SCENARIO OF VEGETABLE MARKETING IN RANGAMATI HILL TRACTS

RAJESH CHAKRABORTY

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

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BY

RAJESH CHAKRABORTY

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Approved by:

_____

Bisakha Dewan
Assistant Professor

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

_____

Md Ghulam Rabbany
Assistant Professor

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

_____

Bisakha Dewan
Chairman
Examination Committee

Bisakha Dewan
Assistant Professor
Department of Agribusiness and Marketing
Sher-e-Bangla Agricultural University
Dhaka-1207, Bangladesh
Mobile: +8801554-477127
E-mail: d.bisakha@gmail.com

CERTIFICATE

This is to certify that the thesis entitled, **"SCENARIO OF VEGETABLE MARKETING IN RANGAMATI HILL TRACTS"**. Submitted to the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTER OF BUSINESS ADMINISTRATION IN MARKETING,** embodies the result of a piece of bona fide study work carried out by **RAJESH CHAKRABORTY, REGISTRATION NO. 11-04638** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma

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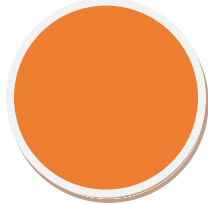
Dated:

Place: Dhaka, Bangladesh

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Bisakha Dewan

Supervisor

Dedicated to

My

Beloved Parents

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ABSTRACT

The present study was designed to analyze the scenario of vegetable marketing of Rangamati Hill Tracts. Marketing channel, supply chain and value addition of the vegetable marketing was analyzed in vegetable marketing. In some few selected areas of four unions of Rangamati Hill Tracts. The study was revealed the socio economic characteristics of the indigenous farmers. Primary data were collected from 50 indigenous farmers. A random sampling was followed. Tabular, graphical and statistical analyses were applied in this case. The main findings of the study reveal that there is a huge scope of vegetable production and it will be more profitable in Rangamati, if the marketing channel, supply chain, value addition development and technology adaptation will implement. Costs, returns, profitability, marketing channel, supply chain and value addition were depicted separately. Based on the total variance explained, it was confirmed that, there were nine components that influence the value chain development with 58% since their total loading is more than one. Since from 4 to 21st component were having total Eigen values less than one (Annex 2.2). But because of lower loading factor only four components were selected from the particular variable which included as a factor was made on the basis of whether the correlation value (factor loading) was high or not.

Focus group discussions are excluded with growers to draw points of interventions and to address constraints by promoting the strength of the chain. For this purpose, internal weakness and strengths of actors and external opportunities and threats are analyzed under categories of economic, social, technological, demographic and institutional themes. Irrigation problem, Electricity problems, High input cost, Lack of quality seeds, Lack of Training, Lack of Market infrastructure, High housing cost, Problems of transportation, Lack of storage facilities, Low price,, Unstable price, Lack of technological adaptation and lack of government supervision were the major problems faced by indigenous farmers. The study revealed price variation at market level on the supply chain which vary from Tk 03 to Tk 10 per kg due to value addition done by the indigenous farmers. They usually did three types of value addition. These are washing, bundling, grading of the vegetables. Prices were lower in case of roadside sale of vegetables which were a little away from the market and close to boat ghat. Customers get fresh products in this marketing system. Govt. initiative is necessary to reduce the problem of transportation and marketing infrastructure for the betterment of both indigenous farmers. Necessary actions were also expected by indigenous farmers from Govt. NGOs and other private institutions to reduce the barriers faced by them in case of marketing and production of vegetables in Rangamati Hill Tracts so that they could get benefit from maximum productivity. Finally, some recommendations were provided for policy formulation and execution.

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

LIST OF TABLE

LIST OF FIGURE

CHAPTER I
INTRODUCTION

1.1 Background of The Study

The Chittagong Hill Tracts, located in southeastern Bangladesh, form the country's only extensive hilly region. They cover about 13,184sq. km, of which 92% is highland, 2% medium highland, 1% medium lowland and 5% residential areas and bodies of water. The population of the CHT is about 1.35 million, of which about 51% are indigenous people who inhabit the often remote upland areas. The indigenous peoples of the CHT are the most disadvantaged ethnic groups in Bangladesh. The majority of them are Chakma (48%), Marma (28%) and Tripura (20%). Agriculture is the main source of livelihood and the incidence of poverty is very high. Non-farm income opportunities are very limited, and in some areas, non-existent.

The two main land forms in the CHT are the hills and the valleys. Hill villagers engage mainly in jhum cultivation, otherwise known as shifting cultivation or swidden farming, with some fruit horticulture. Valley villagers engage in the plough cultivation of paddy rice, along with a fair amount of vegetable and fruit cultivation. Many valley farmers also cultivate timber or jhums on the hill slopes, but more often than not, they are moving away from jhumming to either horticulture or timber plantations. The valley dwellers are mainly from the Chakma, Marma, Tanchangya and Bengali groups, while the Tripura, Mro and Bawm are hill dwellers, along with smaller communities, such as the Khyang, Pankhua and Lushai.

Of the CHT's rural households, 66% depend mainly on agriculture for their livelihood. Among these, 33% are involved only in plough cultivation and 20% only in jhum cultivation, while the rest combine both plough and jhum cultivation (UNDP, 2009).

In terms of on-farm agricultural product the observed two types of production do exist in CHT area. One is for household consumption and another one is for commercial/trade purpose. Different types of vegetables such as sweet gourd, ponted gourd, sponge gourd, brinjal, papaya etc. are grown commercially in the hills. But the marketing systems are not much suitable. The second Chittagong Hill Tracts Rural Development Project, funded at a cost of US$50 million by the Asian Development Bank and the Government of Bangladesh, expects that its project activities between 2011 and 2018 – chiefly the construction of roads and promotion of commercial agriculture – will expand the area's production of fruit and commercial crops. Estimated increments in agricultural outputs are shown in Table 1.1.

Table 1.1.1 : Crop production increments through CHT Rural Development Project

Crop	National production (tons)	Estimated incremental output in CHT (tons)	Increment as percentage of national production
Brinjal (Solanummelongena L.)	334,300	960	0.28
Banana (Musa spp.)	909,000	300	0.03
Papaya (Carica papaya L.)	105,000	513	0.48
Turmeric (Curcuma longa Linn.)	98,500	178	0.18
Ginger (ZingiberofficianaleRosc.)	57,000	237	0.42

Source: ADB (2011).

Vegetable cultivation can be very much profitable if the products are timely supplied to the consumer through efficient marketing channels. Vegetable supply chain, problems and prospects have not yet been studied and analyzed for the CHT area especially in Rangamati district where great potential of vegetable production exists. Therefore, this study has the purpose of investigating vegetable production by the indigenous farmers, vegetable marketing chains and factors affecting

vegetable value chain to the market, which will narrow the information gap on the subject and will contribute to better understand on improved strategies for reorienting marketing system for the benefit of small vegetable growers and intermediaries.

1.2 Description of the Study Area

The description of the study area is important because it provide a brief, clear and unambiguous description of the study area to identify the farmer's level of living and the salient features of the area. The description of the study area includes location, area and population, educational and occupational status, physical features and topography such as climate, temperature and rainfall, economic condition, transportation, communication and marketing facilities. This information is essential for better understanding of the facts and findings of the research and for the selection of a representative sample.

1.2.1 Location

Rangamati is located in the Chittagong Division of Bangladesh. It is a district in south-eastern Bangladesh. Rangamati Sadar is a part of the Chittagong Division and the town of Rangamati serves as the headquarters of the district. It is also a capital city of Chittagong Hill Tracts. The town is located at 22°37'60N 92°12'0E and has an altitude of 14 metres (46 ft). From Chittagong a 77 kilometres (48 mi) road leads to Rangamati. The township is located on the western bank of the Kaptailake. (Wikipedia 2018)

1.2.2 Area and Population

The area of the district is 6116 km^2 of which 1292 km^2 is riverine and 4825 km^2 is under forest vegetation. It is bordered by the Tripura state of India to the north, Bandarban District to the south, Mizoram State of India and Chin State of Myanmar to the east, and Khagrachari and Chittagong Districts to the west. Rangamati is the only district in Bangladesh with international borders with two countries: India and Myanmar. Area-wise, Rangamati is the largest district of the

country.The district of Rangamati consists of 10 upazilas, 1 municipality (9) wards and 35 *mahallas*), 50 union parishads, 162 mouzas and 1347 villages.

The total population is 508,182 according to 2005 census of which indigenous communities constitute 52% and non-indigenous Bengalis constitute 48%. The number of males is 287,060 and the females are 238,043 (Census 2001). The density of population is 83 per square kilometre (Census 2001). The number of household is 103,974 having the household size 4.8 (Census 2001). The total population is divided into Bangalees and indigenous communities (ethnic minorities): Chakma, Marma, Tanchangya, indigenos   Assamese   people, Keot (Kaibarta), Tripura, Pankua, Lushai, Khiang, Murang, Rakhain, Chak, Bowm, Khumi. (Wikipedia 2018)

1.2.3 Educational and Occupational Status

The average literacy rate of Rangmati is 43.60% in which male is 51.47% and female is 34.21% (Bangladesh Population Census 2001, Bangladesh Bureau of Statistics; Cultural survey report of Rangamati District 2007; Cultural survey report of upazilas of Rangamati District 2007).

The economy of Rangamati is hugely dependent on agriculture with a total of 41.94% of the population employed there. Other occupational percentages are: agricultural labourer 12.06%, wage labourer 4.95%, commerce 8.22%, service 13.04%, fishing 2.02%, industry 4.57%, forestry 3.2% and others 10%. A grand total of 12275 hectares of land is used for cultivation, producing food and non food crops such as rice, potato, corn, mustard seed, cotton and jute among others. Fruits such as mango, jackfruit, banana, pineapple, litchi, black berry are also grown in Rangmati (Wikipedia, 2018).

Out of total 108,263 holdings of the district, 74.10% holdings are farms that produce varieties of crops namely local and HYV rice, wheat, vegetable, cash crops and others. Rangamati district is famous for jackfruits and pineapples, which is abundantly grown in the district. The other important fruits are banana, guava, olive, papaya etc. Fish of special varieties ruhi, katal& chital abound in this district.

All these varieties of fish are caught from lake. Besides crops, livestock, forestry and fishery are the main sources of household income. The district is very rich in forest resources. The status of non-farming activities in the district is rather low (District Statistics, Bangladesh Bureau of Statistics, 2011).

1.2.4 Transport, Communication and Marketing Facilities

Transport, communication and marketing facilities play a significant role in overall agricultural and economic development; especially rural development becomes impossible without these facilities. The only transport within the town is three wheeler taxis (Green CNGs). Buses are used to travel to some upazilas outside the town. As a riverine land, some union parishads don't have the access to road route. People use engine boats to travel from one upazila to others.

1.3 Statement of the Problem

Farmers in the hill tract areas mainly produce seasonal vegetables either for their family consumption or commercial purpose. In case of commercial production, farmers face different types of problems. They do not get proper prices of their produce due to the lack of proper marketing chain. Agriculture based industries are also unavailable. Necessary steps should be taken by the Govt. or other non-govt. organization to ensure a smooth transportation system for goods produced in Rangamati hill areas.

Marketing of horticultural crops, especially vegetables in particular, is more complex and risky because of the special characteristics like highly perishable nature, seasonality, bulkiness etc. and needs special care and immediate disposable. As a result, the supply of vegetables is subjected to various problems including wide fluctuation in prices. The current marketing situation of vegetables is still in developing stage characterized by influences of supply and demand and price realization. The important factor that energizes agriculture development towards commercialization and diversification is the development of proper marketing system. Despite the fact that vegetable production is a viable option to increase

farm income and hence alleviate widespread poverty considerable attention has not been given for its marketing aspects. Because of the imbalance in distribution system and lack of organized marketing system there is always a market glut of vegetables in main production season and scarcity of vegetables in the other seasons.

1.4 Rationale of the Study

In many parts of the world, agriculture continues to play a central role in economic development and to be a key contributor to poverty reduction. However, agriculture alone will not be sufficient to address the poverty and inequality that are so pervasive in today's world. It is becoming increasingly crucial for policy makers to focus immediate attention on agriculture. Agricultural products offer much better prospects of growth than primary commodities. In addition, the marked trend to break down production processes into specific tasks opens up new opportunities for developing countries to specialize and take a more profitable part in global trade provided they meet increasingly stringent market requirements.

In developing countries, a significant proportion of national funds are used to support agricultural production inputs – primarily seeds, fertilizers and irrigation systems. Traditionally, little attention has been paid to the supply chain &value chains by which agricultural products reach final consumers and to the intrinsic potential of such chains to generate value added and employment opportunities. By revealing strengths and weaknesses, supply chain & value chain analysis helps participating actors to develop a shared vision of how the chain should perform and to identify collaborative relationships which can lead to improvements in chain performance.

Agriculture in Rangamati can benefit from the emerging market opportunities. Present day agriculture is characterized by smallholder, subsistence farming, with little or no influence from markets. In most parts of Rangamati markets are weakly organized with primitive communication system. Development of viable and

sustainable supply chains requires new relationships, networks, skill, and coordination mechanisms to manage the flow of products between intermediaries and ensure that quality specifications are met.

For sustainable income growth, vegetable growers need to position themselves precisely in high value added activities in the value chain. It requires grassroots level innovations and skills to organize indigenous farmers in to self-help groups/ development of local clusters/ commodity groups at higher level to market their products. Ultimately the successful farming resulted in higher and sustained revenues to the farmers.

1.5 Significance of the Study

There is a huge scope of production and marketing of vegetables in the study area. Production can be increased by increasing the technical efficiency of existing vegetable production and marketing. There are absent of supply chain, marketing channel and value chain studies of vegetables in this area. The study was new for that region; it will enhance the existing vegetable production. More importantly, it was urgently needed to identify inefficiencies of indigenous growers for improving their present situation. The spatiality of this study was provided some important information regarding marketing channel, supply chain and value chain performance of selected fruits in the study area. This study also identified the problems regarding marketing channel, supply chain and value chain in the region. The study would be helpful for policy makers for strengthening study area's agricultural policy programs as well as national food policy programs. The study would also help the researchers and development workers to formulate appropriate policy measures for uplifting the livelihoods of poor indigenous farmers for this region.

