PROFITABILITY ANALYSIS AND IDENTIFYING EXISTING MARKETING CHANNEL OF TOMATO IN BANGLADESH: A STUDY BASED ON SOME SELECTED AREAS OF JAMALPUR DISTRICT

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CERTIFICATE

This is to certify that the thesis entitled **"PROFITABILITY ANALYSIS AND IDENTIFYING EXISTING MARKETING CHANNEL OF TOMATO IN BANGLADESH: A STUDY BASED ON SOME SELECTED AREAS OF JAMALPUR DISTRICT"** submitted to the Department of Agribusiness and Marketing, Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfilment of the requirements for the degree of **Master of Science (MS) in Agribusiness and Marketing** , embodies the result of a piece of bona fide research work carried out by **ABU SHARIF ANIS, Registration No. 12-05189** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:
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DEDICATED
TO

MY
BELOVED PARENTS,
TEACHERS
AND
FRIENDS

ABSTRACT

The study was conducted to examine the profitability analysis and identifying existing marketing channel of tomato in some selected areas of Jamalpur district in Bangladesh. Besides, attempt had given to describe the socio-economic characteristics of the tomato farmers, and to estimate the costs and returns of tomato crop on sample farms in the study area, to study the existing marketing channel of tomato and marketing margin of intermediaries and to identify the constraints in production of tomato crop and to suggest measures to overcome them. Jamalpur districts was selected purposively for the study on the basis of extensive tomato production. A total of 105 tomato cultivators were randomly selected to conducting farm level survey with pre-tested questionnaire. Data were collected during 1st November, 2018 to 31st March, 2019. After analysing the data, per hectare gross return, net return and gross margin were found to be Tk. 228076, Tk. 222452, and Tk. 216818. Tk. 135699, Tk. 124082 and Tk. 111872 and Tk. 111565, Tk. 102058 and Tk. 90367 for marginal, small and medium tomato farmers, respectively. Total cost of tomato production was calculated at Tk. 116511, Tk. 120394 and Tk. 126451 per hectare for marginal, small and medium tomato farmers, respectively. Benefit Cost Ratio (BCR) were found 1.96, 1.85 and 1.72 for marginal, small and medium tomato farmers, respectively. A sample number of 20 traders were selected, categorized as petty traders, aratdars, wholesalers, and retailers. The process of tomato market passes by various marketing channels until it reache the final consumer or export. Such dealers took care of all market aspects such as storage, transport, finance, and risk taking. The average net margin (profit) of petty traders. aratdars, wholesalers, and retailers were 156 Tk., 42 Tk., 128 Tk. and 342 Tk. per 100 kg, which indicates that among the intermediaries net marketing margin was highest in retailers and lowest in Aratdars. Thus, the producers and various intermediaries losing their attention in commercial cultivation and trading. In the study area, lack of quality seed was the most severe problem among the farmers and diseases and pest infestation was the last problems of the farmers. Although, lack of quality seed was the first problem of the sample farmers, they strongly suggested about the credit facility which was the 1st ranked suggestions of the farmers in the study area were poor and they have no fund to cultivate tomato.

ACKNOWLEDGEMENT

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ABBREVIATIONS

DAE	Department of Agricultural Extension
FAO	Food and Agricultural Organization
BBS	Bangladesh Bureau of Statistics
SD	Standard Deviation
SPSS	Statistical Package For Social Sciences
BCR	Benefit Cost Ratio
HYV	High Yielding Variety
TC	Total cost
GR	Gross returns
GM	Gross Margin
TVC	Total variable costs
GOs	Government Organizations
FC	Fixed cost
BDT	Bangladesh Taka
MP	Muriate of Potash
TSP	Triple Super Phosphate
LUC	Land Used Cost
MM	Marketing Margin
MC	Marketing Cost
NM	Net Margin

1.1 General Background of the Study

Tomato (*Solanum lycopersicon*) is the world's largest vegetable crop and known as protective food, both because of its special nutrient value and also because of its wide spread production. Tomato is one of the important vegetable crops cultivated for fleshy fruit. Tomato is also considered as "poor man's orange" in Bangladesh. Tomato is considered as important commercial and dietary vegetable crop. Tomato is used in preserved product like ketchup, sauce, chutney, soup, paste, puree etc. Tomato is rich a source of vitamins (A and C), minerals, organic acid, essential amino acid and dietary fibers. Tomato contains lycopene and beta-carotene pigment (Debjit et al., 2012).

The vegetable production in Bangladesh has touched a new height in recent years, placing it as the seven largest producer of vegetables in the world (Kumar et al., 2005; Kumar et al., 2004). The growing population and the improving economic status in the country have increased vegetables consumption, both across regions and income groups (Kumar and Mathur, 1996; Kumar, 1998). Vegetable cultivation is capital intensive and production risks are very high (Alam, 2001). About 90-98 per cent of the vegetables are sold and used afresh, except some roots and tubers (Subramanian et al. 2000; GOI, 1989) and only 1 per cent of the vegetable output is being processed commercially (Verma et al. 2002). The last nine years tomato production in Bangladesh are presented in the Figure 1.
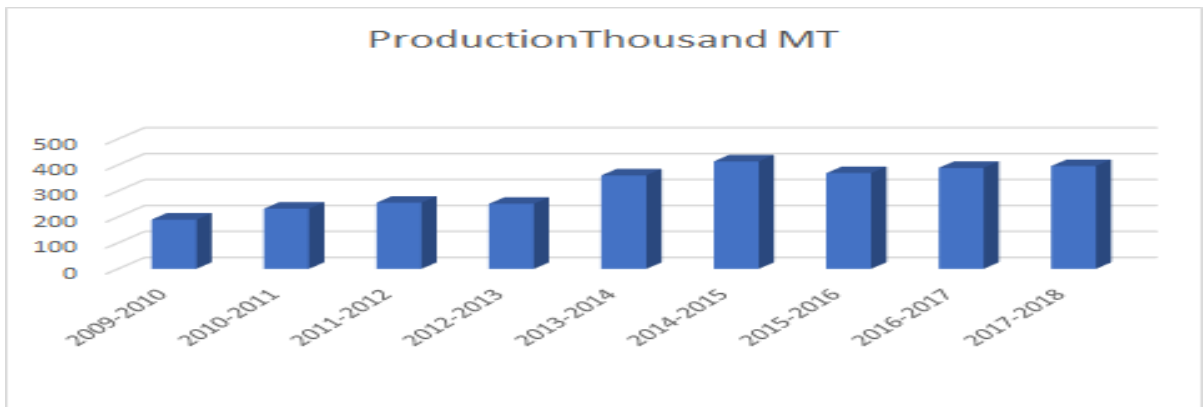
(Source: BBS, 2019)

Figure 1.1: Tomato production in Bangladesh

It is an important cash-generating crop to small-scale farmers and provides employment in the production and processing industries. Farmers are interested in tomato production more than any other vegetables for its multiple harvests potential of year round production, which results in high profit per unit area. Besides countrywide problem it helps people in their personal interest to increase input-output ratio, full utilization of farm resources, fulfill the immediate money need as being cash crop, less risk, increase in repaying capacity, increase women participation in farming due to its labour intensive nature and finally motivation for the people to adopt the vegetable crops. In Jamalpur district tomato is grown in 398 thousand hectares with the production of 4634 million tones approximately and productivity is 11.64 tons ha-[1] (BBS, 2018).

1.2 Importance of vegetable production

In modern day generation of diversification of agriculture, farmers are now moving from traditional subsistence agriculture to commercial agriculture land holdings are in standard small in our country. This makes a farmer to undertake vegetable manufacturing. Vegetables are crucial in lots of approaches, including:

• Changing food conduct of humans and so their food baskets.

• Increasing awareness of people towards balanced weight loss plan and idea of nutritional protection.

• Vegetables produce extra biomass in step with unit vicinity and fetch greater charges consistent with unit manufacturing so are greater low in cost to grow.

There are extraordinary sorts of veggies. They may be fit to be eaten as root, stem, leaf, fruit and seed. Each organization contributes to weight-reduction plan in its very own manner Fleshy roots are high in electricity value and correct assets of vitamin B. Seeds are relatively excessive in carbohydrates and proteins. Leaves, stem and end result are extremely good assets of minerals. 2 nutrients, water and roughage. A deficiency of these nutrients can result in eye infection, terrible vision, night blindness, and frequent cold, loss of appetite and skin issues. Generally, deep green, yellow and orange colored vegetables including green leafy vegetables, carrot, papaya tomato and yellow pumpkin are wealthy sources of carotene.

According to FAO, per capita consumption of vegetables in Bangladesh is very low (40 g/day/person) compared to that in Nepal (175.1g), India (190.4g) and Srilanka (91 8g). Therefore, vegetable production and consumption in the country must be increased manifold to upgrade the food supply and dietary standard.

As vegetables are generally short duration crops, these are suitable for mixed, companion and intercropping. Nevertheless, there is a bright scope of earning foreign exchange by strengthening the export of fresh and processed vegetables

1.3 Statement of problem.

Vegetables occupy hardly 2.64 percent of the total cropped area of the country which is very low in view of the national need. Hence, it is necessary to increase the production and productivity of vegetables to meet the demand of growing population to ensure better nutrition by adopting improved technology. An increase of 2.5 % per year in vegetable production is also necessary. Present production of 1.5 million tons of vegetable supply only 145 g per capita per day against recommended requirements of 300 g (BBS, 2018). Agricultural development can be constrained by many factors. Key constraints include high transaction costs, market imperfection, lack of technology, lack of access to credit, perishability of the products and the prevalence of staple foods that are only slightly traded (World Bank, 2008). These constraints may result in either exclusion of smallholders from market or unequal distribution of benefits. This high loss is due to packaging, storage facilities and poor means of transportation such as human labor, donkeys and mules, public transport and rented trucks (Kebede, 1991; Samira et al. 2011). Massaoud and Srinivass (2012) revealed that there is the tendency to increase producer's share in the consumer's price if the number of intermediaries is reduced and the government intervenes in order to organize and structure the marketing cooperative unions so that the farmer can use these unions as profitable channels to sell their produce. In view of the agro-climate condition and increasing popularity of tomato cultivation in Jamalpur District, it is felt necessary to study profitability analysis and existing marketing channel of tomato in Bangladesh: A study based on some selected areas of Jamalpur District.

1.4 Significance of the study

The study will help provide scientific information on the necessary social and psychological factors that would influence the cultivation and any large scale tomato production in the study area as well as in Jamalpur. Bangladeshi's age-old farming practices have taken a turn in recent years. There has been a technological breakthrough because of the evolution of high yielding variety seeds, increasing use of fertilizer, insecticides, pesticides, the installation of pumping sets, and tractorization. To maintain this tempo and pace of increased production through technological development, an assurance of remunerative prices to the farmers is a prerequisite and this assurance can be given the farmer by developing an efficient marketing system. Thus the present study sought to provides answer to the following questions.

➢ What is per unit cost incurred and returns obtained from tomato production?
➢ What is the technological breakthrough has led to a substantial increase in production on the farms and to the larger market?
➢ What are the possibilities of the resource for profit maximization?

1.5 Limitations of the study

A. The coverage of study area was limited. This is due to the fact that coverage of large area is beyond the capacity of investigator.

B. The primary data collected for the study were entirely based on memory of the respondents because cultivators do not keep any record regarding their farm practices and marketing.

C. The illiteracy of the farmers was also a problem for gathering the data. Some of the farmers did not co-operate in giving data because of some misunderstanding regarding agricultural taxes, ceiling etc.

D. They were biased in giving data towards higher side of the investment and lower side towards productivity. However, sufficient care was taken to collect the data by cross checking with the educated neighboring farmers and other village leaders and Gram Panchayat etc.

E. The findings from this observe might be useful for all stakeholders concerned in tomato enterprise and in formulation of policies related to tomato manufacturing and advertising for the examine regions and other similar areas.

1.6 Objectives of the study

Looking to the above facts, it is essential to conduct a study, which could say something about variation and growth rate in area, production and marketing of tomato in the Jamalpur District of Bangladesh. The present study is therefore, under taken in view of the following specific objectives:

1. To describe the socio-economic characteristics of the tomato farmers;
1. To estimate the costs and returns of tomato crop on sample farms;
3. To study the existing marketing channel of tomato and marketing margin of intermediaries; and
4. To identify the constraints in production of tomato crop and to suggest measures to overcome them.

