CONSTRAINTS FACED BY THE FARMERS IN VEGETABLE PRODUCTION

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CERTIFICATE

This is to certify that the thesis entitled, **"CONSTRAINTS FACED BY THE FARMERS IN VEGETABLE PRODUCTION"** submitted to the faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **Master of Science (MS) in Agricultural Extension,** embodies the result of a piece of bonafide research work carried out by **Md. Sarower Hossain**, Registration No. 10-03933, under my supervision and guidance. No part of this thesis has been submitted for any other degree or diploma.

I further certify that any help or sources of information, as has been availed of during the course of investigation have been duly acknowledged.

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DEDICATION

DEDICATED TO MY BELOVED PARENTS

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LIST OF ABBREVIATIONS

Abbreviation	Full word
Ag. Ext. Ed.	Agricultural Extension Education
Ag. Ext. and Info. Sys.	Agricultural Extension and Information System
AIS	Agriculture Information Service
β	Beta co-efficient
BBS	Bangladesh Bureau of Statistics
BEC	Bangladesh Economic Census
BRRI	Bangladesh Rice Research Institute
DAE	Department of Agricultural Extension
et al.	All Others
FAO	Food and Agriculture Organization
MoYS	Ministry of Youth and Sports

CONSTRAINTS FACED BY THE FARMERS IN VEGETABLE PRODUCTION

ABSTRACT

The research examines the extent of constraints faced by the farmers in vegetable production and to explore the contribution of the selected characteristics of the farmers to their constraints faced in vegetable production. The locale of the study was five villages of Sangalshi union under Nilphamari Sadar upazila of Nilphamari District. Data were collected from 109 vegetable cultivators from 04 April, 2017 to 03 May, 2017. Descriptive statistics, multiple regressions (β) were used for analysis. The highest proportion (66.10 %) of the respondent had medium constraints in vegetable production, 18.30 percent had low constraints and 15.6 percent had high constraints in vegetable production. According to Constraints Faced Index (CFI), high cost of labor (367), lack of knowledge about post harvest technologies (364) and high fluctuation in price (365) were highest extent of constraints in case of input constraints, technical constraints and marketing constraints in vegetable production respectively. Among the variables, level of education, effective farm size, annual family income, training exposure, extension media contact, knowledge on vegetable production technologies of the farmers had significant contribution to their constraints faced in vegetable production. These six variables combinedly contributed 79.30% (R2=0.7930) of the variation in explaining constraints faced by the farmers in vegetable production.

CHAPTER I

INTRODUCTION

1.1 General Background

Bangladesh, basically an agro-based country, is considered one of the world's most densely populated countries (964 persons per square km) with an annual population growth rate of 1.2 percent (BBS, 2016). In such setting, the pressure on the land for agricultural production and the demand for job is increasing day by day. This has led to rapid changes in the country's socio-economic characteristics in the recent years. Agriculture is the economic backbone of the country. Subsistence vegetable farming is traditionally practiced by the farmers. So, there is no cost-benefit calculation. But nowadays, Bangladesh agriculture is in transition from subsistence to commercial agriculture. Many entrepreneurs are investing in agriculture. Farmers are commercially cultivating crops especially vegetable. During the last decade, both area and production of vegetable increased manifold (AIS, 2001 and 2016).

More than 40 kinds of vegetables belonging to different groups, namely, solanaceous, cucurbitaceous, leguminous, cruciferous (cole crops), root crops and leafy vegetables are grown in Bangladesh. Important vegetable crops grown in the country are potato, tomato, onion, brinjal, cabbage, cauliflower, okra etc. Bangladesh is third next to China and India in area and production of vegetable. Next to cereals, pulses, oilseeds, vegetable occupy an important position in the economy of Bangladesh's agriculture. The vegetable are grown throughout the year i.e Kharif, Rabi and summer depending upon rainfall, temperature, market demand, preference of growers and social requirements. The most important aspect of vegetable cultivation is that it absorbs woman labor to a greater extent compared to other crops. It is not out of place to mention that in many cases housewives entirely manage the vegetable production system up to harvesting and marketing.

Apart from national and international consideration, the grass root population needs to understand the meaning and concept of constraints in vegetable production. In a country like Bangladesh, where most people depend on farming for living, they need to have full idea being discussed about vegetable production and what role local people have to play. It is quite pertinent and necessary to know the extent of constraints faced by the farmers in vegetable production. But a very limited research work has been done on this aspect. Therefore, the researcher felt necessity to conduct a research entitled 'Constraints Faced by the Farmers in Vegetable Production'.

1.2 Statement of the Problem

In Bangladesh, diversification in the land use pattern has to be taken into account for both food security and livelihood sustainability. The limitations of terraced farming in terms of productivity and the dearth of land for cultivation highlight the constraints faced by farming community for vegetable cultivation. Under these conditions, innovative scientific technologies, exploration of pressing constraints and best possible opportunities for the growth of vegetable cultivation should be identified. In order to formulate suitable strategic measures for the reduction of constraints faced by the farmers in vegetable production, this research was undertaken to answer the following questions:

- What is the extent of constraints faced by the farmers in vegetable production?
- What are the characteristics of the vegetable farmers?
- What is the extent to which selected characteristics of the vegetable farmers contribute to their constraints in vegetable production?

In order to get a clear view of the above questions, the investigator undertook a study entitled 'Constraints Faced by the Farmers in Vegetable Production'.

1.3 Objectives of the Study

The Following objectives were structured out in order to provide an appropriate track to the research work:

i. To assess the extent of constraints faced by the farmers in vegetable production;

ii. To describe the following selected characteristics of the farmers:

- Age
- Level of education
- Family size
- Effective farm size
- Annual family income
- Experience in vegetable cultivation
- Training exposure
- Extension media contact
- Level of aspiration in life
- Organizational participation, and
- Knowledge on vegetable production technologies; and

iii. To explore the contribution of the farmers' selected characteristics to their constraints in vegetable production

1.4 Scope or Rationale of the study

The present study was designed to have an understanding constraints faced by the farmers in vegetable production and to explore the contribution of the farmers' selected characteristics to their constraints in vegetable production.

i. The findings of the study will, in particular, be applicable to the study area at Nilphamari Sadar upazila. The findings may also be applicable to other locale of Bangladesh where socio-cultural, psychological and economic circumstance do not differ much than those of the study areas.

ii. The findings of the study may also be subsidiary to the field worker of extension service to enhance their action strategies on constraints faced by the farmers in vegetable production.

iii. The findings of the study will be conducive to accelerate the improvement in agriculture, farmers' logistic supports, information needs. The outcomes might also be helpful to the planners, policy makers, extension workers, beneficiaries of the agriculture.

iv. To the academicians, it may help in the further conceptualization of the systems model for analyzing the constraints faced by the farmers in vegetable production.

1.5 Justification of the Study

Vegetable, as high value crops, often require an intensive care, necessitating large labor input in planting and harvesting. In Bangladesh, higher profit variability in commercial cultivation of vegetable is evident due to variability in yields and market prices (Weinberger and Genova II, 2005). It is reported that due to various constraints farmers are not getting expected benefit from their investment. Moreover, constraints vary from one farmer to another due to influence of various factors (Rahman *et al.,* 2008-10).

So, it is logical to investigate about constraints faced by the farmers in vegetable production. The finding of the study will be especially applicable to the ChottoSangalshi, BaroSangalshi, Subornokuli, South Balapara, Digholdangi villages of Sangalshi union under the Nilphamari. The findings will also have implications and applicability for other areas of the country, having similarities in physical, socio-economic and socio-cultural conditions with the study area. Thus, the findings are expected to be useful to extension workers and planners for their preparation of extension programmers for rapid action on constraints faced by the farmers in vegetable production. The findings of the study are also therefore, expected to be conducive to the

researchers, academicians and policy makers who are concerned with of constraints in vegetable production.

1.6 Assumptions of the Study

An assumption is the supposition that an apparent fact or principle is true in the light of available evidence (Goode and Hatt, 1952). The researcher had considered the following assumptions while undertaking the study:

i. The respondents were capable of furnishing proper answers to the questions contained in the interview schedule.
ii. The data collected by the researcher were free from any bias and they were normally distributed.
iii. The responses answered by the respondents were valid, acceptable and reliable.
iv. Information sought by the researcher elicited the real situation and was the representative of the whole population of the study area to gratify the objectives of the study.
v. The researcher was well adjusted to himself with the social contiguous of the study area. Hence, the collected data from the respondents were free from favoritism.
vi. The selected characteristics and constrains faced by the farmers in vegetable production of the study were normally and independently allotted with respective means and standard deviation.

1.7 Limitations of the Study

Considering the time, respondents, communication facilities and other necessary resources available to the researcher and to make the study manageable and meaningful, it became necessary to impose certain limitations as mentioned bellow:

i. The study was confined to only one upazila namely Sadar upazila of Nilphari district which may fail to represent the actual scenario of the

whole situation as people develop their strategies according to the concrete situation they face.

ii. It is difficult to get exact information on constraints faced by the farmers in vegetable production indicator from the vegetable farmers as many of them are illiterate.

iii. Characteristics of the farmers were many and varied, but only eleven characteristics were selected for the research study.

iv. There were embarrassment situations at the time of data collection. So, the researcher had to establish proper rapport with the respondents to collect accurate information.

v. Several methods, scales and statistical tests have been utilized in this study over a relatively short period of time.

1.8 Definition of Important Terms

Age: Age refers to the terms of actual years from their birth to the time of the interview, which was found on the basis of the verbal response of the respondents.

Education: Education was measured by assigning score against successful years of schooling by a vegetable grower.

Family size: Family size refers to the total number of members in the family including him/her, children and other dependents.

Effective farm size: Effective farm size of a farmer refers to the total area of land on which carried out the farming operation, the area being in terms of full benefit to the family.

Annual family income: Annual income refers to the last year annual gross income from different sources.

Experience in vegetable cultivation: Experience in vegetable cultivation of the farmer refers the total number of year involved in vegetable cultivation.

Training exposure: Training exposure refers to the total number of days agricultural training received on various farming activities.

Extension media contact: Extension media contact defines as one's extent of exposure to different communication media related to farming activities.

Level of aspiration in life: Level of aspiration in life is a desire or ambition for which someone is motivated to work very hard.

Organizational participation: Organizational participation refers to the participation in different organizations by a respondent.

Knowledge on vegetable production technologies: Knowledge on vegetable production technologies refers to the knowledge on different production technologies regarding vegetable production.

Constraints faced: The state of being restricted or confined within the bounds.

Constraints faced in vegetable production: It refers to the state of being restricted vegetable production faced by ones.

CHAPTER II

REVIEW OF LITERTURE

Review of literature gives the clear and concise direction of the researcher for conducting the experiment. In this Chapter, review of literatures relevant to the objectives of this study was presented. This was mainly concerned with 'constraints in vegetable production'. There was serious dearth of literature with respect to research studies on this aspect. So, the directly related literatures were not readily available for this study. Some researchers addressed various aspects of the constraints in vegetable production and its effect on client group and suggesting strategies for their emancipation from socio-economic deprivations. A few of these studies relevant to this research are briefly discussed in this Chapter under the following four sections:

Section 1: Literature related to problems faced by the respondent's in different aspects of agriculture

Section 2: Review concerning the relationship between selected characteristics of the respondent and their problem confrontation

Section 3: Research gap of the study

Section 4: Conceptual framework of the study

2.1 Literature Related to Problems Faced by the Respondent's in Different Aspects of Agriculture

Mortuza (2015) found that more than two third (67.10 percent) of the respondents faced medium problem in maize production activities and 19.50 percent faced low problems and 13.40 percent faced high problems.

Rahman (2015) observed that more than half (67.4%) of the respondents faced medium problem in jackfruit commercialization activities, while 18.6 percent faced high problems and only 14 percent faced low problems.

Baten (2014) in his study found that the majority (73.3 %) of the farmers faced medium problem in cotton cultivation, while 16.4 percent low and 10.3 percent high problem in cotton cultivation.