1.6 Research Questions

This study attempted to answer the following research question:

1. What are the major vegetable marketing channel and supply chains in the study area?
2. How the indigenous farmers added value to their products?
3. What are the factors affecting existing supply chain and value chain of the market?
4. What are the constraints and opportunities of vegetable marketing in the study area?

1.7 Objectives of the Study

Objectives of the study are given below

(i) To identify socio-economic profile of indigenous farmers of Rangamati hill tracts
(ii) To find out existing marketing channel, supply chain & value chain in the study area
(iii) To depict the factors that affecting existing marketing channel in the study region
(iv) To determine the problems & recommendations to develop the marketing system in the study area

1.8 Limitations of the Study

Some limitations were faced during conducting the study. These ares-

i. Indigenous vegetable growers and market intermediaries did not record their production and marketing information so it was tough to collect accurate data,

ii. For the study, data were collected during fruiting season and harvesting season, vegetable growers were so busy on their job and it was tough to collect data from fruit growers,

iii. Most of market intermediaries came from different districts in market day and did not stay in study area; they were very busy to talk, this created lots of hamper to collect data.

iv. Most of the respondents were not habituated with this type of research. So a huge amount of time had to spend to explain them about the purpose of the research.

v. Transportation system in the mentioned region was very much poor which was an obstacle for data collection.

1.9 Organization of the Thesis

Chapter one describes the background, description of the study area statement of the problem, rationale of the study, significance of the study, objectives, research questions, and limitations of the study. The second chapter provides review of literature. The third chapter consists of the research methodology. Chapter four provides the socio-demographic profile of indigenous vegetable growers. Chapter five has briefly discuss about existing marketing channel, supply chain and value addition of indigenous vegetable growers and in the study area; chapter six consists of depict the factors that affecting existing marketing channel, supply chain and value chain development in Rangamati hill tracts. Chapter seven contains problems & constrains of vegetable farming in Rangamati hill tracts. Chapter eight contains summary, conclusion & recommendations.

CHAPTER II

REVIEW OF LITERATURE

Vegetables include a group of specialized crops and are important economically from the health point of view. They are important sources of protein, vitamins, minerals, energy and integral constituents of Nepalese dish. The main vegetables grown are cauliflower, cabbage, radish, broadleaf mustard, carrot, peas, beans, chilli, okra, brinjal, onion, cucumber, pumpkin, bitter gourd, bottle gourd. Cauliflower has occupied first position both in area and production, followed bycabbage, radish and tomato. Though the production is much higher, the marketing systems are not very efficient in case of vegetable production in Bangladesh which is a big obstacle (Awasthi, 2007).

Efficient marketing system plays an important role in the economic development as it stimulates production, avoids unnecessary fluctuation in output and prices and reduces costs of production and unfair share of consumer's price. However, for attaining these benefits, marketing system and marketing technology have to keep pace with the production technology and socioeconomic development of the country. The experience of many countries suggests that in the absence of an efficient marketing system strategy, agricultural development cannot go very far to stimulate production and contribute to price stability (Khalon and George, 1985).

Characteristics of Vegetables Marketing

Being produced both by commercial and smallholder farmers, vegetable marketing is influenced by a number of factors that can be attributed to production, product, and market characteristics. Kohl and Uhl (1985) identified these attributes as-

Perishability

As vegetables are highly perishable, they start to lose their quality right after harvest and continued throughout the process until it is consumed. For this purpose, elaborated and extensive marketing channels, facilities and equipments are vital.

This behavior of vegetables exposed the commodity not to be held for long periods and fresh produce from one area is often sent to distant markets without a firm buyer or price. Prices may be negotiated while the commodities are en route, and they are frequently diverted from their original destination of a better price can be found. Sellers might have little market power in determining a price. As a result, a great deal of trust and informal agreements are involved in marketing fresh vegetables. There could not always be time to write everything down and negotiate the fine details of a trade. The urgent, informal marketing processes often leads to disputes between buyers and sellers of fresh fruits and vegetables. Producers are normally price takers and are frequently exposed for cheating by any intermediary.

Price /Quantity Risks

Due to perishable nature and biological nature of production process there is a difficulty of scheduling the supply of vegetables to market demand. The crops are subjected to high price and quantity risks with changing consumer demands and production conditions. Unusual production or harvesting weather or a major crop disease can influence badly the marketing system. While food-marketing system demands stable price and supply, a number of marketing arrangements like contract farming provide stability.

Seasonality

Vegetables have seasonal production directly influencing their marketing. Normally they have limited period of harvest and more or less a year round demand. In fact, in some cases the cultural and religious set up of the society also renders demand to be seasonal. This seasonality also worsened by lack of facilities to store.

Product bulkiness

Since water is the major components of the product, it makes them bulky and low value per unit that is expensive to transport in fresh form every time. This, therefore, exposed farmers to loose large amount of product in the farm unsold. These listed characteristics of the product require a special complex system of

supportive inputs. It demands a regular marketing preparation process like washing, cooling, proper management from the time of harvest until the produce is put on display. It is frequently believed a vegetable not only remain attractive to the consumer it must also have a shelf life of few days after having purchased by the consumer (Nonnecke, 1989).

According to Wolday (1994), marketable supply of agricultural product could be affected by different factors including the size of land holding, the output level, family size, market access, price, inputs, formal education, oxen number, accesses to extension and credit services, distance to market, time of selling, access to labor and age. Additionally, Abay (2007) and Adugna (2009) found out that marketable supply of vegetables were significantly affected by family size, age of household, distance from main road, number of oxen owned, extension service and lagged price.

Again, Ayelech (2011) using SCP5 approach and multiple linear regressions found that structure of the market indicates that licensing and years of avocado and mango trade experience did not hinder entry into avocado and mango trade, but capital, education and market information were barriers to enter into the trade. Based on regression model for market supply, she has identified quantity of avocado produced; experience, education and price of avocado in the previous year are factors that significantly affect quantity of avocado supplied to the market positively while lack of market access affects the supply negatively. Similarly, quantity of mango produced, education and SCP – market structure – conduct – performance extension contact are factors that significantly affect quantity of mango supplied to the market positively.

Furthermore, Abay A. (2013) stated that the variables that influenced the marketable supply positively were agricultural experience, access to credit, yield, land size, current year and lagged prices and negatively that of low access to improved inputs, collateral problem to get credit, poor storage facilities and low price of produce. In his study on value chain analysis of vegetables in Habro and

Kombolcha, Abraham (2013) also found that marketable supply is significantly affected by access to market information and quantity of tomato produced in the case of tomato; access to extension service, access to market information, vegetable farming experience and quantity of potato produced in the case of potato; and Woreda dummy, non/off-farm activities, distance to the nearest market and quantity of cabbage produced in the case of cabbage.

In India, Chauhan and Singh (1998) found mainly three channels of vegetable growers for the disposal of vegetables in their study. The most important channel, which had been adopted by the majority of farmers in the study area, was the channel involving commission agent and retailer. However, in the most predominant channel comprising producers, commission agent, retailer and consumer, the net price received by the producer was in the range of 60 to 63 percent. The leading marketing channels of farm products used by the farmers are local assemblers, followed by financier-middlemen and wholesalers. Due to lack of organization, the farmers can only sell their products in the local market where prices are dependent mainly on the law of supply and demand which is unstable.

Piya (2001) identified four types of marketing channels for winter vegetables (cauliflower, cabbage, radish and cucumber) in Chitwan district of Nepal. These channels were producers-consumers, producers-retailers-consumers, producers-wholesalers-retailers consumers and producers-contractors-retailers-consumers.

According to Adhikari (2002) there are three channels for marketing of cauliflower and cabbage in Palpa district of Nepal. These include farmers-consumers, farmers—retailersconsumers, farmers-dokes-consumers.

Small Marketing Infrastructure Development Project (1996) studied marketing system offresh vegetables in Dhankuta district of Nepal and found seven types of marketing channels:
Channel 1: Producers-consumers

Channel 2: Producers-retailers-consumers

Channel 3: Producers-collectors-retailers-consumers

Channel 4: Producers-wholesalers-retailers-consumers

Channel 5: Producers- wholesalers-processors-consumers

Channel 6: Producers-cooperatives-export (to India)

Channel 7: Producers-cooperatives- wholesalers-retailers-consumers

Adepetu, et al. (2005) identified five types of channels in tomato marketing in Nigeria. They have mentioned producer-retailer-consumer, producer-assembler-retailer-consumer, producer-assembler-bulk purchaser-agent-retailer-consumer, producer-commission agents bulk purchaser-agent-retailer-consumer and producer-commission agents-retailer consumer. Huang, et al. (2009) found that farmers were disposing vegetables through traditional marketing channels. Further they reported that about 80 percent of vegetable marketing at farm gate was conducted by wholesalers.

Eleven lines of marketing channels of tomato were identified by Weldeslassie (2007) in a study conducted in Amhara national regional state of Ethiopia. The main receivers from the producers were rural assemblers, retailers and wholesalers and with an estimated share of 43.29, 33.36 and 22.25 percent, respectively. Teka (2009) found eight marketing channels for tomato in Ethiopia. The main receivers from the producers were wholesalers, retailers and rural assemblers, and with an estimated share of 44.7, 40.4 and 8.5 percent, respectively. The channel of producer-retailer-consumer was found to carry the largest share followed by producer-wholesaler-retailer-consumer with the volume of 552 quintal and 382 quintal respectively.

For marketing of vegetables, Thapaliya (2006) mentions three main marketing channels followed according to the type of vegetables. The leafy vegetables follow the first channel, i.e. farmer-retailers/consumer; whereas other fresh vegetables follow the second channel, i.e. farmer/farmer group/cooperative-collection centre-intermediary-urban wholesaler retailer/ hawker/Indian wholesaler-

consumer/exports to India; and non-perishable vegetables such as potato, onion, garlic follow the third category of channel, i.e. importer-urban wholesale market-retailer-consumer. These vegetables (onions, garlic, potato) mostly come from foreign markets (India, Tibet).

There are enormous empirical works that shows how the vegetable and fruit marketing system in Ethiopia is functioning and factors that determine vegetables and fruits production, market supply and demand. However, some of the most relevant are going to be reviewed below.

Mamo (2009) argued that the development of markets, trade and the subsequent market supply that characterize commercialization are fundamental to economic growth. Bezabih and Hadera (2007) stated that the production of vegetables is seasonal and price is inversely related to supply. The situation is worsened by the perishability of the products and poor storage facilities. Farmers bargaining power is low due to lack of alternative market outlet. They also found that the most common marketing channel immediately available to the farmer is through brokers i.e. up to three brokers between the producer and the trader which is an indication of long marketing channel. They recommended that the more the farmers organize themselves and access the terminal market, the more they benefit.

Bezabih (2008) also identified that lack of markets to absorb the production, low price for the products, large number of middlemen in the marketing system, lack of marketing institutions safeguarding farmers' interest and rights over their marketable produces (e.g. cooperatives), lack of coordination among producers to increase their bargaining power, poor product handling and packaging, imperfect pricing system and lack of transparency in market information communications as major marketing challenges.

Dendena*et al.* (2009) using value chain analysis on mango indicated that highly disorganized and fragmented industry with weak value chain linkages, long and

inefficient supply chains, inadequate information flows and lack of appropriate production were explained as the major marketing problems. They recommended that institutional innovation to reduce the above challenges.

Adugna (2009) also stated that the vegetable market conduct is characterized by unethical practices of cheating and information collusion that led to uncompetitive market behavior even though the calculated concentration ratio did not indicate oligoposony market behavior (24.56%). He suggested that some corrective measures are required by the government as well as institutions like cooperatives.

Abraham (2013) stated that limited access to market, low price of product, lack of storage, lack of transport, low quality of product and lack of policy framework to control the illegal Ethio-Somalia trade route are the major marketing problems. Moreover, Abraham (2013) has noted that the transition of the small-scale sector towards commercial production will ultimately be determined by the ability and willingness of producers to provide a commodity. Similarly, however, this potential benefit is under challenges of imperfect marketing. Furthermore, the marketing system of vegetable was found as poor, limited access to market information and weak market linkage or non-existent. This was exacerbated by inadequate seed regulatory frameworks and supply of seeds of poor quality, poor post-harvest handling which are attributed to low capacity and capability for policy implementation as well as unregulated vegetable seed supply (Bezabih*et al*., 2014). Adhikari (2002) conducted a research on analysis of marketing system of cauliflower and cabbage in Palpa district of Nepal. She found that the net return from cauliflower production was higher in Chidipani and lower in Madanpokhara. The net return from cabbage was higher in Madanpokhara and lower in Chidipani. In the marketing system of cauliflower and cabbage, channel of producer-retailer-consumer was most common. The marketing margin was higher in Madanpokhara as compared to Pokharathok and Chidipani. Similarly, the producer's share was lower (41.80%) in Madanpokhara and higher in Pokharathok (81.24%) and Chidipani (81.54%).

A study on production and marketing of tomato conducted by Marketing Development Directorate (MDD) and Winrock International (2003) shows that the lack of basic infrastructure (market yard, storage, weighing machine) at local assembly markets causes great hardship to farmers as well as traders (wholesalers and retailers).The prevailing marketing system of tomatoes, consumers in Kathmandu are paying three times more than what farmers are receiving in Sarlahi district (Marketing Development Directorate, 2002a). The difference between the price of farmers receiving and consumers paying is large due to the high transportation cost and post-harvest losses.

Similarly, Paudel (2006) conducted another study on production and marketing efficiency of cauliflower in Makwanpur district of Nepal. He found that the marketing system of the study area was poorly organized and purely private based system dominated by traders. He further mentioned that the local collectors had major influence on price fixation. Marketing margin was the highest in Chitlang (Rs 11.83/kg) with the lowest producers' share (54.39%), whereas the lowest marketing margin (Rs 11.14/kg) and the highest producers' share (57.05%) were found in Daman. Categorically, the lowest marketing margin (Rs 10.03/kg) and the highest producers' share (61.33%) were found in category 3 i.e. farmers having more than 6 ropani land.

