level of significance. It indicates that the people who have non-farm income source, have 8.9% more probability of access to microcredit compared to the people who have no non-farm income source. The households with non-farm income source need to diversify their activities and so they rely on external finance. For this reason, they need more financial sources and they are more likely to participate in microcredit.

4.2.10. Annual Income

The marginal value of annual income was -0.002 which was significant at 5% level of significance. It indicates that considering all other factors constant, one thousand Taka increment of income would diminish the probability of access to microcredit by 0.2%. The households who earn more income are less likely access to microcredit than those households with less amount of income.

4.2.11. Training

The marginal value of training was 0.148 which was significant at 1% level of significance. It indicates that the trainers have 14.8% more probability of access to microcredit compared to the non-trainers. Trainers find innovative idea from training and try to apply their knowledge and skill in income generating activities. Therefore, trainers need to capital and they are more likely access to microcredit than non-trainers.

4.3. Household Level Food Security

Food security status of households are classified into three categories such as poor category, borderline category and acceptance category. Food security status of total sample households based on FCS is shown in Table 8.

Table 8. Food Security Status of Household Based on FCS

Food Security Status	**No. of Microcredit Borrowers (110)**	**Microcredit Borrowers (%)**	**No. of Microcredit Non-borrowers (90)**	**Microcredit Non-borrowers (%)**
Poor (0-28)	0	0	0	0
Borderline (29-42)	42	38.18	4	4.44
Acceptable (>42)	68	61.82	86	95.56

Source: Field survey, 2022

It is demonstrated in Table 8 that neither microcredit borrowers nor non-borrowers fell into the category of the poor. About 42 households (38.18%) and 4 households (4.44%) were belonged to borderline category of microcredit borrower and non-borrower group, respectively. It is also evident from Table 7 that about 68 households (61.82%) and 86 households (95.56%) were belonged to acceptable category of microcredit borrower and non-borrower, respectively.

Table 9. Food Security Status of Microcredit Borrower and non-borrower households

Food Security Status	No. of Borrowers	% of borrowers	No. of Non-borrowers	% of Non-Borrowers	Total NO.	Total %
Food Insecure	42	38.18	4	4.44	46	23
Food secure	68	61.82	86	95.56	154	77
Total	110	100	90	100	200	100

Source: Field Survey, 2022

By using FCS, we classified households into food secure and food insecure. According to WFP, poor and borderline category are considered as food insecure and acceptable category is considered as food secure. It is shown that in case of microcredit borrower group, about 38.18% were belonged to food insecure and 61.82% were belonged to food secure. On the other hand, in case of microcredit non-borrower group, it seems that about 4.44% households were belonged to food insecure and about 95.56% households were belonged to food secure. It is seen that the proportion of food insecure households in microcredit borrower group was higher than proportion of food insecure households in microcredit non-borrower group. It is demonstrated that only 154 households (77%) were fell into food secured and remaining 46 households (23%) were fell into food insecure which was consistent with the national level study of food security as about 25% people of Bangladesh belong to food insecure.

Table 10. Mean and Mean Differences in Food Consumption Score (FCS)

Variable	Borrower	Non-borrower	Overall Mean	Mean Difference	t test
Food Consumption Score	46.24	60.71	53.50	-14.47***	-12.36

Note: t-test was used. Source: Field Survey, 2022

Table 10 demonstrates the mean and mean difference of food consumption score (FCS) between microcredit borrowers and non-borrowers. The mean food Consumption score

of microcredit borrowers and non-borrowers was 46.24 and 60.71, respectively. The overall mean and mean difference of food consumption score between microcredit borrower and non-borrower groups were 53.50 and -14.47, respectively. The result illustrated that there is a significant difference of food consumption score between microcredit borrower and non-borrower groups. The overall FCS is higher for non-borrowers compared to borrowers.

4.4. Impact of microcredit on food security of rural households

Most of rural households generated income from agricultural sources like crop cultivation, poultry and livestock rearing, fishery, nursery and agribusiness. However, households also received income from non-agricultural activities such as, wage earning, handicrafts, small business, etc. The estimated results of the impact of microcredit on food security status of rural households by using Nearest neighbor and Radius matching are shown in Table 11.

