WOMEN EMPOWERMENT IN AGRICULTURE THROUGH VEGETABLE CULTIVATION: AN EMPIRICAL STUDY IN JAMALPUR DISTRICT

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CERTIFICATE

This is to certify that the research work entitled, **"WOMEN EMPOWERMENT IN AGRICULTURE THROUGH VEGETABLE CULTIVATION: AN EMPIRICAL STUDY IN JAMALPUR DISTRICT"** conducted by **FARZANA AHMED** bearing Registration No. **12-05159. (July-December/2018)** under my supervision and guidance in the partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (M.S.) IN DEVELOPMENT AND POVERTY STUDIES** in the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka 1207, Bangladesh. No part of this thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information received during this study has been dully acknowledged by her.

Dated:.....

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Dedicated to my

Parents

&

Teachers

Women Empowerment in Agriculture through Vegetable Cultivation: An Empirical Study in Jamalpur District

ABSTRACT

Women's empowerment is a significant issue all over the world. The study was conducted to know socioeconomic characters of the household, assess the contribution of women to their household income and identifying the influencing factors of women's participation in the decision-making process. The study was carried out at three villages of Bakhsiganj Upazila under the district of Jamalpur. Data were collected from 60 rural households applying by simple random sampling technique with a structured questionnaire. The obtained data were analyzed by using tabular and different statistical techniques. In the study area, women were participating in the various decision-making processes regarding agriculture. The multiple regression analysis showed that women's income was positively significant to women's education, age, farm size, and experience. The results of the MNL model indicate that farmer's age, experience, access to agricultural credit, and access to information have a significant influence on decision-making strategies. Government policy should target improving farmers' access to credit, delivering proper information to enhance the facilities for the women's decision-making process. Women performed different activities regarding vegetable cultivation like bed preparation, seed sowing, transplanting of seedling, fertilizer application, irrigation, weeding, insect control, seed collection, and seed preservation. In the study area, respondents also faced various problems such as lack of quality seeds and seedlings, lack of required information in time, higher vegetable of inputs, lower market vegetable of products, lower fertility of homestead land, lack of technical knowledge, lack of credit, lack of homestead land, insect and disease infestation, cattle and goat destroy the vegetables, social problems. To reduce their constraints, the study suggested providing logistic supports such as credit facility, input supply, agricultural extension services, need-based training, etc. in order to increase their participation in income-generating activities and different household decision-making events.

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Farzana Ahmed

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

1.1 Background of the study

The number of working women increased to 18.6 million in 2016-17 from 16.2 million in 2010 (Bangladesh Economic Review, 2018). Bangladesh secured the 47th position among 144 countries in 2017 as per The Global Gender Gap Report, whereas India, Sri Lanka, Nepal, Bhutan and Pakistan remain at 108, 109, 111, 124 and 143 positions respectively (World Bank, 2018). Bangladesh is an overpopulated nation based on agriculture. Of the 10 million farm homes, about 70 percent have less than one hectare of property (tiny farm) (Anonymous, 2011). Homestead farming is, therefore, the most important production system in rural Bangladesh. In Bangladesh, females hardly engage outside of their homes in agricultural operations. About half (49%) of Bangladesh's population is women among them 45.6 percent are associated with farming activities (Agricultural Diary, 2012).

Women's contribution to the overall economy is high throughout Asia, especially in agriculture. Bangladesh, Bhutan, Cambodia, China, India, Myanmar, Nepal, Pakistan, and Vietnam have especially elevated percentages of females in the agricultural industry, with estimates ranging from 60% to 98% (FAO, 2003). Among neighboring nations, only 59% of Bangladeshi females are employed in agriculture, compared to over 74% of Indian females, 64% of Pakistani females and 85% of Nepali females (Roy et al. 2017).

Women's participation in rural development, more particularly in agricultural development in Bangladesh, is the most important strategy. Bangladeshi women play a significant role in agricultural production. Although vegetable is the dominant crop, vegetable occupies a very important place in vegetable -based cropping systems and play a distinct role in the crop sub-sector to provide nutritious food to the dwellers, generate income, employment, and goods to trade. Vegetables are essential in the diet, provide fiber, trace minerals, vitamins, and proteins. Vegetables help to prevent various diseases resulting from malnutrition and unbalanced nutrition. The climate and soil of Bangladesh are very much suitable for growing vegetables around the year. Improved production technologies for field crops is not of value to them as they have neither enough land nor access to high-cost inputs. But the minimum level of vegetable intake is 200 g person−1 day−1 recommended by the Asian Vegetable

Research and Development Center (AVRDC) (Weinberger and Genova, 2005). Many vegetables are grown in the homestead. Homestead is the dwelling place and it is the center where vegetables are cultivated. Homestead as defined by Abdullah (1986), is the land owned and occupied by the dwelling unit of the household and immediate area surrounding by the dwelling unit including a courtyard, pond, road space around the homestead, space used for cultivation of trees and vegetable and unutilized space. Cultivable land is a scarce resource in densely populated Bangladesh, which is mostly used for grain crop production. Many vegetables are grown in homestead such as cabbage, carrot, eggplant, cauliflower, tomato, radish, sweet gourd, wax gourd, bitter gourd, teasel gourd, pointed gourd, etc. Much care is not taken or necessary for growing these vegetables in Bangladesh (Weinberger and Genova, 2005). Little attention is given to cultivating these vegetables, though these are a very important source of human nutrition. There is a great scope for increasing the production of vegetables throughout the year. Thus, homestead farming is the most significant system of production in rural Bangladesh. Women make these contributions by participating in pre and post-harvest operations and in various activities under homestead agriculture. These are in addition to their traditional role of housekeeping and child-rearing (Ali, 1995). Assessment of the role of women in household activities particularly in homestead vegetable production is, therefore, important particularly for policy formulation and program interventions for the development of women. Approximately forty-five percent of our rural humans are landless and about 55 percent of the landowners are small farmers (Anonymous, 2011). Al-Mamun et al. (2010) argue that domestic gardening things to do are situated on women and it can additionally extend the income of women, which can also end result in the higher use of family sources and expanded caring practices and empowerment. This empowerment of women additionally addresses a precedence vicinity of poverty alleviation and presents essential socio-economic returns via lower fitness and welfare costs, lower fertility, and lower maternal and baby mortality rates. Thus, the simultaneous impact of home gardening programs in phrases of giving women a voice and advertising their full participation in domestic life can make an important contribution to the standard improvement of communities as well as countrywide earnings levels.

In their homes, women from landless and marginally landless rural households grow various types of vegetables. Women can undoubtedly play a vital role if they can explore their full talent in the cultivation of homestead vegetables. If females are able to conduct their responsibilities correctly and skillfully in home-grown vegetable agriculture, they will be

able to provide food security and family nutrition, boost family revenue, and contribute to Bangladesh's general enhancement. Therefore, if rural women are engaged and included in this development activity and are conscious of their rights and demands, their involvement in the cultivation of homestead vegetables will be greatly improved (Islam et al. 2018).

The World Bank study in Bangladesh highlighted that women have limited role in household decision-making, limited access and control over household resources (physical and financial assets), low level of individual assets, heavy domestic workloads, restricted mobility, and inadequate knowledge and skills that leading to women's vulnerability (Sebstad and Cohen, 2000). The majority of women, who are mostly poor, vulnerable and marginalized, live in rural areas. They play an important role in seed production, animal husbandry, fisheries, post-harvest management, conservation of biological diversity, management of energy and family (Anon, 1995). Despite their tremendous contribution to food production and well-being for the household, rural women are underestimated in development strategies (Murshid and Yasmeen, 2004). Thus, the lack of access to and control over productive resources is the main factor limiting women's equal participation in economic activities, thereby hampering the human development process (Acharya, 2003). Women's participation in economic activities can automatically increase the overall status of women and as well as make them empowered. Few studies in South Asia found that economic empowerment has been the entry point for the overall empowerment of women if they are organized under a common platform (Carr et al., 1996).

The table showed (Table. 1) that the area and production are increasing year by year. It indicates that the demand is growing up of vegetables with an increase in population. The economic importance of vegetable cultivation is indispensable for our country.

Table 1: Production and Area of Vegetable in Different Years

Year	Area (hectare)	Production (mt)
2011-12	908148	3061154
2012-13	924862	3132850
2013-14	925926	3357363
2014-15	991055	3734155
2015-16	991277	3874896
2016 -17	1011095	4024932

Source: BBS, 2018

1.2 Justification of the study

Vegetable cultivation is a common phenomenon of the rural women in our country. They are involved in vegetable cultivation which indicates their participation to economy and women empowerment. This works also contributed in our economy but it doesn't seen and remain uncounted. The research is mainly concerned with assessing rural women's involvement in vegetable gardening. Currently, government and non-governmental organizations are making efforts and allocating funds for production-oriented studies and also promoting rural individuals to undertake cultivation of vegetables with women. It is therefore essential to evaluate rural women's involvement in vegetable cultivation in agriculture. Taking into account the above results, in this thesis work it was tried to carry out a survey to determine rural women's involvement in vegetable cultivation.

1.3 Objectives of the study

The objectives of the study are given below:

a. To delineate the socio-economic characteristics of the vegetable producing farmers;
b. To assess the influencing factor in household income through vegetable cultivation; and
c. To detect the dimensions of women's empowerment through vegetable cultivation.

1.4 Outline of the study

The study consists of 7 chapters. Chapter 1 describes the introduction of the study, Chapter 2 relevant to literature. Chapter 3 deals with the methodology of the study. In Chapter 4, the socioeconomic characteristics of the sample farmers, Chapter 5 describes on Ordinary least square model results. Chapter 6 deals with MNL results. Finally, the summary, conclusion, and recommendations of the study are presented in Chapter 7.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter also would discuss the previous study regarding vegetable cultivation in our country and the world. Significant studies regarding vegetable cultivation are discussed below.