CHAPTER II
REVIEW OF LITERATURE

2.1 Introduction

The purpose of this chapter is to review of literature having relevance to the present study. The researcher made an elaborate search of available literature for the above purpose. But it is rare to find a study dealing with the profitability of tomato cultivation. The researcher attempted to search the literatures and found few studies on the use of tomato cultivation. Therefore, the finding of such studies has been cited in this chapter.

2.2 Review of literature related to the profitability and marketing of tomato

Gunwant et al. (2015) resulted that the was conducted in the nainital and U.S nagar districts of uttarakhand .On an average the cost of cultivation per hectare of tomato was found Rs. 89005.00 and 74604.00 respectively.

Kumar et al. (2015) examines the marketing efficiency has been worked out total marketing cost and marketing margin involved in channel-I was Rs.100, Rs.466.42 in channel-II, Rs.731.19 in channel-III and Rs.154 in channel-IV. Since the marketing cost and marketing margin in channel-III was higher, the marketing efficiency was very low for channel-III. For channel-I, because of saving of marketing cost due to absence of market intermediaries and relatively low consumer's price, the marketing efficiency was higher. It was highest for channel-I i.e. 16.30% and lowest in channel-III i.e. 2.735%. Thus channel-I is more efficient than all other channel of marketing of vegetables.

Noonari et al. (2015) examined the costs and returns indicate that farmers incurred an average per hectare fixed costs. Rs 33187.00 include Rs 700.00 for land tax, Rs 32487.00 for rent of land. The results revealed that tomato farmers incurred an average per hectare cost of Rs 19780.75 as labor cost. An average per acre marketing cost of 30457.65 on tomato capital input used, and an average per acre marketing cost was Rs. 4191.73 On an average per acre spent a total cost of production of Rs. 87617.13. An average per acre Physical productivity was 186.00 in mounds. An average per acre Revenue productivity

was Rs.158750.00 and the Net income was 71133.00 an availed input output ratio 1:1.81 it means that with the investment of Rs.1.00 in tomato enterprises they yielded Rs.1.81. The cost benefit ratio of the cultivation of tomato at 1:0.81 it means that the tomato growers fetched Rs.0.81 on each rupee investment of tomato.

Meena and Singh (2014) studies were conducted in jaipur and kota which were selected on the basis of highest area and production of tomato. There was no difference in marketable and marketed surplus of tomatoes to total marketing cost accounted for 18.20 per cent and marketing margin accounted for 31.80 per cent of consumer's rupee. In kota, producer's share in consumer's rupee was 52.73 per cent. Total marketing cost accounted for 18.21 per cent and marketing margin were 29.06 per cent of consumer's rupee.

Meena et al. (2014) conduct was undertaken in two districts of Rajasthan, viz., Jaipur and Kota districts. In this study it was found that 13543 quintal of tomato was produced by the sample households, in which 13425 quintal was the marketed surplus. Due to perishable nature of vegetable, the farmers did not stock tomato for sale in lean months. Therefore, there was no difference in marketable and marketed surplus of tomato. Two marketing channels were found in marketing of tomato. In channel–I and channel –II, producer's share in consumer's rupee was 50.0 per cent and 47.27 per cent, respectively in Jaipur Market and 52.73 and 43.33 per cent, respectively in Kota Market. Marketing efficiency was 1.12 for channel-I and 1.07 for channel –II in Kota market. In case of Jaipur market marketing efficiency was 1.00 for channel-I and 0.76 for channel -II. Channel I was found more efficient than channel II in all the markets of both districts in Rajasthan.

Muthyalu (2014) studied to analyze the major problems and prospects of tomato marketing. The major challenges in tomato production are tomato weed, tomato frost and transportation related problems. The problems in tomato marketing are low price, lack of storage facilities, and lack of market centers. Opportunities for expansion of tomato marketing are market stability, infrastructure facility, market demand, improved yield, better price, storage facilities and processing facilities.

Odemero and Ngozi (2014) Surveyed tomato marketers were purposively selected from two major tomato markets (Ogbegonogo and Igbodo markets) in Delta state, Nigeria. Primary data were collected from the respondents with the use of observation and interview schedule. The Shephered-Futrel coefficient of marketing efficiency of 78.15% suggests that the level of marketing efficiency of tomatoes in the study area is low (21.8%).

Swaminathan et al. (2014) studies were addressed farm profitability and value chain management aspects of tomato growers in the Salem, Dindigul and Krishnagiri districts of Tamil Nadu. A sample size of 300 respondents was used for the study. The study has revealed a skewed price spread at the farmers' end. At the same time, Shepherd's index has also been found very low (1.22), indicating market efficiency to be dismal. The total cost of tomato cultivation, on an average, was estimated to be 48,951/ ha.

Hussein et al. (2013) analysis of marketing margin of tomato in the area of the study reveals that the sampled respondents had a marketing margin estimated at (2.69 SG/kg), (2.33 SG/kg) and (1.97 SG/kg) for wholesalers and (0.77 SG/kg), (0.67 SG/kg) and (0.75 SG/kg) for retailers in Khartoum, Madani and Sinnar, respectively. The proposed factors affecting marketing margins (i.e. transportation cost, packing cost, level of education and experience etc.) explained about 30% of variation of factors affecting marketing margin of respondents. Transportation cost forms the largest component of total marketing costs in both markets in the study area.

Imtiyaz and Soni (2013) carried out in Allahabad district, Uttar Pradesh, India during November, 2011 to March,2012 to evaluate the existing marketing supply chains of fresh tomato, cabbage and cauliflower (SC1: Producer– Consumer; SC2: Producer - Retailer – Consumer; SC3: Producer-Commission agent - Retailer – Consumer and SC4: Producer - Commission agent -Wholesaler - Retailer - Consumer). The marketing supply chains had significant effect on net marketing price of producer, net profit of producer, total marketing cost, total marketing loss, total net marketing margin, marketing efficiency, producer share in consumer price and consumer purchase price of fresh tomato, cabbage and cauliflower. The gross marketing price, net marketing price and net profit of producer for fresh tomato,

cabbage and cauliflower were significantly higher in marketing supply chain SC1, followed by SC2, SC3 and SC4.

Mwaura (2013) a surveyed conducted by interviewing a sample of tomato market trader in the two market of study. Sampling of tomato market trader will be done using simple random sampling method. The data was collected and analysis will be done four stages the finding of this research will increase the level of knowledge on marketing efficiency. it will facilitate planning for improvement of agriculture produce marketing.

Sashimatsung et al. (2013) carried out on June to September 2011 to access production, market arrival, cost, price spread and efficiency of tomato in Mokokchung District. The marketable surplus was 206.69 quintals (91.23%) after retaining 19.85 quintal (8.78%) for family consumption, religious payment and gift to friends and relatives. Marketed surplus was 196.83 quintal (86.88 %). The most effective marketing channel for tomato was channel III (65.16%) followed by channel IV (20.4%), channel II (9.32%) and channel I (5.08%). The producers share in consumers' rupee was highest in channel I (94%) and the lowest was in channel IV (48.07%). Producers share is directly related to the number of market intermediaries involved in the marketing of tomato. The percentage share of gross marketing margin in consumers rupee was (6%), (27.78%), (43.78%) and (51.93%) respectively in channel I, II, III and IV. Marketing efficiency ratio was found to be highest in channel I.

Shende et al. (2013) revealed that the cost of cultivation per hectare for tomato over the cost C2 was found 76417.41 Rs/ha .the net over cost C2 was found to 65139.23 Rs/ha. For tomato. The B: C ratio over cost A2 which is known as available cost was found to 3.73 for tomato. However the B: C ratio over C2 i.e. cost of cultivation was 1.85 for Tomato. The study identified for different marketing channel for Tomato vegetable. . It shown that Channel-I i.e. Producer to Consumer was best channel for marketing for selected vegetable. The marketing efficiency was worked out with three different method viz; Conventional method, Shepherd method and Acharya method. It reveal that efficiency was decline with

increase in number of intermediaries. The different constraints were identified during production and marketing of Tomato vegetable.

Swaminathan et al. (2013) conducted on wholesale, retail and farmers' markets in Coimbatore to understand market efficiency, marketing efficiency (Shepherd's index) and price spread analysis of different vegetables. It revealed that the farmer's share in consumer's rupee was highest in wholesale market (72.23 per cent) followed by farmers' market (66.83 per cent) and retail market (60.33 per cent).The Shepherd's index was more tilted in the favour of farmer's market (3.33) and it was 3.03 and 2.07 in wholesale and retail markets respectively.

Haruna (2012) studies carried out to analyze economics of fresh tomato marketers in Bauchi metropolis of Bauchi State, Nigeria. The costs and returns analysis revealed variable cost (99.99%) and fixed cost (0.01% of the total cost of tomato marketing with acquisition cost (87.46%) and cost of empty baskets (4.37%) constituting the highest. The findings of returns per naira invested of 1.20k disclosed that the enterprise is profitable. The cost of marketing was N68, 670.00, total revenue was N80, 000.00 and the net income of N11, 33000 was realized, indicating highly profitable.

Haruna and Ustarz (2012) analysed the efficiency of marketing system of tomatoes in Pwalugu in the Upper East Region of Ghana. Deconstructed Marketing Margins, Gini Coefficient, Returns on Capital Employed and the marketing efficiency criterion were used in assessing the efficiency of the marketing system of tomatoes. An average profit margin of Gh 21,888.68, Gh 110,060.70 and Gh1, 169.03 for farmers, wholesalers and retailers per year respectively was realized. Also, farmer's real wholesalers and 66.0% for retailers.

 Toppo et al. (2012) conducted in the Jashpur districts of Chhattisgarh. On an average the cost of cultivation per hectare of tomato was found Rs. 26576.89. Overall on an average the cost of production per quintal of tomato was observed as Rs. 222.84. Cost of production per quintal of these vegetables shows decreasing trend with increase in farm size whereas cost of cultivation increases with increase in the farm size. Overall on an average the input-

output ratio and Benefit-Cost ratio of tomato came to 1:3.70 and 1:2.70, respectively on the sample farms. The cost and return on average cost-A, cost-B, and cost-C were 16026.99, 18526.99 and 29254.64 Rs/ha. More than ninety five per cent marketable surpluses were observed in the tomato crops in different size groups of farmers. Average marketable surplus in tomato was 117.06 Qtl/ha.

Akter and Islam (2011) analyzed economics of winter vegetables production in some selected areas of Narsingdi district, Bangladesh. The collected data was tabular and quantitative analyses were done to achieve the major objectives of the study. The major findings of the study revealed that production of all the selected vegetables were profitable. The per hectare gross cost of production of tomato, cauliflower and cabbage were Tk. 118000, 116977 and 120522, respectively and the corresponding gross returns were Tk. 217020, 210000 and 220000, respectively. The per hectare net returns of producing tomato, cauliflower and cabbage were Tk. 97000, 93023 and 99478, respectively. The study reported some problems and constraints which are related to production and marketing of these vegetables.

Bhardwaj et al. (2011) emphasized value chain of Tomato and Dehradun and Nainital districts has been taken for getting the sample of various stake holders. Study highlighted that farmer's share in a consumer rupee is only 50 paisa. Plenty number of middle man like Adatiya / commission agents/ local collectors are pocketing from both sides. Study suggested that small cold storage should be established nearby mandi. Study also suggested that Government should announce minimum support price for tomato.

Sangeetha and Banumathy (2011) conducted an economic analysis of marketing of major vegetables in Cuddalore district. The first hypothesis of the study was there exist a direct relationship between total marketing cost and the number of middlemen involved in the identified marketing channel. It was clear from the results that the total marketing cost of Tomato and Brinjal was observed as the highest in the marketing channel I.

Baba et al. (2010) reported the growth of vegetable sector in relation with technology mission, extent and determinants of marketed surplus and price spread of vegetables in the Kashmir valley. Marketing efficiency was higher in Channels-I and -II with respect to daily local market, indicating the efficient functioning of these types of markets. The Channel-I turned out to be highly efficient, followed by Channel-II and Channel-IV. In Channel-III, returns were lower to the producer and it was found less efficient for marketing of all the selected vegetables.