Table 11. Estimated results of Propensity Score Matching

Indicator	Matching Technique	ATT	Std. Err.	t-value
Food Consumption Score	Nearest Neighbor	-17.564	11.71	-1.5
Food Consumption Score	Radius	-6.04	5.28	-1.14

Source: Field Survey, 2022

The negative value of average treatment effect on the treated (ATT) indicates that the microcredit program has reduced the food security status of the borrowers by 17.564 unit based on Nearest Neighbor (NN) matching method. Under the Radius matching method, it is evident that food consumption score of the borrowers has been reduced by 6.04 unit for the treatment group. The study revealed that the food consumption score of the rural households is lower for microcredit borrowers compared to non-borrowers. Under the study, majority of the households do not have access to the basic minimum requirements for healthy standard of living. To fill up their basic minimum requirement, they borrow money from MFIs. However, they do not spend this money in income

generating activities. For this reason, it is hard for them to repay weekly installment with high interest rates of microcredit program. Moreover, maximum microcredit borrowers are illiterate and so they have lack of awareness and competency for improving the standard of living. The households with large amount farmland are more likely to access credit under the study. They complained that if their production fall down due to natural calamities, then it is very difficult for them to repay this loan. Above mentioned all the reasons affect households' food consumption score of microcredit borrowers.

CHAPTER 5

CONSTRAINTS ENCOUNTERED BY MICROCREDIT BORROWERS

In this chapter, the researcher discussed about the problems faced by microcredit borrowers. Open ended questions regarding the constraints of microcredit programs were asked to the respondents. The respondents were free to mention all the problems they faced during their participation in microcredit programs.

5.1. The Constraints Encountered by Microcredit Borrowers

The majority of the participants in this study expressed their dissatisfaction with microcredit programs and reported the causes behind their failure. The constraints encountered by microcredit borrowers in acquiring microcredit is presented in Table 12.

Table 12. Constraints Encountered by Microcredit Borrowers

Problems	**Frequency**	**Percentage**	**Rank**
High interest rate	110	100	1st
Weekly installment	102	92.73	2nd
Inadequate loan for sustainability	94	85.45	3rd
Increased repayment amount	85	77.27	4th
Loan from multiple microcredit programs	53	48.18	5th
Lake of proper investment	41	37.27	6th
Unskilled staff and mismanagement of MFIs	25	22.72	7th
No provisional facilities by MFIs	12	10.90	8th

Source: Field Survey, 2022

5.1.1. High Interest Rates

All of the respondents reported that the interest rates of microcredit programs were very high, which ranked first among the constraints of the microcredit borrowers. The interest scale of microcredit programs is significantly high compared to conventional banks which made repayment difficult as it was not suited to the circumstances of

microcredit participants. As the rural households had no alternative, they had to accept loans from microcredit program because no other banks had offered any solution to assist the rural people. Therefore, high interest rate is considered as a barrier for microcredit program participants to improve their financial situation and food security status.

5.1.2. Weekly Installment

About 93% microcredit participants reported that the weekly installment system of MFIs did not suit to the poor rural households because they had to repay first installment after one week of receiving loan. So, they had difficulty in fulfilling the weekly installment. It is surely impossible to settle income generating activities within one week after receiving loan. The weekly repayment system of MFIs has made vicious cycle of debt for microcredit participants.

5.1.3. Inadequate Loans for Sustainability

Almost 85% microcredit participants of the study reported that the loans which were granted were not sufficient to sustainable business and so they would not be able to repay the weekly installments. Because the spent their loans to fill up their basic needs and so they were unable to apply the loans to plans to improve their financial condition and quality of life as well as improved food security status.

5.1.4. Increased Repayment Amount

Almost 77% microcredit participants reported that when they failed to pay back the loan within a year, the micro-financial institutions (MFIs) extended their loan for further one to two years. That's why the interest rate would be double or triple. Even if they repaid their loan within six months, they would pay interest for the one year. So, the increased repayment amount are unable to improve their standard of living.

5.1.5. Loan from Multiple Microcredit Programs

The microcredit program do not consider the welfare of rural households and their main intension is to achieve profit from poor rural households. As microcredit programs provided insufficient loan for sustainable business, rural people had to achieve loan from different microcredit programs and this problem identified about 48%

participants. Because the limited loans that were available to the rural people granted by microcredit program, would unable to improve their financial conditions. They also achieved loan from different microcredit program to repay the previous loan. The microcredit participants reported that when they achieved loans from different microcredit programs and they were pessimistic about their future. When the microcredit participants were unable to use the loans to establish income, repayment must be made by selling household property.

5.1.6. Lack of Proper Investment

MFIs grant loan to the poor people in accordance with the agreement that they invest the loan for income generating activities. But they spent their loan to meet up basic needs such as food, clothes, education, repaying earlier debt, wedding ceremony and house construction and this problem was identified by about 37% participants. For this reason, they failed to repay weekly installment and fall into vicious cycle of debt.