Regarding demand determinants of vegetables and fruits, there is scarcity of literatures while Abay (2007) mentioned that vegetable as a group of crops from the horticulture category has a very wide importance both as a source of food and health care. On the contrary, the level of consumption is very low for reasons of unavailability and market imperfection. Moreover, he found that income, purchase frequency, distance, own price and single purchase lot that were identified to be significant determinant of demand for vegetable.

Haji (2008) did a study on economic efficiency and marketing performance of vegetable production in the Eastern and Central Parts of Ethiopia. He found that

there was the existence of considerable economic inefficiency in production, poor contract enforcement and imperfect competition in the marketing of vegetables, and indicated the need of intervention from the governmental and/or private institutions to improve the production and marketing performances of vegetables by providing the necessary supports to the smallholder farmers.

CHAPTER III
METHODOLOGY

Methodology is the important part of any research. Improper methodology very often leads to an erroneous result. This chapter provides a detailed account of the description of the study area, selection of the study area, selection of respondents, data collection procedure and analytical techniques followed in this study.

3.1 Background of the District

Rangamati is the largest district of the country. Rangamati sub-division was turned into a district in 1983. It takes about 305 km by road from Dhaka and 74 km from Chittagong to go at Rangamati. The district of Rangamati represents the natural, wild, beauty of Bangladesh. Rangamati was under sector one in the great Bangladeshi Liberation war 1971. In liberation war, the Bengali and tribes of Rangamati participate willingly. For the memory of their sacrifices, there is a symbol of Doel (Magpie robin) in the center of Rangamati Sadar. The total population is divided into Bangalees and indigenous communities. Fourteen tribal communities reside in this district. The mix of different races, cultures, religions and customs creates an interesting community at Rangamati.

3.2 Selection of the Study Area

For an economic investigation, site selection is an important step. The area in which a farm business survey is to conduct relies on the particular purposes of the survey is possible cooperation from the respondent. The study area should be selected on the basis of the objectives of the study. In other words, the area selected must serve the objectives of the study. The research work carried out in some selected area at Rangamati Sadar upazila, considering the most potential geological area of vegetable production and marketing. The area has been selected based on following considerations:

- Easily accessible and thus facilitate the researcher to complete the field work;
- Favorable for vegetable production and marketing;
- Most of the farming areas are nearby to the kaptai lake.
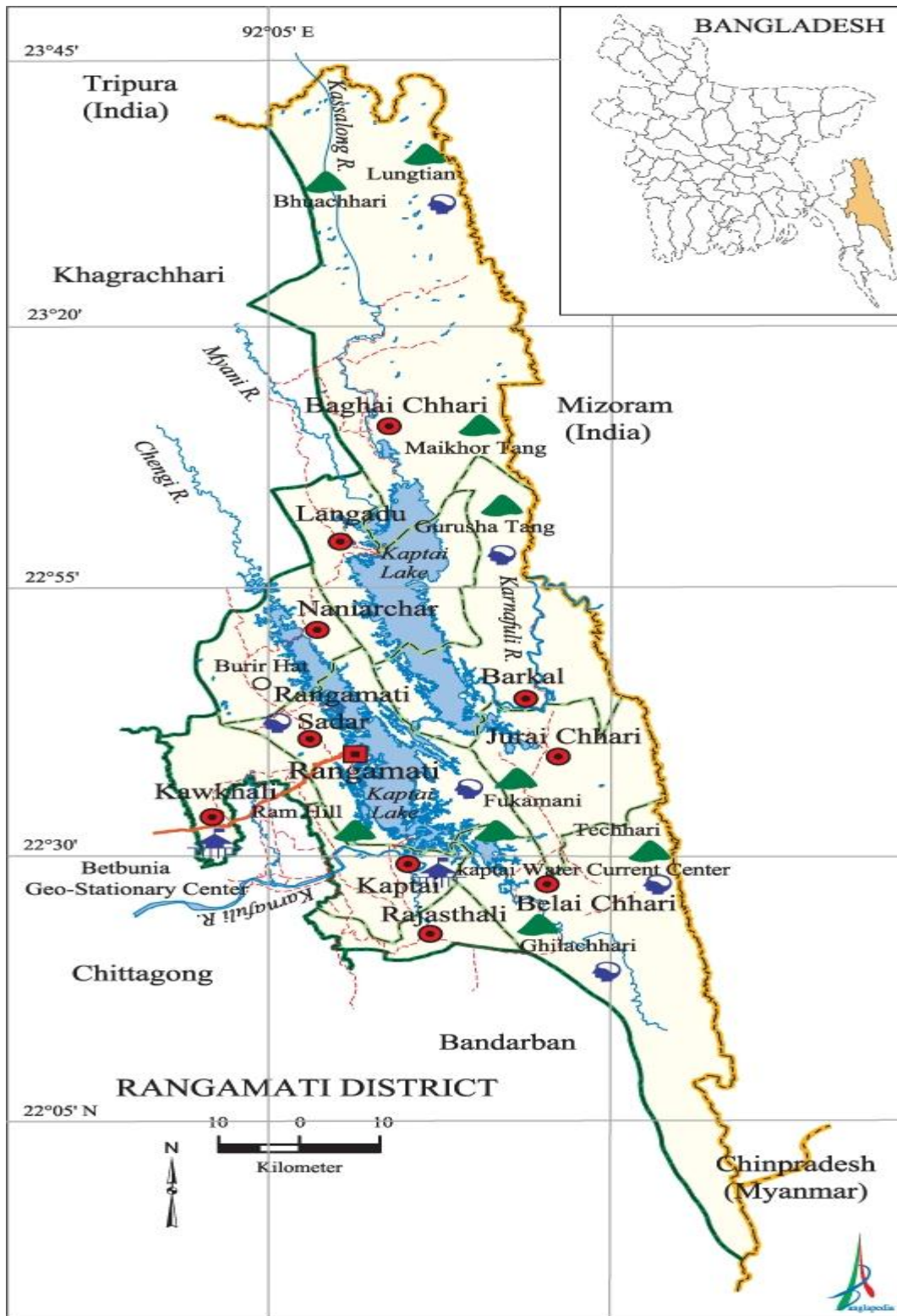
Picture-1: Rangamati District Map.

3.3 Climate of the Study Area

The warmest month (with the highest average high temperature) is April (33°C). The month with the lowest average high temperature is January (25.7°C). Months with the highest average low temperature are June and August (24.9°C). The coldest month (with the lowest average low temperature) is January (14°C).
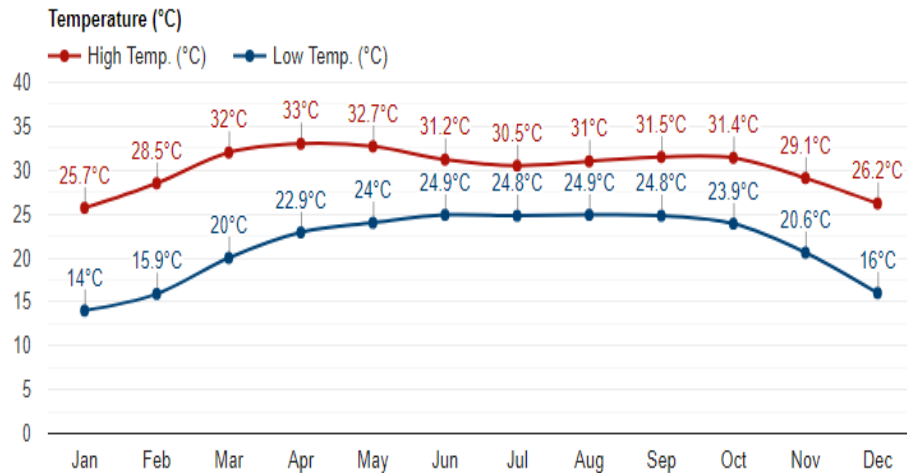
Figure 3.3.1: Average Temperature of Rangamati

The wettest month (with the highest rainfall) is July (572.6mm). The driest month (with the lowest rainfall) is January (5.1mm).
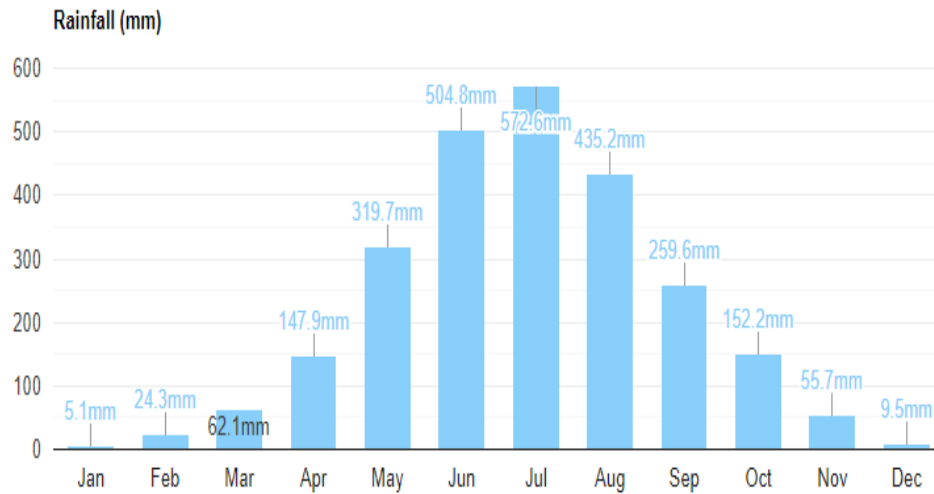
Figure 3.3.1: Average Rainfall of Rangamati

The month with the highest number of rainy days is July (21 days). Months with the lowest number of rainy days are January and December (1 day). Climate Reference: https://www.weather-atlas.com/en/bangladesh/rangamati-climate#temperature

3.4 Source of Data and Collection Procedure

3.4.1. Desk top study

For preparing the thesis there has to collect good reports covering different aspects about vegetable marketing. Although most of the reports were not specifically marketing Analysis; and they tended to concentrate on the problems of producers at the expense of other links of the value chain ;the mission was able to gain a very useful insight into the vegetables marketing analysis in hilly areas. As it was not worked before with value marketing analysis of indigenous vegetables it was too difficult to get proper data from this region. The following twelve good reports have been reviewed for better understanding of the study.

These are given below:

i. Marketing System Analysis of Vegetables and Fruits in Amhara Regional State: Survey Evidence from Raya Kobo and HarbuWoredas.

ii. *A study on Marketing Behaviour of Vegetable Growers in Morar Block of Gwalior district {M.P}.*

iii. Analyzing Efficiency of Vegetable Production in Benin: Alphonse Singbo.

iv. *Marketing analysis of vegetables, A review of selected studies for Pakistan and Guidelines for further research, Pakistan strategic support program, 2012. Pakistan.*

v. *Linking small scale vegetable growers to markets, Building the next links in the value chain. South Asian Nation, February 2011.*

vi. Conduct and Performance of Vegetable Marketing System in Kangra District of Himanchal Pradesh in India.

vii. *Poor marketing system, 25 guiding questions for designing and implementing agro industry projects, 2011, United Nations Industrial Development Organization. (UNIDO) Vienna, Austria.*

viii. *Quesada, H.,Gazo R,, and Sanchez. S., Critical Factors Affecting Supply Chain Management: A Case Study in the US Pallet Industry, March 2010.*

ix. An analysis of Marketed Surplus and Price Spread of Cauliflower in S. Chotanagpur (Jharkhand) for Sustainable financial inclusion of Tribal Farmers: Tara Shankar and K.M. Singh

x. *Karna. N., Surwar. R. , MacCarthy. G., Value chain analysis final report, CHT value chain portfolio, August 2010, Bangladesh.*

xi. *Market efficiency on vegetable commodities in developing country: case study from Dambulla wholesale market in Sri Lanka.*

xii. *Economics of vegetable production and marketing in Lahunipara block of Sundargarh district.*

xiii. *Vegetable cultivation in Uttarakhandhills:viewingthorugh gender lens by Surya Rathore, May 2013, India.*

3.4.2 Collection of secondary data

Secondary information, especially with regards to marketing system, market actors, commodity flows, marketing costs and margins, production cost and price formation on the selected vegetables were collected from books, journals, reports (BBS, DAM, HIES), documents and online resources.

3.4.3 Pre-test of survey questionnaire

Before the final survey a pre-test was done from the vegetable growers and marketers in the local market of the study area. The pre-test helped to find out the main problems in vegetable production and marketing in the study area and it helped to finalized the survey questionnaire. The questionnaire was pre-tested on ten vegetable growers and ten marketers to evaluate the appropriateness of the design, clarity and interpretation of the questions, relevance of the questions and time taken for an interview.

3.4.4 Final questionnaire preparation

From the pre-test result a final survey questionnaire was prepared. Final questionnaire also made to find out the marketing system of vegetable production and marketing in the study area. Also to find out the existing value chain of selected areas.

3.4.5 Data collection

Data collection is not an easy task. It must be done sincerely, because a successful report depends on the reliable data. Before beginning the interview, each respondent was given a brief description about the aim and objectives of the study. Primary data were collected from the farmers who are grower and marketer using

pre-tested semi structured questionnaires; conduct FGD and the Key Informants Interviews (KII).

The questions were asked in a simple manner and friendly environment with explanation where it was felt necessary. Data were collected under continuous supervision of the researcher. For primary data collection, the following steps were followed:

3.4.5.1 Data collection from growers

Vegetable growers and marketers were select from Rangamati District. Formal survey data was complemented by key informant discussions and vegetable growers. Growers selected from different area in Rangamati District like Khandhobchor, Aamchuri, Katachuri, Rangapani, Ashambosti which are located outside the city. As the population size was not readily available, the vegetable growers and marketers were selected considering availability at the first sight. Inside the city, from each area respondents were selected. However, wherever possible, discussions were held with farming households on an informal basis. There were 50 respondents, where all respondents were vegetable growers and marketers.