Uddin (2004) in his study identified five aspects of constraints in commercial cultivation of vegetables viz. seed constraints, disease and insect infestation constraints, field management constraints, marketing of vegetable constraints and extension work constraints. Among these aspects of constraints, he revealed disease and pest infestation constraints severely faced by the farmers.

Salam (2003) in his study identified constraints in adopting environmentally friendly farming practices. Top six identified constraints according to their rank order were: (i) low production due to limited use of fertilizer, (ii) lack of organic matter in soil, (iii) lack of Govt. support for environmentally friendly farming practices, (iv) lack of capital and natural resources for integrated farming practices, (v) lack of knowledge on integrated farm management and (vi) unavailability of pest resistant varieties of crops.

Pramanik (2001) made an extensive study on 24 problems of farm youth in Mymensingh district relating to different problem in crop cultivation. Out of 24 problems the top 4 problems in rank order were: (1) local NGOs take high rate of interest against a loan, (2) lack of agricultural machinery and tools, (3) lack of cash and (4) financial inability for seeds, fertilizer and irrigation.

Ismail (2001) conducted a study on problem faced by the farm youth of haor area of Mohongonj upazila. The study revealed six top problems in rank order which were: (1) no arrangement of loan for the farm youth for fishery cultivation, (2) lack of government programs in agriculture for the farm youth, (3) absence of loan giving agencies for establishing farm in locality, (4) general people face problem for fishery due to government leasing of Jalmohal, (5) lack of government program for establishing poultry farm and (6) lack of agricultural loan for the farm youth.

Alam *et al.* (2000) conducted a survey on jute crops in seven districts in Bangladesh and found that scarcity of quality seeds, high labour wage and low market price of fiber were the major constraints of jute production.

Muttaleb *et al.* (1998) revealed that among different constraints, high fertilizer cost, high seed cost, lack of quality seed, lack of awareness, lack of

technological knowledge and low price of potato at harvest period were perceived as barriers for the adoption of potato technologies.

Gumisiriza *et al.* (1994) showed several constraints of wheat production in Uganda. Those were: traditional farming practices, unavailability or lack of improved cultivars, information and technology transfer, rust and foliar diseases and ineffective communication between research stations.

Freeman and Breth (1994) conducted a study on productivity of agricultural systems in the West African savanna. The study showed several constraints in farming practices such as intensified land use, fallow period decline and crop cultivation spreading ecologically fragile lands. In the absence of appropriate resource management technologies, those practices inevitably led to degradation of the resource base with important implication with soil productivity, household food security and rural poverty.

Ramachandran and Sripal (1990) identified different constraint in adopting of dry land technology for rainfed cotton in Kamaraz district, Tamilnadu, India. They found that farmers faced constraints which included insufficient rainfall susceptibility of pest and diseases, lack of experience, unavailability of inputs in time, lack of knowledge, in sufficient livestock, risk due to failure of monsoon, high cost etc.

Chander *et al.* (1990) in their study identified constraints in potato cultivation. Main constraints were ignorance about improved cultivars and cultivation practice, ignorance about time and number of irrigations, ignorance about scientific method of sowing, lack of guidance of marketing of potato, high cost of improved cultivars, high cost of fertilizers, pesticide and irrigation, lack of enough space for storing potatoes scientifically and so on.

Zinyama (1988) conducted a relative observation to find out the farmers' perception of the constraints against increased crop production in the subsistence communal farming sector of Zimbabwe. Five of the most frequently cited constraints were (1) lack of money with which to purchase seasonal agriculture inputs, particularly fertilizer (2) lack of basic farming

implements, notably the ox driven single furrow plough (3) lack of draught cattle, (4) inadequate arable land and (5) inadequate family labour for agricultural work.

Kher and Halyal (1988) administered a research work to identify the constraint in adoption of sugarcane production technology. The most important constraint identified regarding the adoption of input in sugarcane production technology were irregular and insufficient electricity supply, small size of holding for green manuring inconvenience of inter cropping due to weeds, high cost of farm fuel, scare irrigation facility, absence of location specific recommendations for earthing up, lack of drought resistant varieties and lack of technical knowledge about plant protection and chemical fertilizer.

Raha *et al.* (1986) identified some common problems of cotton cultivation as perceived by the farmers in Bangladesh. Those were lack of suitable land, lack of irrigation facility, shortage of labour, shortage of cash money, lack of technical knowledge, lower price of cotton and non-availability of seed, insecticide and fertilizer.

Arya and Shah (1984) conducted a study in the mid-Himalayan Region of Uttar Pradesh of India to find out the existing and potential level of food production and main constraints on the adoption of new technology for rainfed agriculture. The main constraint identified were (1) small and skewedly distributed holdings, (2) fragmented and scattered holdings, (3) shortage of labour, (4) lack of availability of inputs and funds and (5) lack of education, training and extension especially for women.

Marothia (1983) conducted a study to find out the constrains in the adoption of paddy technologies in two villages in Raipur block, Madhya Pradesh, India. The findings revealed that the majority of farmers still adopt a partial package of recommendations, mainly due to the high cost of input, financial limitations and risk of crop failure. Inadequate supportive input facilities were found to be responsible for the slow adoption of paddy technology.

King (1980) showed that the problems of cotton development project in Gambia were dominated by three main factors that are: (1) low yield, (2) high labour input (3) the relative price paid to the farmers for groundnut and cotton. There were no technical reasons why cotton cannot be grown.

2.2 Review Concerning the Relationship between Selected Characteristics of the Respondent and their Problem Confrontation

2.2.1 Age and problem confrontation

Mortuza (2015) found that age had no significant relationship with their problems faced in maize cultivation.

Baten (2014) revealed that age had no significant relationship with their problem faced in cotton cultivation.

Bhuiyan (2002) in his study found a positive and significant relationship between age of the farmers and their constraints in banana cultivation. Similar findings were obtained by Rahman (1996) in his respective study.

Rashid (1999) found that age of the rural youth had significant negative relationship with problem in selected agricultural production activities.

Kashem (1997) conducted study on the landless labourers of Barakhata Union under Rangpur district and determined the relationship between age of the landless labourers and their problem confrontation. He found no relationship between age of the landless labourers and their problem confrontation.

Mansur (1989) found that age of the farmers had no significant relationship with the feeds and feeding problem confrontation.

Hossain (1985) in a study on landless labourers in Bhabakhali Union of Mymensingh district found that there was no relationship between the landless labourers and their problem confrontation. Similar findings were obtained by Rahman (1995), Ali (1999), Rashid (1999), Pramanik (2001), Ahmed (2002) and Salam (2003) in their respective studies.

2.2.2 Level of education and problem confrontation

Mortuza (2015) found that level of education had no significant relationship with their problems faced in maize cultivation.

Baten (2014) revealed that education had significant negative relationship with their problem faced in cotton cultivation.

Haque (2001) found a significant negative relationship between education and problem confrontation of the Farmers Field School (FFS) in practicing .

Kashem (1997) in his study found a significant negative relationship between education of the landless labourers and their problem confrontation.

Islam (1987) in his study found a significant and negative relationship between education of the farmers and their problem confrontation on artificial insemination. Similar findings were obtained by Mansur (1989), Rahman (1995), Haque (1995), Rahman (1996), Karim (1996), Faroque (1997), Pramanik (2001), Ahmed (2002), Hossin (2002), Bhuiyan (2002) and Salam (2003) in their respective studies.

2.2.3 Farm size and problem confrontation

Mortuza (2015) found that farm size had no significant relationship with their problems faced in maize cultivation.

Baten (2014) revealed that land possession had significant negative relationship with their problem faced in cotton cultivation.

Rashid (2003) found that farm size of the rural youth had no relationship with problem confrontation in selected agricultural activities.

Hoque (2001) revealed that significant positive relationship existed between farm size and problem confrontation of the FFS farmers in practicing IPM.

Kashem (1997) found a significant negative relationship between borga farm size of the landless laborers and their problem confrontation.

Hossain (1985) in his study found a significant relationship between borga farm size of the landless laborers and their problem confrontation.

2.2.4 Family annual income and problem confrontation

Mortuza (2015) found that annual family income had no significant relationship with their problems faced in maize cultivation.

Baten (2014) revealed that annual family income had no significant relationship with their problem faced in cotton cultivation.

Masur (1989) did not find any significant relationship between income of the farmers and their problem confrontation in feeds and feeding cattle. However, the trend of the relationship was negative.

Raha (1989) found in his study that income of the farmers had no significant relationship with their irrigation problem confrontation.

Islam (1987) reported that the relationship between income and artificial insemination problem confrontation was negatively significant.

Hossain (1985) found a significant relationship between income and problem confrontation of the land less laborer.

Saha (1983) found in his study a negative relationship between income of the farmers and their poultry problem confrontation.

Kashem (1997) in his study examined the relationship between income of the landless laborers and their problem confrontation. Though the relationship was not statistically significant, the data indicated an appreciable negative trend between the two variables.

2.2.5 Training exposure and problem confrontation

Mortuza (2015) revealed that training exposure on maize cultivation had significant and negative relationship with their problems faced.

Baten (2014) revealed that training exposure had significant negative relationship with their problem faced in cotton cultivation.

2.2.6 Extension contact and problem confrontation

Mortuza (2015) revealed that extension media contact had significant and negative relationship with their problems faced.

Baten (2014) revealed that extension media contact had significant negative relationship with their problem faced in cotton cultivation.

The study of Ismail (2001) revealed that there was no significant relationship between media exposure of the farmers and their agricultural problem confrontation. Similar findings were obtained by Hoque (2001) in his study. Rahman (1995) in his study concluded that media exposure of the farmers had significant negative relationship with their faced problem in cotton cultivation. Similar findings were obtained by Rahman (1996), Faruque (1997), Pramanik (2001), Hossain (2002), Bhuiyan (2002) and Salam (2003) in their studies.

Raha (1989) Found that extension contact of the farmers had no significant relationship with immigration problem confrontation. However, the relationship showed a tendency in the negative direction.

2.2.7 Organizational participation and problem confrontation

Rahman (1995) found in his study that there was no relationship between the farmers' social participation and their faced constraints in cotton cultivation.

Ali (1978), Saha (1983), Sarker (1983) and Mansur (1989) found in their studies that social participation of the farmers had a significant negative relationship with the agricultural constraints faced. On the other hand, Islam (1987) and Raha (1989) found no significant relationship with their agricultural constraints faced.

Rashid (1975) concluded in his study that social participation of the farmers had no significant relationship with their agricultural problem confrontation.

Mahboob (1966) undertook a study on the personality characteristics of the main county extension personnel in Wisconsin and based on finding of his study he concluded that participation in society is desirable for extension worker as it developed leadership qualities. Conclusion suggested that social participation of individuals may lessen their problem and thus enhance performance.

2.2.8 Knowledge and problem confrontation

Mortuza (2015) revealed that knowledge on maize cultivation had significant and negative relationship with their problems faced.

Rahman (2015) exposed that knowledge on jackfruit cultivation had significant negative relationship with the problems faced by the farmers.

Baten (2014) revealed that cotton cultivation knowledge had significant negative relationship with their problem faced in cotton cultivation.

2.3 Research Gap of the Study

A few researches had been conducted to solely assess the extent of constraints faced by the farmers including dimensions of constraints in vegetable production. This was one of the research gaps of the study.

Additionally, most of the previous researches were carried out based on correlation analysis but the researcher followed the regression analysis in the present study. This is another research gap of the present study. Lastly, very few researches were conducted to assess the extent of constraints faced by the farmers in vegetable production taking some new variables like experience in vegetable cultivation, level of aspiration in life which were used in the present study. This is also a research gap of the present research. Therefore, the researcher carried out the present study using the some new dimensions and variables as mentioned.