Chaudhary (2010) studied the analysis of Tomato Marketing System in Lalitpur District, Nepal. This study was carried out to analyze the marketing system of tomato in Lalitpur district of Nepal during the year 2010. Specifically, this study was intended to identify marketing channels, to estimate gross margin, marketing margin 20 and producer share, to find out the situation of market information and to identify constraints related to production and marketing of vegetables, especially tomato. The channel of producer wholesaler-retailer- consumer was most common where about 50 percent tomato passed to consumer through this channel. The marketing margin was estimated to be Rs. 20 per kg and producer share in the study area was 67 percent, which was highest among chain factors.

Pramanik et al. (2010) analyzes the marketable surplus and marketing efficiency of vegetables (tomato, potato and cauliflower) in Indore District, Madhya Pradesh. The outcomes of the study reveal that marketable surplus of tomato, potato and cauliflower is observed to be 90%, 89% and 95.5%, respectively. Further, three types of marketing channels in the process of marketing vegetables are undertaken to estimate the marketing performance. It can be concluded that marketing efficiency is affected by market intermediaries and perishable nature of the commodities. In the case of Tomato, marketing efficiency is highest in case of Channel 1.

Bala et al. (2009) examines the cost of tomato cultivation amounted to be 54,800/ha. It was higher for large (60,700/ha) than small (53,200/ha) farms due to more expenditure on plant protection measures by the large farmers. Thus, the net returns per quintal were higher (1348) on small than large (1308) farms.

Karim et al. (2009) conducted a study at Bagherpara thana under Jessore district to assess the profitability, contribution of factors to production and changes in socio-economic status of the farmers. About 42% and 21% of total variable cost was incurred for tunnel preparation and using human labour, respectively. The average yield of BARI hybrid tomato was found 32.78 t/ha. The average return per hectare over variable cost is observed to be Tk 11, 44,387 on full cost basis and Tk 12, 07,481 on cash cost basis. On an average benefit cost ratio was found to be 4.19 on full cost basis and 5 09 on cash cost basis. The cost per kilogram of hybrid tomato cultivation was Tk 10.94 and return from one kilogram of tomato production was Tk 45.83. The functional analysis shows that MP and TSP had positive significant contribution to yield while human labor, hormone, irrigation and seed had negative significant impact on yield of hybrid tomato. The overall socio-economic status of the sample farmers was found increased by 20.33 percent High price of tunnel materials, timely non availability of hormone, insect and diseases attack were reportedly the major problems for tomato production.

Mishra (2009) studies horticulture as a livelihood activity for rural people and value chain analysis of tomato in Rajnandgaon district of Chhattisgarh. The study defined horticulture as a value chain was the range of service required to bring a product from conception to the final consumer .a theoretical basis of value chain analysis, as the value added at each step of the chain, was explain along with problem analysis of tomato production .despite the difficulties of obtaining data, the study demonstrates some common trend space in the tomato cultivation in Rajnandgaon district.

Mohammad (2009) conducted study on structure and efficiency analysis of vegetable production and marketing in Sindh, Pakistan. The study made a valuable addition to the knowledge required for efficient production and marketing of onion, tomato and chilies in Sindh. The results revealed that there was high degree of competition among wholesalers and retailers, which suggested that their market margins were not excessive except wholesalers where indications of collusive oligopoly could be said as the profit margins and returns to investment of wholesalers were significantly higher when compared with other actors.

Ramya (2009) analyzed the production and marketing of major vegetables in Bilaspur District of Chhattisgarh, The main objectives of study were to examine the marketing pattern, and find out the constraints in production and marketing of vegetable and suggest suitable measures. It was concluded that the cost of cultivation of Tomato, Brinjal and Okra was calculated Rs 29782.82, Rs 26252.01 and Rs 29788.78 respectively and its input output ratio was 1:2.76, 1:2.83 and 1:2.36 on the sample farms.

Weldeslassie (2007) identified eleven lines of marketing channels of tomato were in a market oriented policy and programs linking with production in order to enhance production and marketing efficiency in the study area, in particular.

Suryavanshi et al. (2006) conducted a study to identify marketing channels, to estimate marketing cost, marketing margin and price elasticity. The study revealed that 80% of the tomato was sold through channel (producer-commission agent cum wholesaler-retailer-consumer). The cost of marketing incurred was the highest (Rs. 187.45) in channel-I, where as it was the lowest (Rs. 55.40) in channel (producer-consumer). And retailers enjoyed higher net proportion of margin as compared to commission agent cum wholesaler. Marketing efficiency was observed to be the highest (9.70%) in channel (producer-consumer) for achieving maximum profit and to reduce intermediary charges in trade, when the produce is in small quantity and if the produce is in large quantity channel-II should be selected to safeguard the interest of tomato growers.

Zaman (2006) reported that return of summer tomato cultivation by using the data collected from experimental plot in Regional Agricultural Research Station, Jamalpur. Anupama performed with a per hectare yield of 28240 kg. To cultivate summer tomato in one hectare of land, total variable cost incurred BDT 292936 and total cost of production was BDT 297936.Gross margin was BDT 695464, net return or profit was BDT 690464 and benefit cost ratio (BCR) was 3.32. It can be concluded that cultivation of summer tomato is profitable for jamalpur region.

Lokesh et al. (2005) analyses the comparative economics of short- vs. long-duration tomato cultivar production; identifies the marketing channels and the price mechanism for tomatoes; and determines the feasibility of tomato processing in Karnataka, India. The analysis is based mostly on primary data collected from 60 farmers, 15 dealers, 10 traders, and 10 processing units.

Singh (2005) using data collected for the agricultural year 1997-98, this study analyses the production and marketing of selected vegetables (tomato, onion, arvi, okra, brinjal and potato) in Madhya Pradesh, India. Examined in detail are the following: production costs and returns; marketable and marketed surplus; marketing costs, channels, margins and efficiency; and production and marketing problems.

Haque (2004) conducted a study on comparative technical efficiency and profitability of potato, tomato and cauliflower production in a selected area of Netrokona district. The study revealed that per hectare total cost for potato was height and followed by cauliflower and tomato. Per hectare gross return of potato, tomato and cauliflower were Tk 68915, Tk. 91495 and Tk. 60061, respectively. Per hectare gross margin of potato, tomato and cauliflower were 44951, Tk. 747466 and Tk 42198, respectively. The return from tomato was the maximum due to lower production cost. On the contrary, benefit cost ratio was the lowest for potato and cauliflower due to higher production cost.

Wadhwani and Bhogal (2004) studied: (1) to estimate the marketed surplus of principal vegetables and identify the determinants; and (2) to examine the present status of postharvest management of important vegetables grown in western Uttar Pradesh, India, during the cropping season 1996-97. Results of the statistical analysis revealed that the marketed surplus was more than 95% in vegetables like bottle gourd, pumpkin, aubergines, tomato, cauliflowers, cabbage, carrot and radish. Lower marketed surplus in case of potato, okra and pumpkin is justifiable as on-farm consumption of these vegetables is expected to be more than other vegetables. It was found increasing with farm size in most of the vegetables.

Jain and Tegar (2003) examines the costs and returns of tomato production on various sizes of farms as well as the channels, margins and efficiency of tomato marketing in Jaspur district, Chhattisgarh, India. Data were obtained from a sample of 90 farmers and from market intermediaries. Total production costs and returns were highest on large farms (Rs.17937.58/ha and Rs. 52192.14/ha, respectively). The farmer's share in consumer's rupee was 80% in the producer-retailer channel and 92 per cent in the producer-consumer channel. The latter channel is also more efficient than the former.

Dileep et al. (2002) find out the economics of tomato contract farming in Ellenabad block, Sirsa district, Haryana, India, is examined. Data were obtained from interviews with contract (n=50) and non-contract farmers (n=50) as well as with officials of two tomato processing firms in the study area in 1999-2000. The following aspects are analysed: cost, returns, and resource use efficiency of contract vis-a-vis non-contract tomato farming; the effect of contract farming on price, production, and income of the farmers; the yield and price uncertainty involved in tomato production, the marketing costs, and the losses incurred by the farmers; and the problems faced by the contract farmers and the processing firms. Keeping in mind the interests of the producers as well as the processing firms at the same time, measures are suggested to improve the overall production and marketing activities of the tomato industry.

Alam et al. (2001) studied through structured interviews with 70 farmers in 3 villages of Norsingdi district, Bangladesh, during October 1997 April 1998 to: investigate the cropping pattern and cropping intensity of the selected vegetable growers; determine and compare the relative profitability of selected winter vegetables; and identify the major problems associated with production and marketing and suggest some policy recommendations. The selected winter vegetables constitute about 15% of the total gross cropped area; the average cropping intensity of land is 195.52%. Production of selected vegetables (cauliflower, cabbage, tomato, radish, bean, and bottle gourd) was profitable although the growers faced a lot of production and marketing problems.

Baruah and Barman (2000) in his studies involves the marketing cost, marketing margin, marketing efficiency, benefit-cost ratio and price spread involved in the production and marketing of tomatoes in Barpeta district, Assam, India, were estimated based on data for the period 1997-98 collected from 5 primary wholesalers, 7 secondary wholesalers, and 10 retailers. Net returns over costs showed direct relationship with farm size. Producers' return was found to be highest when the farmers sold their produce through secondary than through primary wholesalers.

Rangi and Sidhu (2000) studied data for the 1998-99 crop year were obtained from 50 contract farmers all over Punjab, India in order to examine contract farming of tomato in the state. The following are discussed: the status of tomato production in Punjab; the fixing of contract price; tomato procurement and processing by the Zahura and Nijjer plants; the profile of tomato contract farmers; the size of the operational holdings of contract farmers; area planted under tomato through contract farming; yield of tomato under contract farming; gross returns from tomato vis-a-vis other crops; and the problems of the farmers in contract farming.

Chahal et al. (1997) revealed that tomato is one of the most popular vegetable grown in India. Increased production of tomatoes has led to numerous marketing inadequacies relating to grading, packing, handling, transportation, and sale of marketable surplus. The seasonality, bulkiness and perishability of the product creates difficulties for marketing, which is controlled by the private sector. There are significant differences between the price received by the producer and that paid by the consumer. The market structure of tomatoes is examined over time and space, and variations in price spreads, marketing costs and margins over time and space are analyzed for Punjab tomatoes.

Singh (1997) in his study revealed that Fifteen vegetable growers were selected randomly from each of three villages in the Patan sabzi mandi of Patan, Madhya Pradesh, during 1995-96 (kharif season). The growers all produced tomato, brinjal and okra. The various components arising from market forces were analyzed. The costs and returns in vegetable

production were estimated along with marketing efficiency. The problems faced by the vegetable growers are analyzed and suitable remedial measures are suggested.

Venkataramana and Gowda (1996) compute the costs and returns of tomato production, estimates labour requirements and examines the problems encountered by farmers in producing and marketing tomatoes. A sample of 100 farmers who grew tomatoes during 1990-91 was selected from Kolar, Srinivaspur and Chintamani taluks of Kolar district, Karnataka state, India. The total cost of production was Rs 36611.51, of which variable costs were Rs 15648.26, fixed costs Rs 2556.48 and marketing costs Rs 18406.77. Though the net return obtained is high compared to many other crops, the high costs of production, perishable nature of the produce, risk associated with large fluctuations in tomato prices, and shortage of labour during peak periods discourage farmers from increasing tomato production.

Patel (1995) examines the market structure and efficiency of tomato marketing and identifies problems that producers face, particularly in relation to input supply. A sample of 50 tomato growers in Padra taluka, Vadodara district, Gujarat, India, was selected. Net income per ha after deducting production and marketing costs was Rs 33,654 during 1991-92. The most important item of expenditure was labour, followed by irrigation, chemical fertilizers, pesticides and seeds. No cold storage facilities were available to growers.