Figure-3.4.5.1: Data collection from different respondents

Figure-3.4.5.1: Data collection from different respondents

3.5 Data Analysis

Data obtained from questionnaire interviews were coded where appropriate, entered into a database system using Microsoft EXCEL, and analyses using SPSS Statistical Software. Descriptive statistics (percentage, mean, range, standard deviation, correlation co-efficient, co-efficient of variation, etc.) was used to describe the variables. For the estimation of comprehensive marketing costs, the method described by Dawe et al. (2008) was followed.

3.5.1 Statistical analysis

Factor Analysis

Factor analysis is a multivariate statistical technique that addresses itself to the study of interrelationships among a total set of observed variables. The technique allows looking at groups of variables that tend to be correlated to one another and identify underlying dimensions that explain these correlations. While in multiple regression model, one variable is explicitly considered as dependent variable and all the other variables as the predictors; in factor analysis all the variables are considered as dependent variables simultaneously. In a sense, each of the observed variables is considered as a dependent variable that is a function of some underlying, latent, and hypothetical set of factors. Conversely, one can look at each factor as dependent variable that is a function of the observed variables.

If $\{X_1, X_2, ----, X_n\}$ be a set of n observed variables and $\{F1, F2, -----, F_m\}$ be a set of unobservable variables then the factor analysis model can be expressed as

$$
\left.
\begin{aligned}
X_1 - \mu_1 &= l_{11}F_1 + l_{12}F2 + ----- + l_{1m}F_m + \varepsilon_1 \\
X_2 - \mu_2 &= l_{21}F_1 + l_{22}F_2 + ----- + l_{2m}F_m + \varepsilon_2 \\
& ---------------------------- \\
& ---------------------------- \\
X_n - \mu_n &= l_{n1}F_1 + l_{n2}F_2 + ----- + l_{nm}F_m + \varepsilon_m
\end{aligned}
\right\} \text{-------------- (2.1)}
$$

where μ_i is mean of X_i, ε_i is error or specific factor. The coefficient l_{ij} is the loading of i-th variable on the j-th factor. In matrix notation the factor analysis model can be expressed as

$$X - \mu = LF + \varepsilon \text{---(2.2)}$$

where $L_{n \times m}$ is the matrix of factor loadings.

Several methods are available in literature to estimate factor loadings and factor scores. The study considers principal component method to estimate the factor loadings and communalities $[h_i^2 = \sum_{j=1}^{m} l_{ij}^2]$, a measure of the variation of observed variables through factors. 'Varimax', factor rotation is adopted to find estimate of factor loadings.

CHAPTER IV

SOCIO-DEMOGRAPHIC PROFILE OF THE INDIGENOUS FARMERS

4.1 Introduction

Main purpose of this section is to identify socio economic characteristics of the indigenous farmers and provide basic information about the areas of observation. Socioeconomic characteristics of the farmers are important in influencing production planning. People differ from one another in many respects. Behavior of an individual is largely determined by his/her characteristics. The age of the farmers, education, health, water & sanitation, land, NGO involvement, training, assistance from government are discussed here. For this reason various information related to age, education, health, gender, training, assistance from government have been taken into account in this study. A brief discussion of these aspects is given below.

4.2 Age Distribution of the Sample Farmers

Age of farmers have an influence on the production and in the better management of the farming system. The important demographic factor such as age, measured in years, was analyzed to know the working age of the farmers. The age group of the farmers was classified into four categories in this research. These were: i) 30-39 years ii) 40-49 years iii) 50-59 years iv) 60-69 years. In the study area, about 56% of the total farmers belonged to the age group 30-39 years, 32% were in the age group of 40-49 years, 8% were in 50-59 years and 4% belonged to the age group 60-69 years. Most of the farmers were middle aged in the study area. The farmers' average age was 39.2 year.

Table 4.2.1 Age Distribution of the sample farmers

Range of age (year)	Number of farmers	Percent
30-39	28	56
40-49	16	32
50-59	4	8
60-69	2	4
Total	50	100

Source: Field survey, 2017.

4.3 Educational Status of the Respondents

Education is a crucial factor for skill development and improving marketing techniques. Educated people can have a better access to the pertinent information related to food and livelihood system. Education is generally regarded as an index of social improvement of a community. It plays a critically important role in reducing poverty and inequality, improving health and enabling the use of knowledge. Education of farmers helps to increase skill and productivity. It is evident from table 5.2 that out of 50 sample farmers, 18 percent farmers had general education, 52 percent farmers had completed Primary level education, 26 percent farmers had completed secondary level education, 4 percent farmers had completed their higher secondary level education.
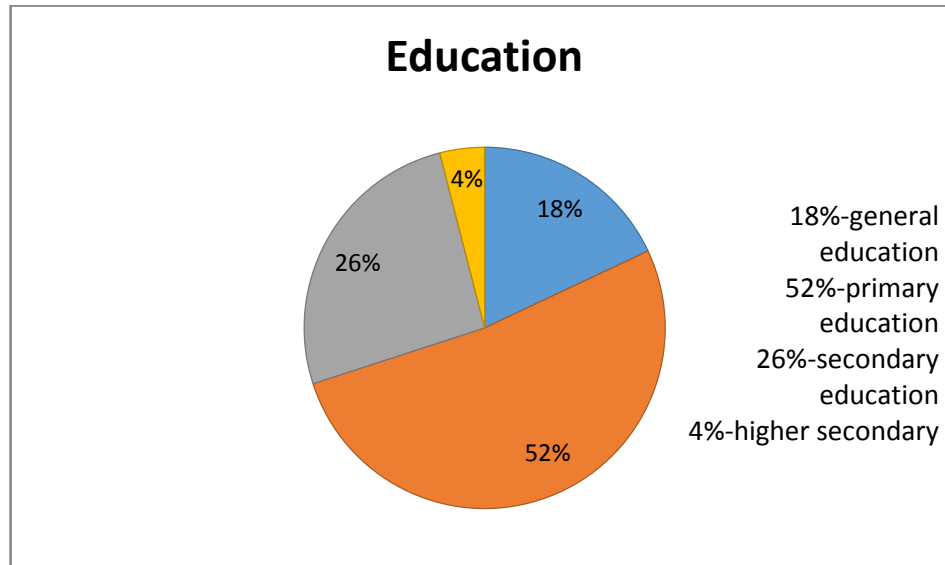
Figure-4.3.1: Educational status of the respondents

4.4 Educational Status of the Respondents Family Members

Education is generally regarded as an index of social improvement of a community. Educated persons are better able to adopt new technology and they can develop their community. Indigenous farmers are more conscious about their family members' education. Whatever they earn, they always try to educate their children. Almost all of the respondents' family members are school and college going students. The distance of Primary schools is about 1-3 km from their home. They go to school by boat or feet.

4.5 Family Size & Members Involvement In Farming of The Sample Farmers

The average family size of our country was about 4.40 (BBS, 2013b). The average family sizes of the vegetable producing farmers were found to be 4.70 which were slight greater than the average family size of the country. Maximum 8 members and minimum 3 members were found in one family of the respondent. The average family member involved in farming was 2.83. Maximum 4 members and minimum 2 members were found in one family of the respondent.

4.6 Involvement of Indigenous Women in Farming

Women in our country are the most deprived one but at present this situation is changing. About half of the population of our country is women. So without their development, the total social and economical development of our country is not possible. Indigenous women are more conscious about their empowerment. They always involve themselves in different income generating work. In the present study, we saw that involvements of women in farming were 58% from 50 respondents.
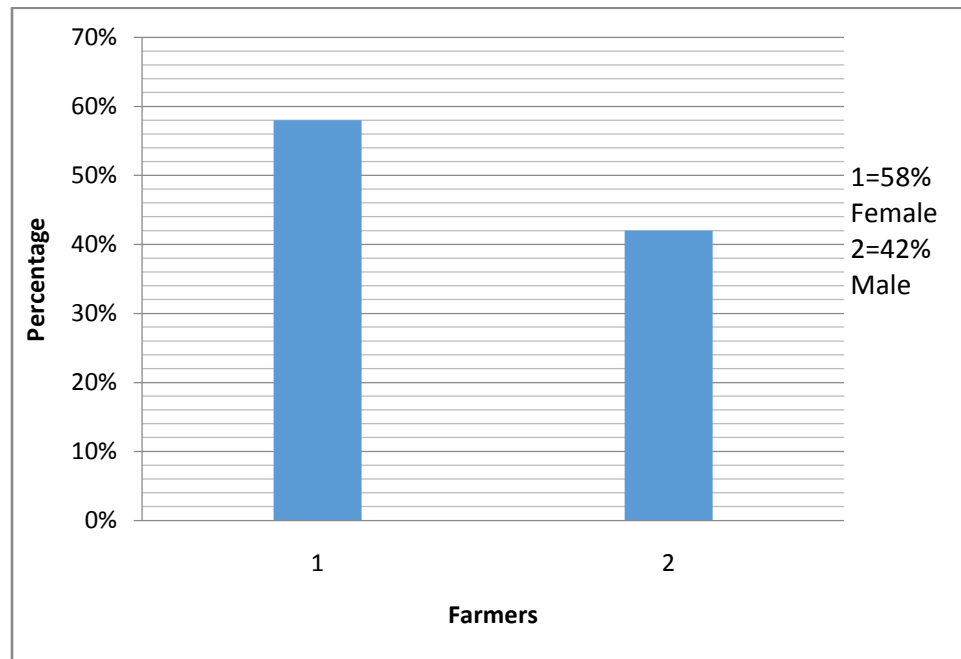
Figure-4.6.1 Involvement of Indigenous Women in Farming

4.7 Health Status of the Respondents Family Members

From the 50 respondents, 34 respondents said that their family has been suffering from various health issues, in percentage it was 68. Another 16 respondents claimed that their family members had not been suffering from any kind of health issues which is 32%.
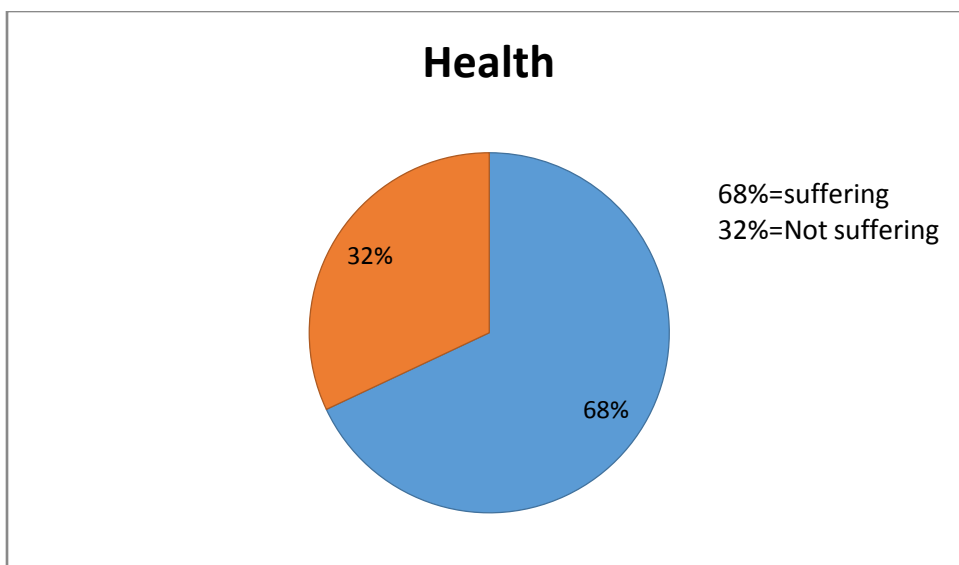
Figure-4.7.1: Health Status of the Respondents Family Members

4.8 Clean Water & Sanitation Status of the Respondents Family

From the 50 respondents 45 said that their family gets clean water and proper sanitation and 5 respondents claimed that their family didn't get clean water and proper sanitation.

Table-4.8.1: Clean Water & Sanitation Status of the Respondents Family

Water & Sanitation	Number of Farmers	Percent
1	45	90%
2	5	10%
Total	50	100%

Source: Field survey, 2017.

4.9 Land Status of the Respondents Family

In the present study the size of land holdings of the indigenous vegetable producing farmers are classified into three categories. The size of lands 1-4 acre 35 respondents, 4-7 acre 13 respondents and 7-10 acre 2 respondents. It was observed that 70% farmers were small scale grower, 26% farmers were medium scale grower and 4% were large scale growers.

Land Size

70%

26%

4%

1=70%
2=26%
3=4%

1   2   3
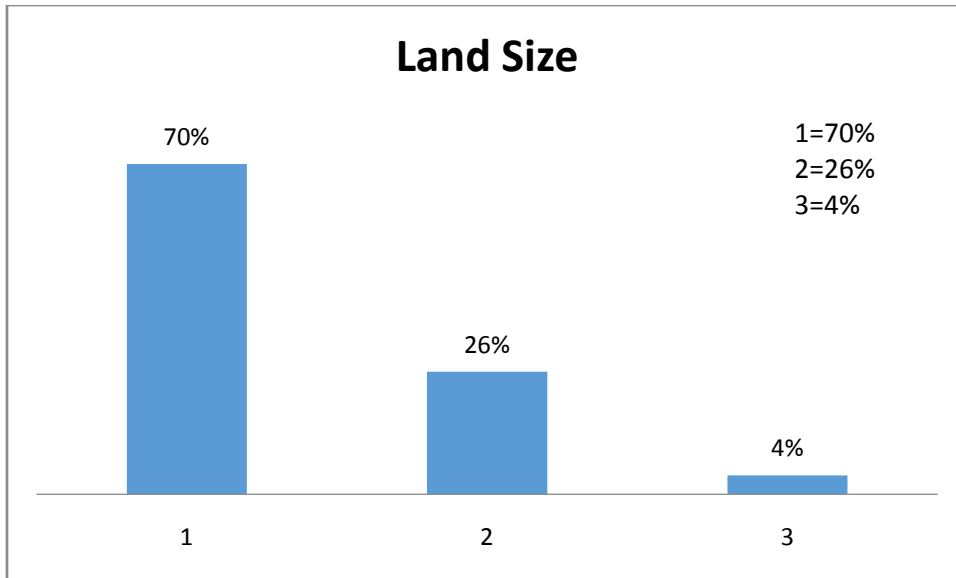
Figure-4.9.1: Land Status of the Respondents Family

4.10 NGO Involvement Status of the Respondents

Involvement with banks & NGO is an important factor for any kind of farming. They are the sources of credit facilities and various kinds of assistance & training program. In the study area different NGOs such as BRAC, ASA, CARE, Noboloketc are operating their services. From the 50 respondents 29 are not involved with NGO, 7 respondents are involved with BRAC, 13 respondents are involved with other local NGOs and 1 respondent is not involved with such organizations.