2.4 Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. Studies on individual, group and society revealed that acceptance of modem technologies is conditional upon many factors. Some of these are social, personal, economical and situational factors and the behavior of vegetable cultivators are influenced by these characteristics. The hypothesis of a research while constructed properly consist at least two important elements i.e.: a dependent variable and an independent variable. A dependent variable is that factor which appears, disappears or varies as the researcher

introduces, removes or varies the independent variables (Townsend, 1953)**.** An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. Variables together are the causes and the phenomenon is effect and thus, there is cause effect relationship everywhere in the universe for a specific events or issues.

This study is concerned with the 'constraints faced by the farmers in vegetable production'. Thus, constraints faced by the farmers in vegetable production were the dependent variable and 11selected characteristics of the vegetable cultivators were considered as the independent variables under the study. Constraints faced by the farmers in vegetable production may be affected through interacting forces of many independent variables. It is not possible to deal with all of the independent variables in a single study. It was therefore, necessary to limit the independent variables, which were age, level of education, family size, effective farm size, annual family income, experience in vegetable cultivation, training exposure, extension media contact, level of aspiration in life, organizational participation, knowledge on vegetable production technologies.

Considering the above-mentioned situation and discussion, a conceptual framework has been developed for this study, which is diagrammatically presented in the following Figure 2.1.

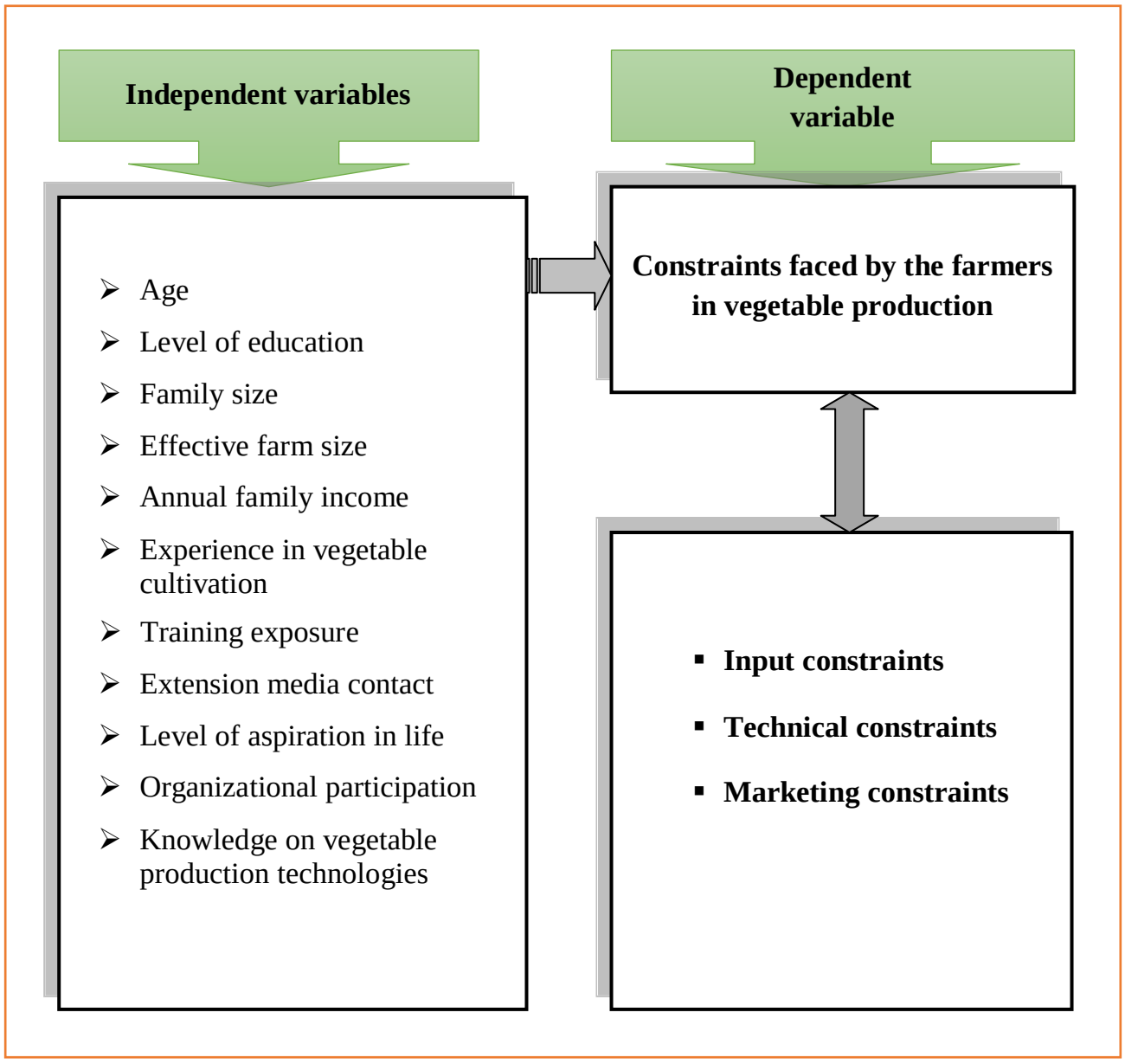

Figure 2.1 The conceptual framework of the study

CHAPTER III

MATERIALS AND METHODS

Methods play an important role in a scientific research. To fulfill the objectives of the study, a researcher should be very careful while formulating methods and procedures in conducting the research. According to Mingers (2001), research methodology is a structured set of guidelines or activities to generate valid and reliable research results. This Chapter of the thesis illustrates the research methodology and procedures used to collect and analyze the data for answering the research questions and attaining the purposes. A chronological description of the methodology followed in conducting this research work has been presented in the subsequent sections and subsections:

3.1 Locale of the Study

The study was conducted in the Nilphamari Sadar under Nilphamari district. Nilphamari Sadar upazila is comprised of 373.09 sq km, located in between $25^0$48' and $26^0$03' north latitudes and in between $88^0$44' and $88^0$59' east longitudes. It is bounded by Domar and Jaldhaka upazilas on the north, Saidpur upazila on the south, Kishoreganj and Jaldhakaupazilas on the east, Khansama and Debiganjupazilas on the west. Nilphamari sadar has several unions in which Sangalshi union was selected purposively as the study area. Sangalshi union consists of 16 villages among them 5 villages namely- Baro Sangalshi, Chotto Sangalshi, Subornokuli, South Balapara, Digholdang were again purposively selected due to the fact that vegetable are exclusively cultivated in these villages.

The map of the Nilphamari district showing Nilphamari Sadar upazila and another map of Nilphamari Sadar upazila showing sangalshi union are presented in figure 3.1 and 3.2 respectively:

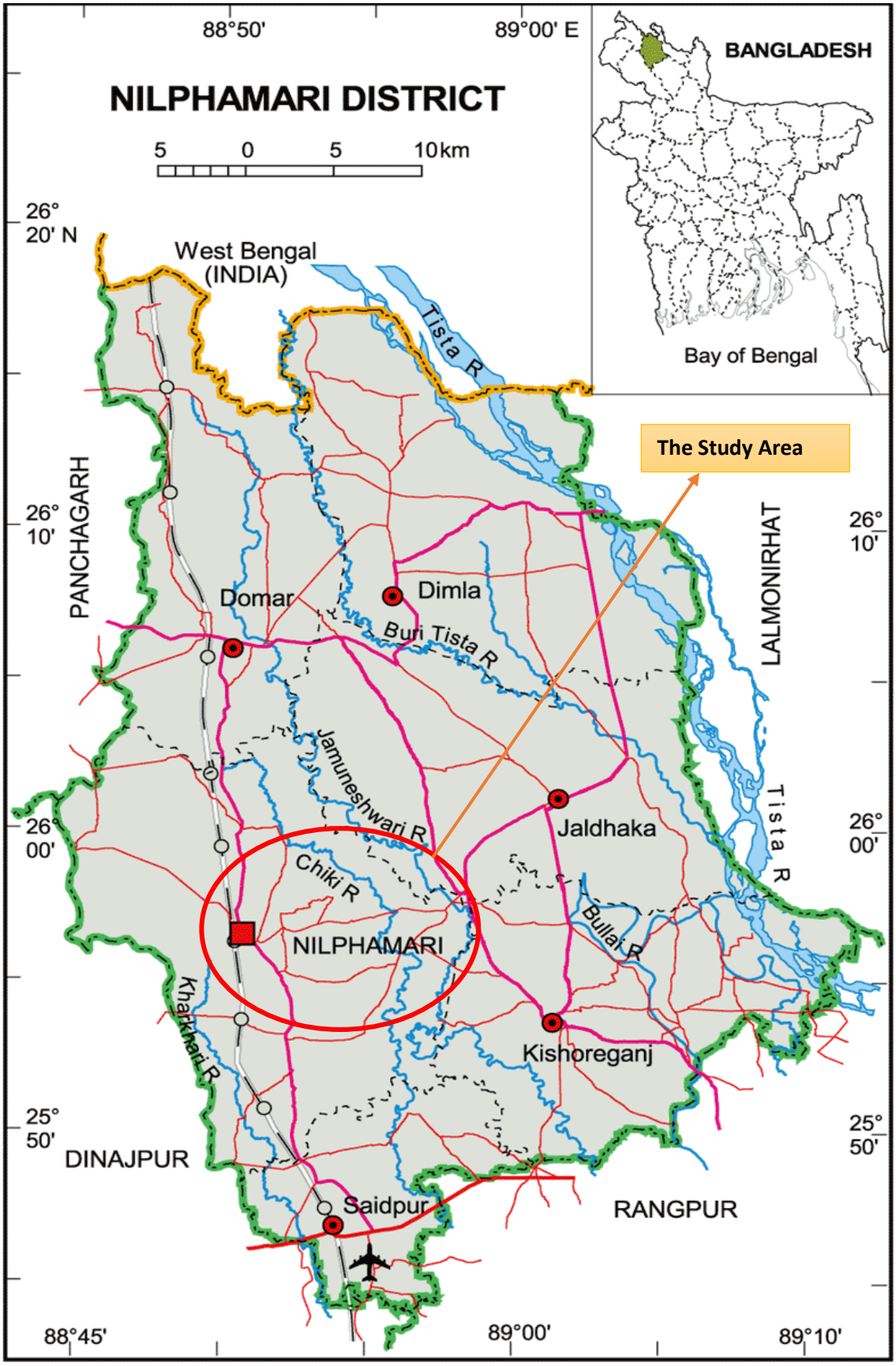

Figure 3.1 Map of Nilphamari district showing -Nilphamari Sadar upazila

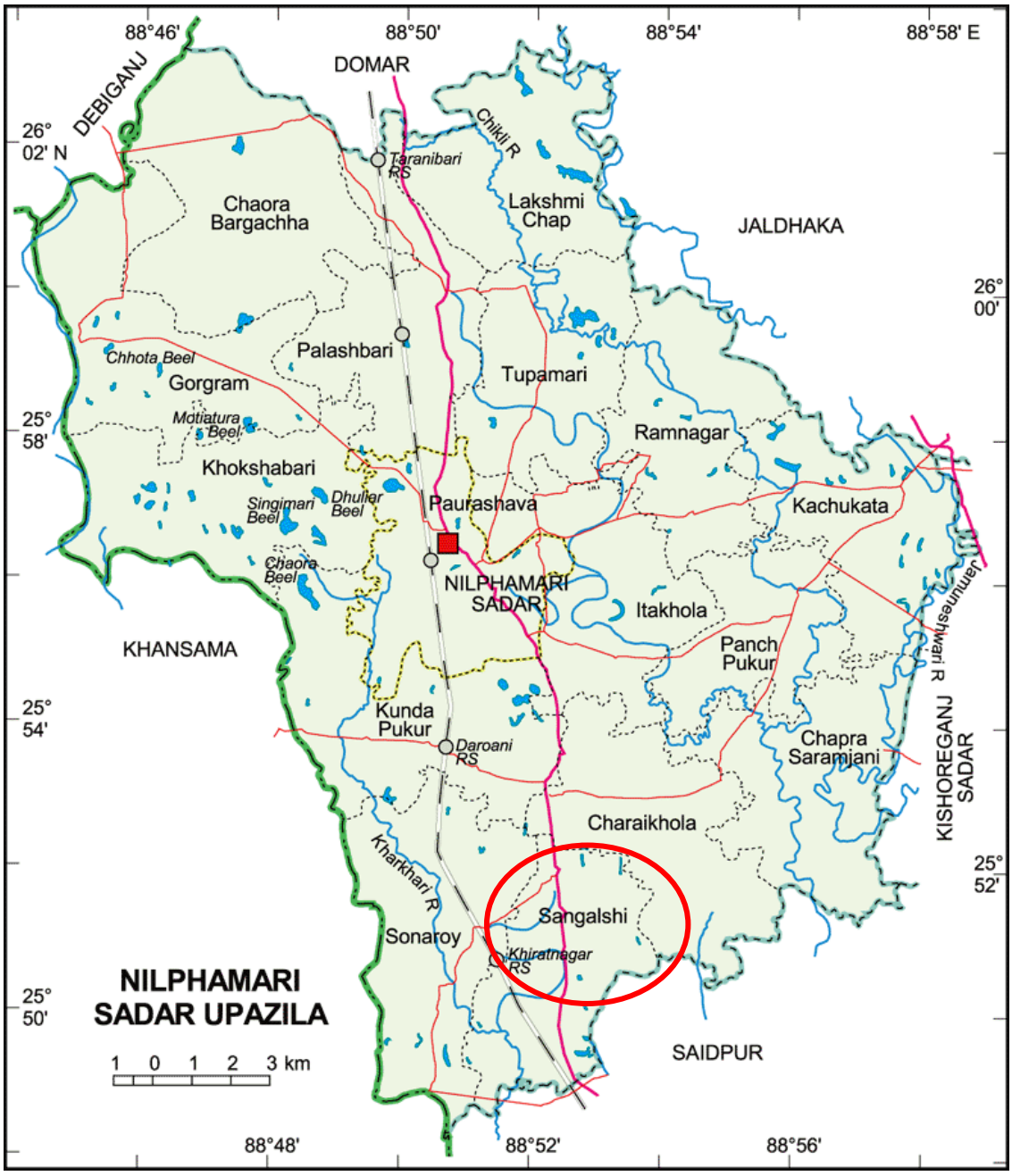

Figure 3.2 Map of Nilphamari Sadar upazila showing Sangalshi union

3.2 Population and Sample of the Study

3.2.1 Population

People who cultivate vegetable and permanently reside in the selected villages of Sangalshi union constituted the active population of this study. As all population of the study area could not possible to measure, head of the farm families of vegetable cultivators of Chotto Sangalshi, Baro Sangalshi, Subornokuli, South Balapara and Digholdangi villages of Sangalshi union under Nilphamari Sadar upazila were the population of the study. However, representative sample from the population were taken for collection of data following proportionate random sampling technique. The total number of vegetable farmers in selected five villages was 1398 which constituted population of the study.

3.2.2. Determination of sample size

There are several methods for determining the sample size; here, researcher used Yamane's (1967) formula with the following value of each parameter:

$$n = \frac{z^2 P(1-P)N}{z^2 P(1-P) + N\,(e)^2}$$

Where, n = Sample size;

N, Population size = 1398;

e, The level of precision = 9%;

z = the value of the standard normal variable given the chosen confidence level (e.g., z = 1.96 with a confidence level of 95 %) and

P, The proportion or degree of variability = 50%;

The sample size (n) is = 109.

3.2.3 Distribution of the population and sample

According to Yamane's formula, the sample size comprised of 109 farmers. A reserve list of 11 vegetable cultivators (ten percent of the sample size) were also prepared so that the farmers of this list could be used for interview if the farmers included in the original sample were not available at the time of conduction of interview. The farmers of the villages were selected according to

the proportionate of the total sample size (109). The distribution of the population, sample and reserve list are given in the following Table 3.1.

Table 3.1 Distribution of the population, sample and reserve list

Selected upazila	Selected union	Selected villages	Population	Sample	Reserve list
Nilphamari Sadar	Sangalshi	BaroSangalshi	360	28	3
		ChottoSangalshi	218	17	2
		Subornokuli	273	22	2
		South Balapara	312	24	2
		Digholdangi	235	18	2
Total			1398	109	11

3.3 Data Collection Methods and Tools

3.3.1 Data collection methods

The survey method was used to collect quantitative data that allow to answer the research questions framed and to gain an understanding of the determinants of constraints faced by the farmers in vegetable production. Individual interviews were used in the survey and were conducted in a face-to-face situation by the researcher.

3.3.2 Data collection tools

Structured interview schedules were prepared to reach the objectives of the study. A structured interview schedule was prepared containing open and closed questions. The questions in this schedule were formulated in a simple and unambiguous way and arranged in a logical order to make it more attractive and comprehensive. The instruments were first developed in English and then translated into Bengali. The survey tools were initially constructed based on an extensive literature reviews and pre-tested. The schedule was pre-tested with 15 randomly selected vegetable farmers in the study area. The pre-test was helpful in identifying faulty questions and statements in the draft schedule. Thus, necessary additions, deletions, modifications and adjustments

were made in the schedule on the basis of experiences gained from pre-test. Data was gathered by the researcher personally. During data collection, necessary cooperation was obtained from field staff of different GOs and NGOs and local leader. The primary data were collected from 25 March to 31 March, 2017. Books, journals, reports and internet documents were used as secondary sources of data supporting or supplementing the empirical findings of the study. The final data collection were started from 04 April and completed in 03 May, 2017.

3.4 Variables and Their Measurement Techniques

The variable is a characteristic, which can assume varying, or different values in successive individual cases. A research work usually contains at least two important variables viz. independent and dependent variables. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variable (Townsend, 1953). In the scientific research, the selection and measurement of variable constitute a significant task. Following this conception, the researcher reviewed literature to widen this understanding about the natures and scopes of the variables relevant to this research. At last 11 independent variables were selected which include age, level of education, family size, effective farm size, annual family income, experience in vegetable cultivation, training exposure, extension media contact, level of aspiration in life, organizational participation, knowledge on vegetable production technologies. The dependent variable of this study was the 'constraints faced by the farmers in vegetable production'. The methods and procedures in measuring the variables of this study are presented below:

3.4.1 Measurement of independent variables

The 11 characteristics of the vegetable farmers mentioned above constitute the independent variables of this study. The following procedures were followed for measuring the independent variables.

3.4.1.1 Age

Age of the farmers was measured in terms of actual years from their birth to the time of the interview, which was found on the basis of the verbal response of the farmers. A score of one (1) was assigned for each year of one's age. This variable appears in item number 1 in the interview schedule as presented in Appendix-I.

3.4.1.2 Level of Education

Education was measured by assigning score against successful years of schooling by a farmer. One score was given for passing each level in an educational institution. For example, if a farmer passed the final examination of class five or equivalent examination, his/her education score has given five (5). A farmer who can't read & write has given a score of zero (0). A person not knowing reading or writing but being able to sign only has given a score of 0.5. If a farmer did not go to school but took non-formal education, his educational status was determined as the equivalent to a formal school student. This variable appears in item number 2 in the interview schedule as presented in Appendix-I.

3.4.1.3 Family size

Family size of a farmer was determined by the total number of members in his/her family including him/her, children and other dependents. The scoring was made by the actual number of family members expressed by the farmers. For example, if a farmer had five members in his/her family, his/her score was given as 5. This variable appears in item number 3 in the interview schedule as presented in Appendix-I.

3.4.1.4 Effective farm size

Effective farm size of a farmer referred to the total area of land on which his/her family carried out the farming operation, the area being in terms of full benefit to the family. The term refers to the cultivated area either owned by the

farmer or cultivated on sharecropping, lease or taking from other including homestead area and measured using the following formula (Rashid, 2014):

$$EFS = A + B + \frac{1}{2}(C + D) + E$$

Where, EFS = Effective Farm size,

A = Homestead area including garden and pond,

B = Own land under own cultivation,

C = Land taken from others as borga

D = Land given to other as borga,

E = Land taken from others on lease,

The data was first recorded in terms of local measurement unit i.e. kani or decimal and then converted into hectare. The total area, thus, obtained is considered as his farm size score (assigning a score of one for each hectare of land). This variable appears in item number three (3) in the interview schedule as presented in Appendix-I.

3.4.1.5 Annual family income

The term annual income refers to the annual gross income of farmer and the members of his family from different sources. It was expressed in thousand taka. In measuring this variable, last year total earning of an individual farmer was converted into score. A score of one was given for every one thousand taka was calculated. This variable appears in item number 4 in the interview schedule as presented in Appendix-I.

3.4.1.6 Experience in vegetable cultivation

Experience in vegetable cultivation of the farmer was determined by the total number of year involved in vegetable cultivation. A score of one (1) was assigned for each year vegetable cultivation. This variable appears in item number 6 in the interview schedule as presented in Appendix-I.

3.4.1.7 Training exposure

Training exposure of a farmer was determined by the total number of days agricultural training received in his/her life. A score of one (1) was assigned for

each day of training attended. This variable appears in item number seven (7) in the interview schedule as presented in Appendix-I.

3.4.1.8 Extension media contact

It was defined as one's extent of exposure to different communication media related to vegetable production. Extension media contact of a farmer was measured by computing extension media contact score on the basis of their nature of contact with eight extension media. Each farmer was asked to indicate his nature of contact with five alternative responses, like regularly, frequently, sometimes, rarely and not at all basis to each of the eight media and score of four, three, two, one and zero were assigned for those alternative responses, respectively. Logical frequencies were assigned for each of the four-alternative nature of contact. Extension media contact of the farmers was measured by adding the scores of eight selected communication media. Thus, extension media contact score of a farmer could range from 0 to 32, where zero indicated no extension media contact and 32 indicated highest level of extension media contact. This variable appears in item number 8 in the interview schedule as presented in Appendix-I.

3.4.1.9 Level of aspiration in life

Level of aspiration of respondent in his/her life was determined in four aspects of life. This has been described as follows-

A. Educational aspiration: This was determined by asking the respondent about his/her aspiration regarding to study of his/her son(s) and daughter(s). A score of zero (0) was given for having no aspiration, one (1), two (2), three (3) and four (4) was given for primary level, secondary level, higher secondary level and graduate/above graduate level respectively. This variable appears in item number 9.1 in the interview schedule as presented in Appendix-I.

B. Occupational aspiration: Occupational aspiration of a respondent is the aspiration or expectation regarding to his/her children. The extent to which

level she expects his/her children to have an occupation in future. To determine this aspect scoring was provided as follows-

Occupational Aspiration	Score
Day laborer	0
Traditional cultivation	1
Improved cultivation	2
Business	3
Government service	4

For example, if a respondent had expectation to see his/her children serving government job in future, s/he was given a score of 4. This variable appears in item number 9.2 in the interview schedule as presented in Appendix-I.

C. Aspiration for house construction: This implied the aspiration of the respondent about constructing his/her house for the next 3 years at the time of interview. Scoring was done as follows-

Aspiration for house construction	Score
No aspiration	0
Minor repairing	1
New tin house	2
New brick made building	3
2/3 More house	4

For example, if a respondent desire to build a new brick building within next three years, s/he will be given a score of 3. This variable appears in item number 9.3 in the interview schedule as presented in Appendix-I.

D. Aspiration for savings: This implied the aspiration of the respondent about his/her savings for the current year at the time of interview. Scoring was done as follows-

Aspiration for savings	Score
No aspiration	0
Savings <5,000 tk	1
Savings5,000 to <10,000 tk	2
Savings 10,000 to <15,000 tk	3
Savings >15000 tk	4

For example, if a respondent desire to save 12,000 tk within this year, s/he will be given a score of 3. This variable appears in item number 9.4 in the interview schedule as presented in Appendix-I. Level of aspiration of respondent in his/her life was measured by adding the scores of four selected aspiration in life which could range from 0-16, where 0 indicating no aspiration and 16 indicating highest level of aspiration.