Sharma et al. (1995) studied: (1) calculates the post-harvest losses during storage, transportation and marketing of major vegetable crops; (2) quantifies the factors affecting marketed surplus; and (3) investigates the problems cultivators face in storing, transporting and marketing vegetables. A sample of 60 farmers from Solan and Kandaghat blocks of Solan district, Himachal Pradesh, India, was selected. The study shows that the highest percentage of losses occurred during assembly and transportation for tomato and capsicum, whereas assembly and market operations caused major losses for beans and peas. Increased productions with minimum losses are important factors for increasing marketed surplus. Costly wooden boxes, time consuming manual grading, distant markets, high

transportation charges, malpractices in the market and lack of market information were the major problems faced by growers.

Patil and Mahajan (1993) findings from India reveal that on average, farmers receive only 40 per cent of the price paid for food products by the consumers and that middlemen enjoy a disproportionate margin of profit. This paper verifies the above hypothesis with other objectives of: identifying marketing channels for tomatoes; estimating marketing costs, marketing margins and the price spread in tomato marketing and assessing marketing efficiency. The study was undertaken in the Thane district of Maharashtra, near Bombay. One hundred vegetable growers from the sub-districts of Basai Palghar and Dahanu were selected. The costs and margins for each channel were worked out and the producers' shares in the rupee were found to be different for different channels.

CHAPTER III
METHODOLOGY

3.1 Introduction

The credibility of a scientific research depends to a great extent on the appropriate methodology used in the research. Using improper methodology very often leads to an erroneous result. A researcher has to give a careful consideration in following a scientific and logical methodology for carrying out any scientific research. This study involves collection of information from individual farmers. There are various methods of collecting information from the farmers. For the present study farm survey method was adopted for collecting data. There are three main methods through which farm survey data can be gathered.

These are 1) Direct observation 2) Interviewing respondents. 3) Records kept by the respondents. Since the farmers of Bangladesh do not usually maintain records and accounts of their farm operations, the interviewing respondent's method was used to collect data from the tomato growers. This chapter discusses about the selection of the study area, period of study, sampling technique and sample size, preparation of the survey schedule and data processing and analysis.

3.2 Selection of the Study Area

Jamalpur district was selected purposively as a study area because this district is one of the leading tomato producing area of Bangladesh. Jamalpur Sadar upazila was selected randomly as the study area. A preliminary survey was conducted in some villages of Jamalpur Sadar upazila under Jamalpur district to gather primary knowledge about the tomato production, productivity. After preliminary visit four village's namely Vatipara, Tulshir char, Charpara and Nondina were selected randomly as lire study area. Most of the farmers in these villages used to produce high yielding varieties of tomato and sell their product to different middlemen.
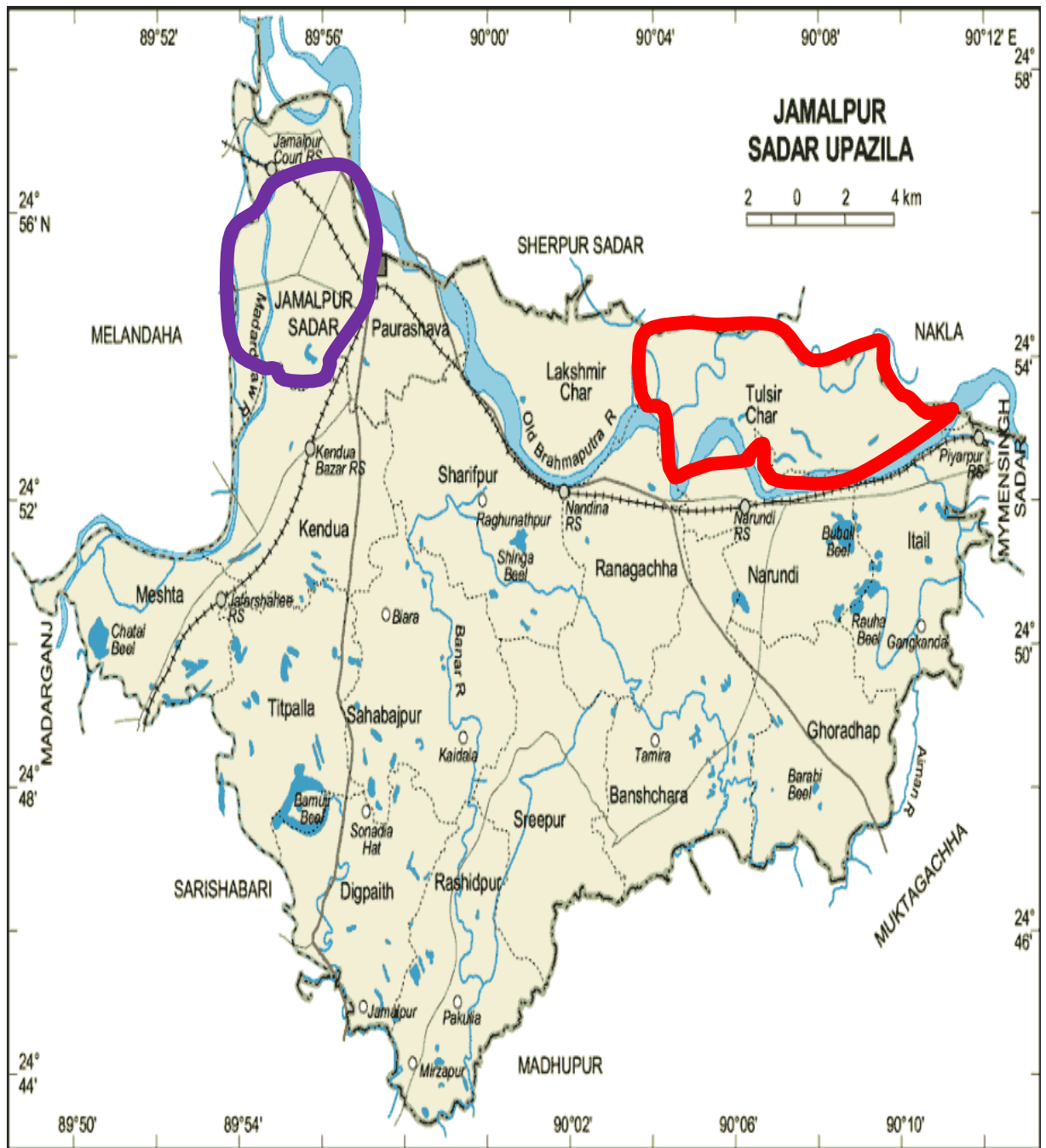
Figure 3.1 Map of Jamalpur Sadar showing the study area

The main criteria behind the selection of the upazila were as follows:

➢ The selected upazila was a good tomato producing area.

➢ The researcher is familiar with the language, living, beliefs, and other socio-economic characteristics of the villages of this upazila and

➢ Previously such type of study was not conducted in this area.

3.3 Period of the study

Data for the study were collected from 1st November, 2018 to 31th March, 2019.

3.4 Selection of the sample and sampling techniques

A simple random sampling technique was applied for selecting sample. Through simple random sampling 105 farmers were selected for the study. Among the 105 farmers, 45 were marginal, 38 were small and 22 were medium. Farm size was arbitrarily classified on the basis of their land where they produce tomato. Farmers having 0.20 hectares lands were considered as marginal farmers, 0.21 to 1 hectares as small farmers while those having 1 hectares and above lands as medium farmers. A sample number of 20 traders were selected for the study from Sakal bazar and Nondina bazar under Jamalpur Sadar of Jamalpur district, categorized as petty traders, aratdars, wholesalers, and retailers and each category consisting of 5 members

3.5 Preparation of the survey schedule

In conformity with the objectives of the study, a preliminary survey questionnaire was designed for recording data from the farmers. After pretesting, the questionnaire necessary corrections and modifications were made and then the questionnaire was finalized. The questions were arranged in logical sequences.

3.6 Methods of collecting data

The data for the present study were collected from both primary and secondary sources. Primary data were collected by the researcher himself through personal interview with the respondents. To attain accuracy and reliability of data, care and caution were taken in data collection. The researcher look all possible effort to establish a congenial relationship with

the respondents so that the respondents do not feel hesitation or hostile to furnish correct data. Before interviewing, the aims and objectives of the study were explained to each and every owner of the tomato growers, as a result they were convinced that the study was purely an academic one and was not likely to have an adverse effect on their business. During data collection an attention was also paid to the mood of the owners of the tomato growers.

3.7 Processing and analysis of data

Collected data were scrutinized and summarized for the purpose of tabulation. Data were transferred to a master sheet and compiled with a view to facilitating classified. Two techniques of analysis were used in this study, tabular and statistical. Analysis by tabular technique included socio-economic characteristics of tomato fanners, classification of size of tomato land, production practices, inputs used and returns of tomato farmers. Statistical analysis was used to show the effect of inputs used and other related factors of tomato cultivation. Enterprise costing and gross margin analysis technique was used for calculating costs and returns for tomato cultivation.

3.8 Procedure of computation of costs

The farmers producing tomato had to incur cost for different inputs used in the production process. The input items were valued at the prevailing market price and sometime at government price in the area during survey period, or at the priced at which fanners bought. Sometimes, the farmers purchased hired labor, seed, fertilizer, manure and insecticide from the market and it was easy to pricing these items. But, fanners did not pay cash for some input such as family labor, home supplied seed, cowdung etc. So it was very difficult to calculate the cost of production of these inputs. In this case opportunity cost principle was used. In calculating the production cost, the following components of cost were considered in this study area:

• Human labor
• Land preparation/Mechanical power cost
• Seed
• Cowdung

• Fertilizer

• Insecticides

• Irrigation

• Pesticides cost

• Interest on operating capital and

• Land use.

3.8.1 Cost of human labor

Human labor cost was one of the most important and largest cost items of tomato production in the study area. It is required for different farm operations like land preparation, planting, weeding, application of fertilizer and insecticide, harvesting and carrying etc. Mainly two types of human labor used in the study area; such as family labor and hired labor. Family labor includes the operator himself, the adult male and female as well as children of a farmer's family and the permanently hired labor. To determine the costs of unpaid family labor, the opportunity cost concept was used. In this study the opportunity cost of family labor was assumed to be market wage rate, i.e., the wage rate that the fanners actually paid to the hired labor. The labor that was appointed permanently was considered as a family labor in this study. In computing the cost of hired labor, actual wages were paid and charged in case where the hired labors were provided with meals; the money value of such payment was added to the cash paid. The labor has been measured in a man-day unit, which usually consisted of 8 hours a day. In producing tomato human labor were used for the following operations:

- Land preparation/ploughing/laddering
- Transplanting
- Fertilizing, weeding and irrigation
- Pest control
- Harvesting, storing and marketing

3.8.2 Cost of ploughing and laddering

Human labor and mechanical power were jointly used for ploughing and laddering. Ploughing and laddering cost was the summation of hired and home supplied draft power and human labor. Hired ploughing and laddering cost were calculated by the prevailing market prices that were actually paid by the farmers. Home supplied mechanical power and human labor cost was estimated on the basis of opportunity cost principle.

3.8.3 Cost of seeds

Cost of seed was also estimated on the basis of home supplied and purchased seed. Home supplied seed were calculated at the prevailing market rate and the costs of purchased seed were calculated at the actual price.

3.8.4 Cost of cow dung

Cow dung may be used from home supplied or through purchased. The value of home supplied and purchased cow dung was calculated at the prevailing market price.

3.8.5 Cost of fertilizer

It is very important for vegetable cultivation to use the fertilizer in recommended dose. In the study area, farmers used mainly three types of chemical fertilizer i.e., Urea, TSP (Triple Super Phosphate), MP (Muriate of Potash) and Zinc sulphate for growing tomato cultivation. Fertilizer cost was calculated according to the actual price paid by the farmers.

3.8.6 Cost of insecticide

Most of the sample farmers used Dithane M-45, Thiovit 80wp and Rovral 50wp for tomato. The cost of these insecticides was calculated by the prices paid by farmers.

3.8.7 Cost of irrigation

The cost of irrigation included the rental charge of machine plus the costs of fuel. Someone rent/borrow only water from the shallow tube well (STW) owners by paying some charge.