NGO Involvement

58%

2%

14%

26%

58%=Not Involved
26%=Local NGO
14%=BRAC
2%=Others

1   2   3   4
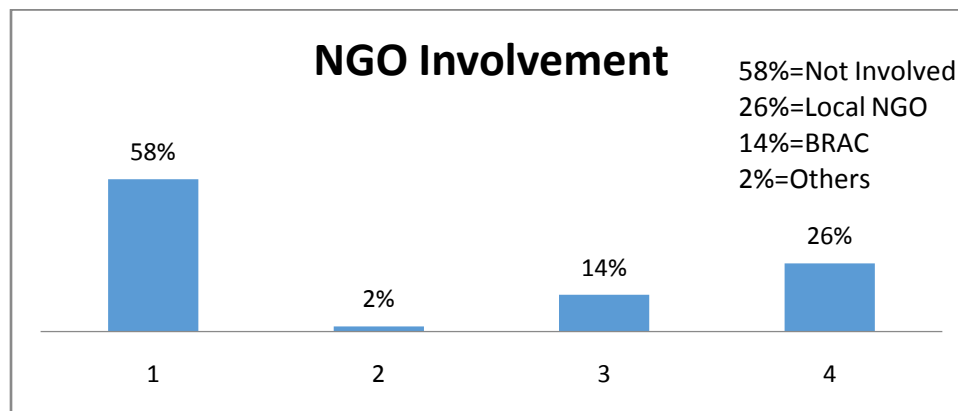
Figure-4.10.1: NGO Involvement Status of the Respondents

4.11 Training Status of the Respondent Farmers

Training is an important factor for highest range of productivity with the most recent scientific method. Farmers who get proper training are more conscious about their farming method, technology and efficient marketing system. From the 50 respondents 36 or 72% got training and 14 respondents or 28% didn't get any training.
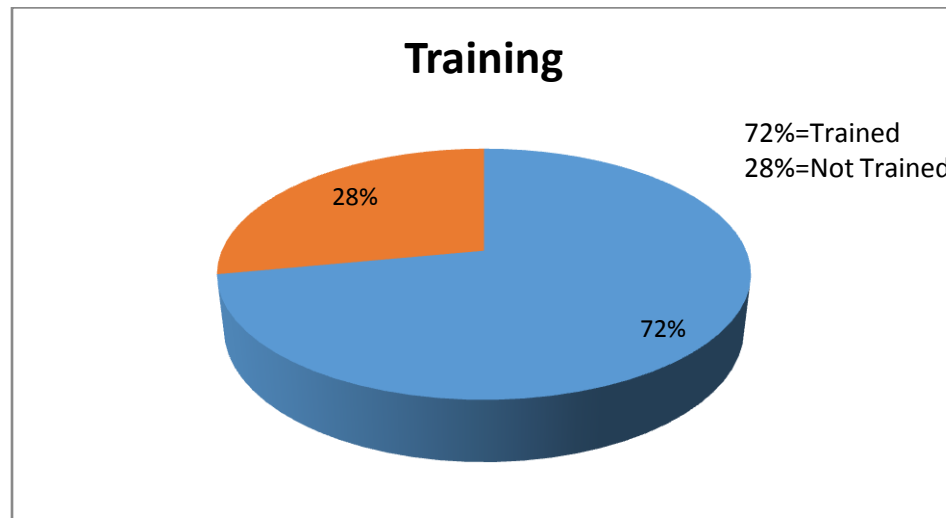
Figure-4.11.1: Training Status of the Respondent Farmers

4.12 Assistance from the Government/NGO

Government carries out long term plans to aid and support overall development of agriculture in the country. The objective is to increase area under agriculture, improve cultivation practices, use of modern methods & technologies, enhancing production & quality, linking with markets, pre-post harvest measures, cold chain logistics, establishment of value processing units etc. so that farmers get maximum leverage from the markets. The govt. initiatives and plans make the farmers successful; make them adopt newer method of cultivation etc. Happy and progressive farmers build the foundation for a stronger nation. It was observed that 50% of the farmers didn't get any kind of assistance from the government or NGOs where as 50% of the farmers got assistance from the government or NGOs.
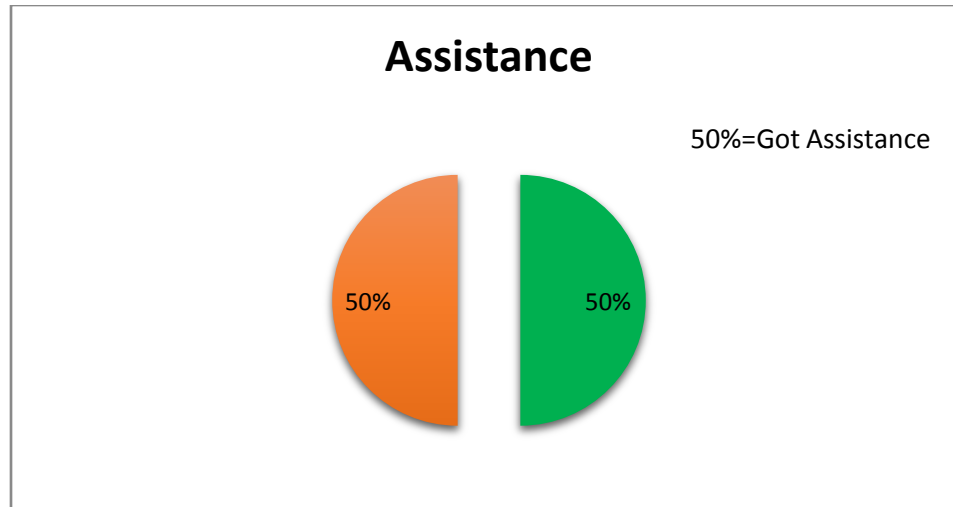
Figure-4.12.1: Assistance from the Government/NGO

4.13 Own Shop/Selected Place for Selling the Products of the Respondents

Some farmers, such as cash grain farmers or dairy farmers, have large, well-established markets. They can use existing organizations to perform the marketing function for them, or they can band together, form a cooperative, and market their products jointly. Small-scale vegetable growers generally have more difficulty finding established markets; therefore, they usually develop marketing systems tailored to their unique situations. Small-scale growers use four different direct marketing channels. Roadside marketing is by far the most common direct marketing system. Location is very important for roadside marketing. It was observed that no respondents had their own shop in the market and they had no selected place for selling their products. So they have to sell their products beside the road of a market.

CHAPTER V

MARKETING CHANNEL, SUPPLY CHAIN & VALUE ADDITION

5.1 Introduction

The concept of supply chain management is rapidly developing with high rate in the contemporary business world, especially for Agricultural sector. This chapter identified the main actors of supply chain of vegetables produced and marketed by the indigenous farmers in Rangamati hill tracts. Appropriate marketing channels and the market actors are important in timely delivery of vegetables from the producers to the consumers. Effective Supply Chain Management can reduce the fluctuation of price of vegetables and ensure the reasonable price for the producers of vegetables. At present, Bangladesh's agricultural marketing system is often accused in the popular press of being inefficient. Through supply chains, producers in developing countries and emerging economies can access market information and knowledge to hone their value-added activities. The advantages of supply chain management are numerous, like the reduction of product losses, increase in sales, reduction of transaction costs, a better control of product quality and safety and the dissemination of technology, capital and knowledge among the chain partners. Supply chain management tools have been developed and implemented throughout the chain to guarantee optimal chain performance. Overseeing supply chains requires a necessary methodology in which chain accomplices mutually plan and Control the stream of merchandise, data, innovation and capital from 'ranch to fork', which means from the providers of crude materials to the last customers and the other way around. So as to respond adequately and fast to customer's interest, production network the board is shopper arranged. It goes for coordination of generation forms. Production network management results in lower exchange costs and expanded edges. In light of the numerous exercises and aspects included it requests a multidisciplinary approach and economical exchange relations. Supply chain associations depend on relationship, trust, open correspondence and common advantages. Effective Supply Chain Management can reduce the fluctuation of price of vegetables and ensures the reasonable price for the producers of

vegetables. The advantages of the supply chain management approach are numerous. Some important Advantages are:

- Reduction of product losses in transportation and storage.
- Increasing of sales.
- Dissemination of technology, advanced techniques, capital and knowledge among the chain partners.
- Better information about the flow of products, markets and technologies.
- Transparency of the supply chain.
- Tracking & tracing to the source.
- Better control of product safety and quality.
- Large investments and risks are shared among partners in the chain.

In Rangamati however, supply chain development is often hampered due to lack of governmental support, Institution building & market infrastructure, raising awareness, pilot chain projects poor transportation facilities. This study reviews the issues of the marketing channel, supply chain and value addition processes of the indigenous farmers who involved in production and marketing of the vegetables in Rangamati.

Marketing channel refers to the sequential arrangement of various marketing intermediaries involved in the movement of products from the producers to the consumers. In traditional agricultural marketing, there is a lack of direct linkage between the producers and the consumers. After harvesting, the commodity passes through a number of middlemen and finally reaches the consumers. But in Rangamati there is a direct linkage between the indigenous farmers and the consumers. Different commodity offer for sale by the producers, different types of buyers appear and engage in bargaining to purchase the produce.

Analysis of the value chain is needed to obtain knowledge that can be applied to upgrade value chain activities. Several scholars have recognized that more attention is required to upgrade agricultural value chains to increase quality-based

competitiveness of domestic agricultural produce. FAO (2014) defined a food value chain as "the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into a particular food product that are sold to final consumers and disposed of after use." Value addition is mainly regarded as the difference between total expenses involved in making or of a product and the total revenue accruing from its sales. This chapter goes through the existing market channel, the cost and returns at different levels that are incurred and obtained by milk producers, milk traders, sweetmeat shopper and finally the estimation of value addition at different levels and marketing efficiency.

5.2 Marketing Channels

In Rangamati we saw that there were two marketing channels. These are described below:

5.2.1 Channel 1:

In channel one; we observed that farmers produce their products. After harvesting their products they went to the local markets directly either by boat (manual or engine powered) or by CNG auto rickshaw. Roadside marketing is by far the most common direct marketing system on those local markets. Location is very important for roadside marketing, because these roadside markets are too large. Farmers who came first take the better place beside the main market and more customers went there, bargain and bought their daily needs. If it's too far from the main market like near to the boat ghat/station customers usually don't go there and their products remain undistributed. So channel one show the direct marketing channel: Farmer- Local Market- Customer.

Channel-1

Figure-5.2.1.1: Channel-1

5.2.2 Channel 2:

In channel two we observed that farmers produce their products. After harvesting their products they went to the local markets directly either by boat (manual or engine powered) or by CNG auto rickshaw. Farmers who became late to get better position in the market usually had to sell their products beside the road far from the main stream market near the boat ghat/station which was basically awkward position. On the contrary customers didn't go or gather there. So their products remain undistributed. Then the sold it to the nearest shop of their position. Those are called local retailers. Those local retailers bought these products from them and then sold it to their local customers. In channel two we found four market actors which were: Farmer- Local Market- Local Retailer- Customer.

Figure-5.2.2.1: Channel-2

5.3 Vegetable supply chain

The concept of supply chain has come into existence since 1980s. A supply chain is a network of facilities and distribution options that performs the functions of:

(a) Procurement of raw materials and input.

(b) Transformation of these materials into intermediate and finished products and services through processing.

(c) The distribution and delivery of these finished products or final services to consumers. Each supply chain thus provides certain or specific types of end products or services to the end users at the end point of the supply chain (Douma*et al*., 2004).

Supply chain analysis intended to generate a systematic knowledge of flow of goods and services from the origin (producers) to the final destination (consumers) through different market intermediaries. The market supply of vegetable produced by the indigenous farmers is the end point of a chain of service activities ranging from input supply and farm services to processing, quality control and product marketing. Distribution channels of vegetables were shown with different figure for farmers and retailers respectively. Those figures were constructed on the data basis of data collection in some selected areas in Rangamati hill tracts.

5.3.1 Supply chain-1:

In supply chain one; we saw that farmers collect their inputs (fertilizer, pesticides, seed etc) from the local market or local nursery. Using those inputs they cultivated their crops. After harvesting their final products they brought it to the local markets and directly sold it to the customers. No middleman or intermediaries exist there. Customer usually got fresh products in these channel.