3.4.1.10 Organizational participation

Organizational participation of a respondent was computed on the basis of his/her participation in six different organizations. This variable appears in item number ten (10) in the interview schedule as presented in Appendix-I. Scoring of the organizational participation was done using the following formula and in the following way:

$$OP = P_{om} + P_{em} + P_{eo}$$

Where, OP = Organizational participation score

P_{om}= Participation as ordinary committee member

P_{em} = Participation as executive committee member and

P_{eo} = Participation as executive committee officer (president/secretary).

Nature of participation	Score assigned
No participation	0
Participation as ordinary member	1
Participation as executive member	2
Participation as secretary/ president	3

For example, if a respondent participated as an executive committee member of school committee, an ordinary member at NGO organized society and no participation in other organizations, that respondent would have a total score 3.

3.4.1.11 Knowledge on vegetable production technologies

Vegetable production technologies knowledge of a farmer was measured by asking him/her 20 questions related to different components of vegetable production technologies. It was measured assigning weightage two to four depending on question. So, the total assigned scores for all the questions

became fifty. The score was given according to response at the time of interview. Answering a question correctly an individual could obtain full score. While for wrong answer or no answer he obtained zero (0) score. Partial score was assigned for partially correct answer. Thus, the agricultural knowledge score of a farmer could range from zero (0) to fifty (50), where zero indicates very poor knowledge and fifty indicates highest knowledge on vegetable production technologies. This variable appears in item number eleven (11) in the interview schedule as presented in Appendix-I.

3.4.2 Measurement of dependent variable

3.4.2.1 Constraints faced by the farmers in vegetable production

Constraints faced by the farmers in vegetable production is the dependent variable. To measure constraints in vegetable production, the researcher considered three dimensions: input, technical and marketing constraints. Constraints in Vegetable Cultivation (CVC) were calculated by using the following formula:

$$CVC = IC + TC + MC$$

Where, CVC = Constraints in Vegetable Cultivation;

IC= Input Constraints;

TC= Technical Constraints;

MC= Marketing Constraints;

3.4.2.2 Input constraints

Input constraints of a farmer were measured by computing input constraints score on the basis of their nature of input constraints. Each farmer was asked to indicate his nature of input constraints in vegetable production with five alternative responses, like very high, high, medium, low and not at all basis to each of the eight input constraints and score of four, three, two, one and zero were assigned for those alternative responses, respectively. Input constraints of the farmer were measured by adding the scores of eight selected input constraints. Thus, input constraints score of a farmer could range from 0 to 32, where zero indicated no input constraints and thirty-two indicated highest level

of input constraints. This variable appears in item number 12.1 in the interview schedule as presented in Appendix-I.

3.4.2.3 Technical constraints

Technical constraint of a farmer was measured by computing technical constraints score on the basis of their nature of technical constraints. Each farmer was asked to indicate his/her technical constraints in vegetable production with five alternative responses, like very high, high, medium, low and not at all basis to each of the eight technical constraints and score of four, three, two, one and zero were assigned for those alternative responses, respectively. Technical constraints of the farmer was measured by adding the scores of eight selected technical constraints. Thus, technical constraints score of a farmer could range from 0 to 32, where zero indicated no technical constraints and thirty-two indicated highest level of technical constraints. This variable appears in item number 12.2 in the interview schedule as presented in Appendix-I.

3.4.2.4 Marketing constraints

Marketing constraints of a farmer was measured by computing marketing constraints score on the basis of their nature of marketing constraints. Each farmer was asked to indicate his nature of marketing constraints on vegetable production with five alternative responses, like very high, high, medium, low and not at all basis to each of the eight marketing constraints and score of four, three, two, one and zero were assigned for those alternative responses, respectively. Marketing constraints of the farmer was measured by adding the scores of eight selected marketing constraints. Thus, marketing constraints score of a farmer could range from 0 to 32, where zero indicated no marketing constraints and thirty-two indicated highest level of marketing constraints. This variable appears in item number 12.3 in the interview schedule as presented in Appendix-I.

Thus constraints in vegetable cultivation score of a respondent was calculated by adding score of three types of constraints which could range from 0 to 96.

To compare among constraints faced by the vegetable farmers; Constraints Faced Index (CFI) was computed. A Constraints Faced Index (CFI) was computed by using the following formula:

$$CFI = f_{vh}\times4 + f_h\times3 + f_m\times2 + f_l\times1 + f_n\times0$$

Where, CFI = Constraint Faced Index

f_{vh} = No. of respondents faced very high constraint

f_h = No. of respondents faced high constraint

f_m = No. of respondents faced medium constraint

f_l = No. of respondents faced low constraint

f_n = No. of respondents faced no constraint

Constraints Faced Index (CFI) for each constraints could range from 0 to 436 where 0 indicating lowest extent and 436 indicating highest extent of constraints.

3.5 Hypothesis of the Study

According to Kerlinger (1973) a hypothesis is a conjectural statement of the relation between two or more variables. Hypothesis are always in declarative sentence form and they are related, either generally or specifically from variables to variables. In broad sense hypotheses are divided into two categories: (a) Research hypothesis and (b) Null hypothesis.

3.5.1 Research hypothesis

Based on review of literature and development of conceptual framework, the following research hypothesis was formulated:

"Each of the 11 selected characteristics (age, level of education, family size, effective farm size, annual family income, experience in vegetable cultivation, training exposure, extension media contact, level of aspiration in life, organizational participation, knowledge on vegetable production technologies) of the farmers has significant contribution to their constraints in vegetable production."

3.5.2 Null hypothesis

A null hypothesis states that there is no contribution between the concerned variables. Hence, in order to conduct tests, the earlier research hypothesis was converted into null form as follows:

"There is no contribution of the selected characteristics (age, level of education, family size, effective farm size, annual family income, experience in vegetable cultivation, training exposure, extension media contact, level of aspiration in life, organizational participation, knowledge on vegetable production technologies) of farmers to their constraints in vegetable production."

3.6 Data Processing and Analysis

Bogdan and Biklen (2006) insist that data analysis is an on-going part of data collection. After completion of field survey, all the data were coded, compiled and tabulated according to the objectives of the study. Local units were converted into standard units. All the individual responses to questions of the interview schedule were transferred in to a master sheet to facilitate tabulation, categorization and organization. In case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative form.

3.7 Statistical Analysis

Regression analysis was used to identify the linear combination among independent variables used collectively to predict the dependent variables (Miles and Shevlin, 2001). Regression analysis helps us understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed.

The data were analyzed in accordance with the objectives of the proposed research work. The factors that contribute to the constraints faced by the farmers in vegetable production are analyzed using a multiple regression analysis (β) was used. Throughout the study, five (0.05) percent and one (0.01)

percent level of significance were used as the basis for rejecting any null hypothesis. If the computed value of β was equal to or greater than the designated level of significance (*p*), the null hypothesis was rejected and it was concluded that there was a significant contribution between the concerned variable. Whenever the computed value of β was found to be smaller at the designated level of significance (*p*), the null hypothesis could not be rejected and it was concluded that there was no contribution of the concerned variables. The model used for this analysis can be explained as follows:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} + b_{11}x_{11} + e$$

Where, Y= is the constraints faced by the farmers in vegetable production;

Of the independent variables, x_1 is the age of farmer, x_2 is level of education, x_3 is family size, x_4 is effective farm size, x_5 is annual family income, x_6 is experience in vegetable cultivation, x_7 is training exposure, x_8 is extension media contact, x_9 is level of aspiration in life, x_{10} is organizational participation and x_{11} is knowledge on vegetable production technologies. On the other hand, b_1, b_2, b_3, b_4, b_5, b_6, b_7, b_8, b_9, b_{10} and b_{11} are regression coefficients of the corresponding independent variables, and e is random error, which is normally and independently distributed with zero mean and constant variance.

CHAPTER IV

RESULTS AND DISCUSSION

The findings of the study and their interpretation have been presented in this Chapter. These are presented in three sections according to the objective of the study. The first section deals with the selected characteristics of the farmers, while the second section deals with the constraints faced by the farmers in vegetable production. The third section deals with contribution of the farmers' selected characteristics to their constraints in vegetable production.

4.1 Characteristics of the Farmers

There were various characteristics of the farmers that might have consequence to face the constraints of different issues. But in this study, eleven characteristics of the vegetable farmers were selected which might greatly affected the constraints faced by them. The salient features of these characteristics of the vegetable farmers are presented below:

4.1.1 Age

The age of the farmers has been varied from 23 to 65 years with a mean and standard deviation of 40.28 and of 9.98 respectively. Considering the recorded age, farmers were classified into three categories as presented in Table 4.1.

Table 4.1 Distribution of the farmers according to their age

Category	Range (years)		Farmers		Mean	SD
	Score	Observed	Number	%		
Young aged	≤ 35	23-65	42	38.5	40.28	9.98
Middle aged	36-50		49	45.0		
Old aged	> 50		18	16.5		
Total			109	100.0		

Table 4.1 reveals that the middle-aged farmers comprised the highest proportion (45.0 %) followed by young aged category (38.5 %) and old aged category (16.5 %). Data also indicates that the middle and young aged category

constituted 83.5 percent of total farmers. The young and middle aged farmers were generally more involved in farm activities than the older that might be due to the energetic, enthusiastic nature of young and middle aged farmers.

4.1.2 Level of education

The level of educational scores of the farmers ranged from 0 to 16 with a mean and standard deviation of 6.52 and of 4.26 respectively. Based on the educational scores, the farmers were classified into five categories. as presented in Table 4.2.

Table 4.2 Distribution of the farmers according to their level of education

Category	Range (years)		Farmers		Mean	SD
	Score	Observed	Number	%		
Can't read and sign	0	0-16	4	3.7	6.52	4.26
Can sign only	0.5		19	17.4		
Primary education	1-5		25	22.9		
Secondary education	6-10		44	40.4		
Above secondary	>10		17	15.6		
Total			109	100.0		

Table 4.2 shows that farmers under secondary education category constitute the highest proportion (40.4 %) followed by primary education (22.9 %). On the other hand, the lowest 3.7 percent was in can't read and sign category followed by can sign only category (17.4 %) and 15.6 percent respondents were above secondary category.

4.1.3 Family size

Family size of the farmers ranged from 3 to 8 with the mean and standard deviation of 4.78 and of 1.31 respectively. According to family size the farmers were classified into three categories as presented in Table 4.3.

Table 4.3 Distribution of the farmers according to their family size

Category	Range (Number)		Farmers		Mean	SD
	Score	Observed	Number	%		
Small family	≤ 4	3-8	21	19.3	4.78	1.31
Medium family	5-6		75	68.8		
Large family	> 6		13	11.9		
Total			109	100.0		

Table 4.3 indicates that the medium size family constituted the highest proportion (68.8 %) followed by the small size family (19.3 %). Only 11.9 percent farmers had large family size. Such finding is quite normal as per the situation of Bangladesh. The findings also indicate that average family size of the study area was smaller than the national average which is 4.85 (BBS, 2014). The trend of nuclear family has been rising in the study area and subsequently the family size becoming smaller.

4.1.4 Effective farm size

The effective farm size of the farmers ranged from 0.12 ha to 2.25 ha with a mean and standard deviation of 0.93 and of 0.48, respectively. Based on their farm size, the farmers were classified into three categories as presented in Table 4.4.

Table 4.4 Distribution of the farmers according to their effective farm size

Category	Range (ha)		Farmers		Mean	SD
	Score (ha)	Observed	Number	%		
Marginal	0.02<0.20	0.12-2.25	2	1.8	0.93	0.48
Small	0.2<1.00		66	60.6		
Medium	1.0-3.0		41	37.6		
Total			109	100.0		

Table 4.4 indicates that the small farm holder constitutes the highest proportion (60.6 %) followed by medium farm holder (37.6 %). The findings of the study reveal that most of the farmers (98.2%) were small to medium sized farm

holder. The average farm size of the farmers of the study area (0.78 ha) was higher than that of national average (0.60 ha) of Bangladesh (BBS, 2014).