Islam et al. (2018) assessed the extent of participation of rural women in homestead vegetable cultivation at Monirampur Upazila under Jessore district and to explore the relationship between each of the selected characteristics of the rural women and their extent of participation in homestead vegetable cultivation. Data were collected from randomly selected 60 respondents. Appropriate scales were used to measure the variables of the study. Considering broadly selected 6-aspects of homestead vegetable cultivation, the rural women's participation was highest in seedbed preparation and raising of seedlings, while it was lowest in the case of intercultural operation. Only age out of eleven selected characteristics had a significant positive relationship with their participation in homestead vegetable cultivation.

Diiro et al. (2018) stuied on a positive relationship between maize productivity in western Kenya and women's empowerment in agriculture, measured using indicators derived from the abbreviated version of the Women's Empowerment in Agriculture Index. Applying a crosssectional instrumental-variable regression method to a data set of 707 maize farm households from western Kenya, we find that women's empowerment in agriculture significantly increases maize productivity. Although all indicators of women's empowerment significantly increase productivity, there is no significant association between the women's workload (amount of time spent working) and maize productivity.

Roy et al. (2017) carried out a study to measure women's contribution to their household i ncome, to examine how women are active in the decisionmaking process, their income per ception, and the effects on the decision-making process. The study was carried out at three villages of Mymensingh Sadar Upazila. Data were collected from 50 rural households by random sampling technique with a structured questionnaire. In the study area, women were participating in various income generating activities such as crop production, post-harvest activities, poultry rearing, management of livestock and fisheries, etc. A logistic regression

analysis showed that women's participation in decision making process was negatively related with family size, but positively related with respondent's age, education, farm size, income and occupation.

Bargali et al. (2015)in the Kumaun Himalaya district of Nainital, India studied the contrib ution of rural women to home garden vegetable cultivation. Using a random sampling proc ess, data was obtained from 100 respondents. Characteristics of rural women such as age, level of education, family size, homegarden size, knowledge about homegarden etc vary from place to place and affect contribution of rural women insignificantly. In order to enable women to actively participate in the various activities related to homegarden vegetable cultivation there is a great need to promote change in policies, laws and development programmes.

Patalagsa (2015) analyzed women's training in home gardening and nutrition empowers women. The study used a mixed methods approach, combining statistical analysis of quantitative data for 456 women with content analysis of qualitative data from in-depth interviews and they shown that home garden training is popular and widely accepted by both men and women largely because it does not contest existing socially constructed gender roles. Nevertheless, we find clear signs of increased control by women over food supplies and income, and gains in women's self-confidence and role in the community as husbands and outsiders begin to recognize their agricultural skills.

Khatun et al. (2014) determined the extent of participation of rural women in the cultivation of vegetables and fruit trees around the homestead areas. The study was conducted on married women of four selected villages of Raumari upazilla under Kurigram district. Data were collected from randomly selected 103 women. About 59 percent of the rural women had high participation in vegetables cultivation while only 10.68 percent of them had low participation in the cultivation of fruit trees. Agriculture knowledge, attitude and innovativeness had positive relationship with the cultivation of vegetables. On the other hand, education, family income, cosmopoliteness behavior and attitude had positive relationship with the cultivation of fruit trees.

Dey et al. (2012) conducted at Mymensingh to grow vegetables round the year, to solve nutritional problem and to create employment opportunity during 2010-2011. The results revealed that the farmers produced on an average of 244.17 kg vegetables round the year. They consumed most of the vegetables (149.5 kg), distributed a small portion (25.67 kg)

and sold a major portion (69 kg) to meet up their daily necessities. In home garden management, female members of each family were participated directly along with male and children.

Chowdhury (2009) conducted a study on participation of women in farm and non-farm activities in two villages of Sadar Upazilla of Mymenshingh district. This study showed that in case of both low and medium income households, female participation is moderately higher in non-farm activities than the high income households.

Mamun et al. (2010) studied at Raichow village under Comilla district to investigate the homestead vegetable production and its impact on family nutrition and income generation and involvement of female members to this activity. A total of 125 randomly selected homesteads were surveyed for this purpose through questionnaire and focus group discussion. On the basis of farm category highest number of farmers are marginal (44%), followed by landless (28%). In respect of total cultivated percent of households are highest in marginal group (46.9%) followed by small (36.8%) and medium (28.9%) group. The highest amount of vegetables was produced by the large farmer (1230.20 kg/year) followed by small (780.67 kg/year) and marginal (540.50 kg/year) and landless (260.50 kg/year) farmer.

Chowdhury et al. (2011) carried out to determine the extent of contribution of women in homestead vegetables cultivation and to explore relationships among the selected characteristics of the women and their contribution in homestead vegetables cultivation. Correlation analysis indicated that the characteristics of the women namely education, family size, annual income, training exposure, organizational participation, individual extension contact, group extension contact, mass extension contact, decision making process and innovativeness had significant positive relationships with the contribution of women in homestead vegetable cultivation. The regression coefficients of only three variables viz. education, physical fitness and training exposure were statistically significant indicating that these variables had significant contribution in the vegetable cultivation of the women.

Rahman et al. (2008) determined food security through homestead vegetable production. The study was conducted in the Bhaluka, Trishal and Gaforgaon upazilas of Mymensingh district. Four vegetable crops i.e. red amaranth, cabbage, tomato and batishak were introduced into the existing cropping pattern. Changes in social and livelihood issues of a

respondent were satisfactory after demonstration. Majority of the respondents (45%) earned satisfactory annual income having homestead. Shortage of irrigation water, quality seeds and inputs cost were the major problems faced by the farmers in homestead vegetable production.

Nahar (2008) in her study in a selected area of Gazipur district observed that the involvement of rural woman in each of the homestead activities i.e. homestead vegetable cultivation, post-harvest activities, poultry raising and goat rearing and the extent of participation is high in all cases which is highly encouraging. In fact, these kinds of activities are mostly performed by the rural women in our country and have perfectly reflected in her study.

Uddin (2008) conducted a study among the women of Shariatpur district. He found that 68.63 percent of the respondent had medium and 31.37 percent had low involvement in home gardening practices.

Hasan (2006) observed that the highest proportion (98 percent) of conventional rural women had medium involvement in homestead activities. On the other hand, cent percent of organic women farmworkers had high involvement in homestead farming activities by organic women farmworkers was significantly higher than that of conventional rural women's farming activities.

Bushamuka et all (2005) assessed the additional benefits of a homestead gardening program designed to control vitamin A deficiency in Bangladesh. The proportions of active and former-participant households that gardened year-round were fivefold and threefold, respectively, higher than that of the control group (78% and 50% vs. 15%). In a three-month period, the households of active participants produced a median of 135 kg and consumed a median of 85 kg of vegetables, while the control households produced a median of 46 kg and consumed a median of 38 kg (p and consumed a median of 38 kg (p and consumed a median of 38 kg (< .001). The results highlight the multiple benefits that homestead gardening programs can bring and demonstrate that these benefits should be considered when selecting nutritional and development approaches targeting poor households.

Orcherton and Somarriba (1996) stated that some 96% had home gardens but they occupied only 2% of the total area. Home gardens absorbed an average of 48% of the total manual labour available; women and girls contributed to over half (29%-56%) of the family requirements of home gardens. Men mostly dedicated labour to the production of

commercial crops (sweet peppers and tomatoes) while women and girls, showed lower (20%) labour participation in the production of these crops. Farm women were highly involved in several agricultural activities traditionally considered as masculine in nature.

Ajayi (1995) performed analysis based on the descriptive examination of women's agricultural activities in four local government areas giving emphasis on market economy that features very prominently in national income accounting, erroneous belief that most rural women do not make an appreciable contribution to crop production is undetermined. He found that most women take part in planting, weeding, harvesting, and post-harvest activities of subsistence crops.

Akanda's (1994) study revealed that the highest proportion of the rural women had high participation in vegetable cultivation while only 15 percent of them had high participation in the cultivation of fruit trees.

Halim et al. (1994) reported that in Bangladesh, women produced Indian spinach, amaranth, okra, gourd, cucumber and pumpkin during summer season and country bean, brinjal and tomato during winter season in their homestead garden successfully.

Sultana (1993) stated that vegetables and fruits form an integral part of the family diet and a part of them enters the commercial market. Although every member of the family has some contribution to the homestead gardening most of the activities, including seed preparation, land preparation, transplanting, watering, and harvesting are done by women. Men usually help in pesticide applications.

Vlassak (1993) observed that in third world countries, the role of women in agricultural production were extremely important. The tasks in agriculture as well as in food distribution and provide to women an income of their own, which was essential because of the increasing importance of money in developing countries. Women liked to increase agricultural production, but their activities were being impeded in different ways.

Akhter (1989) stated that women were involved in homestead agricultural production activities such as vegetable, fruits, timber, small animals (goat, sheep) and poultry to supply food and to increase family income.

Halim (1987) informed that women were a potential producers of the homestead agricultural products and through their participation, intensive homestead products may be

produced. But due to lack of knowledge and utilization of proper technology and manageable practices, the production remained below the expected level.

Dey (1985) mentioned in his paper that women in households were economically active and played an important role in post-harvest operations as well as other activities like kitchen gardening and livestock care.

Hossain (1985) mentioned in his paper that women were involved in most of the post-harvest operations of vegetable production. He also advocates some measures to be taken by the government, policymakers, planners, development workers and researchers for the effective integration of participation in different homestead production and management activities like vegetable growing, livestock raising, fish cultivation, post-harvest operation, and household decision making.