3.8.8 Interest on operating capital

Interest cost was compute at the rate of 12% per annum. It was assumed that if farmers would take loans from a bank, they would have to pay interest at the above mentioned rate. Since all expenses were not incurred it the beginning of the production process, rather they were spent throughout the whole production period the cost of operating was, therefore, computed by using the following formula:

$$\text{Interest on operating capital} = \frac{\text{Operating Capital} * \text{Rate of interest x Time}}{2}$$

This actually represented the average operating costs over the period because all costs were not incurred at the beginning or at any fixed time. The cost was charged for a period of 12 months at the rate of Tk. 12 per annum.

3.8.10 Land use cost

The price of land was different for different plots depending upon location and topography of the soil. The cost of land used was estimated by the cash rental value of land. In calculating land use cost, average rental value of land per hectare for a particular year. In computing rental value of land of the land used cost (LUC), it was calculated according to farmer's statement.

3.9 Profitability Analysis

Cost and return analysis is the most common method of determining and comparing the profitability of different farm household. In the present study, the profitability of tomato cultivation is calculated by the following way-

3.9.1 Calculation of Gross Return

Per hectare gross return was calculated by multiplying the total amount of product and by-product by their respective per unit prices.

Gross Return= Quantity of the product * Average price of the product + Value of by-product.

3.9.2 Calculation of Gross Margin

Gross margin is defined as the difference between gross return and variable costs. Generally, farmers want maximum return over variable cost of production. The argument for using the gross margin analysis is that the farmers are interested to get returns over variable cost. Gross margin was calculated on TVC basis. Per hectare gross margin was obtained by subtracting variable costs from gross return. That is, Gross margin = Gross return – Variable cost.

3.9.3 Calculation of Net Return

Net return or profit was calculated by deducting the total production cost from the total return or gross return. That is,

Net return = Total return – Total production cost.

The following conventional profit equation was applied to examine farmer's profitability level of tomato producing farms in the study areas.

$$\pi = \Sigma\, P_m Q_m - TFC.$$

Where,

π = Net profit/Net return from tomato cultivation (Tk/ha);

P_m = per unit price of tomato (Tk/kg);

Q_m = Total quantity of the tomato cultivation (kg/ha);

TFC = Total fixed cost (Tk) and

$i = 1, 2, 3,\dots\dots\dots\dots, n$ (number of inputs).

3.9.4 Undiscounted Benefit Cost Ratio (BCR)

Average return to each taka spent on production is an important criterion for measuring profitability. Undiscounted BCR was estimated as the ratio of total return to total cost per hectare.

$$\textbf{BCR}= \frac{\text{Total Return}}{\text{Total Cost}}$$

3.10 Problems faced in collecting data

The researcher had to face following problems in the field during the collection of data.

- The farmers did not keep records of their farming activities. Therefore, the researcher had to depend upon their memory. It was difficult to get information from memory.

- Most of the farmers in the study area thought that the investigator was a government officer. So, they initially hesitated to answer the questions relating to their income and expenditure. Some were afraid of position of new taxes.

- Sometimes, the farmers were not available at their home because they remained busy with outside work. That is why sometimes more than two visits were required to get information from them.

- A totally important dilemma of the examine become that for collecting essential information the researcher had to rely totally at the memory of the traders due to the fact they did now not maintain written statistics. Therefore, tomato traders were interrogated in the limits of their reminiscence ought to recollect the best answers to the questions positioned to them.

- Most of the traders, wholesaler, aratdar and value chain actor was avoiding information about their loan and tax.

- Respondents from all classes had been regularly unable to bear in mind the exact statistics, say, earnings, growth of income, price, general production etc. Reliability of facts therefore, posed a few confuting;

CHAPTER IV

SOCIO-ECONOMIC CHARACTERISTICS OF THE FARMERS

4.1. Socioeconomic characteristics of tomato producers

This phase offers with the socio-financial traits of the pattern farmers. To get a whole and accurate situation of tomato generating farmers of a specific vicinity, it is required to understand these socio- financial characteristics. An effort has, therefore, been made in this chapter to describe briefly some of the basic socioeconomic characteristics of the sample farmers of the study area because people differ from one to another in many respects. Decision making behavior of an individual is determined by his socio economic characteristics. There are numerous interrelated and constituent attributes that characterize a person and these profoundly influence development behavior. Socio economic characteristics of the producers affect their production process and technology use. It is, however, not easy task to collect all the relevant information regarding the socio - economic characteristics of the sample farmers due to limitation of time and resources.

4.1.1 Age distribution of farmers

Age of the farmers ranged from 30 to 72 years, the average being 50.38 years. All the variables were categorized on the basis of their possible scores except age was categorized based on the classification provided by the Ministry of Youth and Sports, Government of the People's Republic of Bangladesh. The distribution of the tomato farmers according to their age is shown in Table 4.1.

Table 4.1 Distribution of the farmers according to their age

Categories	Farmers		Mean
	Number	Percent	
Young aged (30-35)	3	2.9	
Middle-aged (36-50)	64	60.9	
Old (>50)	38	36.2	50.38
Total	**105**	**100**	

Source: Field Survey, 2019

Table 4.1 showed that the highest proportion 60.9 percent of the farmers fell in the "middle aged" category, while 2.9 percent of them fell in the "young aged" category and 36.2 percent in the "old aged" category. The findings indicate that a large proportion (97.1) of the farmers were middle to old aged.

4.1.2 Education distribution of farmers

The education scores of the farmers ranged from 0 to 12. The average was 5.06. On the basis of their educational scores, the tomato growers were classified into four categories, namely "illiterate (0-0.5), primary (1-5), secondary (6-10) and above secondary (above 10). This distribution was supported by Hoque (2016) and Masud, (2007) and shown in the Table 4.2.

Table 4.2 Distribution of the farmers according to their education

Categories	Farmers		Mean
	Number	Percent	
Illiterate (0-0.5)	31	29.5	
Primary level (1-5)	9	8.6	
Secondary level (6-10)	47	44.8	5.76
Above secondary level (>10)	18	17.1	
Total	**105**	**100**	

Source: Field Survey, 2019

Similar result was observed by Nasreen *et al*. (2013) where highest numbers of respondents were completed up to secondary education level. Table 4.2 indicated that the majority (44.8 percent) of the farmers had secondary level of education compared to 29.5 percent of them having illiterate. About 8.6 percent of the farmers were primary level education, while 17.1 percent had above secondary level of education. About 29.5% of the respondents were illiterate which is consistent with national average.

4.1.3 Family size

To describe the family size of the respondents, the category has been followed as represented by

Poddar (2015). Family size scores of the farmers ranged from 3 to 9 with an average of 5.33. According to family size, the respondents were classified into three categories as shown in Table 4.3.

Table 4.3 Distribution of the farmers according to their family size

Categories	Farmers		Mean
	Number	Percent	
Small family (3-4)	27	25.7	
Medium family (5-6)	61	58.1	
Large family (above 6)	17	16.2	5.33
Total	**105**	**100**	

Source: Field Survey, 2019

Data contained in Table 4.3 indicates that (58.1%) of the farmers had medium family while 16.2 percent of them had large family and 25.7 percent of them had small family. Thus, about two third (83.8%) of the farmers had medium to large family.

4.1.4 Farm size

The farm size of the respondents varied from 0.28 to 2.75 hectares. The average farm size was 1.04 hectare. The respondents were classified into three categories based on their farm size as followed by DAE (DAE, 1995): "small farm" (0.21 – 1.0 ha) and "medium farm" (1.0 -3.0). The distribution of the farmers according to their farm size is shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their farm size

Categories	Farmers		Mean
	Number	Percent	
Small farm (0.21-1.0 ha)	63	60.0	
Medium farm (1.01-3.0 ha)	42	40.0	1.09
Total	**105**	**100**	

Source: Field Survey, 2019

Table 4.4 indicated that more than half (60.0 percent) of the farmers possessed small farms and 40 percent of them having medium farms. Majority of the farmers were under small farmer's category which is consistent with national scenario.

4.1.5 Annual family income

Annual income score of the respondents ranged from 70 to 520 (in thousands) with an average of 311.94. On the basis of the observed scores, the respondents were classified into three categories as shown in Table 4.5.

Table 4.5 Distribution of the farmers according to their annual income

Categories	Farmers		Mean
	Number	Percent	
Low income (70-195)	17	16.2	
Medium income (196-427)	75	71.4	
High income (above 427)	13	12.4	311.94
Total	105	100	

Source: Field Survey, 2019

Data presented in Table 4.5 indicate that the highest proportion (71.4 percent) of the respondent to medium annual income, while (16.2 percent) had low annual income and (12.4 percent) had high annual income. As a result, the most (87.6 percent) of the respondents in the study area were low to medium annual income earners.

4.1.6 Income from tomato cultivation

Income from tomato cultivation score of the respondents ranged from 20 to 350 (in thousands) with an average of 85.75. On the basis of the observed scores, the respondents were classified into three categories as shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their income from tomato cultivation

Categories	Farmers		Mean
	Number	**Percent**	
Low income (20-116)	82	78.1	
Medium income (117-232)	16	15.2	
High income (above 232)	7	6.7	85.75
Total	**105**	**100**	

Source: Field Survey, 2019

Data presented in Table 4.6 indicate that the highest proportion (78.1 percent) of the respondent to low income from tomato cultivation, while (15.2 percent) had medium income and (6.7 percent) had high income.

4.1.7 Organizational participation

The observed organizational participation score of the respondents ranged from 0 to 24. The mean score was 11.12. On the basis of organizational participation scores, the respondents were classified into three categories namely, low organizational participation, medium organizational participation and high organizational participation, as shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their organizational participation

Categories (Scores)	Farmers		Mean
	Number	**Percent**	
No participation (0)	29	27.6	
Low (5-8)	5	4.8	
Medium (9-16)	44	40.9	11.12
High (above 16)	27	26.7	
Total	**105**	**100**	

Source: Field Survey, 2019

Data contained in the Table 4.7 revealed that the majority (40.9%) of the farmers had medium organizational participation as compared to (4.8%) and (26.7%) having low and high organizational participation respectively. About 27.6% of the farmers had no organizational participation.

4.1.8 Extension Media contact

Extension media contact scores of the farmers ranged from 12 to 18 with an average of 14.56. On the basis of their media contact, the respondents were classified into three categories namely, low contact, medium contact and high contact. The scale used for computing the media contact score of a respondent is given Table 4.8.

Table 4.8 Distribution of the farmers according to their media contact

Categories (Scores)	Farmers		Mean
	Number	**Percent**	
Low (12-13)	23	21.9	
Medium (14-15)	46	43.8	
High (above 15)	36	34.3	14.56
Total	**105**	**100**	

Source: Field Survey, 2019

Data contained in the Table 4.8 indicated that the highest proportion (43.8%) of the respondents had medium extension media contact as compared to (21.9%) and (34.3%) having low and high extension media contact respectively.

4.1.9 Experience on tomato marketing

Experience on tomato marketing ranged from 10 to 50. The average was 25.77. On the basis of their knowledge, the farmers were classified into the following three categories "low experience" (10-17), "medium experience" (18-33) and "high experience" (above 33). Table 4.9 contains the distribution of the farmers according to their experience.

Table 4.9 Distribution of farmers according to their Experience on tomato marketing

Categories (Years)	Farmers		Mean
	Number	Percent	
Low (10-17)	16	15.2	
Medium (18-33)	67	63.8	25.77
High (>33)	22	21.0	
Total	**105**	**100**	

Source: Field Survey, 2019

Table 4.9 showed that the majority of the 63.8 percent of the farmers had "medium experience" compared to more different than 21.0 percent of them having "high experience. The proportion of "low experience" was 15.2 percent.

4.1.10 Land under tomato cultivation

Land under tomato cultivation score of the respondents ranged from 0.19 to 2.15 ha. The mean score was 0.71. On the basis of tomato cultivation land, the respondents were classified into three categories namely, low, medium and high attitude, as shown in Table 4.10.

Table 4.10 Distribution of the farmers according to their land under tomato cultivation

Categories (Scores)	Farmers		Mean
	Number	**Percent**	
Marginal land (0.19-0.20 ha)	45	42.8	
Small land (0.21-1 ha)	38	36.2	0.71
Medium (above 1 ha)	22	21.0	
Total	**105**	**100**	

Source: Field Survey, 2019

Data contained in the Table 4.10 revealed that the majority (42.8%) of the farmers had marginal land under tomato cultivation as compared to (36.2%) and (21.0%) having small and medium land under tomato cultivation respectively.