4.1.5 Annual family income

The score of annual family income of the vegetable cultivators ranged from 65 to 630 thousand (BDT) with a mean and standard deviation of 201.50 and 112.82, respectively. On the basis of annual income, the vegetable cultivators were classified into three categories as presented in Table 4.5.

Table 4.5 Distribution of the farmers according to their annual family income

Category	Range ('000' BDT)		Farmers		Mean	SD
	Score	Observed	Number	%		
Low income	≤ 88	65-630	15	13.80	201.50	112.82
Medium income	89-315		77	70.60		
High income	> 315		17	15.60		
Total			109	100.00		

Data revealed that the vegetable cultivators having medium annual income constituted the highest proportion (70.60 %), while had low income and (15.60 %) had high income. An overwhelming majority (86.20 %) of the vegetable cultivators had medium to high annual family income.

4.1.6 Experience in vegetable cultivation

Experience in vegetable cultivation scores of the farmers ranged from 5 to 28 with a mean and standard deviation of 14.01 and of 6.11 respectively. On the basis of experience scores, the vegetable cultivators were classified into three categories as shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their experience in vegetable cultivation

Category	Range (year)		Farmers		Mean	SD
	Score	Observed	Number	%		
Low experience	<10	5-28	13	11.9	14.01	6.11
Medium experience	10-20		74	67.9		
High experience	>20		22	20.2		
Total			109	100.0		

Table 4.6 reveals that the majority (67.9 %) of the vegetable cultivator fell in medium experience in vegetable cultivation category, whereas only 11.9 percent in low experience category followed by 20.2 percent in high experience category. The findings of the present study also reveal that around 88.10 percent of the vegetable cultivators in the study area had medium to high experience in vegetable cultivation.

4.1.7 Training exposure

Training exposure score of the vegetable cultivators ranged from 0 to 18 with a mean and standard deviation of 8.48 and of 4.59 respectively. Based on the training exposure score, the vegetable farmers were classified into four categories as presented in Table 4.7.

Table 4.7 Distribution of the farmers according to their training exposure

Category	Range (score)		Vegetable farmers		Mean	SD
	Score	Observed	Number	%		
No training	0	0-18	6	5.5	8.48	4.59
Low training	≤ 3		17	15.6		
Medium training	4-13		68	62.4		
High training	> 13		18	16.5		
Total			109	100.0		

Table 4.7 indicates that the highest proportion (62.4 %) of the vegetable farmers had low training exposure compared to 5.5 percent had no training exposure, 15.60 percent in low training exposure 22.2 percent had high training exposure. Training makes the vegetable farmers skilled and helps them to acquire deep knowledge about the respected aspects. Trained vegetable farmers can face any kind of challenges about the adverse situation in their vegetable cultivation.

4.1.8 Extension media contact

The observed score of extension media contact of the farmers ranged from 09 to 26 against a possible range from 0 to 32. The average score of the farmers'

extension media contact was 16.54 with a standard deviation of 5.65 (Table 4.8). The farmers were classified into three categories on the basis of extension media contact score as shown in Table 4.8.

Table 4.8 Distribution of the farmers according to their extension media contact

Category	Range		Farmers		Mean	SD
	Score	Observed	Number	%		
Low contact	<11	09-26	19	17.4	16.54	5.65
Medium contact	11-22		69	63.3		
High contact	>22		21	19.3		
Total			109	100.0		

Data shows that the highest proportion (63.3 %) of the farmers had medium extension media contact, 17.4 percent of them had low extension media contact and 19.3 percent felt in high extension media contact category.

4.1.9 Level of aspiration in life

The observed score of level of aspiration in life of the farmers ranged from 14 to 17 against a possible range of 0 to 20. The average score of the farmers' level of aspiration in life was 15.75 with a standard deviation of 1.09. The farmers were classified into three categories on the basis of their aspiration in life as presented in 4.9.

Table 4.9 Distribution of the farmers according to their level of aspiration in life

Category	Range		Farmers		Mean	SD
	Score	Observed	Number	%		
Low aspiration	≤14	14-17	22	20.2	15.75	1.09
Medium aspiration	15-16		54	49.5		
High aspiration	>16		33	30.3		
Total			109	100.0		

Data shows that the highest proportion (49.5 %) of the farmers had medium aspiration in life, 20.2 percent of them had low aspiration and 30.3 percent had high aspiration in life.

4.1.10 Organizational participation

Organizational participation score of the vegetable cultivators ranged from 0 to 7 with a mean and standard deviation of 3.50 and of 1.86 respectively. Based on organizational participation score, the vegetable cultivators were classified into three categories as shown in Table 4.10.

Table 4.10 Distribution of the farmers according to their organizational participation

Category	Range		Farmers		Mean	SD
	Score	Observed	Number	%		
Low participation	<3	0-7	23	21.1	4.10	1.12
Medium participation	3-5		70	64.2		
High participation	> 5		16	14.7		
Total			109	100.0		

Data reveals that the highest proportion (64.2 %) of the vegetable cultivators had medium organizational participation, while 21.1 percent had low organizational participation and the lowest 14.7 percent had high organizational participation.

4.1.11 Knowledge on vegetable production technologies

Knowledge on vegetable production technologies scores of the vegetable farmers ranged from 32 to 44 against the possible score of 0 to 50. The average score and standard deviation were 39.02 and 2.54 respectively. Based on the knowledge on vegetable production technologies scores, the vegetable farmers were classified into three categories as shown in Table 4.11.

Table 4.12 Distribution of the farmers according to their knowledge on vegetable production technologies

Category	Range		Vegetable farmers		Mean	SD
	Score	Observed	Number	%		
Medium knowledge	<38	32-44	73	66.9	39.02	2.54
High knowledge	≥ 38		36	33.1		
Total			109	100.0		

Table 4.12 reveals that 66.9 percent of the vegetable farmers had medium knowledge on vegetable production technologies and 33.1 percent had high knowledge on vegetable production technologies.

4.2 Constraints Faced by the Farmers in Vegetable Production

4.2.1 Input constraints faced by the farmers in vegetable production

Input constraints faced score of the farmers ranged from 08 to 28 against the possible score of 0 to 32. The average score and standard deviation were 24.11 and 1.60, respectively. Based on the input constraints in vegetable production scores, the respondents were classified into three categories as shown in Table 4.12.

Table 4.12 Distribution of the farmers according to their input constraints in vegetable production

Category	Range		Respondents		Mean	SD
	Score	Observed	Number	%		
Low input constraints	< 11	08-28	12	11.1	24.11	1.60
Medium input constraints	11-22		68	62.4		
High input constraints	> 22		29	26.5		
Total			109	100.0		

Table 4.12 reveals that 62.4 percent of the respondent had medium input constraints in vegetable production, 11.1 percent had low input constraints in vegetable production and 26.5 percent had high input constraints in vegetable production. Thus, an overwhelming majority (88.9 %) of the respondents had

medium to high category input constraints in vegetable production at the study area.

4.2.1.1 Rank order of input constraints in vegetable production

Rank order of the eight types of input constraints faced by the farmers in vegetable production based on CFI is presented in the following Table 4.13.

Table 4.13 Rank order of input constraints in vegetable production

Sl. No.	Nature of constraints	CFI score	Rank
1.	High cost of labor	367	1st
2.	Lack of quality fertilizer	354	2nd
3.	Lack of quality pesticides	343	3rd
4.	Seed fertilizer and pesticides are costly input	330	4th
5.	Lack of quality seed	318	5th
6.	Lack of irrigation facilities	311	6th
7.	Small land holding	307	7th
8.	Unavailability of seed, fertilizer and pesticides at the peak season	298	8th

The highest input constraints faced by the farmers in vegetable production were high cost of labor. This might be caused because agricultural labor was unavailable in the study area.

The least input constraint faced in vegetable cultivation at the study area was unavailability of seed, fertilizer and pesticides at the peak season. This might be happened because the private sectors as well as government organization were more functional to supply the above-mentioned items at the study area.

4.2.2 Technical constraints faced by the farmers in vegetable production

Technical constraints faced score of the farmers ranged from 09 to 28 against possible the score of 0 to 32. The average score and standard deviation were 23.59 and 1.79 respectively. Based on the technical constraints in vegetable production scores, the respondents were classified into three categories as shown in Table 4.14.

Table 4.14 Distribution of the farmers according to their technical constraints in vegetable production

Category	Range		Respondents		Mean	SD
	Score	Observed	Number	%		
Low technical constraints	<11	09-28	11	10.1	23.59	2.25
Medium technical constraints	11-22		74	67.8		
High technical constraints	> 22		24	22.1		
Total			109	100.0		

Table 4.14 reveals that 67.8 percent of the respondent had medium technical constraints in vegetable production, 10.1 percent had low technical constraints and 22.1 percent had high technical constraints in vegetable production. Thus, an overwhelming majority (89.9 %) of the respondents had medium to high technical constraints in vegetable production at the study area.

4.2.2.1 Rank order of technical constraints in vegetable production

Rank order of the eight types of technical constraints faced by the farmers in vegetable production based on CFI is presented in the following Table 4.15.

Table 4.15 Rank order of technical constraints in vegetable production

Sl. No.	Nature of problems	CFI score	Rank
1.	Lack of knowledge about post-harvest technologies	364	1st
2.	Lack of knowledge about production technologies	355	2nd
3.	Technical guidance unavailable at the production period	331	3rd
4.	Lack of knowledge about high yielding vegetable varieties	318	4th
5.	Lack of knowledge about recommended seed rate	310	5th
6.	Lack of knowledge about plant protection chemicals	304	6th
7.	Lack of knowledge about recommended dose of chemical fertilizer	298	7th
8.	Poor knowledge about irrigation management	291	8th

The highest technical constraint faced by the farmers in vegetable production was lack of knowledge about post-harvest technologies which might be due to the fact that most of the farmers found in the study area had little training on post harvest technologies. The least technical constraint was poor knowledge about irrigation management. This might be happened because the farmers had long experience in handling irrigation issues in their vegetable field.

4.2.3 Marketing constraints faced by farmers in vegetable production

Marketing constraints faced score of the farmers ranged from 08 to 28 against the possible score of 0 to 32. The average score and standard deviation were 24.07 and 1.58 respectively. Based on the marketing constraints in vegetable production scores, the respondents were classified into three categories as shown in Table 4.16.

Table 4.16 Distribution of the farmers according to their marketing constraints in vegetable production

Category	Range		Respondents		Mean	SD
	Score	Observed	Number	%		
Low marketing constraints	< 11	08-28	12	11.0	24.07	1.58
Medium marketing constraints	11-22		81	74.3		
High marketing constraints	>22		16	14.7		
Total			109	100.0		

Table 4.16 reveals that 74.3 percent of the respondent had medium marketing constraints in vegetable production while 11.0 percent had low marketing constraints and 14.7 percent had high marketing constraints in vegetable production. Thus, an overwhelming majority (89.0 %) of the respondents had medium to high marketing constraints in vegetable production at the study area.

4.2.3.1 Rank order of marketing constraints in vegetable production

Rank order of the eight types of marketing constraints faced by the farmers in vegetable production based on CFI is presented in the following Table 4.17.

Table 4.17 Rank order of marketing constraints in vegetable production

Sl. No.	Nature of problems	CFI score	Rank
1.	High fluctuation in price	365	1st
2.	Lack of storage facilities	351	2nd
3.	Costly transportation facilities	346	3rd
4.	Incorrect weight measurement by businessman	333	4th
5.	Lack of knowledge about market information	320	5th
6.	Lack of fair price	310	6th
7.	Poor market infrastructure	302	7th
8.	Unnecessary deduction by businessman	297	8th

High fluctuation in price is a major problem of Bangladesh agriculture. This might be caused because production plan was not based on demand of the market. On the other hand, unnecessary deduction by businessman was least marketing problem due to the fact that deduction was insignificant according to their sale.