2.2 Research Gaps

From the above study, it is clear that many studies were accomplished regarding vegetable cultivation especially homestead vegetable cultivation in the different regions in our country. From the best knowledge of the researcher, there is no study regarding women empowerment through vegetable did not perform in my study area. This also motivated me to run my research in this area.

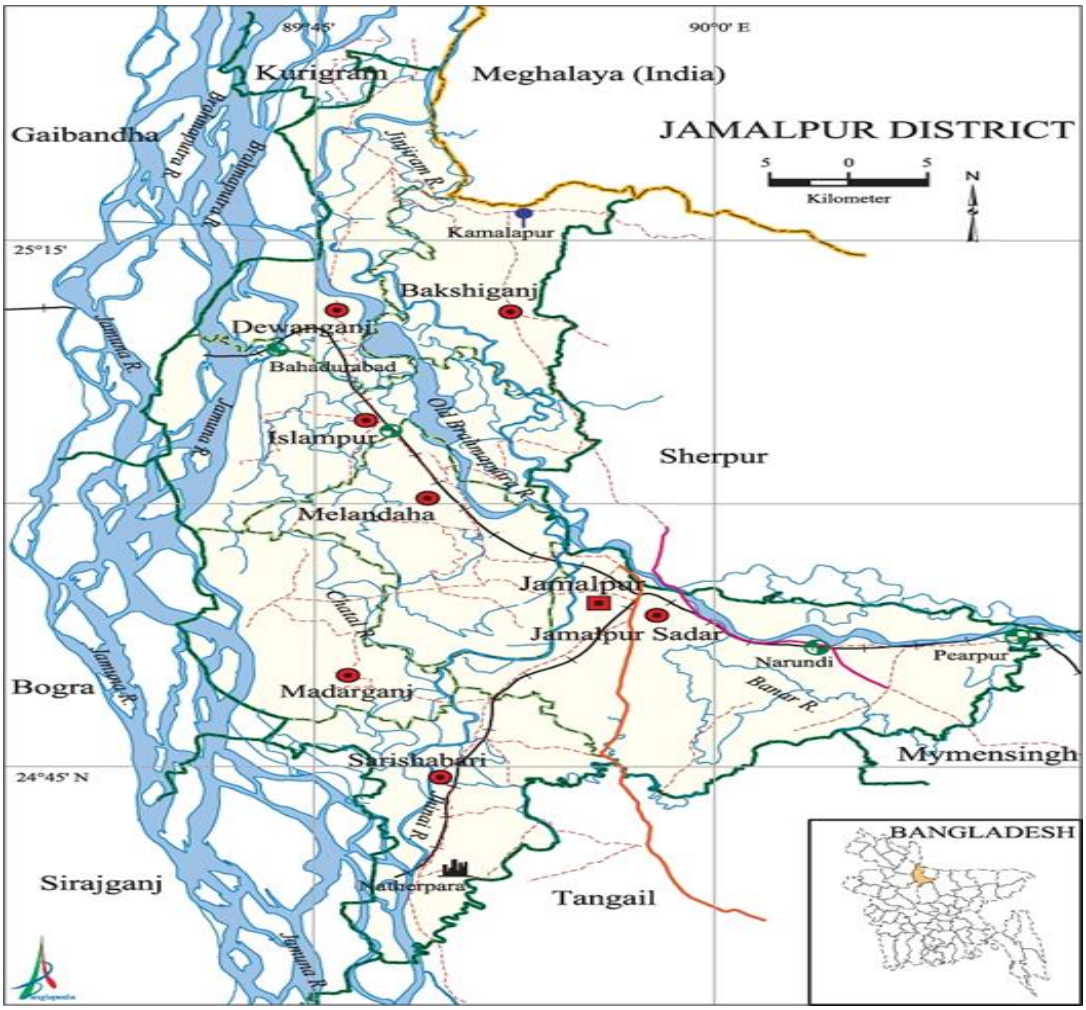
CHAPTER III

RESEARCH METHODOLOGY

3.1 Study area

Bakshiganj Upazila is under the district of Jamalpur area 204.30 sq km, located in between 25°06' and 25°18' north latitudes and in between 89°47' and 89°57' east longitudes. It is bounded by the Meghalaya state of India on the north, Islampur upazila on the south, Sreebardi upazila on the east, Dewanganj upazila on the west. The garo Hills are on the north east part of the upazila.

Population status of the district is total 178436; male 91327, female 87109; Muslim 175891, Hindu 2006, Buddhist 473 and others 66. An indigenous community such as garo belongs to this Upazila. Main rivers are old Brahmaputra, Dashani, Jirjira; Singijan beel, Kuiya beel' and Jirjira beel are notable. Literacy rate and educational institutions Average literacy 30.2%; Male 34.4%, female 25.8%. Main sources of income Agriculture 69.06%, non-agricultural labourer 3.01%, industry 0.38%, commerce 11.90%, transport and communication 2.27%, service 3.82%, construction 1.22%, religious service' 0.23%, rent and remittance 0.13% and others 7.98%. Ownership of agricultural land Landowner 50.34%, landless 49.66%; agricultural landowner: urban' 26.53% and rural 51.60%. (BBS 2019). The main crops are paddy, vegetable , wheat, cotton, mustard, sugarcane, sweet vegetable , gram, lentil, turmeric, onion, vegetables. Extinct or nearly extinct crops are corn, sesame, linseed, Kaun etc. The main fruits are watermelon, blackberry, banana, papaya, pineapple. This Upazila has a number of fisheries, dairies, and poultries.



Source: Banglapedia.com/map/jamalpur

- The reasons for selecting this study area for the present study are given below: Comparatively higher concentration of vegetable farming.
- Easy accessibility and good communication facilities.
- Researcher's belief about getting well co-operation from the selected respondent and
- These villages had some identical characteristics like homogeneous soil type, topographical and climatic condition for producing vegetable .
- No such study was conducted in this area.

3.2. Study population and sampling strategy

The population of this study is all farm households residing in the selected villages (Table. 3.4). Thus there are many farm households. The standard statistical formula for selecting a

sample size results in a huge number which is impractical for an individual researcher because of time and funding constraints (Blaikie 2010; Gilbert 2008). Since all the farmers in the area face similar socio-economic, environmental and climate conditions in their farming activities, they make up a mostly homogeneous group which validates the use of a small sample size which can be representative of the whole population (Alam, 2016; Blaikie 2010; Gilbert 2008). Therefore, the sample size is determined purposively depending on the context rather than a statistical formula. This study aimed to survey a sample of 60 vegetable farming households. Respondents were selected randomly within the villages. This was expected to reflect the farming features of all farmers in the villages.

A completed list of all vegetable farming households in the respective villages was collected from the Sub-Assistant Agricultural Officers (SAAOs) in the study areas. The numbered list provided names and addresses of farmers with their farm sizes. Afterward, a computer-generated random number table was applied to the list to select 60 farm households. In this way, the randomness in the sampling procedure was ensured.

Table 3.1 Selected study areas for primary data collection

Upazilla	Villages	Respondents
Bakhsiganj	Kheyarchor	20
	Ayermari	20
	Jhalorchor	20

3.3 Sources of Data

Data required for the present study were collected from primary and secondary sources. Primary data were obtained from farmers and secondary data were collected from various published sources. Secondary sources were the Bangladesh Bureau of Statistics (BBS), Department Agricultural Extension (DAE), Department of Agricultural Marketing, and other related agencies in Bangladesh.

3.4 Preparation of the Survey Schedule

The preparation of survey schedules is of crucial importance in this study. A comprehensive survey schedule was prepared to collect necessary information from the concerned respondent in such a way that all relevant information needed for vegetable farming could be easily obtained within the shortest possible time. The interview schedule was pretested for judging their suitability. After pre-testing, the schedule was finalized.

3.5 Collection of Data

To satisfy the objectives of the study, necessary data were collected by visiting each firm personally and by interviewing them with the help of a pretested interview schedule. Usually, most of the respondent does not keep records of their activities. Hence it is very difficult to collect actual data and the researcher has to rely on the memory of the respondent. Before going to an actual interview, a brief introduction of the aims and objectives of the study was given to each respondent. The question was asked systematically in a very simple manner and the information was recorded on the interview schedule. When each interview was over the interview schedule was checked and verified to be sure that information to each of the items had been properly recorded. In order to minimize errors, data were collected in local units. These were subsequently converted into appropriate standard unit. Data collection period was 1st August to 31st August, 2019. In order to obtain reliable data, the researcher initially visited for several times to introduces herself with the people of the study areas during the season. Secondary data were collected through literature and different publications.

3.6 Editing and Tabulation of Data

After collection of primary data, the filled schedules were edited for analysis. These data were verified to eliminate possible errors and inconsistencies. All the collected data were summarized and scrutinized carefully. For data entry and data analysis, the Microsoft Excel programs and SPSS and STATA programs was used. It might be observed here that information was collected initially in local units and after checking the collected data, it was converted into standard units. Finally, a few relevant tables were prepared according to necessity of analysis to meet the objectives of the study.

3.7 Analytical Techniques

Data were analyzed with the purpose of fulfilling the objectives of the study. Both descriptive and statistical analysis was used for analyzing the data.

3.7.1 Descriptive Analysis

Tabular technique of analysis was generally used to find out the socio-demographic profile of the respondent, to determine the cost, returns and profitability of vegetable farm enterprises. It is simple in calculation, widely used and easy to understand. It was used to get the simple measures like average, percentage etc.

3.7.2 Model specification

3.7.2.1 Ordinary least square model

An attempt was made to explore the determinants of yearly income by using a multiple regression model (Ordinary least square model) that can be seen from following equation:

$$InY = lna + b_1 lnX_{1i} + b_2 lnX_{2i} + b_3 lnX_{3i} + b_4 lnX_{4i} + b_5 lnX_{5i} + b_6 lnX_{6i} + U_i$$

Where, Y = Women's contribution to household income (Tk.);

X1= Farm size (ha);

X2= Age;

X3= Education;

X4= Experience;

X5= Working Person;

X6=Family Size;

ln = Natural logarithm; and

Ui= Stochastic/error/random term.