CHAPTER V
PROFITABILITY ANALYSIS AND EXISTING MARKETING CHANNEL OF TOMATO CULTIVATION

5.1.1 Cost of tomato cultivation

Cost analysis was done through human labor cost, land preparation cost, seed cost, fertilizer cost, manure cost, irrigation cost and pesticides cost.

5. 1.2 Human labor cost

Human labor cost was one of the most important cost items of tomato production in the study area. It is required for different farm operations like land preparation, planting, weeding, application of fertilizer and insecticide, harvesting and carrying etc. Mainly two types of human labor used the study area; such as a) Family labor: for which no payment is made and b) Hired labor: for which farmers have to pay in cash. In this study, human labor was measured in man-days. One man day was equivalent to eight (8) hours in work by an adult. In pricing the labor no distinction was made between the family and hired labor. Family labor was priced at the prevailing wage rate in cash to hired labor. The wage rate was fixed for different types of activities. Cost of human labor is presented in Table 5.1. Total human labor cost/ha was taka 11823 for all farm category. Per hectare labor cost was highest for medium farm category which was Taka marginal followed by small (Taka 11697.00) and marginal farmers (Taka 11280.00).

5. 1.3 Mechanical power cost

The use of power tiller was increasing rapidly in the study area and farmers widely used mechanical power for their land preparation. Mechanical power such as power tiller owner supplies fuel as well as a driver for land preparation. The owner charged a fixed amount of money as service charge for using tiller, which was Tk. 250 per bigha (local unit) land preparation for one tillage. Per hectare power tiller cost for tomato cultivation under marginal, small and medium farmers were Tk. 5870, Tk. 6248 and Tk. 6549 respectively. (Table 5.1).

5. 1.4 Cost of seed

Fanners used both home supplied and purchased seed. The cost of purchased seed was calculated on the basis of actual price paid by the farmers. The cost of home supplied seed was calculated on the basis of actual price paid by the farmers. The cost of home supplied seed was calculated on the basis of actual price paid by the farmers for purchased seed. Per hectare cost of seed for tomato under marginal, small and medium farmers were Tk. 44463, Tk. 48164 and Tk. 51875 respectively (Table 5.1).

5. 1.5 Cost of fertilizer

In the study area, farmers mainly used three types of fertilizer namely urea, Triple super Phosphate (TSP) and Muriate of potash (MP). In case of tomato cultivation under marginal farmer's cost of urea, TSP and MP were Tk. 20573, Tk. 21457 and Tk. 22478 (Table 5.1). From the Table 5.1 it may be concluded that total cost of fertilizer for medium was higher and followed by small and marginal farmers.

5. 1.6 Cost of pesticide

Farmers of the study area used pesticide computed on the basis of the price, which the farmers actually paid. Many farmers, however, did not have appropriate knowledge about the exact quantity to be applied and brands name of the pesticides. It was found that per hectare cost of pesticides for tomato production under marginal, small and medium farmers were Tk. 1567, Tk. 1679, and Tk. 1788 respectively. From this table it may be conclude that cost of pesticide for medium farm size was higher than the small and marginal farms (Table 5.1).

5. 1.7 Cost of irrigation

Irrigation was a leading input for tomato production. The cost of irrigation water was charged at fixed rate of unit of area. The irrigated farms marginal, small and medium fanners were enjoy the irrigation facility. The irrigation cost for marginal, small and medium fanners were Tk. 1679, Tk. 1879 and Tk. 1960. The cost for medium farms for irrigation was higher than marginal and small farmers (Table 5.1).

5. 1.8 Interest on operating capital

In the study, the amount of money needed to meet the express on hired or purchased inputs was treated as operating cost. Interest cost was computed at the rate of 12 percent per annum. It was assumed that if fanners would take loans from a bank, they would have to pay interest at the above-mentioned rate. Since all expenses were not incurred at the beginning of the production process, rather they were spent throughout the whole production period the cost of operating was, therefore, computed by using the following formula

The interest operating capital on an average was Tk. 2378, Tk. 2457 and Tk. 2569 for tomato under marginal, small and medium farms (Table 5.1).

Table 5.1 Per hectare cost of tomato production

Cost(Tk/ha)				
Farm category/ Items Cost of	**Marginal**	**Small**	**Medium**	**All farms**
Human labor	11280	11697	12509	11823
Mechanical power	5870	6248	6549	6223
Seed	44463	48164	51875	48167
Fertilizers	20573	21457	22478	21503
Manure	4567	4789	5218	4858
Irrigation	1679	1879	1960	1839
Pesticide	1567	1679	1788	1678
In. on operating cost	2378	2457	2569	2468
Total variable cost(TVC)	**92377**	**98370**	**104946**	**98559**

Source: Field Survey, 2019

5. 1.9 Cost of land use

The price of land was different for different plots depending upon location and topography of the soil. The cost of land used was estimated by the cash rental value of land. In computing rental value of land of the land used cost (LUC), it was calculated according to farmer's statement. Per hectare land use cost of tomato cultivation were Tk. 12345, Tk. 11456 and Tk. 11260 under marginal, small and medium farms respectively. These results

indicate that per hectare land use cost of tomato cultivation was comparatively higher for medium farmers than the small and marginal farmers (Table 5.2).

5. 1.10 Total variable cost

Total variable cost was estimated adding all the variable costs such as hired labor cost, mechanical power cost, purchased seed cost, cost of urea, TSP, MP, Gypsum, cost of pesticide & insecticides, cost of irrigation. In all farm category total variable cost was Tk. 923377, Tk. 98370 and 104946 for marginal, small and medium tomato farmers respectively (Table 5.2).

5. 1.11 Total fixed cost

Total fixed cost was the summation of all fixed cost which was family labor cost, home supplied seed cost interest on operating capital and laid rent. In monetary terms marginal farmers incurred highest amount of fixed cost which was Tk. 24134 followed by small Tk. 22024 and medium farmers Tk. 21505 (Table 5.2).

Table 5.2 Per hectare total fixed cost and total cost of tomato production

Cost(Tk/ha)				
Farm category/ Cost of Items	Marginal	Small	Medium	All farms
a. Land use cost	12345	11456	11260	11687
b. Family labor	11789	10568	10245	10867
c. Total fixed cost (**a**+**b**)	24134	22024	21505	22554
d. Total variable cost (TVC)	92377	98370	104946	98559
Total cost (c+d)	116511	120394	126451	121113

Source: Field Survey, 2019

5. 1.12 Total cost

Total cost was the summation of total variable cost and total fixed cost. Per hectare cost of tomato production was Tk. 121113 for all farm categories in the study area. Total cost was highest for medium farmers (Tk. 126451) followed by small farmers (Tk. 120394) and marginal (Tk. 116511) (Table 5.2).

5. 1.13 Gross return of tomato production

Per hectare gross return of tomato production under marginal, small and medium farms are shown in Table 5.3. Gross return per hectare consisted of the value of main product. Per hectare return was calculated by multiplying the total amount of products by their respective average market price. The average market price of tomato was Tk. 9.50 per kg. Per hectare gross return of tomato cultivation under marginal, small and medium farms were Tk. 228076, Tk. 222452 and Tk. 216818 respectively which indicates that per hectare gross return of marginal farms were higher than small and medium farms (Table 5.3).

Table: 5.3 Gross return of tomato production

Farm category	Gross return		
	Yield (kg/ha)	Price (Tk/kg)	Gross return (Tk/ha)
Marginal	24008		228076
Small	23416	9.50	222452
Medium	22823		216818
All farms	23416		222449

Source: Field Survey, 2019

Table 5.4 Per hectare gross return, gross margin, net return and BCR of tomato cultivation

Farm category/ Cost of Items(Tk/ha)	Marginal	Small	Medium	All farms
Gross Return	228076	222452	216818	222449
Total Variable Cost (TVC)	92377	98370	104946	98559
Total Fixed Cost	24134	22024	21505	22554
Total Cost (TVC+TFC)	116511	120394	126451	121113
Gross Margin (GR-TVC)	135699	124082	111872	123884
Net Return (GR-TC)	111565	102058	90367	101330
BCR (GR/TC)	**1.96**	**1.85**	**1.72**	**1.84**

5. 1.14 Gross margin

Per hectare gross margin of tomato production under marginal, small and medium farms arc given in Table 5.4. Gross margin was estimated as the difference between gross return and total variable cost. The argument for using the gross margin analysis is that the farmers of Bangladesh are more interested to know their return over variable cost. For short run analysis as well as for farm planning, the gross margin analysis is widely used and this

analysis is easily understandable to the farmers because of its simplicity. Table 5.4 shows that per hectare gross margin of tomato cultivation under marginal, small and medium farms were Tk. 135699, Tk. 124082 and Tk. 111872 respectively. It indicates that the gross margin was highest in marginal farms followed by small and medium farms.

5. 1.15 Net return and benefit cost ratio

Table 5.4 shows that per hectare net return of tomato cultivation under marginal small and medium farms were Tk. 111565, Tk. 102058 and Tk. 90367 respectively, which indicates that net return was highest in marginal farms than small and medium farms. Return over per Taka investment or Benefit-cost-ratio (undiscounted) was calculated as a ratio of gross return to total cost. Table 5.4 shows that per hectare benefit cost ratio (BCR) of tomato cultivation under marginal, small and medium farmers were 1.96, 1.85 and 1.72 respectively; implying that production of tomato under marginal farms was more profitable than the small and medium farmers.

5.2. Identifying existing marketing channel of tomato
5.2.1 Marketing System of Tomato

The term 'market' as the performance of all business activities involved in the flow of products and services from the point of initial agricultural production until they are in the hands of consumers. It is a process that makes goods and services available to the consumers. Marketing is a planning of disposal of the products into the markets.

Marketing encompasses all the activities aimed at satisfying the needs of the customers through the exchange of relationships to achieve organizational objectives with social responsibility. Agricultural marketing is achieved by a series of process.

For transferring agricultural produce from farmers to consumers, various intermediaries play important role in domestic marketing system. The production and marketing system of tomato consist of a myriad of relationship and arrangements which are reflected in the manner by which the production and market are structured, conducted and prices are transmitted to each level from the producer to the consumer. (Kohls and Uhl, 1980))

The producers and the consumers are in the both ends of the tomato industry. Any strategies to stabilize the supply of tomato throughout the year will affect both of them. The consumers will be benefited with a relatively stable price of tomato in the market but there may be some consequences on the producers and the production environment. This would need adequate understanding and assessment of the existing tomato production and marketing system and assess the socio-economic gains and impacts of stabilizing the supply of tomato.

Marketing system may be thought of as the connecting link between specialized producers and consumers (Kohls and Uhl, 1980). Increase in output of food would be meaningless if the producer cannot transfer the product to the consumer at a price which represents a fair remuneration to the producer, and within the consumer's ability to pay. A marketing system includes all activities involved in the flow of goods from the point of initial production to the consumer. It includes the exchange activities associated with transferring property right to commodities, physically purchasing and allocating resources, handling products, disseminating information to participants and market institutional arrangements for facilitating these activities (Amir and Kinpscheer, 1989). In Bangladesh, agriculture is the principal economic activity; this factor becomes even more important. An efficiently organized agricultural marketing system not only facilitates proper and smooth disposal of what the farmer produces but also acts as a catalyst to stimulate increased production. So, an efficient marketing system is essential for the producers as well as the intermediaries. It is composed of marketing functions of different intermediaries.

5.2.2 Marketing channels of tomato
This segment is in particular involved with the different factor of tomato advertising system along with advertising channels, marketplace intermediaries and their advertising and marketing features. An strive has been made to investigate the marketing capabilities executed by way of tomato middleman, which meets the second objective of the examine. According to

Acharya and Agarwal (1999), the marketing channel for vegetables vary from commodity to commodity, from producer to producer, lot to lot and time to time. Agricultural marketing channels are concerned to the concept of "marketable" or "marketed" surplus of farm commodities that enter in the process of circulation and exchange. The purpose of exchange of commodities for money and vice-versa is to have access to a variety of products. Here agricultural marketing channels refer to the outlets or routes through which commodities pass to reach to final consumers. The existing vegetable marketing channels are presented in Figure 5.1. The analysis of channel is intended to provide a systematic knowledge of the flow of the goods and services from their origin to the final destination. The tomato marketing channel drawn based on the data collected from different sources.