5.1.7. Unskilled Staff and Mismanagement of MFIs

Approximately 23% of participants reported that loan officers at MFIs were corrupt, including accountability and transparency. When they paid their weekly installment, sometimes they did not record and for this reason they have to repay the installment again. They also mistreated and neglected by MFIs staff as they failed to repay the installment.

5.1.8. No Provisional Facilities by MFIs

About 11% microcredit participants reported that they did not get any provisional facilities such as health facilities, training, health related workshop from MFIs. The participants were unable to manage health care and medical expenses of their insufficient income level. So, they had to spent their loan on medical purpose. As a result, they did not invest the loan granted by MFIs for income generating activities and they were unable to improve their food security status and quality of life.

CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusions, and recommendations of the study. The summary of the study shows the findings briefly. By conclusion, the main points of the report can be identified quickly. Recommendation draws the attention of the respective policymakers to implement some strategy for improving the situation of microcredit borrower to attain quality of life.

6.1. Summary

This study analyzed the link between microcredit program participation and food security of rural households. Bangladesh is a developing country and about 50% people are dependent on agriculture. Though food production is increased day by day, food insecurity is still a major problem in rural Bangladesh. Chandpur and Comilla districts were selected as the study area due to availability of MFIs and borrowers to determine the food security status, factors influencing access to microcredit, and impact of microcredit on food security of the households.

This study based on primary data collected from 200 rural households (110 were microcredit borrower and 90 were non-borrower) were used as representative sample frame. Five upazillas such as Laksham and Muradnagar in Comilla and Haziganj, Kochua, Shahrasti in Chandpur were selected for conducting field level survey from January to June, 2022. A structured interview schedule was used for data collection.

In this study, FCS, Probit regression model and Propensity Score Matching (PSM) techniques were used to evaluate the food security status, factors influencing access to microcredit and impact of microcredit on food security.

Firstly, researcher applied FCS to obtain food security status of microcredit borrower and non-borrower. FCS classified food security status into three categories such as poor, borderline and acceptance category. Findings indicated that there were no households belong to poor category and about 38.18% and 61.82% of borrowers were belonged to borderline and acceptable category, respectively. On the other hand, about

4.44% and 95.56% of non-borrowers were belonged to borderline and acceptable category, respectively. Poor and borderline category were considered as food insecure and acceptable category is considered as food secure. About 77% were belonged to food secure and remaining 23% were belonged to food insecure under the survey. The mean food Consumption score of microcredit borrowers and non-borrowers was 46.24 and 60.71, respectively. The mean difference of food consumption score between two groups was -14.47. The findings indicated that there was a significant difference of food consumption score between microcredit borrower and non-borrower groups.

Secondly, this study specified binary probit regression model to assess the factors influencing access to microcredit. Participation of microcredit program was considered as dependent variable (where borrower=1 and non-borrower=0) and gender, age, education, occupation, agricultural land, family, household size, earning member, non-farm income source, annual income and training were considered as independent variables that determine households' decision to use microcredit service. The marginal value of gender was 0.101 with 5% level of significance implying that male people have 10% more probability of access to microcredit compared to female. The marginal value of age was 0.007 implying that one year increment of age would increase the probability of access to microcredit by 0.7%.

Thirdly, the study evaluated the impact of microcredit on food security status of rural households using Nearest Neighbor (NN) and Radius matching. Result revealed that food consumption score of borrowers decreased by 17.564 unit and 6.04 unit than non-borrowers based on nearest neighbor and radius matching technique, respectively. Under the study, majority of the households do not have access to the basic minimum requirements for healthy standard of living. To fill up their basic minimum requirement, they borrow money from MFIs. However, they do not spend this money in income generating activities. For this reason, it is hard for them to repay weekly installment with high interest rates of microcredit program. Maximum microcredit borrowers are illiterate and so they have lack of awareness and competency for improving the standard of living. The households with large amount farmland are more likely to access credit under the study. They complained that if their production fall down due to natural calamities, then it is very difficult for them to survive and repay this loan. Above mentioned all the reasons affect households' food consumption score of microcredit

borrowers. The findings indicated that microcredit program did not improve food security status of rural households.

6.2. Conclusions

The main objective of this study was to assess the impact of microcredit on the food security status of the rural households. It was expected that the rural households under microcredit programs would utilize the loan for establishing income generating activities that would help to improve the quality of life and food secure. This study revealed that microcredit had no significant impact on food security of rural households. It was observed that majority of the respondents in this study had their opinions and expressed their dissatisfaction with microcredit programs. The main motive of MFIs is to achieve profit by providing loan schemes with high interest rate and they don't consider the improvement of livelihood of rural households. That's why microcredit programs are failed to assist the poor rural households and the rural households could not improve their standard of living as well as food security. High interest rates of credit, weekly installment, increased repayment amount, inadequate loan for sustainability, loan from multiple microcredit program, lack of proper investment, no provisional facilities, unskilled staffs and mismanagement of microcredit programs were the main causes behind the failure.