3.7.3 Multinomial Logit Model

In order to assess the factors influencing the choice of decision-making strategies, Logit or Probit models can be used to explain categorical variables (Wooldridge, 2009). Farmers can adopt more than one decision-making strategies. MNL model estimates simultaneously all binary logit among categories or choices performing all possible comparisons (Alauddin and Sarker, 2014). In this study MNL model was employed since the choice of decision making was more than one. It was assumed that all the categories were mutually exclusive.

The model for each category of the outcome variable is specified as,

$$lnY_{i((n|b)} = ln \frac{Prob\ (Y=n|x)}{Prob\ (Y=b|x)}$$

Here, b is the reference category and n is the number of categories. The model needs a base category to interpret the log-odds ratio. So, we can get n-1 (log-odds ratios). The probability (Y_i) of choosing one strategy j among a total of n alternatives conditional upon explanatory variables x_i takes the following form,

$$\text{Prob}\,(Y_i \mid x_i) = \frac{e^{\beta j x i}}{\Sigma^{n}_{k=1}\ e^{\beta j x i}}$$

This MNL model as formalized in Greene (2003) estimates the utility from choosing one particular strategy (as shown in the numerator) relative to the sum of utilities from different choices (expressed in the denominator). MNL model requires that the odds ratio does not have an impact on other probabilities; which is the assumption of independence of irrelevant alternatives (IIA) in order to get an unbiased and consistent estimator. The choice of decision-making strategies is assumed to be influenced by socio-economic factors, institutional accessibility and livelihood status.

For each strategy the complete model is specified as follows;

$$\text{In}\,(Y_{i(\,j/b\,)} \mid Xi) = \beta_{0,\,Yi} + \beta_{1,Yi}\,X_{1i} + \beta_{2,Yi}\,X_{2i} + \beta_{3,Yi}\,X_{3i} + \beta_{4,Yi}\,X_{4i} + \beta_{5,Yi}\,X_{5i} + \beta_{6,Yi}\,X_{6i} + \beta_{7,Yi}\,X_{7i} + \beta_{8,Yi}\,X_{8i} + \varepsilon_i$$

Where,

Y_i = Probability of choosing strategy

X_1= Age;

X_2= Experience;

X_3= Education;

X_4= Credit;

X_5= Information;

X_6= Income;

X_7= Farm size;

X_8 = Working person

β_0..... β_8 = Coefficient of the respective variable

ε_i = Error Term

In order to determine the probability of each decision making strategy is computed from the MNL model. There are six main strategies such as buying agricultural inputs, allocation of labor, selling agricultural products and to take out an agricultural loan. The adoption of agricultural technologies has been chosen as the base category so that factors influencing different strategies in comparison with the adoption of agricultural technologies can be assessed. The study also tested the collinearity using the correlation matrix with all the explanatory variables and multicollinearity through VIF and did not find any problem.

3.8 Participation of women in vegetable cultivation

Extent of participation of rural women in homestead farm activities was in this study such as bed preparation, seed sowing, transplanting of seedling, irrigation, weeding, insect control, seed collection and seed preservation. A four-point Likert-type scale was used to measure each activity. The scores of 0, 1, 2 and 3 were assigned for no participation, rarely, occasional participation and regular participation, respectively. For clear understanding of comparative participation of rural women participation index (P1) was computed using the following formula:

PI = (Pnp x 0) + (Pop x 1) + (Prp x 2) + (Prp x 3)

Where, Pnp= Percentage of rural women with no participation
Prp = Percentage of rural women with rarely participation
Pop = Percentage of rural women with occasional participation
Prep = Percentage of rural women with regular participation

4.17 Problem faced Index

In the study area, respondents also faced various problems such as lack of quality seeds and seedlings, lack of required information in time, higher price of inputs, lower market price of vegetables, lower fertility of homestead land, lack of technical knowledge, lack of credit, lack of homestead land, insect and disease infestation, cattle and goat destroy the vegetables, social problems. On the basis of the problems, a problem faced index was prepared. A four-point Likert-type scale was used to measure each activity. The scores of 0, 1, 2 and 3 were assigned for not at all, rarely, occasional and regular problem, respectively. For clear understanding of problem of rural women problem faced index (P1) was computed using the following formula:

PI = (Pnp x 0) + (Pop x 1) + (Prp x 2) + (Prp x 3)

Where, Pnp= Rural women with no problem
Prp = Rural women with rarely problem
Pop = Rural women with occasional participation
Prep = Rural women with regular participation

CHAPTER IV

SOCIOECONOMICS CHARACTERISTICS AND ROLE OF DECISION MAKING OF RESPONDENTS

4.1 Introduction

This chapter deals with the socioeconomic characteristics of the sample farmers. Socioeconomic characteristics of the farmers are important in influencing production planning decision making. People differ from one another in many respects. Behavior of an individual is largely determined by his/her characteristics. There are numerous interrelated and constituent attributes that characterize an individual and profoundly influence development of his/her behavior and personality. It was, therefore, assumed that enterprise combination, consumption pattern, purchase pattern, and employment patterns of different farm household would be influenced by their various characteristics. Finally socioeconomic aspects of the sample households were examined. These were family size and composition, age distribution, Occupation, level of education, involvement of women, land ownership pattern etc. A brief discussion of these aspects is given below.

4.2 Age

The age of the rural women was determined by the number of years from his birth to the time of the interview. The rural women were classified into three categories: young aged (up to 35 years), middle-aged (36 to 55 years) and old aged (56 years and above) (Table 4.2).

Table 4.2 Distribution of the respondents according to their age

Category	Percent	No. of respondents
Young aged (up to 35)	55.00	33
Middle aged (36-55)	41.67	25
Old aged (56 and above)	3.33	2

Source: Field Survey, 2019.

Data presented in table 4.1 indicated that the highest proportion of 55 percent of the respondents fell in the young age category compared to 41.67 percent middle and it was also revealed that 3.33 percent of the respondents comprised of old-aged categories.

4.3 Education

Based on their level of education, the respondents were grouped into five categories, no education can sign only, primary education, secondary education, and above secondary education. Data presented in figure 4.3 indicate that 40.91 percent having primary education and 15.33 percent having secondary education compared to 32.5 percent can sign only and 9.24 percent having no education (illiterate).

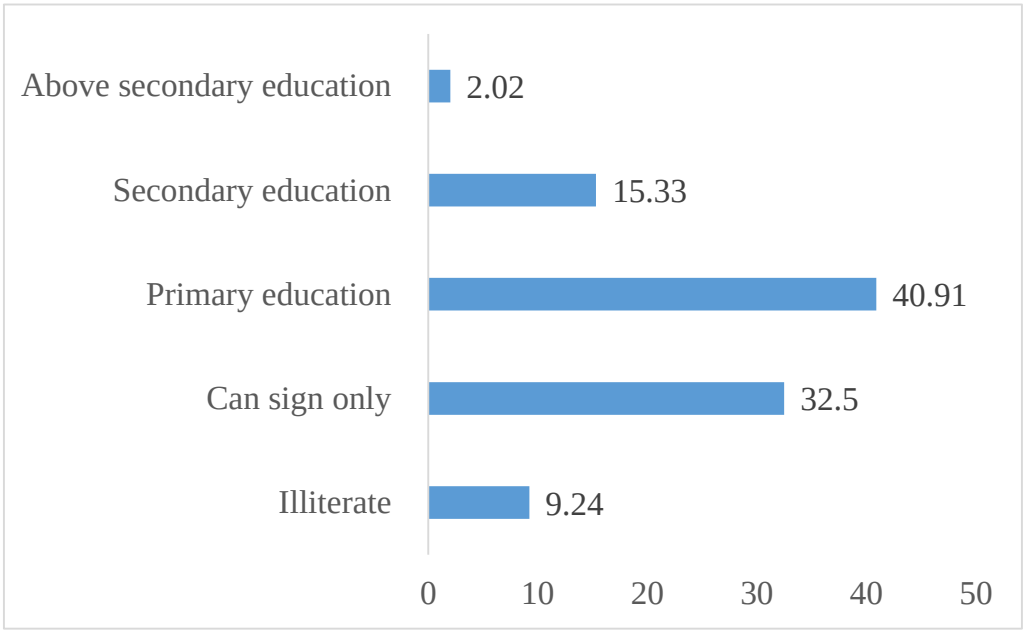


Figure 4.3 Distribution of rural women according to their level of education

Source: Field Survey, 2019.

Women need to have some education in order to use various agricultural information sources properly and ultimately fall a good effect. It is evident that 59 percent of the rural women had an education of various degrees from primary to above secondary level.

4.4 Family size

On the basis of their family size, the respondents were classified into three categories: small family (up to 4 members), medium family (5-7 members) and large family (8 and above). Figure 4.4 shows the distribution of the respondents according to their family size. Data presented in Table 4.3 indicate that the large proportion of 55.35 percent of the respondents belonged to the medium family category compared to 24.52 percent belonged to the small family category and 20.13 percent to large family category.