Channel I. Producer → Petty trader → Aratdar → Wholesaler → Retailer → Consumer

Channel II. Producer → Petty trader → Wholesaler → Retailer → Consumer

Channel III. Producer → Petty trader → Aratdar → Retailer → Consumer

Channel IV. Producer → Petty trader → Retailer → Consumer

Channel V. Producer → Wholesaler → Retailer → Consumer

Channel VI. Producer → Retailer → Consumer

Channel VII. Producer → Consumer
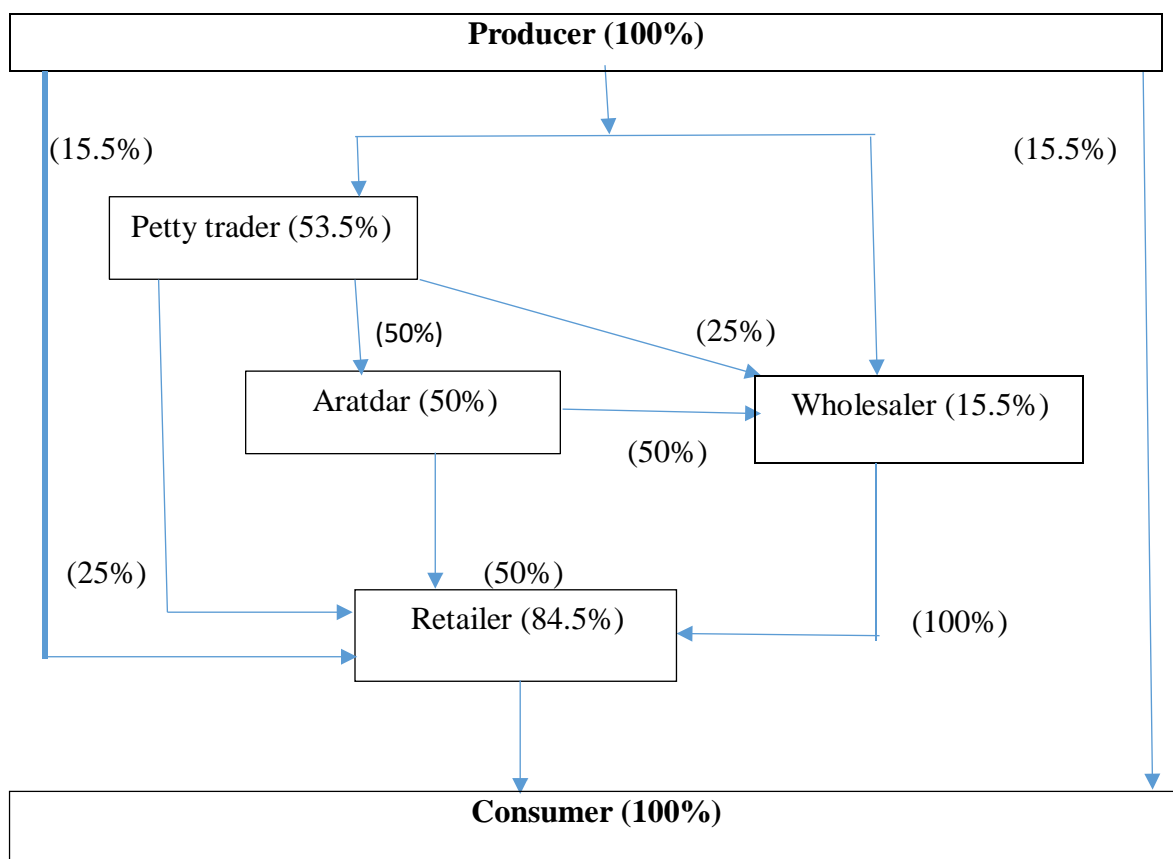
Source: Field Survey, 2019

Fig. 5.1 Marketing channel of tomato in the study areas

Huang et al. (2009) found that producers were disposing vegetables through traditional marketing channels. Further they reported that about 80 percent of vegetable market at farm gate was conducted by wholesalers. The individuals and private organizations as principal market agencies carry out vegetable market particularly vegetable. The existing vegetable marketing channels have been identified and their functions are described in brief as follows:

1. Producer.
2. Petty Trader
3. Aratdar
4. Wholesaler
5. Retailer

Producer

Tomato advertising and marketing channel started from farmers and various intermediaries formed linkage in the channel. Tomato farmers generally sold their produce to all the intermediaries either at the farmyards or in the markets Farmers sold their marketable surplus (53.5%) to petty trader, (15.5%) to wholesalers, (15.5%) to retailers to and (15.5%) to consumers (Figure 5.1). The farmers also sold some quantity of tomato grown. Vegetable producer turned into a number one functionary concerned in crop manufacturing on his very own land or a chunk of land received on rent.

Petty trader

The petty trader treated a comparably smaller quantity of tomato and possessed no constant commercial enterprise premises. The petty investors have been the first hyperlink within the channel of distribution of tomato in the have a look at areas. The seasonal petty buyers were particularly fanners or people from the tomato producing regions. Assembling petty traders had been folks that performed the characteristic of attention of tomato. They bought tomato directly from the farmers either at the farmyards or from different rural markets; transported the same to the assembling or consuming centers and sold to distributing petty traders, wholesalers or retailers through aratdars on payment of aratdari commission. Petty traders who did the function of distribution were termed as distributing petty traders. They were independently organized hired both salaried and casual labor. Petty traders purchased 53.5% tomato from farmers and sold 50 % to aratdars, 25% to wholesalers and 25% to retailers (Figure 5.1).

Aratdar

The Aratdars had been the fee agent who had constant established order in the markets and did the functions of negotiating transactions between buyers and dealers in change of fee. The Aratdars played an crucial role inside the tomato advertising and marketing channel in admire of the offerings they rendered to the petty investors, outlets and circuitously to the customers and the producers. A massive part of tomato supplied inside the dispensing and consuming markets reached the retailers and the purchasers via aratdars.

Wholesaler

Wholesalers purchase and sell huge portions of farm products, usually in wholesale and terminal markets. Wholesaler offers in all of the vegetable and vegetable merchandise inside the inter-regional markets and deliver produce to processing industries, exporters and shops according their call for. A wholesaler is a prime corporation within the advertising and marketing channel of agricultural merchandise, having top contacts with fee retailers in wholesale markets and outlets in local markets.

Retailer

All market sports come to stop with the outlets Retailer buys and sells small quantities of product in keeping with the call for of clients in the area. Retailers maintain contacts with consumers and make transaction Retailers have sorts of selling, few have their small shops in consumption areas and others are hackers having wooden carts. Among retailers high diploma of competition changed into referred to they sold eighty four.5% of merchandise and furnished to the clients (Figure 5.1).

5.2.3 Marketing cost of intermediaries

Marketing cost of tomato refers to the various expenses incurred by different intermediaries for movement of the product through the marketing channel. Different items of cost such as loading and unloading, market tolls, sweeper charge, subscription/charity, commission/aratdar charge, transportation, wastages, personal expenses (e. g. entertainment, tips, rickshaw/bus etc.) and other costs (e g weighting charge, electricity charge, stationery item like paper, pin, pad, forms, ink for maintaining records etc.) were incurred by the intermediaries involved in tomato market. The item wise breakdowns of the marketing cost incurred by different intermediaries in the tomato marketing channel are presented in Table 5.5. Marketing cost was the highest for the wholesalers amounting Tk. 172 per 100 kg. The marketing cost of petty traders, aratders and retailers were Tk. 99, Tk 68 and 87 per 100 kg, respectively. Table 5.5 further shows that wastage cost was the major cost item for the wholesalers and petty traders whereas the transport cost was the major cost items for the aratdars and retailers.

Table 5.5. Marketing costs of intermediaries (Taka per 100 kg)

Category/ Cost items	Location				intermediaries			
	Sakal Bazar	Nondina Bazar	Ave. (%)	Petty traders	Aratdars	Wholesalers	Retailers	All farms
Transport	28	22	25	21	18	33	26	25
Loading	22	18	20	16	14	30	20	20
Marketing toll	12	8	10	-	15	25	-	10
Wastage\Damage	32	24	28	38	-	46	28	28
Personal Ex. cost	14	12	13	17	7	19	9	13
Rent	5	3	4	-	6	6	4	4
Electricity bill	3	3	3	-	4	6	-	3
Mobile bill	6	3	4.5	7	4	7	-	4.5
Total cost	**122**	**93**	**107.5**	**99**	**68**	**172**	**87**	**107.5**

Source: Field Survey, 2019

5.2.4 Marketing margin of intermediaries

The term marketing margin refers to the difference in price for equivalent bodily portions of a given commodity among extraordinary levels of market. In other words, it is the difference in the price paid and received by any marketing agency. Marketing margin consists of profit and remuneration for the distribution but the greater part usually consists of payment for loading and unloading, market tolls, transport etc., i.e. market induces cost of marketing and profit or loss of all the intermediaries in the entire marketing channel. These charges are expressed either in absolute monetary terms or as percentage of the value of a commodity. The term price spread is synonymously used with the marketing margin (Ahamed, 2002).

Gross margin and net margin of tomato intermediaries is shown in Table 5.6. Petty traders, aratdars, wholesalers, and retailers purchased tomato at Tk. 1020, Tk 1270, Tk. 1350 and Tk. 1668 per 100 kg on an average and sold tomato at Tk. 1275, Tk 1380, Tk. 1650 and Tk. 2097 per 100 kg, respectively. The average gross margin of petty traders, aratdars, wholesalers, and retailers was Tk 255, Tk. 110, Tk. 300 and Tk 429 per 100 kg, respectively. The average marketing cost of petty traders, aratdars, wholesalers, and retailers were Tk. 99, Tk.68, Tk. 172 and Tk 87 per 100 kg respectively.

Table 5.6. Marketing margins of intermediaries (Taka Per 100 kg)

Location / Farm category	Cost items				
	Purchase price (A)	Sale price (B)	Gross margin C=B-A	Marketing cost (D)	Net margin E=C-D
Location: Jamalpur sadar					
Sakal Bazar	1379	1678	299	115	184
Nondina Bazar	1275	1523	248	97	151
Intermediaries:					
Petty traders	1020	1275	255	99	156
Aratdar	1270	1380	110	68	42
Wholesalers	1350	1650	300	172	128
Retailers	1668	2097	429	87	342
All farms	1327	1600.5	273.5	106.5	167

Source: Field Survey, 2019

The average net margin (profit) of petty traders, aratdars, wholesalers, and retailers were Tk 156, Tk. 42, Tk. 128 and Tk. 342 per 100 kg, respectively. Thus, among the intermediaries, net marketing margin was the highest in retailers and lowest in Aratdar. Chauhan and Singh (1998) indicated that the producer's share declined drastically with the increase in the number of intermediaries. They have suggested for a need in improving the efficiency of marketing channels.

5. 3 Conclusion remarks

Per hectare benefit cost ratio (BCR) of tomato cultivation under marginal, small and medium farmers were 1.96, 1.85 and 1.72 respectively.

Why marginal farmers were highest?

Because:

i. Intensive care of land

ii. Quickly identified disease infestation and took measurable action and reduced damages.

iii.   Marginal farmers abled to properly replaced death seedlings where small and medium farmers were ignored.

For this reason marginal farmer's production rate were relatively higher. Among the intermediaries, Retailer's net marketing margin were the highest.