4.2.4 Constraints faced by the farmers in vegetable production

Constraints faced score of the farmers in vegetable production ranged from 28 to 83 against the possible score of 0 to 96. The average score and standard deviation were 71.92 and 2.25 respectively. Based on the constraints in vegetable production scores, the respondents were classified into three categories as shown in Table 4.18.

Table 4.18 Distribution of the farmers according to their constraints in vegetable production

Category	Range		Respondents		Mean	SD
	Score	Observed	Number	%		
Low constraints	<32	28-83	18	16.5	71.92	2.25
Medium constraints	32-64		75	68.8		
High constraints	> 64		16	14.7		
Total			109	100.0		

Table 4.13 reveals that 68.8 percent of the respondents had medium constraints in vegetable production, 16.5 percent had low constraints and 14.7 percent had high constraints in vegetable production. Thus, an overwhelming majority (83.50 %) of the respondents had medium to high constraints in vegetable production at the study area.

4.3 Factors Related to the Constraints Faced by the Farmers in Vegetable Production

In order to estimate the constraints faced by the farmers in vegetable production from the independent variables, multiple regression analysis was used which is shown in the Table 4.19.

Table 4.19 Multiple regression coefficients of contributing factors related to the constraints faced by the farmers in vegetable production

Dependent variable	Independent variables	β	*p*	R^2	Adj. R^2	F	*p*
Constraints faced by the farmers in vegetable production	Age	.000	.994	0.793	0.769	33.750	0.000**
	Level of education	-.611	.000**				
	Family size	-.009	.968				
	Effective farm size	1.214	.024*				
	Annual family income	-.004	.048*				
	Experience in vegetable cultivation	-.099	.347				
	Training exposure	-.177	.019*				
	Extension media contact	-.568	.000**				
	Level of aspiration in life	.197	.523				
	Organizational participation	.216	.174				
	Knowledge on vegetable production technologies	-.352	.021*				

** Significant at p < 0.01; * Significant at p < 0.05;

79.3% (R^2 = 0.793) of the variation in the respondents constraints faced in vegetable production can be explained by their level of education, effective farm size, annual family income, training exposure, extension media contact, knowledge on vegetable production technologies, making this an excellent model (see Table 4.19). The F value indicates that the model is significant of $p<0.000$.

However, each predictor may explain some of the variance in respondents' constraint faced simply by chance. The adjusted R-square value penalizes the addition of extraneous predictors in the model, but values of 0.769 still show that the variance in respondents' constraints faced in vegetable production can be attributed to the predictor variables rather than by chance, and that both are suitable models (Table 4.19). In summary, the models suggest that the respective authority should consider farmers' level of education, effective farm size, annual family income, training exposure, extension media contact, knowledge on vegetable production technologies in reducing constraints faced by the farmers in vegetable cultivation.

4.3.1 Contribution of effective farm size to constraints faced

Multiple regression showed that the effective farm size of the vegetable farmers had highest significant positive contribution to their constraints in vegetable cultivation. This implies that with the increase of effective farm size of the vegetable farmers their constraints in vegetable cultivation is increased.

Finding show that most of the vegetable farmers (60.6%) had small effective farm size. Effective farm size of the vegetable farmers does influence their constraint in vegetable cultivation and the vegetable farmers who have less effective farm size facing minimum problem than the more effective farm size. Vegetable production in large area creates the more constraints and farmers would be less progressive to reduce their constraints in vegetable production.

4.3.2 Contribution of level of education to constraints faced

Multiple regression showed that the education level of the vegetable farmers had 2nd highest but significant negative contribution to their constraints in vegetable cultivation. This implies that with the increase of education level of the vegetable farmers their constraints in vegetable cultivation is decreased.

Finding show that most of the vegetable farmers (40.4%) had primary education level. Education level of the vegetable farmers does influence their constraint in vegetable cultivation and educated vegetable farmers facing minimum problem than the less educated. Education broadens the horizon of outlook of farmers and expands their capability to analyze any situation related to constraints in vegetable cultivation. To adjust with same, they would be progressive minded to reduce their constraints in vegetable production.

4.3.3 Contribution of extension media contact to constraints faced

Multiple regression showed that the extension media contact of the vegetable farmers had 3rd highest significant negative contribution to their constraints in vegetable cultivation. This implies that with the increased of extension media contact of the vegetable farmers their constraints in vegetable cultivation is decreased.

Finding show that most of the vegetable farmers (63.3 %) had medium extension media contact. Extension media contact of the vegetable farmers does influence their constraints in vegetable cultivation and the vegetable farmers who have more extension media contact facing minimum problem than the less extension media contact. Continuous contact with different extension media people are concerned about their constraints in vegetable cultivation, learn the technique to minimize their constraints, become trained, get benefitted and so on, which increase the capability of the farmers to reduce constraints in vegetable cultivation.

4.3.4 Contribution of knowledge on vegetable production technologies to constraints faced

Multiple regression showed that the knowledge on vegetable production technologies of the vegetable farmers had significant negative contribution to their constraints in vegetable cultivation. This implies that with the increased of knowledge on vegetable production technologies of the vegetable farmers their constraints in vegetable cultivation is decreased.

Finding show that most of the vegetable farmers (62.4 %) had medium knowledge on vegetable production technologies. Knowledge on vegetable production technologies of the vegetable farmers does influence their constraint in vegetable cultivation and the vegetable farmers who have more knowledge on vegetable production technologies facing minimum problem than the less knowledge on vegetable production technologies. knowledge on vegetable production technologies expand farmers' capability to analyze any situation related to constraints in vegetable cultivation. So, they would be progressive minded to reduce against their constraints in vegetable production.

4.3.5 Contribution of training exposure to constraints faced

Multiple regression showed that the training exposure of the vegetable farmers had significant negative contribution to their constraints in vegetable cultivation. This implies that with the increased of training exposure of the vegetable farmers their constraints in vegetable cultivation is decreased.

Finding show that most of the vegetable farmers (62.4 %) had medium training exposure. Training exposure of the vegetable farmers does influence their constraint in vegetable cultivation and the vegetable farmers who have more training exposure facing minimum problem than the less training exposure. Training helps the farmers to acquire deep knowledge and improve skills about the respected aspects. Trained farmers can cope with and handle smoothly the adverse situation in their cultivation. So the farmers gain the ability to reduce constraints in vegetable cultivation.

4.3.6 Contribution of annual family income to constraints faced

Multiple regression showed that the annual family income of the vegetable farmers had significant negative contribution to their constraints in vegetable cultivation. This implies that with the increased of annual family income of the vegetable farmers their constraints in vegetable cultivation is decreased.

Finding show that most of the vegetable farmers (70.60 %) had medium annual family income. Annual family income of the vegetable farmers does influence their constraint in vegetable cultivation and the vegetable farmers who have more annual family income facing minimum problem than the less annual family income. Annual family income is the key to any investment endeavor. Renewals of investment largely depend on the extent to which someone gets earning. Therefore, annual family income influences the farmers to reduce their constraints in vegetable production.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The study was conducted in the Sangalshi union of Nilphamari sadar upazila to find out the constraints faced by the farmers in vegetable production. Total 1398 vegetable cultivators were listed as the population and according to Yamane's formula, 109 vegetable cultivators constituted the sample of the study. A well-structured interview schedule was developed based on objectives of the study for collecting information. The independent variables were: age, level of education, family size, effective farm size, annual family income, experience in vegetable cultivation, training exposure, extension media contact, level of aspiration in life, organizational participation, knowledge on vegetable production technologies. Data collection was started in 20 April, 2017 and completed in 05 May, 2017. Various statistical measures such as frequency counts, %age distribution, average, and standard deviation were used in describing data. In order to estimate the contribution of the selected characteristics of vegetable cultivators to their constraints faced by the farmers in vegetable production, multiple regression analysis (B) was used. The major findings of the study are summarized below:

5.1 Major Findings

5.1.1 Selected characteristics of the vegetable cultivators

Age: The middle-aged rice cultivators comprised the highest proportion (45.0 %) and the lowest proportion was the old aged category (16.5 %).

Level of education: Secondary education constituted the highest proportion (40.4 %) and the lowest 3.7 percent belonged can't read and sign category.

Family size: The medium family size constituted the highest proportion (68.8 %), whereas 11.9 percent had small family size.

Effective farm size: The small farm holder constituted the highest proportion (60.6 %), whereas 1.8 percent belonged to marginal farm size.

Annual family income: Medium annual income constituted the highest proportion (70.60 %), while the lowest proportion fell in low income (13.80 %) category among the vegetable cultivator of the study area.

Experience in vegetable cultivation: Medium experience in vegetable cultivation constituted the highest proportion (67.9 %), while the lowest proportion (11.9 %) fell in low experience in vegetable cultivation.

Training exposure: The majority (62.4 %) fell in medium training exposure category, whereas only 5.5 percent had no training exposure category.

Extension media contact: The majority (67.0 %) of the vegetable cultivators fell in medium extension media contact category, whereas 13.8 percent had low extension media contact category.

Level of aspiration in life: The majority (49.5 %) of the vegetable cultivators fell in medium aspiration in life category, whereas only 20.2 percent fell in low aspiration in life category.

Organizational participation: The highest proportion (67.9 %) of the farmers had medium organizational participation and 17.4 percent had low organizational participation category as the lowest category.

Knowledge on vegetable production technologies: The highest proportion (66.9 %) of the farmers had medium knowledge and 33.1 percent had high knowledge on vegetable production technologies category.

5.1.2 Constraints faced by the farmers in vegetable production

Input constraints: The highest proportion (62.4 %) of the respondent had medium input constraints in vegetable production while 11.1 percent had low input constraints in vegetable production and 26.5 percent had high input constraints in vegetable production.

Technical constraints: Majority (67.8 %) of the respondent had medium technical constraints in vegetable production, 10.1 percent had low input constraints in vegetable production and 22.1 percent had high technical constraints in vegetable production.

Marketing constraints: Almost three-fourth (74.3 %) of the respondent had medium marketing constraints in vegetable production, 11.0 percent had low marketing constraints and 14.7 percent had high marketing constraints in vegetable production.

Constraints faced by the farmers in vegetable production: The highest proportion (68.8 %) of the respondents had medium constraints in vegetable production, 16.5 percent had low constraints and 14.7 percent had high constraints in vegetable production.

5.1.3 Factors related to constraints faced by the farmers in vegetable production

There is a significant contribution of respondents' level of education, effective farm size, annual family income, training exposure, extension media contact, knowledge on vegetable production technologies to their constraints faced in vegetable production. 79.3% (R^2 = 0.793) of the variation in constraints faced of the farmers can be explained by these factors

5.2 Conclusions

The findings and relevant facts of research work prompted the researcher to draw following conclusions:

i. The findings revealed that majority (63.4 %) of the respondents had medium constraints in vegetable production. However, to meet the ever-growing demand of food, there is a need to know the constraints faced by the farmers in vegetable production. It may be concluded that the composite constraints faced by the farmers in vegetable production needs to minimize for sustainable vegetable production.

ii. Level of education of the farmers had 2nd highest significant negative contribution to their constraints faced in vegetable production. On the other hand, 44 percent of the farmers had no to below secondary level of education. Therefore, it may be concluded that any arrangement to increase their educational level would ultimately reduce their constraints in vegetable cultivation.

iii. Effective farm size of the farmers had 1st highest positive contribution to their constraints in vegetable production. With the increase of farm size their input and marketing constraints are also increased. To reduce these problem demand driven production plan should be followed.

iv. The majority (86.20 %) of the vegetable cultivators had medium to high annual income and regression analysis revealed that annual income was a contributing factor to their constraints faced in vegetable production. Therefore, it may be concluded that any steps taken to increase their annual income would ultimately decrease their constraints in vegetable production.

v. Majority (62.4 %) of the vegetable cultivators had no to medium training on vegetable cultivation and regression analysis revealed that training exposure was a contributing factor to their constraints faced in vegetable cultivation. Therefore, it may be concluded that vegetable farmers should be given more training.

vi. An overwhelming majority (80.7 %) of the vegetable cultivators had low to medium extension media contact and regression analysis revealed that extension media contact was a contributing factor to their constraints faced in vegetable cultivation. Therefore, it may be concluded that any arrangement to increase their extension media contact would ultimately decrease their constraints in vegetable production.

vii. Knowledge on vegetable production technologies of the farmers had a significant contribution to their constraints faced in vegetable production. On the other hand, 66.9 percent of the vegetable farmers had medium knowledge on vegetable production technologies. The above facts lead to

the conclusion that any arrangements made to increase their knowledge would ultimately reduce their constraints faced in vegetable production.