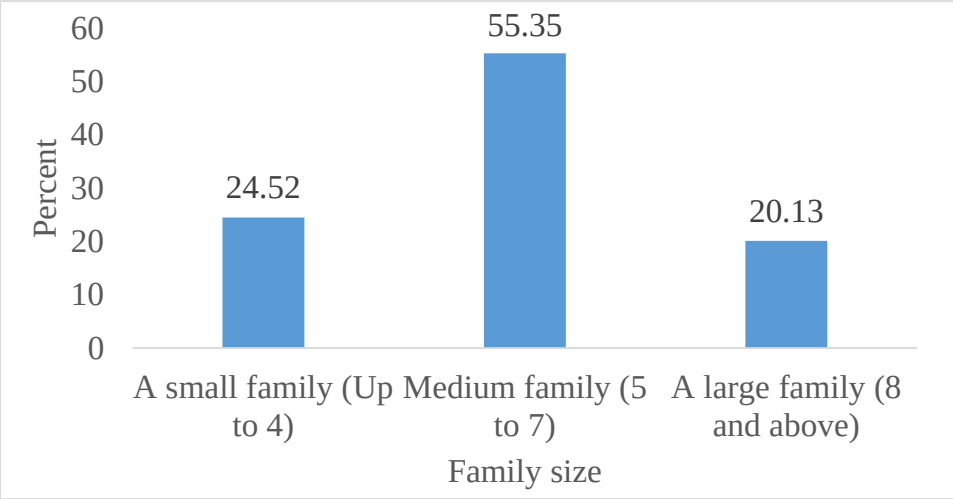


Figure 4.4: Distribution of rural women according to their family size

Source: Field Survey, 2019.

4.5 Occupational Status

In the study area, the selected farmers were engaged with various types of occupations along with vegetable cultivation. It was observed that, as a main source of income, agriculture was the main occupation for vegetable farmers. Some of them had the opportunity to be engaged in other activities. The occupational status of farmers is shown in the following figure 4.5. It is evident from the figure that 68.25 percent of farmers were involved in agriculture and 14.19 percent of farmers were involved in vegetable cultivation. Very few of them were also involved in the business.

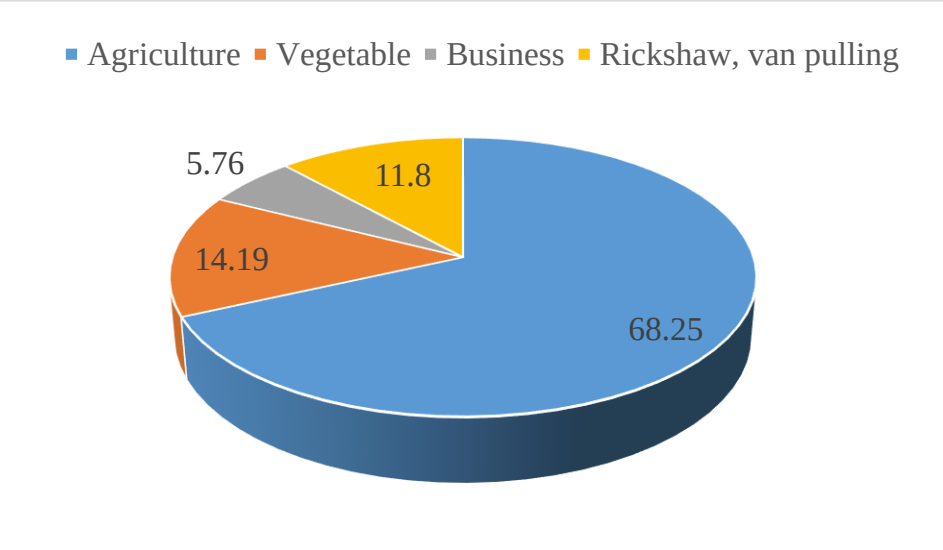


Figure 4.5: Occupational status

Source: Field Survey, 2019.

4.6. Farm size and ownership

The study farmers are categorized as landless farmers (less than 49 decimal), small farmer (50-249 decimal), medium farmer (250-749 decimal) and large farmer (above 750 decimal) (GOB, 2009). Table 4.6 shows that in the sample, 28.36 percent were landless farmers, 57.39 percent were small farmers, 9.28 percent was a medium farmer and only 3.97 percent was a large farmer.

Table 4.6: Farm size and ownership

Types of farmers	No. of respondents	Percentage (%)
Land less (less than 49 decimal)	17	28.36
Small Farmer (50-249 decimal)	34	57.39
Medium Farmer (250-749 decimal)	6	9.28
Large Farmer (above 750 decimal)	3	3.97

Source: Field Survey, 2019.

4.7 Family Income status

In the study area, the incomes were categorized as follows: less than 150,000, from 150,000 to 250,000 and above 250,000. It is evident from Table 4.7 that most of the farmer's yearly income belonged to the category of 150,000 to 250,000. About 46.60 percent of the vegetable farmers were earned Tk. 150,000 to 250,000 per year, 51.31 percent of the farmers were earned Tk. less than 150,000 per year and 2.09 percent farmers were earned Tk. Above 250,000 per year.

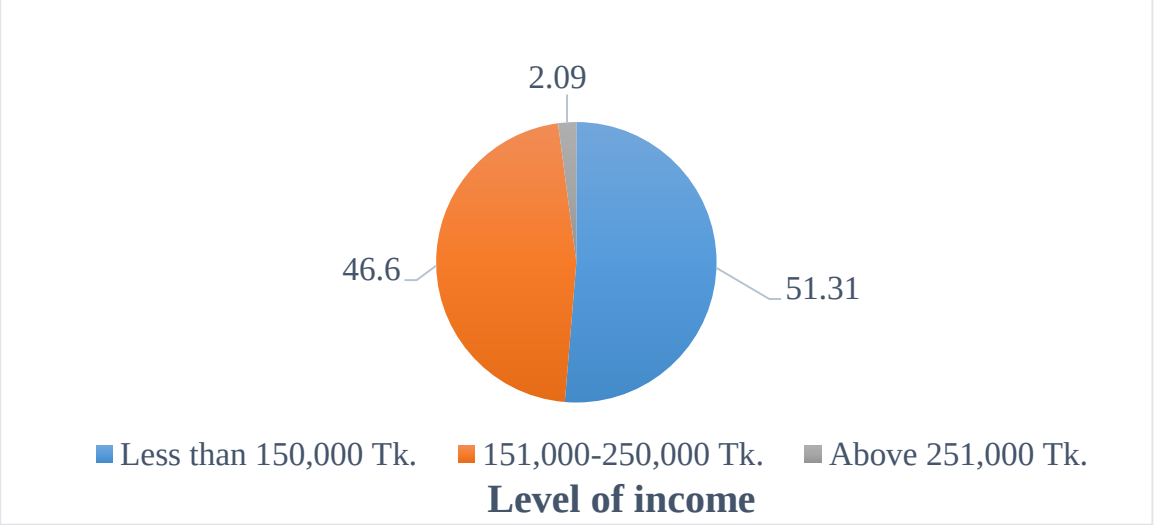


Figure 4.7.: Income status

Source: Field Survey, 2019.

4.8 Dependency Ratio

In economics, geography, and demography the dependency ratio is an age-population ratio of those typically not in the labor force (the dependent part) and those typically in the labor force (the productive part). The real (or effective) dependency ratio looks at the ratio of economically active workers compared to inactive. The effective dependency ratio doesn't just look at the age profile but, whether people are economically active or not.

It is used to measure the pressure on the productive population. As the ratio increases, there may be an increased burden on the productive part of the population to maintain the upbringing and pensions of the economically dependent. This results in direct impacts on financial expenditures on things like social security, as well as many indirect consequences. Each and every family is rationally composed of both income earners and dependents. Table 4.8 present the depending members per income earner. In this present study, the average dependency ratio was found at 1.59.

Table 4.8: Dependency Ratio

Category	Number
Total family members	298
Total dependent members	187
Total earning members	111
Dependency ratio	1.68

Source: Field Survey, 2019.

4.9 Involvement of Women

Women in our country are the most deprived one but at present, this situation is changing. About half of the population of our country is women. So without their development, the total social and economic development of our country is not possible. In the present study, involvements of women in vegetable farming were categorized into three categories: 1 women involvement, 2 women involvement and 3 women involvement. It is evident from figure 4.9 that 43.25 percent of farmers used 1women labor in their farm, 56.75 percent of farmers used 2 women labor on their farm. So the result implies that the involvement of women in vegetable farming activities was very small.

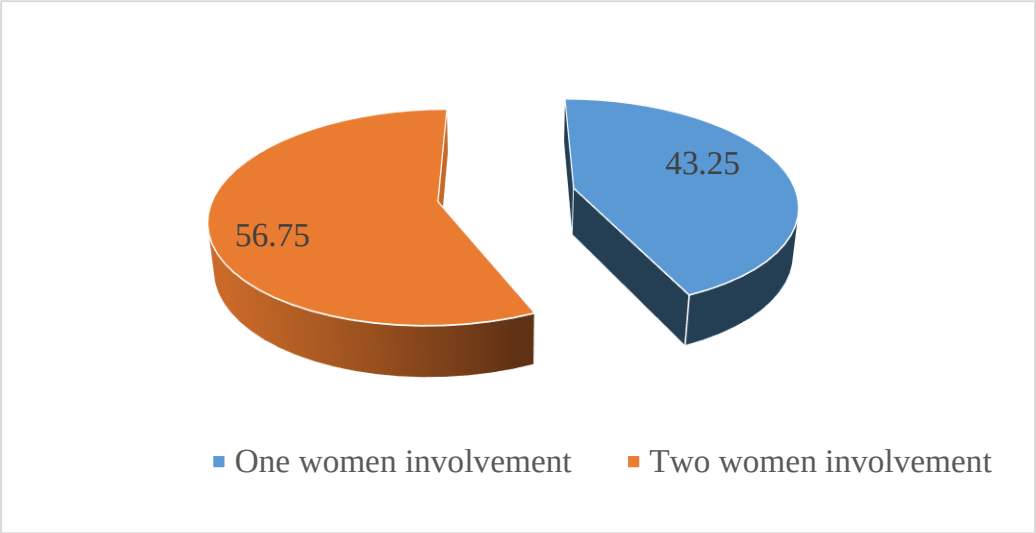


Figure 4.9: Involvement of Women

Source: Field Survey, 2019.