6.3. Recommendations

Policymakers should emphasize on the following aspects to improve the food security status among the borrowers:

Firstly, encouraging rural households to diversify their income sources beyond agriculture can enhance their access to credit. Microcredit institutions can partner with local development agencies to promote and support income-generating activities in non-agricultural sectors.

Secondly, microcredit programs should be designed to promote sustainable livelihoods for rural households. This could involve integrating credit with capacity-building programs in sustainable agricultural practices, improved livestock management, and environmentally friendly income-generating activities.

Thirdly, regular monitoring and evaluation of microcredit programs are essential to assess their impact on food security and identify areas for improvement. Microcredit institutions should collaborate with researchers and policymakers to evaluate the effectiveness of their interventions and make data-driven decisions.

Fourth, combining microcredit interventions with social support programs, such as nutrition education, healthcare, and access to clean water, can have a holistic impact on improving food security and overall well-being of rural households.

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DEPARTMENT OF MANAGEMENT AND FINANCE

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An Interview Schedule for the Study Entitled

IMPACT OF MICROCREDIT IN ENHANCING FOOD SECURITY OF RURAL HOUSEHOLDS IN BANGLADESH

Serial number: **Date:**

Dear Respondent,
All of your information will be kept confidential and will be used for research purpose only. Please provide the following information.

A. General Information

Name:……..

Address:Village:……..Upazilla:…….

District:…….Mobile:……..

B. Demographic and socio-economic information

1. Gender of the respondent: ……..(Use code)

(Use code: Male: 1, Female :0)

2. Age of the respondent: ……years

3. Education of the respondent: ……..years

4. Household size : ……number

5. Main source of income :…….(Use code)

(Use code: Agriculture: 1, Non-agriculture:0)

6. Type of family: …… (Use code)

(Use code: joint family: 1, nuclear family:0)

7. Amount of own agricultural land : ……decimal

8. Household size : ……number

9. Marital status of the respondent: Yes (1) / No (0)

9.1 If yes, Education of the spouse: ……..years

10. Total number of earning member in the family: ……number

11. Do you or any member of the family have mobile phone: Yes (1) / No (0)

12. Do you have television in your house: Yes (1) / No (0)

13. Did you receive any skill development training in last one year: Yes (1) / No (0)

14. Are you a member of any societal/cooperative society: Yes (1) / No (0)

15. Did you receive any remittances: Yes (1) / No (0)

16. Do you have any non-farm income source: Yes (1) / No (0)

16.1 If yes, amount of income earn in last one year……..Taka

17. Yearly income from farming sources: ……Taka

18. Are you or any member involved in homestead gardening? Yes (1) / No (0)

19. Distance of highway from your house: ……..km

20. Did you receive any credit (NGO/Bank) in last one year: Yes (1) / No (0)

20.1 If yes, please provide the following information

Loan sources	Amount (Tk)	Interest rate	Duration
Bank			
NGO (Micro credit)			
Cooperative			
Others (informal sources)			

21. Utilization pattern of the credit:

Purpose	Amount (Tk)
Family Consumption	
Crop production	
Other farming activity (fish/livestock)	
Business	
Repaying earlier loan	
Child marriage	
Child education	

22. Problems you faced during loan duration:

1.	
2.	
3.	

23. Food Consumption in last 7 days:

Name of food	How many days you have eaten this food in the last 7 days
1| Rice	
2|Flour	
3| Maize	
4| Pulse	
5| Fish	
6| Meat	
Beef	
Buffalo	
Goat	
Duck, cock, worthsome	
7| Egg	
8| Milk, Yo-gurt	
9| Spinach	
10| Cucumber	
11| Potato	
12| Brinjal	
13| Lady's finger	
14| Snack gourd	
15| Tomato	
16| Gourd	
17 Pointed gourd	
19| Cucurbit	
20| Pumpkin	
21| Banana	

22| Guava	
23| Cool plums	
24| Orange	
25| Apple	
26| Grapesi	
27| Papaya	
28| Oil	
29| Turmeric`	
30| Onion	
31| Garlic	
32| Ginger	
33| Chilli	
34| Sugar	
35| Tea	
36| Spice (Cardamon, cumin, cinnamon), GjvP, wRiv)	
37| Salt	