5.3 Recommendations

5.3.1 Recommendations for policy implications

On the basis of observation and conclusions drawn from the findings of the study following recommendations are made:

i. A reduced rate and extent of constraints faced by the farmers in vegetable production are vitally important for increasing the yield of vegetable production. The findings reveal that 83.40 percent of the farmers faced medium to high constraints in vegetable production. It is, therefore, recommended that effective steps like arrangement of quality seeds, fertilizers, increasing storage capacity should be taken by the Department of Agricultural Extension (DAE) and Non-Government Organizations (NGOs) for reducing constraints in vegetable production.

ii. Level of education of the farmers had a significant contribution to their constraints faced in vegetable production. It indicates the importance of education for reducing the constraints faced by the farmers in vegetable production. It may be recommended that arrangements should be made for enhancing the education level of the vegetable cultivators by the concerned authorities through the establishment of night school, adult education and other extension methods as possible.

iii. Effective farm size had a significant contribution to the constraints faced by the farmers in vegetable production. It may be recommended that arrangements should be made for enhancing the awareness of the vegetable cultivators towards market information, market demand and supply by the concerned authorities in case of large scale vegetable production.

iv. Annual family income was important contributing factors to their constraints faced in vegetable production. Therefore, it is recommended that the extension workers should work with the farmers to diverse their source

of annual family income which would help them to minimize the constraints faced in vegetable production.

v. The concerned authorities should take necessary steps to increase the training facilities for the farmers in vegetable cultivation.

vi. The concerned authorities should take necessary steps to increase the extension media contact of the farmers by frequent farm and home visit, telephone contacts, arranging meetings, providing leaflet etc.

5.3.2 Recommendations for further study

On the basis of scope and limitations of the present study and observation made by the researcher, the following recommendations are made for future study.

i. The present study was conducted in Sangalshi union of Nilphamari Sadar upazila under Nilphamari district. It is recommended that similar studies should be conducted in other areas of Bangladesh.

ii. This study investigated the contribution of eleven characteristics of the farmers with their constraints faced in vegetable production. Therefore, it is recommended that further study should be conducted with other characteristics of the farmers with their constraints faced in vegetable production.

iii. The present study was concerned only with the extent of constraints faced by the farmers in vegetable production. It is therefore suggested that future studies should be included other areas of vegetable productions.

iv. The study was based on the farmers' constraints faced in vegetable production. Further studies may be conducted in respect of constraints faced by the farmers in other crops production.

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APPENDIX-I

ENGLISH VERSION OF THE INTERVIEW SCHEDULE

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University

Dhaka-1207

An Interview Schedule for the Study Entitled

CONSTRAINTS FACED BY THE FARMERS IN VEGETABLE PRODUCTION

Name of the respondent: …… Serial No: ……

Union: …….

Village: ……..…….

(Please provide following information. Your information will be kept confidential and will be used for research purpose only)

1. Age

How old are you? _____ years.

2. Level of education

Please mention your level of education.

a) I can't read and write ☐

b) I can sign only ☐

c) I have passed…….class.

3. Family size

How many members do you have in your family? …….. Nos.

4. Effective farm size

What is your total farm size according to use?

Sl. No.	Use of land	Land possession	
		Local unit	Hectare
1.	Homestead area (A_1)		
2.	Own land under own cultivation (A_2)		
3.	Land taken from others on borga system (A_3)		
4.	Land given to others on borga system (A_4)		
5.	Land taken from others on lease (A_5)		
Total			

Total farm size = $A_1 + A_2 + 1/2 (A_3 + A_4) + A_5$

5. Annual family income

Please mention the amount of annual from income from the following sources during last year:

a) Income from agricultural crops

SL. No.	Crop Name	Production (Kg or Maund)	Income/Unit (Tk)	Total Income (Tk)
1.	Rice			
2.	Wheat			
3.	Maize			
4.	Jute			
5.	Potato			
6.	Pulse crop			
7.	Oil crop			
8.	Spice crop			
9.	Vegetables			
10.	Fruits			
Total				

b) Income from animals and fish resources

Sl. No.	Income resources	Production (Kg or Maund/Number)	Income/Unit (Tk)	Total Income (Tk)
1.	Livestock			
2.	Poultry			
3.	Fish resources			
Total				

c) Income from other resources

Sl. No.	Income resources	Total Income (Tk.)
1.	Service	
2.	Business	
3.	Day labor	
4.	Other family members	
5.	Others income source	
Total		

6. Experience in vegetable cultivation

How long have been cultivating vegetable as commercial? ..... Years

7. Training exposure

Please mention about your training exposure on agriculture:

Sl. No.	Name of the training course	Organization	Days
01.			
02.			
03.			
04.			
05.			

8. Extension media contact

Please state the extent of your contact with the following ones:

Sl. No.	Name of information sources	Extent of contact				
		Regularly (4)	Frequently (3)	Sometimes (2)	Rarely (1)	Not at all (0)
1.	Seed, Insecticide, Fertilizer dealer	> 9 times/ year	7-9 times/ year	4-6 times/year	1-3 times/ year	0 time /year
2.	Ideal vegetable cultivators	> 9 times/ year	7-9 times/ year	4-6 times/year	1-3 times/ year	0 time /year
3.	Agricultural Extension Officer (AEO)	> 6 times/ year	5-6 times/ year	3-4 times/year	1-2 times/ year	0 time /year
4.	Sub Assistant Agriculture Officer (SAAO)	> 6 times/ year	5-6 times/ year	3-4 times/year	1-2 times/ year	0 time /year
5.	Group discussion	Once in a month	Once/ 2 months	Once/ 3 months	Once/ 4 months	0 time/6 months
6.	Watching agril. related programs on TV	Daily	Weekly	Fortnightly	Once/ month	0 time/6 months
7.	Listening agril. related programs on radio	Daily	Weekly	Fortnightly	Once/ month	0 time/6 months
8.	Reading agril. related leaflet, booklet	Daily	Weekly	Fortnightly	Once/ month	0 time/6 months
Total						

9. Level of aspiration in life

Please indicate your level of aspiration with respect to the following statements:

9.1 Occupational aspiration

SL. No.	Questions	F (0)	IC (1)	B (2)	S (3)	GS (4)
1.	What level you expect your son(s) to reach in their occupation?					

[F=Farming; IC=Improve Cultivation; B= Business; S=Service; GS=Govt. service]

9.2 Educational aspiration

SL. No.	Questions	NE (0)	P (1)	S (2)	HS (3)	HE (4)
1.	What level you expect your son(s) to reach in their education?					
2.	What level you expect your daughter(s) to reach in education?					

[NO=No Education; P=Primary; S=Secondary; HS=Higher Secondary; HE=Higher Education]

9.3 Aspiration for house construction

SL. No.	Questions	N (0)	MR (1)	NTH (2)	NPH (3)	T/MH (4)
1	What is your aspiration with regard to house construction in the next three years?					

[N=None; MR=Minor repairing; NTH=New tin house; NPH=New pucca house; T/MH=Two/More house]

9.4 Aspiration for savings

SL. No.	Questions	None (0)	< 5 '000' tk (1)	5 to <10 '000' tk (2)	10 to <15 '000' tk (3)	>15 '000' tk (4)
1	What is your aspiration in respect to save your income in this years?					

10. Organizational participation

Please mention the nature of your participation:

Sl. No.	Name of organizations	Not involved (0)	Nature of participation		
			Ordinary Member (1)	Executive Member (2)	President/ Secretary (3)
1.	GO organized co-operative				
2.	Youth club				
3.	NGO organized co-operative				
4.	Farmers' co-operative organized by themselves				
5.	IPM club				
6.	FFS				

11. Knowledge on vegetable production technologies

Please answer the following questions:

Sl. No.	Questions	Total Marks	Marks Obtained
1.	How do you prepare land during potato cultivation?	2	
2.	Mention the procedure of seedbed preparation in tomato cultivation	2	
3.	Mention the seed rate in potato cultivation	2	
4.	Mention row to row and plant to plant distance in ladies-finger cultivation	2	
5.	Mention the rate of urea fertilizer for one hectare in tomato cultivation	3	
6.	Mention the rate of TSP fertilizer at 100 decimals for cauliflower cultivation	2	
7.	Mention the rate of MP fertilizer at 100 decimals for brinjal cultivation	3	
8.	Mention the management procedure of earthing up for potato cultivation	2	
9.	Mention the management procedure of mulching for brinjal cultivation	4	
10.	Mention the damaging nature of late blight of potato	2	
11.	Mention the damaging nature of wilting of brinjal	2	

continued….

Sl. No.	Questions	Total Marks	Marks Obtained
12.	Mention the damaging nature of mosaic virus of tomato	2	
13.	Mention the damaging nature of cutworm of potato	2	
14.	Mention the damaging nature of brinjal fruit and shoot borer	3	
15.	How do you control late blight of potato?	3	
16.	How do you control diamond back moth of cabbage?	3	
17.	How do you control early blight of tomato?	2	
18.	Mention maturity symptom of cabbage	3	
19.	Mention the harvesting time of potato	4	
20.	Mention the post-harvest management of potato	2	

12. Constraints faced by the farmers in vegetable production

12.1 Input constraints

Please express your opinion on the following constraints:

Sl. No.	Item	Extent of problem				
		VH (4)	H (3)	M (2)	L (1)	NAT (0)
1.	Lack of quality seed					
2.	Lack of quality fertilizer					
3.	Lack of quality pesticides					
4.	Unavailability of seed, fertilizer and pesticides at the peak season					
5.	Lack of irrigation facilities					
6.	Small land holding					
7.	Seed fertilizer and pesticides are costly input					
8.	High cost of labor					

[VH=Very High; H=High; M=Medium; L=Low; NAT=Not at all]

12.2 Technical constraints

Please express your opinion on the following constraints:

Sl. No.	Item	Extent of problem				
		VH (4)	H (3)	M (2)	L (1)	NAT (0)
1.	Lack of knowledge about production technologies					
2.	Lack of knowledge about post-harvest technologies					
3.	Lack of knowledge about high yielding vegetable varieties					
4.	Lack of knowledge about recommended seed rate					
5.	Lack of knowledge about recommended dose of chemical fertilizer					
6.	Poor knowledge about irrigation management					
7.	Lack of knowledge about plant protection chemicals					
8.	Technical guidance unavailable at the production period					

[VH=Very High; H=High; M=Medium; L=Low; NAT=Not at all]

12.3 Marketing constraints

Please express your opinion on the following constraints:

Sl. No.	Item	Extent of problem				
		VH (4)	H (3)	M (2)	L (1)	NAT (0)
1.	Lack of storage facilities					
2.	Costly transportation facilities					
3.	Lack of knowledge about market information					
4.	Incorrect weight measurement by businessman					
5.	Lack of fair price					
6.	Unnecessary deduction by businessman					
7.	Poor market infrastructure					
8.	High fluctuation in price					

[VH=Very High; H=High; M=Medium; L=Low; NAT=Not at all]

Thanks for your kind co-operation.

Dated: (Signature of interviewer)