4.10 Size of Land Holdings of the Sample Farmers

In the present study, the size of landholdings of the vegetable producing farmers is classified into different categories. Size of land holdings includes homestead area, orchard, pond, cultivated land, fellow land, leased in, leased out and mortgage in as reported by the sample farmers. It is evident from figure 4.10 that the average area 17.89 decimal, 79.36 decimal, 11.67 decimal & 21.54 decimal were homestead area, cultivated land, leased out and leased in area respectively hold by the sample farmers on an average.

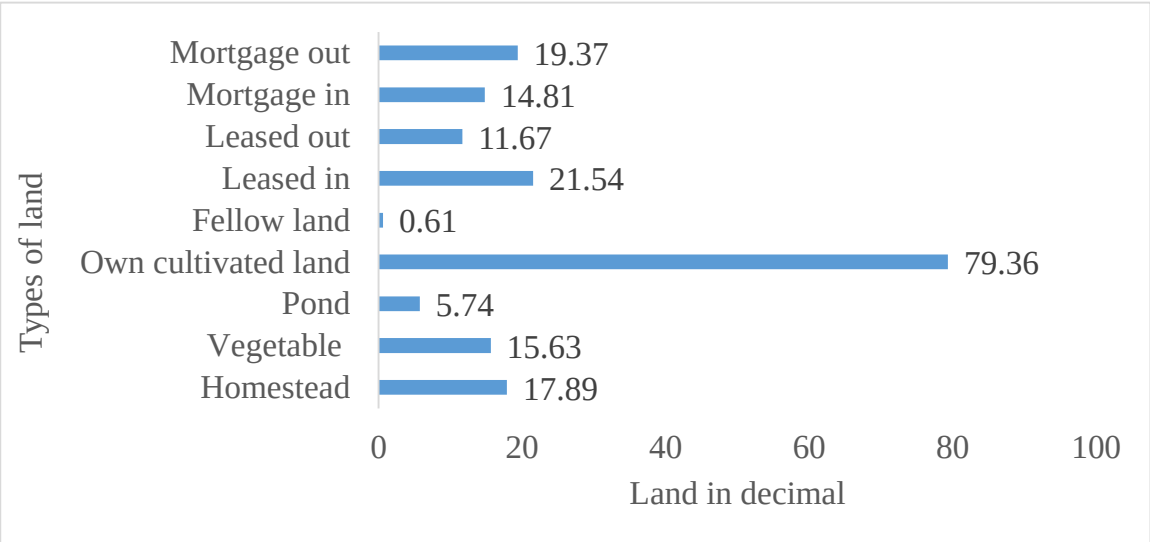


Figure 4.10 Size of Land Holdings of the Sample Farmers

Source: Field survey, 2019

4.11 Knowledge on homestead gardening

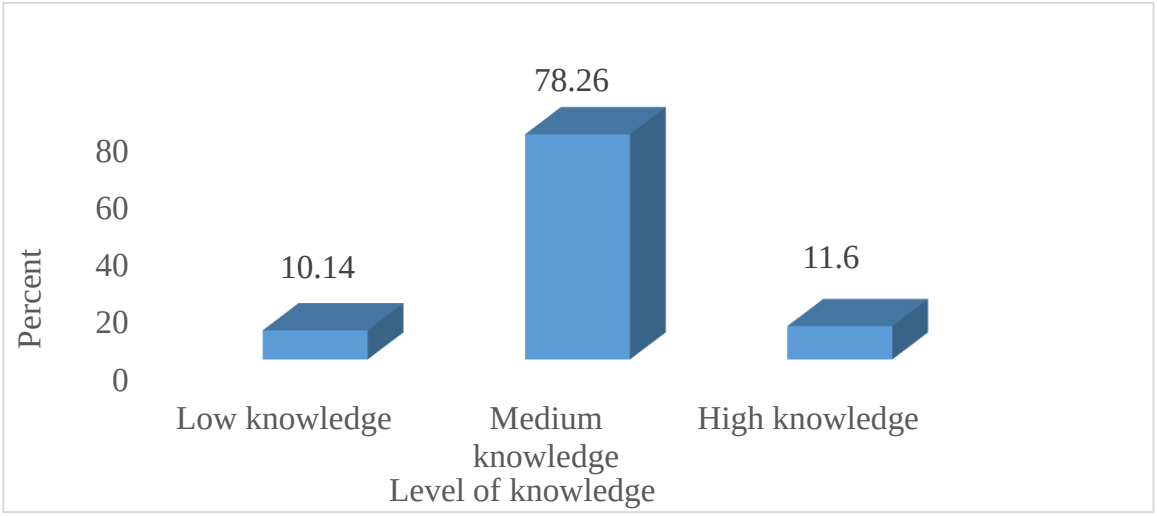


Figure 4.11 Knowledge on homestead gardening

Source: Field survey, 2019

The rural women were classified into three categories on the basis of their vegetable knowledge scores such as (i) low knowledge (6months-1 year), (ii) medium knowledge (1-3 years), and (iii) high knowledge (above3 years) (Figure 4.10).

Data presented in figure 4.11 showed that the highest proportion of 78.26 percent of the rural women had medium knowledge on homestead gardening compared to 10.14 percent of them having low knowledge on gardening and 11.60 percent had high knowledge on homestead gardening. It can be clearly seen from Table 4.10 that majority of the respondents / rural women 89.86 percent had medium to high knowledge on homestead gardening.

4.12 Training experience

Based on their training experience, the rural women were classified into two categories as shown in Table 4.12. The highest proportion of 90.20 percent of rural women in the study group had no training experience while 9.80 percent had training experience.

Table 4.12 Distributions of the respondents according to their training experience

Level of experience	Percent
Training experience	9.80
Training inexperience	90.20

Source: Field survey, 2019

4.13 Attitude towards home gardening

Data contained in table 4.13 indicated that the majority had a medium attitude 49.8 percent as compared to 29.6 percent low attitude and 20.6 percent had a highly favorable attitude towards the homestead gardening.

Table 4.13 Distribution of the respondents according to their Attitude towards home gardening

Level of attitude	Percent
Low favorable attitude	29.8
Moderately favorable attitude	49.6
Highly favorable attitude	20.6

Source: Field survey, 2019

Education and knowledge are considered as major factors for influencing, motivating and changing persons' attitude. Again, contact with information sources results in positive changes in attitude towards productive activities and new technologies. So, more extension agents should be employed by GOs and NGOs to reach rural women to involve them in development activities.

4.14 Cosmo-politeness

Cosmo politeness, or the extent to which one possesses cosmopolitan traits, is a characteristic long associated with innovation. Rogers (2004) notes that people who are more cosmopolitan are earlier adopters of innovations, know more about innovation, and exert opinion leadership. They also are more likely to be stimulators of collective innovation decisions, i.e., recognize that a need exists and call attention to it in a specific social system. Cosmopolitan people are thus expected to have a greater interest in international issues, other cultures, and events occurring in other countries. Other things being equal, cosmopolites are more likely to travel more extensively, particularly outside of their local region and country. They are more likely to identify with a broad, perhaps global, culture than with a specific, narrower milieu (Hampton et al., 2003; Sassen, 2002).

The table 4.14 showed that most of the respondent is not interested to move other than her village, 62.1 percent of women who moved from her own village to another and this is the highest frequency to visit of the respondents in the study area. Very negligible percent of respondents who visited to other Upazila Sadar and Dhaka city (Capital).

Table 4.14 Distribution of the respondents according to their Cosmo-politeness

Place Visit	Frequency of visit (%)			
	Regularly	Occasionally	Rarely	Not at all
Visit to other villages	62.1	20.15	5	12.75
Visit to other union	10.29	17.14	2.65	69.92
Own Upazila Sadar	35.59	40.54	8.23	15.64
Other Upazila Sadar	5.36	10.27	3.67	80.7
Own district town	21.72	15.68	6.91	55.69
Other district town	2.15	13.85	1.78	82.22
Capital city (Dhaka)	1.56	6.24	2.65	89.55

Source: Field survey, 2019

4.15 Decision-making role

Decision making is the process of making choices by identifying a decision, gathering information, and assessing alternative resolutions. Women played important role in decision making like adoption of agricultural technologies, family affairs, buying of agricultural inputs, selling of agricultural products, education of children, participation in social activities, to take out an agricultural loan, allocation of land for cultivation, allocation of farm labor, allocation fertilizer, allocation of seed, allocation of pesticide. Most of the decision making process women played a good role the table 4.16 showed. Family affairs, children education taking an agricultural loan, allocation of labor, fertilizer, seed adaptation of agricultural technologies, etc reflected that women are a well player in decision making and the family head as emphasized on women in the decision-making process.

Table 4.15 Decision making role (Percent)

Nature of Decision	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Adoption of agricultural technologies	9	36	19	27	9
Family affairs	17	58	8	11	6
Buying of agricultural inputs	6	15	46	21	12
Selling of agricultural products	8	19	30	34	9
Education of children	42	54	0.41	2.53	1.06
Participation in social activities	7	34	43	13	3
To take out agricultural loan	14	46	13	17	10
Allocation of land for cultivation	7	32	46	12	3
Allocation of farm labor	13	47	19	15	6
Allocation Fertilizer	16	51	20	9	4
Allocation of seed	19	56	17	5	3
Allocation of pesticide	11	49	21	11	8

Source: Field survey, 2019

4.16 Participation Index of Rural Women in Vegetables Cultivation

The level of women's participation in decision making has been calculated by four different scores given on the basis of the decision-maker. The table 4.16 indicated that women performed different activities regarding vegetable cultivation like bed preparation, seed sowing, transplanting of seedling, fertilizer application, irrigation, weeding, insect control, seed collection, and seed preservation. A participation index was prepared on the basis of the activity in the study area. The following table showed that bed preparation is the first in ranking it conveyed the message that in the study area most of the women involved in bed preparation.