Chain- 1

Input→ Local Market, Local Nursery Input→ Local Market Input→ Local Market

Farmer→ Local Market Farmer→ Local Market Farmer→ Local Market

Customer→ Local Market Customer→ Local Market Customer→ Local Market
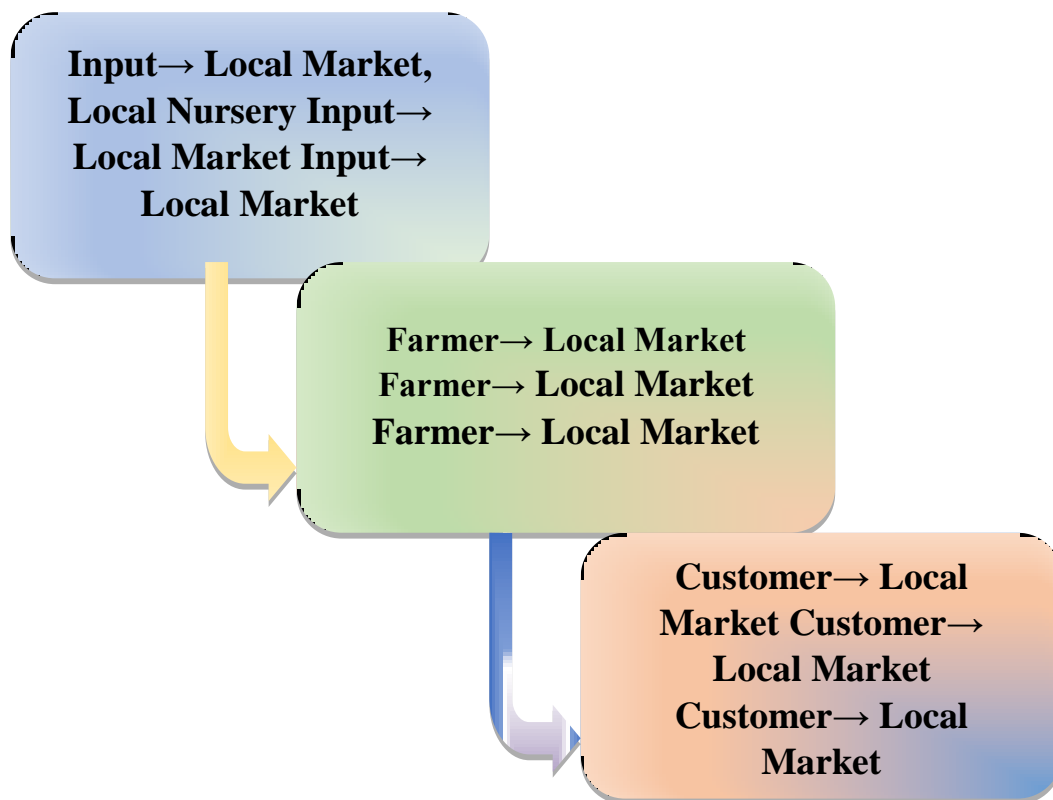
Figure-5.2.1.1: Supply Chain-1

5.3.2 Supply chain-2:

In supply chain two we saw that farmers collects their inputs (fertilizer, pesticides, seeds, etc) from the local market, local nursery or BADC. Using those inputs they cultivated their crops. After harvesting their final products they brought it to the local markets and directly sold it to the local customers and the undistributed products sold to the local retailers. No middleman or intermediaries exist there. Customer usually got fresh products in these channel.

Figure 5.2.1.1: Supply chain- 2

5.3.3 Supply chain-3:

In supply chain three we saw that farmers collects their inputs (fertilizer, pesticides, seeds, etc) from the local market, local nursery or BADC. Using those inputs they cultivated their crops. After harvesting their final products they brought it to the local markets and directly sold it to the local retailers. Local retailers sold those products to the customers in upazila and sadar market (Banarupa, Tabalchori, Reservebazar, Ashambosti). Middleman or intermediaries exist there. Customer usually didn't get fresh products in these channels.

Chain- 3
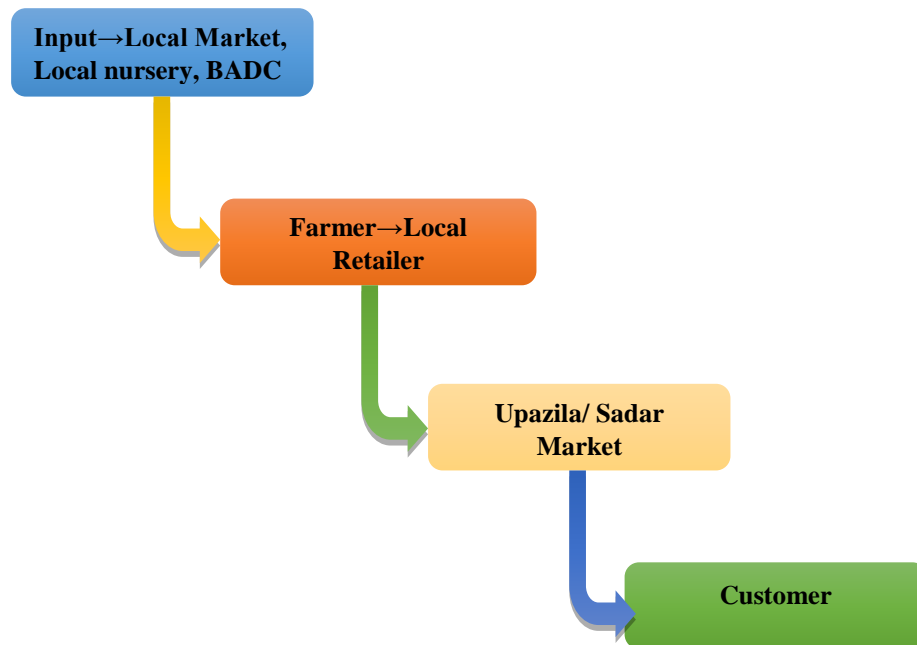
Figure-5.3.3.1: Supply chain-3

5.3.4 Supply chain-4:

In supply chain four we saw that farmers collects their inputs (fertilizer, pesticides, seeds, etc) from the local market, local nursery, BADC. Using those inputs they cultivated their crops. After harvesting their final products they brought it to the local markets and directly sold it to the local retailers. Local retailers distributed those products to some selected markets of Dhaka and Chittagong where indigenous people lives in. This market is not so big but demand is always there as the indigenous people prefer the products most. Middleman or intermediaries exist there. Customer usually didn't get fresh products in these channels.

Chain-4
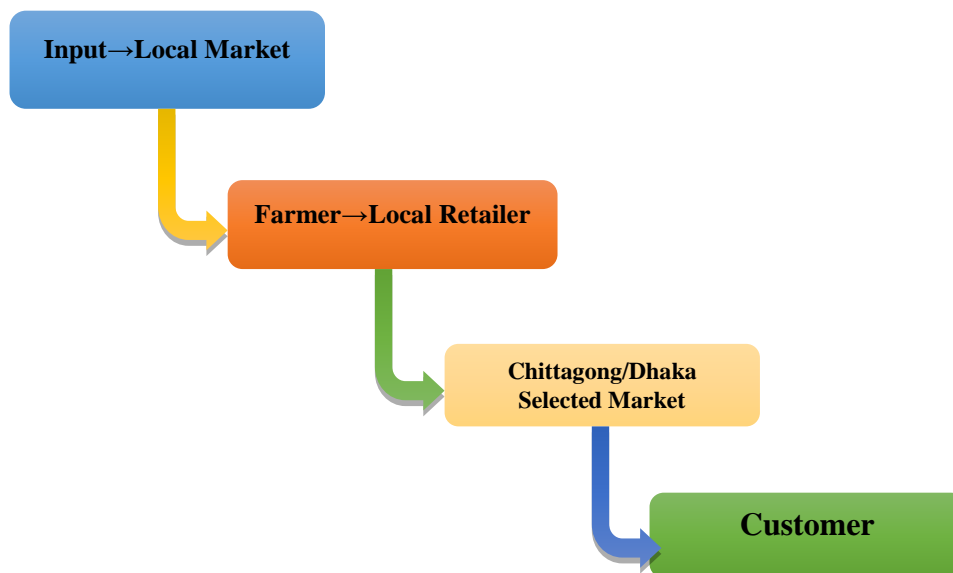
Figure-5.3.4.1: Supply chain-4

5.4 Vegetable Value chain

Vegetables are highly perishable and have limited life, which need to be marketed immediately or processed into varied value-added products. Demand for value-added products is due to the change in the market behavior, changes in consumer preferences which have resulted in the usages of more value-added, ready-to-use vegetable products and vegetables in consumer packs. These products also have a high demand. In most cases, the added value is probably some form of processing. The continuing trend in selling vegetables is adding value. In the study area we saw that 100% of the farmers had the idea about value addition. It was observed that farmers basically did three types of value addition when they marketed their products. Those were washing vegetables, grading vegetables and bundling. Someone took the time to wash, grading or sorting and bundling that action had added "value" to the product.

5.4.1 Value Addition

In the study we got four type of group who did value addition. Here 1= grading/sorting vegetables, 4= washing the vegetables after picking, 5= bundling the vegetables. We observed that 12 farmers did washing after picking their products which was 24%. 18 farmers did both grading/sorting and washing their products for value addition which was 36%. 3 farmers did both washing and bundling their products for value addition which was 6%. 17 farmers did grading/sorting, washing and bundling for value addition which was 34%. From the observation we can say that maximum farmers did washing their products for value addition to get more value from their produce. And their second priority in value addition was grading & sorting.

Value Type	Number of The Respondent	Percentage
4	12	24%
1,4	18	36%
4,5	3	6%
1,4,5	17	34%

Source: Field survey, 2017.

5.4.2 Price Variation after Value Addition

Farmers seriously consider the ways in which they added value to their products.

In the study area we observed that 100% of the respondents had the idea about value addition. From the observation we got a clear picture about the value addition and its effect on pricing of the produce. After washing, grading/sorting and bundling the average price variation of the products was 6.33tk greater than the original price of the products in the local market. Maximum price variation of the products was 10tk greater than the original price of the products. And minimum

price variation of the products was 3tk greater than the original price of the products.

Price Variation after Value Addition	Tk
Average	6.33
Maximum	10
Minimum	3

Source: Field survey, 2017.

CHAPTER VI

FACTORS AFFECTING MARKETING CHANNEL, SUPPLY CHAIN &VALUE CHAIN DEVELOPMENT

For developing marketing channel, supply chain and value chain of selected indigenous farmers in Rangamati District, it was observed that some causes were responsible for the marketing channel, supply chain and value chain development. This chapter adopted factor analysis to identify the major dimensions of the causes of marketing channel, supply chain and value chain development.

6.1 Factor Analysis

Factor Analysis is primarily used for data reduction or structure detection. The purpose of data reduction is to remove redundant (highly correlated) variables from the data file, perhaps replacing the entire data file with a smaller number of uncorrelated variables. The purpose of structure detection is to examine the underlying (or latent) relationships between the variables. This analysis that explains most of the variance observed in the much larger number manifest variables by reducing the number of causes to a few factors. The analysis determined causes that affect marketing channel, supply chain and value chain development of selected indigenous farmers in Rangamati District. The analysis used principle component method to extract the factors with varimax rotation technique. Table 7.1 shows the results of the factor analysis of the causes of marketing channel, supply chain and value chain development. Based on the total variance explained, it was confirmed that, there were nine components that influence the value chain development with 58% since their total loading is more than one. Since from 4 to 21th component were having total Eigen values less than one (Annex 2.2) But because of lower loading factor only four component was selected from the particular variable which included as a factor was made on the basis of whether the correlation value (factor loadings) was high or not.

KMO and Bartlett's Test: The Kaiser-Meyer-Olkin measure of sampling adequacy is a statistic that indicates the proportion of variance in variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful. Here, the KMO value was 0.821.

Bartlett's test of sphericity test: The test indicates that variables are unrelated and therefore unsuitable for structure detection. Small values (less than 0.05) of the significance level indicate that a factor analysis may be useful with data. Here the significance level was 0.00 or 1%.

Based on rotation matrix, it could find out the different factors. On the basis of the maximum variation of the factors, the study identified four main factors as the causes that affect value chain development in the study area. These factors are:

Factor I: variety, mode of transport, storage facility, Selected place for marketing, location of marketing, market structure value addition, price variation were found on factor I.

Factor II: yield, total expense, total income were found on factor II.

Factor III: Religion, education, family size, age, place of production, land and health were found on factor III.

Factor IV: NGO's involvement, training, assistance from Government were found on factor IV.

The elements of each of the above factors were arranged in order of their respective magnitude of factor loadings indicating the importance of a particular element in a factor. The causes comprising Factor I was mainly related to marketing factor; the causes comprising factor II contained the causes related to economic factor; the Factor III related to social factor and the elements of Factor IV included the causes related to environmental factor. The negative value of factor loadings for the variables number of traders in Factor I; marketing price and labor wages in Factor II; religion, education and culture in Factor III indicated that these variables were inversely related to Factor I, Factor II and Factor III.

Table 7.1: Factor analysis for the causes that affect marketing channel, supply chain and value chain development of selected indigenous farmers' production.

Causes that affect marketing channel, supply chain & value chain development	Factor loading				Communalities
F1= Marketing factor					
No of farmers	.778				.856
Mode of transport	.732				.821
Market structure	.726				.731
Storage facility	.707				.842
Selected place	.724				.921
Location	.542				.726
Value addition	.429				.868
Price variation	-.585				.834
F2= Economic factor					
Yield		.660			.846
Total expense		-.584			.720
Total income		.621			.879
variety		.453			.721
F3= Social factor					
Age			-.465		.653
Education			-.557		.641
Family size			.692		.746
Place of production			-.542		.743
Land			.452		
Health			.653		
F4= External factor					
Training				-.218	.781
NGO involvement				.314	.819
Assistance from Govt.				.631	.846
Eigen value: F1= 6.454, F2= 3.476, F3= 4.680, F4= 6.843					
Percent of variation: F1= 18.429, F2= 14.945, F3= 13.243, F4= 12.268					
Cumulative percent of variation: F1= 23.419, f2= 32.395, f3= 45.495, F4= 45.756					
KMO= 0.821 and only factor loading ≥58 has been shown in the table, P-value=0.00					

Extraction method: Principle Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Source: Field Survey, 2017.

The result suggested that these factors were mainly responsible for affecting value chain development in the study area. Therefore, to identify these factors coefficient value and significance level here multiple logistic regression model was done. In this model factors were terms as variable. This model was also helpful to find out the relation between dependent variable and independent variable. Here, dependent variable was vegetables supplied by growers and independent variables were religion, education, family size, culture, poverty, market price, high input price, capital, credit availability, labor wages, and variety, location of market, market structure, marketing policy, consumer choice, supply and number of growers.

6.2 SWOT Analysis

In light of the stakeholder analysis, mixed focus group discussions are executed with fruit growers and intermediaries to draw points of interventions and to address constraints by promoting the strength of the chain. For this purpose, internal weakness and strengths of actors and external opportunities and threats are analyzed under categories of economic, social, technological, demographic and institutional themes. The main results of the SWOT analysis are listed under (Table 6.2).