Table 4.16 Participation of Rural Women in Vegetables Cultivation

Particulars	Regularly	Occasionally	Rarely	Not at all	Index	Rank
Bed preparation	123	30	2	0	155	1
Seed sowing	117	34	3	0	154	2
Seed collection	114	26	7	0	147	3
Transplanting of seedling	108	32	4	0	144	4
Seed preservation	105	34	2	0	141	5
Fertilizer application	99	36	5	0	140	6
Weeding	93	38	6	0	137	7
Irrigation	102	24	10	0	136	8
Insect control	102	22	8	0	132	9

Source: Field survey, 2019

4.17 Problem faced Index

In the study area, respondents also faced various problems such as lack of quality seeds and seedlings, lack of required information in time, higher price of inputs, lower market price of vegetables, lower fertility of homestead land, lack of technical knowledge, lack of credit, lack of homestead land, insect and disease infestation, cattle and goat destroy the vegetables, social problems. On the basis of the problems, a problem faced index was prepared and the table showed that lack of credit is the top in ranking, the lower market price of vegetables is in the second in ranking and the respondents feel fewer problems with cattle and goat destroy the vegetables; it is last in raking of problem faced index (Table 4.17).

Table: 4.17 Problem faced by respondents

Particulars	Regularly	Occasionally	Rarely	Not at all	Index	Rank
Lack of quality seeds and seedlings	135	20	5	0	160	7
Lack of required information in time	117	36	10	0	163	5
Higher price of inputs	117	39	8	0	164	4
Lower market price of vegetable	147	27	2	0	176	2
Lower fertility of homestead land	90	45	15	0	150	11
Lack of technical knowledge	114	39	9	0	162	6
Lack of credit	138	39	1	0	178	1
Lack of homestead land	123	24	11	0	158	8
Insect and disease infestation	132	36	4	0	172	3
Cattle and goat destroy the vegetables	120	24	12	0	156	9
Social problems	114	30	11	0	155	10

Source: Field survey, 2019

4.18 Concluding Remarks

This chapter analyzed the socioeconomic attributes of the sample farmers. The findings of analysis clearly indicate the socioeconomic characteristics from each other in respect of age distribution, education, occupation, farm size, ownership pattern, involvement of women & income etc.

CHAPTER V

FACTORS AFFECTING THE LEVEL OF WOMEN'S CONTRIBUTION TO HOUSEHOLD INCOME

5.1 Introduction

To determine the effects of the explanatory variables, liner and log linear models were initially estimated for determining the effects of some selected factor on women's contribution to household income of different categories of households. If the women contribute to the family income then it is very well-being for family and it indicates the women empowerment in the society.

5.2 Factors affecting the level of women's contribution to household income:

To determine the effects of the explanatory variables, liner and log-linear models were initially estimated for determining the effects of some selected factors on women's contribution to a household income of different categories of households. But, the log-linear model was found better in terms of expected signs and magnitudes of the co-efficient, R^2 (adjusted) and F- values. So, the parameter estimators obtained from the log-linear model were selected for interpretation. Care was also taken to avoid the multicollinearity of the selected variables. Factors affecting women's contribution to household income have been presented in Table 5.2.

Table 5.2: Factors affecting the level of women's contribution to household income

Variables	Coefficients	Standard Error	t Stat
Intercept	5.951***	0.527	11.302
Farm size	1.082***	0.07	15.526
Age	0.240*	0.150	1.993
Education	0.162	0.036	1.194
Experience	0.142**	0.067	2.118
Working person	0.249*	0.142	1.756
Family size	0.043	0.103	0.417
R Square	0.9129		
F	44.1557***		

Farm size (X1): The regression coefficient of the number of farm size was estimated at 1.082 which indicates that 1 percent increase in the number of farm size would increase women's contribution to household income by 1.082 percent, keeping other factors constant.

Age (X2): The regression coefficient of age was estimated at 0.240. The coefficient was statistically significant and positive which indicates that age plays an important role to define women's contribution to household income. It implies that holding all other variables constant, 1 percent increase in age would lead to an increase in women's contribution to household income by 0.240 percent.

Experience (X4): The regression coefficient of experience was 0.142 which implies, holding all other variables constant, 1 year increase in experience would lead to an increase in women's contribution to household income by 0.142.

Working person (X5): The regression coefficient of the number of working persons was estimated at 0.249 which indicates that 1 percent increase in the number of females earning members would increase women's contribution to household income by 0.249 percent, keeping other factors constant.

The coefficient of determination (R^2) was 0.9129, which implies that about 91.29 percent of the variation in women's contribution to household income was explained by the set of explanatory variables in the model.

The value of adjusted R^2 was 0.8144, indicating that after taking into account the degree of freedom (d. f.), the six explanatory variables included in the model still accounted for 81.44 percent of the variations in the women's contribution to household income.

The F-value stood at 44.1557and was significant at 1 percent level. It measures the overall goodness of fit of the estimated regression model.

5.3 Concluding Remarks

It is evident from the log linear model, that the included key variables had significant and positive effect on income except education and family size. So, there is a positive effect of key factors on income from vegetable cultivation of year-round vegetable farming.

CHAPTER VI

DIMENSIONS OF WOMEN'S EMPOWERMENT IN VEGETABLE CULTIVATION

6.1 Introduction

Women's empowerment is the process in which women elaborate and recreate what it is that they can be, do, and accomplish in a circumstance that they previously were denied. Empowerment can be defined in many ways, however, when talking about women's empowerment, empowerment means accepting and allowing people (women) who are on the outside of the decision-making process into it. Women's empowerment has five components: women's sense of self-worth; their right to have and to determine choices; their right to have access to opportunities and resources; their right to have power to control their own lives, both within and outside the home; and their ability to influence the direction of social change to create a more just social and economic order, nationally and internationally. (UNFPA, 2017).

6.2. MNL Model Results

Table 6.2 presents the results of the MNL model of estimated parameters. Overall, the model offers a good fit with factors predicting the decision-making strategies by the study households. The chi-square statistics (LR= 44.11) indicate the strong explanatory power of the model. The goodness of fit of the model given by the McFadden pseudo R^2 of 0.2189 also indicates reasonable explanatory power of the model (Table 6.2). Moreover, most of the explanatory variables in the model were found to be statistically significant with an expected sign (see discussion below).

6.2.1. Age of household head

The age of the household head acts as a proxy for experience and so influences the adoption of adaptation strategies. The study found the household head's age was a significant positive (1.304) factor buying of agricultural inputs. It implies that a one-unit (year) increase in a respondent's age will increase the probability of decision making of buying of agricultural inputs 1.304 relatives to the base category while the effect on the remaining options is negligible. Negative relationship implies that a one-unit (year) increase in a respondent's age will decrease the probability of decision making a particular strategy. The same interpretation holds true for the other variables.

6.2.2. Level of education

The study found a significant positive relationship with the decision making of buying agricultural inputs, allocation of labor, and to take out an agricultural loan. This finding supports the empirical evidence that women with higher educational levels were likely to play a crucial role in decision making.

6.2.3. Experience

The model results found the farming experience was a significant positive factor in the decision-making process to the allocation of labor and selling of agricultural products. This implies that the probability of decision making is greater for those who have more experience.

Table 6.2 Dimensions of women's empowerment in vegetable cultivation

Variables	Buying of agricultural inputs	Selling of agricultural products	Allocation of labor	To take out an agricultural loan
Intercept	-1.773 (3.971)	4.344 (3.588)	3.118 (3.211)	-0.759 (3.059)
Age	1.304** (0.085)	0.095 (0.082)	1.079** (0.075)	0.080 (0.070)
Education	2.291** (0.851)	0.812 (0.739)	1.109** (0.090)	1.338* (0.068)
Experience	0.027 (0.110)	1.079** (0.106)	0.071* (0.100)	-0.054 (0.102)
Credit	1.634** (0.037)	0.223 (1.188)	0.885 (0.946)	0.638 (1.104)
Information	3.093** (1.488)	2.321** (1.120)	1.484 (0.992)	2.338** (1.079)
Income	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Farm size	0.082 (0.152)	-0.288 (0.175)	0.191*** (0.133)	-0.074 (0.125)
Working person	0.260 (1.039)	-0.785 (0.941)	1.040** (0.049)	-0.131 (0.878)

Log likelihood = -73.341

Pseudo R^2 = 0.2189

LR (Chi-square) = 41.11

N = 60. Adopting agricultural technology is used as base category. Standard errors are indicated in parentheses.

*p< 0.10 **p< 0.05 ***p< 0.01

6.2.4. Access to credit

Access to credit has been reported to have a significant positive impact on decisions making the process (Bryan et al., 2009; Deressa et al., 2009). This study found a significant positive relationship between buying agricultural inputs.

6.2.5. Information

Information on women empowerment can create awareness among women and increase the probability of keeping a role in decision making. The model results found a significant positive relationship between buying of agricultural inputs, selling of agricultural products, and to take out an agricultural loan.

6.2.6. Income

The model results found the income was a significant positive factor in the decision-making process to the buying of agricultural inputs, selling of agricultural products, allocation of labor, and to take out an agricultural loan. This implies that the probability of decision making is greater for those who have more income.

4.2.7. Farm size

. The model results found the farm size was a significant positive relationship with the allocation of labor. This implies that the probability of decision making is greater for those who have more land.

6.2.8 Working person

The model results found the working person was a significant positive relationship with the allocation of labor.

6.3 Concluding Remarks

It is evident from the MNL model, that age, education, experience, income, farm size and information have the significant impact to taking decision on buying of agricultural inputs, selling of agricultural products, allocation of labor, to take out an agricultural loan. When the power of income of women have in hand then they can take any decision easily.

CHAPTER VII

SUMMARY, CONCLUSION AND RECOMMENDATION

7.1 Introduction

This chapter attempts to summarize the major findings of the study. Section 7.2 presents a summary of the major findings of the study. Conclusion, policy recommendations, limitation and scope for the further study are given in Sections 7.3, 7.4, 7.5 and 7.6 respectively.

7.2 Summary of the study

In Bangladesh, women's participation in economic activities in general and agriculture, in particular, has remained low. However, a recent labor force survey conducted by the Bureau of Statistics (BBS, 2017) showed a rapidly increasing participation of women in economic activities. With the absence of male members, women's role is changing from unpaid family workers to farm managers, a phenomenon termed as "feminization of agriculture" is visible. Only 3.85 percent of the female workers participated in crop farming in 2008, compared to 53 percent for men. Only about one (01) percent of the women participated in the agricultural labor market in 2000 and 2008. Women's participation in the agricultural labor market remains insignificant at 1.07 percent of agricultural workers compared to 23 percent for male workers in 2008 (BBS 2018). The situation now seems to be changing considerably due to the introduction of new technologies in agriculture and rural life. It is now well recognized that in an effort to raise production, employment and income in rural areas, both men and women should embrace agricultural and non-agricultural activities in rural homes.

The objectives of the study are to delineate the socio-economic characteristics of the vegetable producing farmers; to assess the influencing factor in household income through vegetable cultivation; and to detect the dimensions of women's empowerment through vegetable cultivation.

From the study, we got the following findings.

The highest proportion of 54.36 percent of the respondents fell in the young age category compared to 42.25 percent middle and it was also revealed that 3.29 percent of the respondents comprised of old-aged categories. The percentage of having primary education

is 40.91 and 15.33 percent having secondary education compared to 32.5 percent can sign only and 9.24 percent having no education (illiterate). The large proportion of 55.35 percent of the respondents belonged to the medium family category compared to 24.52 percent belonged to the "small family" category and 20.13 percent to "large family" category.

It is evident from the study that 68.25 percent of farmers were involved in agriculture and 14.19 percent of farmers were involved in vegetable cultivation. Very few of them were also involved in the business. The percentage of the landless farmer was 28.36, 60.39 percent were small farmers, 9.28 percent was a medium farmer and only 1.97 percent were large farmers. It is evident from the study that most of the farmer's yearly income belonged to the category of 150,000 to 250,000. About 46.60 percent of the vegetable farmers were earned Tk. 150,000 to 250,000 per year, 51.31 percent of the farmers were earned Tk. less than 150,000 per year and 2.09 percent farmers were earned Tk. Above 250,000 per year. The depending members per income earner. In this present study, the average dependency ratio was found at 1.75.

In the present study, involvements of women in vegetable farming were categorized into two categories: 1 women involvement, 2 women involvement. It is evident from that 43.25 percent of farmers used 1women labor in their farm, 56.75 percent of farmers used 2 women labor on their farm. So the result implies that the involvement of women in vegetable farming activities was very small. It is found that the average area 18.27 decimal, 85.12 decimal, 15.31 decimal, 22.10 decimal were homestead area, cultivated land, leased out and leased in area respectively held by the sample farmers on an average. The highest proportion was off 78.26 percent of the rural women had medium knowledge on homestead gardening compared to 10.14 percent of them having low knowledge on gardening and 11.60 percent had high knowledge of homestead gardening. The highest proportion of 90.20 percent of rural women in the study group training experience, while 9.80 percent had training farming inexperience. The study revealed most of the respondent is not interested to move other than her village, 62.1 percent of women who moved from her own village to another and this is the highest frequency to visit of the respondents in the study area. Very negligible percent of respondents who visited to other Upazila Sadar and Dhaka city (Capital). In the study area, women played important role in decision making like adoption of agricultural

technologies, family affairs, buying of agricultural inputs, selling of agricultural products, education of children, participation in social activities, to take out an agricultural loan, allocation of land for cultivation, allocation of farm labor, allocation fertilizer, allocation of seed, allocation of pesticide. Family affairs, children's education taking the agricultural loan, allocation of labor, fertilizer, seed adaptation of agricultural technologies, etc reflected that women are a well player in decision making and the family head as emphasized on women in the decision-making process.

The study showed that women performed different activities regarding vegetable cultivation like bed preparation, seed sowing, transplanting of seedling, fertilizer application, irrigation, weeding, insect control, seed collection, and seed preservation. A participation index was prepared on the basis of the activity in the study area. It was shown that bed preparation is the first in ranking it conveyed the message that in the study area most of the women involved in bed preparation. In the study area, respondents also faced various problems such as lack of quality seeds and seedlings, lack of required information in time, higher vegetable of inputs, lower market vegetable of products, lower fertility of homestead land, lack of technical knowledge, lack of credit, lack of homestead land, insect and disease infestation, cattle and goat destroy the vegetables, social problems. On the basis of the problems, a problem faced index was prepared and it was indicated that lack of credit is the top in ranking, the lower market vegetable of products is in the second in ranking and the respondents feel fewer problems with cattle and goat destroy the vegetables; it is last in raking of problem faced index.

7.3 Conclusion

It is evident from the study that respondents also faced various problems such as lack of quality seeds and seedlings, lack of required information in time, higher vegetable of inputs, lower market vegetable of products, lower fertility of homestead land, lack of technical knowledge, lack of credit, lack of homestead land, insect and disease infestation, cattle and goat destroy the vegetables, social problems. On the basis of the problems, a problem faced index was prepared and it was indicated that lack of credit is the top in ranking, the lower market vegetable of products is in the second in ranking and the respondents feel fewer problems with cattle and goat destroy the vegetables; it is last in raking of problem faced index. In the study area, women played important role in decision making like adoption of agricultural technologies, family affairs, buying of agricultural inputs, selling of agricultural

products, education of children, participation in social activities, to take out an agricultural loan, allocation of land for cultivation, allocation of farm labor, allocation fertilizer, allocation of seed, allocation of pesticide. Family affairs, children's education taking the agricultural loan, allocation of labor, fertilizer, seed adaptation of agricultural technologies etc. reflected that women are a well player in decision making and the family head as emphasized on women in the decision-making process.

The study revealed that most of the farmer's yearly income belonged to the category of 150,000 to 250,000. About 46.60 percent of the vegetable farmers were earned Tk. 150,000 to 250,000 per year, 51.31 percent of the farmers were earned Tk. less than 150,000 per year and 2.09 percent farmers were earned Tk. Above 250,000 per year. The depending members per income earner. In this present study, the average dependency ratio was found at 1.75. In the present study, involvements of women in vegetable farming were categorized into two categories: 1 women involvement, 2 women involvement. It is evident from that 43.25 percent of farmers used 1women labor in their farm, 56.75 percent of farmers used 2 women labor on their farm. So the result implies that the involvement of women in vegetable farming activities was very small. It is found that the average area 18.27 decimal, 85.12 decimal, 15.31 decimal, 22.10 decimal were homestead area, cultivated land, leased out and leased in area respectively held by the sample farmers on an average. The highest proportion was off 78.26 percent of the rural women had medium knowledge on homestead gardening compared to 10.14 percent of them having low knowledge on gardening and 11.60 percent had high knowledge of homestead gardening. The highest proportion of 90.20 percent of rural women in the study group training experience, while 9.80 percent had training farming inexperience.

7.4 Policy implications and recommendations

The following specific recommendations are made for maintaining or improving vegetable production in Bangladesh in the face of climate change:

- Lack of finance is a common phenomenon of our women. Krishi Bank can provide a loan without any interest to women who are more interested to cultivate vegetable or other programs regarding agriculture. But real scenario is different farmers go to rural usury for finance and them victims with the high-interest rate; they get impoverished day by day and a vicious cycle of poverty. To survive our farmer's

government should be attentive to the financial facility of farmers and create the easiest way of providing loans to small and landless farmers.

- Farmers reported that lack of quality seed is also a problem. In this regard, BADC can ensure the matter quality of seed; they must be more sensitive regarding quality seed. In each and every Upazila they should appoint a seed expert who could justify the quality of seed of every company to ensure the good quality of seed, it would be more beneficial for farmers.

- It was observed that women have less technical knowledge regarding vegetable farming. The Upazila extension officer can accelerate the process of providing training to the farmers where they would provide technical knowledge for the farmers; it would increase the productivity and income of farmers.

- In MNL, it was found that the farm size of the rural women had a significant positive relationship with their participation in homestead vegetable cultivation. Therefore, it may be recommended that GOs and NGOs should take the necessary motivational program, especially to small and medium farm sized rural women so that they can cultivate more vegetables in their homestead.

- Homestead vegetable cultivation is an important source of nutrients that make diets for human beings more balanced and also a good earning source for the family. But in the present study, the majority of the rural women had low to medium participation in homestead vegetable cultivation. It is, therefore, recommended that necessary steps should be taken to motivate the rural women in participating in homestead vegetable cultivation.

7.5 Limitations and future research focus

The present study being conducted in some specific location which cannot provide all information for the proper understanding of rural women towards participation in homestead vegetable cultivation. Therefore, the following recommendations were made for further study:

I. The present study was conducted in four selected villages of Jamalpur district. It is strongly felt that the study of this nature is replicated in other parts of Bangladesh.

II. Participation of rural women in homestead vegetable cultivation may be determined by using other ways and methods which may be used in conducting further research.

III. The study was conducted on female farmers but male farmers are equally important. So, a similar study may be conducted with male farmers.

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