Table: 6.2. : SWOT analysis matrix

Strengths	Weaknesses
Resources: • Potential for growth production • Increasing telecom service • Accumulated traditional knowledge • Organic input utilization • Self preparation of seedlings **Marketing:** • Year round supply • Multiple consumers • Payments received at delivery • Employment	**Production:** • Absence of modern agronomic management practices • Lack of quality inputs • Lack of financial institution than other region in the country • Lack of institutional training of growers • High input price • Insufficient electricity supply for irrigation • Poor value • Lack of support from Government/NGO's. • Low road access **Marketing**: • Due to hilly region supply of vegetables hill to market is causes hamper • Needed high transportation cost due to hilly region. • Inability to join in groups for marketing • Lack of organized information catering • Absent of proper market infrastructure • Absent of selected area for selling their products

Opportunities	Threats
Production: • Potential to increase area and productivity • Scope for delivery in big markets • Government can organize input supply **Business Environment:** • High value crop • High opportunity to grow HYV • High prospect of establishing cold storage • High opportunity to develop market infrastructure which helps employment opportunity • Prospect to provide assistance in technology and market information • Transformation and development plan **Market:** • Scope of further value addition • Big scope for import substitution • Opportunity to supply vegetables all over the country • Opportunity to export of vegetables than northern region because of lower distance of Rangamati to Chittagong	**Production:** • Lack of appropriate varieties. • Increased supply of vegetables from other region • Vegetable growers not satisfied with the price they receive. • Lack of input supply • High supply driven channel • Wild animals • Prevalence of heavy rainfall **Marketing**: • Adversarial, with hiding of information • Punitive i.e. no credit extended • Roadside marketing • Low price **Institutional:** • Resource and capacity Constraints • Lack of coordination • Poor Technology generation & dissemination • Lack of reliable statistics on production • Weak extension support service

Source: Survey result, 2017.

CHAPTER VII

PROBLEMS AND CONSTRAINTS OF INDIGENOUS FARMERS

7.1 Introduction

Farming as a source of livelihood has been an age-old practice for thousand of indigenous farmers in Rangamati. But indigenous farmers are socially, economically and educationally backward. In the present study, an attempt had been made to identify and analyze the major problems and constraints faced by the indigenous farmers which act as main barriers in existing marketing system.

7.2 Constrains faced by Indigenous farmers

7.2.1 Quality of Seed

For better yield good quality of seed is very important. Poor quality seeds often give poor results. Indigenous farmers use deshi seeds which percentage is 80. That means maximum indigenous farmers use deshi seeds for their cultivation. That's why they didn't get the expected yield. Other 20% use both deshi and hybrid seeds for cultivation.

Variety	No of the Respondents	Percentage
1	40	80
2	10	20
Total	50	100

Source: Field survey, 2017.

7.2.2 Lack of proper Irrigation System

Effective irrigation will influence the entire growth process from seedbed preparation, germination, root growth, nutrient utilization, plant growth and re-growth, yield and quality. To have more flexibility in their operations as the ability to access water at times when it would otherwise be hard to achieve good plant growth and Producers cannot achieve higher yields. Loss in market value through yield reduction and Reduction in size and quality of the vegetables happened due to lack of proper irrigation. Irrigation water use is pumped directly from Kaptai Lake.

In summer the indigenous farmers suffer from lack of water from the Kaptai Lake. They also suffer from paucity of uninterrupted supply of electricity. They don't get required electricity supply that's why they don't use electric motors for supplying water from the lake. They didn't take advantage of market incentives for unseasonal production. As the maximum cultivable lands are hilly, farmers didn't arrange proper irrigation management. Lack of knowledge about irrigation system is also present among the respondents.

7.2.3 Transportation System

Transport is viewed as a critical factor in enhancing rural profitability. It upgrades personal satisfaction of the general population, makes showcase for rural create, encourages communication among topographical and monetary locales and opened up new zones to financial core interest. Amongst the marketing challenges the farmers face were high transportation costs. Marketing transport is important as it links the farmers to the markets or consumers on time. The availability of one's own market transport influences the delivery time of produce to the markets, unlike the case of farmers who depend on hired transport or public transport to transport their produce. Transport availability determines the quality of the delivered produce. Efficient agriculture marketing is critically dependent on efficient transport system. In efficient transport service coupled with poor storage can lead to losses as deteriorate quickly overtime. Unreliable transport can lead to the late delivery of produce. This paper along these lines takes a gander at the pivotal job transportation plays an important role in indigenous vegetable marketing system in Rangamati. The respondents moreover attested the general conviction that transportation influences the creation measurement of the farmers and furthermore the expense of the yields. 100% of the respondents especially agreed that the above explanation is substantial. A sum of 50 respondents were haphazardly chosen and talked with which speak to 82% of the respondents use boat (manual or Engine powered boats) and 18% of the respondents use CNG auto rickshaw for transportation of their products. Quick and easy transportation is absent here. It is very difficult to manage and is costly in marketing of produce far from the cultivation. So the farmers cannot always deliver their products in the market. This

figure shows that high fuel price and lack of engine powered boat severely affect the marketing system of the indigenous farmers. Deterioration and wastage of their products couldn't be lessening due to delay transportation.
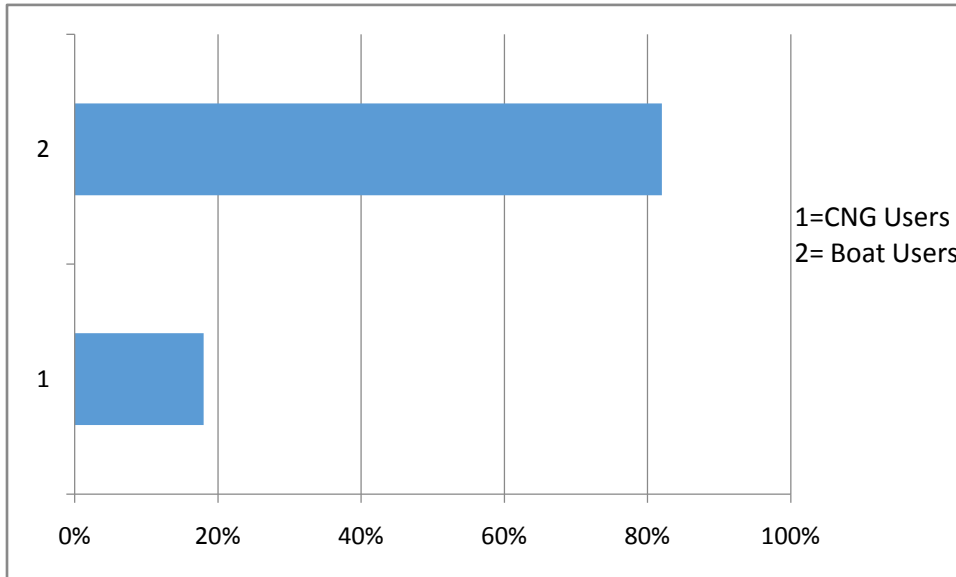
Figure-7.2.3.1: Transportation System

7.2.4 Input Cost

Productivity is not an absolute measure, but rather a reflection of the ratio between inputs and outputs. Respondents reported that high price of input was one of the most important problems for farming. The cost of inputs can likewise change the situation of the supply bend. On the off chance that the cost of data sources decreases, it is conceivable to create more yield with no adjustment in the expense of generation. On the other hand, whenever input costs rise, a littler measure of item can be created without the farmer paying higher generation costs. Cost of fertilizer, cost of seeds, cost of irrigation, and cost of land preparation affects the production rate of the indigenous farmers.

7.2.5 Lack of Diversified Market

The most common problems with the farmers are marketing of their produce irregularly due to lack of diversified market. If the had access to sold their products in different markets it would be more profitable for them. More marketing

opportunity and diversified market help the farmers to sell their products easily. In Rangamati most of the indigenous farmers didn't sell their products in different markets. It shows that 33 respondents said that they usually sold their product in one market and another 17 respondents sold in different markets.
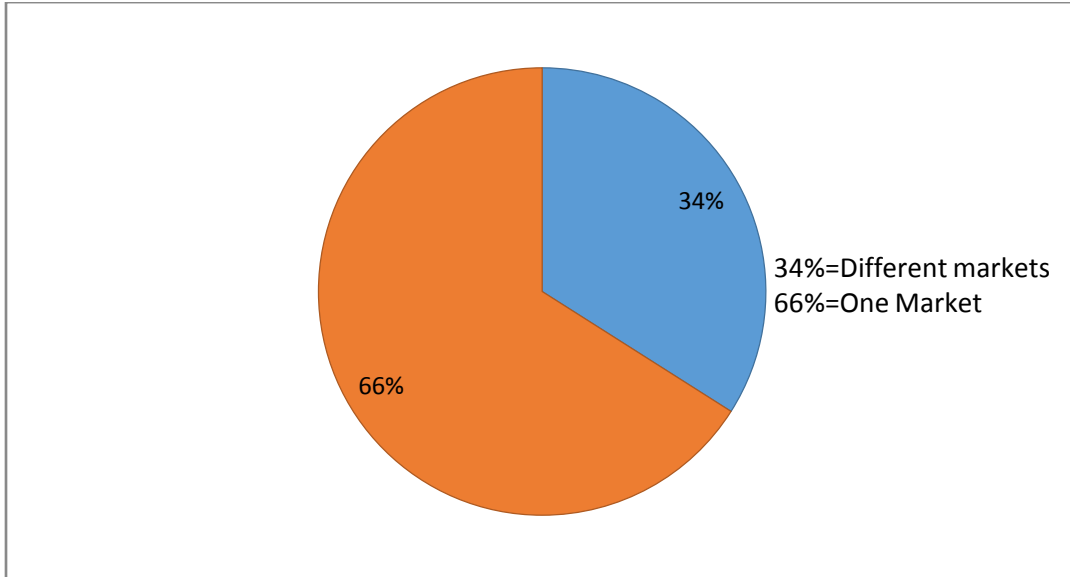
7.2.6 Lack of Market Infrastructure

Improved market infrastructure is a precondition for efficient and effective marketing system. Since the physical structure of market facilities is a determinant of the number of retail outlets, the prevalence of inadequate market facilities in the region's markets would in effect constitute a hindrance to trading and marketing activities as a whole and food distribution in particular. The inadequacy and unavailability of physical structures (particularly super- structures) in the regions' markets imply that buying and selling activities will be hampered. In traditional marketing we see that farmer sell their products to bepari/wholesaler and they sell it to the retailer in the market who has their own shop or place for selling the commodities. In terms of physical structure, the local markets have open stalls and open- air trading is common at the market site. The structures are made of wood and constructed locally.

On market days, traders often protect their wares from the heat of the sun with planks, polythene sheets, zinc and umbrellas. But indigenous farmers sell their

products directly to the customers. There is no middle man here. 100% of the respondents said that they didn't have such type of place or infrastructure like traditional markets. So they sold their products in the open air. Moreover who arrived late in the market had to sold their products at the end of the main market where customers don't go usually. That's why price variation on those places is higher than the other place of the market. The situation of vegetables market in Bangladesh has containing poor marketing infrastructures and huge postharvest losses. Due to seasonal glut and absence of proper marketing system, bulk quantity of harvested produce gets wasted. Price fluctuation was a common phenomenon faced by them. They also replied as due to perishable nature of product they could not get stable price. It was an acute problem to them. More interesting thing is that they have to sell their products beside the roads which usually far away from the markets. They were not able to sell their products everyday in the market because in a week there is two specific days which is called Hat-day/Bazar-bar and the indigenous farmers always sell their products on these days. They usually sold their products in the open air no specific areas were allocated for them. During rainy season and hot weather is was difficult to sell their products and this party accounts for the high risk of perishability & wastage of their commodities.

7.2.7 Lack of Storage Facility

Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption. The storage of goods, therefore, from the time of production to the time of consumption, ensures a continuous flow of goods in the market. Storage protects the quality of perishable and semi-perishable products from deterioration. Storage is necessary for some period for performance of other marketing functions. Lack of proper storage facilities lead to attacks by pests and other organisms. The damage caused through such infestations leads to a reduction in market value depending upon the extent of damage. In some cases the produce is declared unfit for consumption and has to be destroyed. This leads to a huge loss for the farmer. Most of the indigenous farmers have Storage problem. According to the study about 62%

farmers, they have no available storage facilities. Only 19 farmers of the study were agreed to it was not a problem. The percentage was estimated by about 38%.
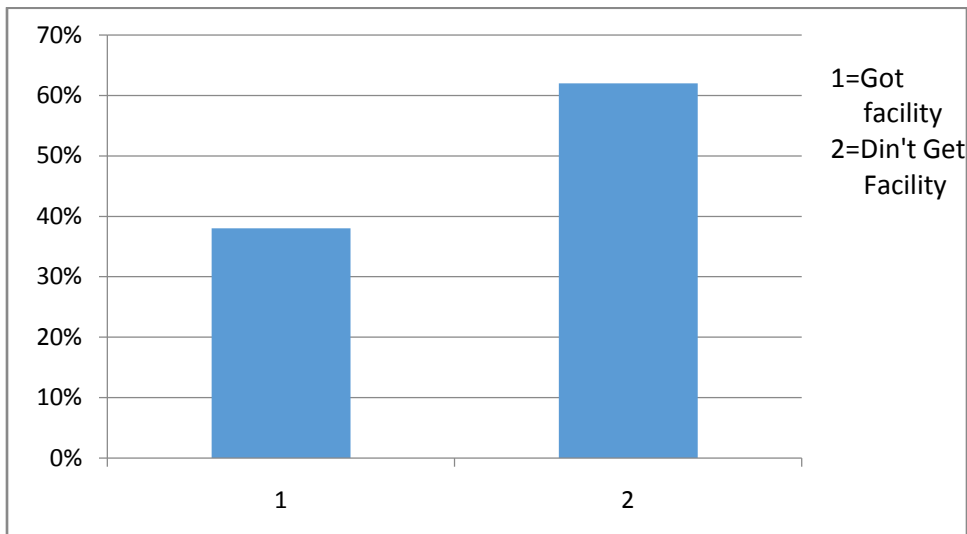
Figure-7.2.7.1: Lack of Storage Facility

7.2.8 Lack of Knowledge about New Technology & Marketing Skill

Many farmers in rural areas do not have the most up-to-date information on how to grow food efficiently and economically. In rural areas where connections to more productive areas are limited, people depend on food grown by farmers in their own. The introduction of new types of crops can improve both a farmer's profits. Marketing the crop, including promoting, selling and efficient distribution, can add profit to a vegetable business. Growers with marketing skill have more opportunity to achieve a premium price. Improving marketing is a medium to long-term project. It involves some expenses and having the right skills. The emerging needs in agriculture sector now are adoption of location specific skill and knowledge based technologies; promote greater value addition to agriculture produce. In the study we saw that 80% of the indigenous farmers applied Old age tradition of farming. They didn't have much more idea about modern farming technology and marketing skills. They follow traditional marketing approach while selling their products. That's why expected output and income wasn't achieved by them.

7.2.9 Lack of Proper Guidance & Training

Important for them are the consideration and assistance they receive from Government or NGO's. But thing is that Most of farmers were not well informed and trained. They had to depend on their indigenous farming experience. It was estimated that 100% of the respondents agreed with the statement that, government/NGO's help will improve their present condition in agricultural product marketing. That means the indigenous farmers were not getting proper guidance and training. In another statement 100% of the respondents said that different training program regarding agro-product marketing can improve their livelihood condition. 72% respondents said they got training but those were not up to date and they didn't improvise it. From the study we saw that, 58% of the respondents had no involvement with NGO's. 50% of the respondents didn't get any kind of assistance & guidance from the Government.
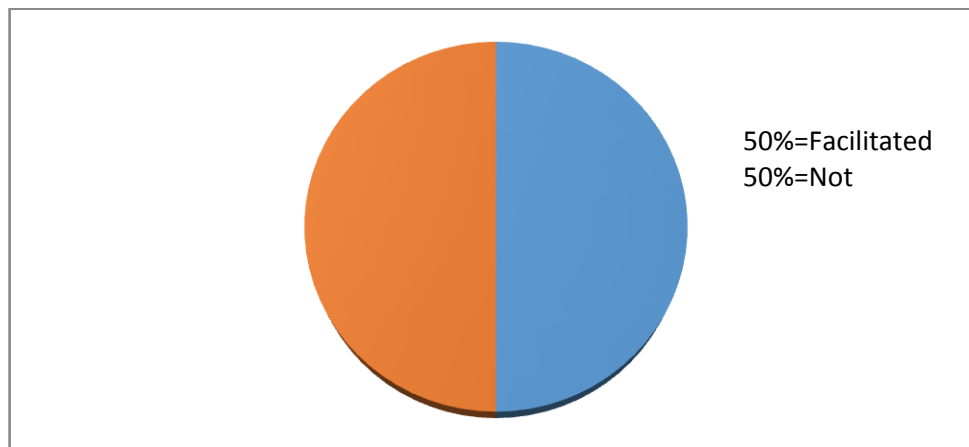
Figure-7.2.9.1: Lack of Proper Guidance & Training

7.2.10 Lack of Government Supervision

The participation of indigenous communities, farmers and traders was often neglected. This leads to ineffective planning and a lack of interest and commitment of the supposed beneficiaries towards using and maintaining the facilities. Care should not be taken for them. Therefore, emphases on the infrastructure over necessary institutional change were not taken that leads to situations where particularly small farmers become efficient but remain poor. The complexity and significance of the market process has often been underrated at considerable cost to

development. Small and emergent farmers tend to incur higher transaction costs than larger producers, because the quantities of inputs they need and output they sell are so much smaller. They are often less informed, less confident, and thus have less bargaining power. Government will only intervene to address market imperfection and to eliminate socially undesirable factors in the marketing of indigenous Agricultural products. The role of government was not satisfactory so that they are not getting protection and discrimination against them was happening.

CHAPTER VIII

SUMMARY, CONCLUSION AND RECOMMENDATIONS

8.1 Introduction

Farming provides a source of livelihood through traditional practices for thousands of indigenous farmers in Rangamati. This chapter provides the summary in the light of the results made in the previous sections. Conference has been given on the basis of analytical result. Policy recommendations are provided for betterment of the existing constraints of vegetable production in selected area. Summary of the major findings of the study, conclusion, policy recommendations, limitation of the study and scope for further research are given in following Sections chronologically

8.2 Summary

Agriculture is the key driver of the growth of Bangladesh economy. The economic development is inevitably linked with the performance of this sector. Vegetable growers are the most prominent contributors in agriculture and total GDP of the country, indirectly the overall growth and development of the economy. The performance of this sub sector has a significant impact in Rangamati on major macroeconomic goal like generation of employment, alleviation of poverty, human development, food and nutritional security of the indigenous community.

Agriculture provides employment to nearly about 41 percent of its total labor forces (Quarterly Labor Force Survey 2015-16). Agriculture occupies the main position in the overall economic development of the country in terms of its contribution to Gross Domestic Product (GDP). Broad agriculture sector which includes crops, livestock, fisheries and forestry contributes 14.79 percent to the gross domestic product (GDP) as a whole in the FY 2013-14 (BER, 2017).

The contribution of the vegetable farming sub-sector to GDP is 1.60 percent in FY2016-17. Share of Agricultural in GDP (2016-17) was 14.31%, Employment (Directly) 20%, Employment (Partly) 50%.

Net returns of major spices are also profitable. It can contribute a vital role to increase the farmers' income, generate employment, alleviate poverty, ensure food security, empower women and increase social development of Bangladesh. In FY 2011-12, total area under spices is 3.25 lakh hectares with the total production of about 17.55 lakh metric tons in our country (BBS, 2014). Spices cover almost 2.16 percent of total cropped area in Bangladesh (BBS, 2014).

Traditionally, indigenous farmers' vegetable is a year round production. Recent total demand for vegetable in Bangladesh is 148.65 & 71.35 Lakh Metric Ton. A huge investment opportunity is present in this sector. Large scale research is inevitable to increase the productivity of vegetables.

Considering this situation, few specific objectives of the study were taken to assess the scenario of vegetable marketing in some selected areas of Rangamati hill tracts. The objectives of the work were as follows:

i.   To identify the socio-demographic profile of the indigenous farmers in Rangamati hill tracts.
ii. To find out the existing marketing channel and supply chain.
iii. To depict the factors that affecting existing marketing system.
iv. To determine the problems and suggest some policy recommendations for the improvement of vegetable farming & marketing.

The sampling frame for the present study were selected purposively as to select the area where there were high demand for the produce by the indigenous farmers and also have high potentiality to increase the productivity and the existing supply chain. On the basis of higher production of vegetables, five villages from three union e.g., Aamchuri, Katachuri, Khandhobchora, Rangapani, Ashambosti were selected for the study.

A sample size of 50 is generally regarded as the minimum requirement for larger population that will yield a sufficient level of certainty for decision-making (Poate and Daplyn, 1993). A sample size 50 respondents of the farmers from different areas of Rangamatiwere selected in order to analyze the whole scenario of the vegetable marketing in Rangamati hill tracts.

Data for the present study were collected during the period from July 2017 to November 2018. Primary data were collected from indigenous vegetable farmers. Selected respondents were interviewed personally with the help of pre-tested semi structured questionnaires. The collected data were checked and verified for the sake of consistency and completeness. Editing and coding were done before putting the data in application software. Collected data were summarized and examined sincerely to avoid all possible errors. Data entry was done in computer through SPSS software and analysis was done using the concerned software SPSS and Microsoft Excel.

Socio-demographic condition of sample farmers in term of family size and household earning members, educational qualification professional distribution, members involved in farming, Percentage of total income from vegetable farming, Type of value addition, Source of Farm's production input, Source of Farm's production capital, and Initial investment .

In the study area, 56% of the total farmers belonged to the age group 30-39 years, 32% were in the age group of 40-49 years, 8% were in 50-59 years and 4% belonged to the age group 60-69 years. Most of the farmers were middle aged in the study area. Farmers average age were 39.2 year out of 50 sample farmers, 18 percent farmers had general education, 52 percent farmers had completed Primary level education, 26 percent farmers had completed secondary level education, and 4 percent farmers had completed their higher secondary level education. There was strong Correlation between earning members of family and educated members of family of farmers and the result was significant at 5 percent level of significance.

It was observed that most of the farmers production was done with own finance. Economic profitability is a critical criterion to make any investment decision at vegetable farming. In this study, factor analysis was used to determine the effects of key variable inputs. The most important six explanatory variables were included in the model to explain the gross income or return of vegetable farming. Most of the variables in the production function were significant in explaining the gross return except the negative and insignificant effect of lime. The coefficient with

expected sign indicates the selected inputs contributed positively to the gross return. The value of the coefficient of multiple determination of vegetable farming was 0.83 which implied that about 83 percent of the total variation in the gross return could be explained by the included explanatory variables of the model. Production function for vegetable farming exhibits increasing returns to scale (1.06). This means that, if all the variables specified in the model were increased by 1 percent, gross return would also increased by 1.06 percent. . The F-value for the vegetable farming was 79.926 which were highly significant at 1 percent level. MulticoLlinearity test indicated that there were no severe correlations among the explanatory variables. Resource use efficiency indicated that all of the resources were under used for vegetable production except overutilization of lime. So there was a positive effect of key factors in the production process of year round vegetable farming by the indigenous farmers.

This study also identified some of the problems and constraints associated with the vegetable farming of the indigenous farmers. The findings revealed that high price of input, lack of sufficient fund, lack of marketing facilities, low price of output, lack of scientific knowledge and technology, lack of transportation facility, insufficient storage facility, attack of diseases, lack of extension services by the government & NGO's, lack of Government supervision, poor marketing channel & supply chain, lack of market infrastructure etc were the major obstacle which stand in the vegetable farming in the study area.

Indigenous farmers faced a lot of problems in vegetable production. Poor market infrastructure was one of the most important limitations of the in the study area. Electricity problem, Lack of quality input, Shortage of Quality verities, Lack of Training, Problems of transportation, Lack of storage capacity, Low price, Unstable price were the major problems faced by indigenous farmers. Public and private initiatives should be taken to reduce or minimize these problems for the sake of better production and marketing of vegetables produced by the indigenous farmers.

8.3 Conclusion

Vegetable production is one of the most important income generating activities of the indigenous farmers. The study areas have tremendous potential for vegetable production. The result of this study indicates that vegetable production is profitable and it would help to improve the socio-economic condition of small indigenous farmers in the study areas. The existing marketing channel & supply chain is not so effective. If it can be improved it has a significant impact on employment generation. In Rangamti, it is difficult to increase vegetable production due to plain land scarcity of and lack of governmental facility. But, there is an opportunity to increase the efficiency of supply chain of vegetables produced by the farmers. Farmers are relatively inefficient due to being small and marginal, lack of space, lack of training, illiteracy, political unrest etc. The present study indicated that the producers were technically inefficient.

Vegetable production in Rangamati could be a more profitable commercial enterprise through proper monitoring and intervention of Govt. which would play a dynamic role to alleviate poverty, raising income, reducing unemployment and underemployment, eradicate under nutrition and malnutrition, reducing unfavorable balance of payment situation of this area. Government should focus to improve the prevailing Marketing channel & supply chain of the indigenous farmers products for their betterment. To overcome the difficulties of the farmers and to make surplus of vegetable production and distributing more profitably, few recommendations are provided below.

8.4 Recommendations

On the basis of the result of this study farming of the indigenous farmers were considered as profitable and investment decision in this sector can provide huge income generating, employment opportunity and nutritional stability to the people of Bangladesh. There are few problems and constraints faced by the farmers to fulfill their expected objectives and maximization of profit. The policy makers should come forward with necessary measures. According to the findings of the study; few policy recommendations are advanced which will be useful for policy formulation

end execution. The following specific recommendations are given for the development of this sector.

a) As most of the indigenous farmers are not efficient with updated production technology at present, training, use of hybrid varieties for production and reduction of input cost will help them in increasing their production.

b) Subsidies for technology adaptation in vegetable production for indigenous farmers should be given for encouraging them to make further investment in this sector.

c) Focus should be given in the following issues e.g. dissemination of appropriate technologies for better pest management, stabilizing the market, stabilize price, availability of inputs with reasonable price, improved varieties supply, which will significantly increase the vegetable production and also increase the performance of marketing channel & supply chain.

d) Adequate training should be provided to the indigenous farmers, which will reduce the production cost and enhance production of vegetables.

e) Credit facilities should be enhanced from both private and government institutions on easy terms and conditions for indigenous producers.

f) Proving better transportation system for quick delivery, storage facilities, well established market infrastructure will encourage small and marginal indigenous farmers to invest in this sector. Easy loan disbursement policy and collateral free loan will also impact significantly.

g) To ensure a smooth, fair and profitable marketing channel, it is essential to integrate all activities of involved participants like farmers, local retailers, govt. NGOs etc. This will help them to improve the farmers bargaining power.

8.5 Limitations of the Study

Some limitations were faced during study as the study was conducted on the indigenous farmers who involved in production and supply chain of their products through face to face interview.

a) Most of the data were collected through interview of the indigenous farmers sometimes they were not interested to respond.

b) The information collected mostly through the recollections of the farmers which were not always accurate.

c) Resource and time constraints were most important barrier in data collection. As a result broad and in-depth study was hampered to some extent.

8.6 Avenues for Further Research

The below limitation of study indicated some new scope of research which might be undertaken in the context of Rangamati. Due to limitation of time and resources this study could not cover some important areas these are discusses

I.   The study of comparative productivity and profitability of different deshi varieties may be conducted.

II.   A similar study could be conducted covering various upazillas of the Rangamati hill tracts and a cross area comparisons could be performed to measure comparative advantage of vegetable farming

In the present study relative profitability, marketing channel & supply chain of Vegetable production were assessed. So there is an ample opportunity to conduct study on resource use efficiency and technical efficiency of vegetable farming.

CHAPTER IX

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