CHAPTER VI
CONSTRAINTS OF TOMATO PRODUCTION

6.1 Introduction

Bangladesh has an economy mainly dependent on agriculture. But this agricultural sector is negligible still now. Various problems are associated with this sector. Experience has shown that farmers in Bangladesh seldom get the required quantity of seeds, adequate fund, fertilizers, pesticides, technical support and finally the remunerative price of their produces. They are economically not very capable of investing the required fund for producing crops due to their low capital base and scarcity of cash fund. Fanners generally complain of receiving insufficient support from government agencies. In this chapter an attempt is made to identify some major problems of tomato production. Relative problems and constraints of tomato production. The sample farmers were asked to stale whether they faced any problems with regard to tomato production. It was observed that most of the fanners were facing some important problems in growing tomato. It may be noted that the problems confronted by the individual farmers were not identical. Some problems were in fact more severe than others. However those problems and constraints which the farmers emphasized upon are shown in Table 6.1 and described below:

Table 6.1 Problems and constraints of tomato production

Problem	Value obtained out of 10	Rank
Lack of quality seed	9.37	1
Lack of adequate fund	8.93	2
High rate of input price	8.35	3
Lack of fertilizer in time	6.79	4
Lack of insecticides & pesticides	6.24	5
Lack of government attention	5.86	6
More infestation of diseases and pest	5.06	7

Source: Field Survey, 2019

6.1.1 Lack of quality seed

In the study area, most of the farmers could not collect quality seed from their own farm production due to natural adversities and lack of their proper knowledge. So they had to depend on purchased seed. Very often they laced quality seed crisis. Even they had to pay illogically very high price. In the study area, lack of quality seed was the most severe problem among the farmers (Table 6.1).

6.1.2 Lack of adequate fund

In the study area, most of the farmers reported that they did not have adequate amount of operating capital. Most of them failed to receive the institutional credit. As a result, financial inability and pressing need for cash money force them to borrow money from non- institutional sources and they have to pay high interest rate. In the study area, lack of adequate fund was the second most severe problem (Table 6.1).

6.1.3 High rate of input price

Different kind of inputs such as seed, fertilizer, pesticides and insecticides were used to produce tomato. But sorry to say that most of the farmers had to pay high market price than the reasonable. In the study area, high rate of input price was the third severe problem among the farmers (Table 6.1).

6.1.4 Lack of fertilizer in time

Fertilizer is the most important input for producing tomato. They usually use urea. TSP, Zypsum and M.P. for the better production farmers had to use fertilizer several times in their field. Fertilizer crisis is a common subject in the production period in our country. Some traders made artificial crisis to make sure higher price of fertilizers. In the study area, it was the fourth problem (Table 6.1).

6.1.5 Lack of insecticides & pesticides

Different type of insect and pest arc affected of tomato and causes low production. To avoid these losses farmers had to use different kind of insecticides and pesticides to control insect and pest. But in the production period, the quality insecticides and pesticides are not

available and the price of insecticides and pesticides is high. The farms faced this problem every year (Table 6.1).

6.1.6 Lack of government attention

During the investigation, most of the farmers complained that they did not get enough support from the government. Only large farmers were benefited from the government institution. Input price should be reduced, proper training should be provided to the farmers. In the study area, lack of government attention was the last problems among the farmers (Table 6.1).

6.1.7 More infestation of diseases and pest

For tomato production diseases and pest infestation was the last problems of 10% yield losses of production the growers in the study area, it causes 5 (Table 6.1).

6.2 Suggestions given by the farmers to overcome the problems in producing tomato

From the study we observed that various problems were associated with tomato production. In the study area, the farmers were given freedom to give their suggestion for overcoming the existing problems related to the tomato production. They suggested various measures. These suggestions are discussed below:

Table 6.2 Suggestions to overcome the problems

Solutions to overcome problem	All farm	
	Mean	**Rank**
Credit facilities	9.54	1
To reduce input price	9.11	2
Need quality seed	8.22	3
Available fertilizer	7.14	4
Available insecticides & pesticides	6.32	5
Government attention	5.54	6

Source: Field Survey, 2019

6.2.1 Credit facilities

Although, lack of quality seed was the first problem of the sample farmers, they strongly suggested about the credit facility which was the lst ranked suggestions of the farmers, because, most of the farmers in the study area were poor and they have no fund to cultivate tomato.

6.2.2 To reduce input price

According to die sample farmers, high rate of input cost in another problem. So, the price of input should be cheaper which the 2nd ranked suggestion of fanners was. Through input subsidy government can reduce input price.

6.2.3 Need quality seed

Quality seed ensure expected production. In the study area farmers faced quality seed crisis in the sowing period. About 52% farmers sought for easy availability of seed through government regulations. Most of the farmers suggested for it because they could not collect quality seed from the dealer and they had to collect poor seed from the local market. So quality seed have to provide to farmers thorough different Channels**.**

6.2.4 Available fertilizer

The farmers claimed that sometimes the fertilizer dealers used to create artificial fertilizer crisis to get higher price. In such situation the farmers used to face fertilizer crisis. To get optimum production of tomato farmers have to give proper fertilizer to field. So government should take steps to ensure proper fertilizer distribution by the government agencies.

6.2.5 Available insecticides and pesticides

For tomato production insecticides and pesticides arc essential to control pest and insect attract. Quality insecticides and pesticides are not available in market during production period.

6.2.6 Government attention

In the study area most of the farmers complained that government gave low attention in agriculture. So government should give proper attention to develop agriculture.

Three categories of problems and constraints such as economic, technical and natural have been identified in the study area. The economic problems are lack of fund, high price of input etc. Technical constraints arc lack of quality seed, lack of insecticides and lack of government attention etc. Natural constraints are infestation of diseases and pests.

Lack of quality seed was the lst problems in the study area followed by lack of adequate fund, high rate of input price, lack of fertilizer in time, lack of insecticides and pesticides, lack of government attention and more infestation of diseases and pests.

Credit facilities was the 1st probable suggestions to overcome problems followed by to reduce input price, need quality seed, available fertilizer, available insecticides and pesticides and government attention.

CHAPTER VII
SUMMARY, CONCLUSIONS AND RECOMMENDATION

7.1 Summary of Findings

Bangladesh has made a breakthrough in vegetable production but due to lesser efforts in market creation, farmers are facing a low prices situation. Some serious thrust should, therefore, be given particularly by planners for substantial increase of nutritive food, particularly vegetables because it is the cheapest source of vitamins. Many educated unemployed persons are taking up vegetable growing as a form of self-employment. This is, no doubt, helping to increase production. Tomato is one of the major vegetables grown in Bangladesh

Looking to the above facts, it is essential to conduct a study, which could say something about variation and growth rate in area, production and marketing of tomato in the Jamalpur District of Bangladesh. It is expected from this study to find-out the cost of cultivation and marketing analysis of tomato. This study will also analyze the various constraints faced by the tomato growers in the production and marketing of tomato. The present study is therefore, under taken in view of the following specific objectives:

1. To describe the socio-economic characteristics of the tomato farmers;
1. To estimate the costs and returns of tomato crop on sample farms;
3. To study the existing marketing channel of tomato and marketing margin of intermediaries; and
4. To identify the constraints in production of tomato crop and to suggest measures to overcome them.

The highest proportion 60.9 percent of the farmers fell in the "middle aged" category, while 2.9 percent of them fell in the "young aged" category and 36.2 percent in the "old aged" category. The majority (44.8 percent) of the farmers had secondary level of education compared to 29.5 percent of them having illiterate. About 8.6 percent of the farmers were

primary level education, while 17.1 percent had above secondary level of education. The majority (58.1%) of the farmers had medium family while 16.2 percent of them had large family and 25.7 percent of them had small family. More than half (60.0 percent) of the farmers possessed small farms and 40 percent of them having medium farms. The highest proportion (71.4 percent) of the respondent to medium annual income, while (16.2 percent) had low annual income and (12.4 percent) had high annual income. The highest proportion (78.1 percent) of the respondent to low income from tomato cultivation, while (15.2 percent) had medium income and (6.7 percent) had high income. The majority (40.9%) of the farmers had medium organizational participation as compared to (4.8%) and (26.7%) having low and high organizational participation respectively. About 27.6% of the farmers had no organizational participation. The highest proportion (43.8%) of the respondents had medium extension media contact as compared to (21.9%) and (34.3%) having low and high extension media contact respectively. The majority of the 63.8 percent of the farmers had "medium experience" compared to more different than 21.0 percent of them having "high experience. The proportion of "low experience" was 15.2 percent. The majority (42.8%) of the farmers had marginal land under tomato cultivation as compared to (36.2%) and (21.0%) having small and medium land under tomato cultivation respectively.

7.2 Conclusion

- ✓ That most of the sample farmers were in age category of 35-50 years.
- ✓ In the study area, tomato growers were secondary level of education (44.8%)
- ✓ Average total income for all farm category growers were Tk. 311 thousand.
- ✓ Most of the sample farmers for tomato growers had 18-33 years marketing experience.
- ✓ Average per hectare total cost for tomato cultivation was TK. 121113. Per hectare total cost was height in medium farms (Tk. 126451).
- ✓ Average per hectare gross return for all category of tomato was TK. 222449. Per hectare gross return of tomato in marginal farms was height (Tk. 228076). Average per hectare gross margin of tomato for all farm categories was TK. 123884. Per hectare gross margin was height in marginal farm (Tk. 135699).

- ✓ Net returns per hectare for all farm categories were Tk 101330. The net return was height in marginal farm category.
- ✓ The average benefit cost ratio was 1.84
- ✓ Lack of quality seed was the 1st rank problem in the study area. Credit facilities were the probable suggestions to overcome the problems.

7.3 Policy implications/ recommendations

On the basis of the salient findings of the study, certain broad implications that can be derived for policy makers and extension personnel to design suitable development strategy for increasing the tomato production in the study area are indicated here:

1. For increasing production of tomato necessary inputs particularly HYV seeds, Fertilizers, insecticides and pesticides etc. should be made available to the farmers just before the growing period.
2. To reduce the cost of seed it will be necessary to produce sufficient quality seeds locally and make them available to the farmers in time at a reasonable d price.
3. The farmers, who were more experienced and contacted frequently with extension workers, were more efficient. So, experience and frequency of extension contact should be increased to help skill development.
4. Domestic consumption of tomato requires to be raised from the present state. A well-coordinated move towards popularization of intake of tomatoes as a major substitute of cereals is yet to be made. Massive publicity of diversified uses of tomato products should be made through mass media.
5. Reduction of transportation cost and damage/wastage of product may help to be more profitable for intermediaries.
6. As a perishable product tomato should delivered to consumer as quick as possible.
7. To increase efficiency in marketing process the number of intermediaries involved in marketing should be decreased.

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PROFITABILITY ANALYSIS AND IDENTIFYING EXISTING MARKETING
CHANNEL OF TOMATO IN BANGLADESH: A STUDY BASED ON SOME
SELECTED AREAS OF JAMALPUR DISTRICT

APPENDIX 1: Interview schedule for Farmers

Serial no ....

Name of the respondent'....................................

Village..

Upazila...

(Please answer to the following questions)

1. **How old are you?..**Years

2. **What is the level of your education?**

i) **.......................** (Do not know reading and writing)

ii) .... (Do not know reading and writing, but can sign only)

iii) (Never attended school, but I can little read and write)

iv) (Up to the level of class .... …. Passed class/ Examination)

3. **Including yourself, how many members belong to your family?**

Male:.............members.
Female:...............members.
Child…..............members
Total:...............members.

4. **Furnish the area of your lands according to use:**

Sl. No.	Type of land	Local unit	Hectare
1	Own house		
2	Own land under own cultivation		
3	Land taken from other on borga		
4	Land taken from other on lease		
5	Own land given to others on borga		
6	Own land given to others on lease		
7	Others (Please mention)		
	Total		

5.   **Please mention your annual income:**

Source of income	Amount (maund)	Price (Tk./maund)	Total taka
1. Agricultural sector			
a) Rice			
b) Wheat			
c) Jute			
d) Tomato			
e) Pulses			
f) Vegetables			
g) Fruits			
h) Poultry			
i) Cattle			
j) Fishes			
k) Others (Please mention)			
2. Services			
3. Business			
Total			

6.   **Please mention your nature of participation (past of present) in the following social organization:**

SI. No.	Name of organization	No Participation (0)	Nature of participation		
			As ordinary member (1)	As executive member (2)	As Officer (3)
1	Krishak sarnbay sainity				
2	Bazar committee				
3	Youth club				
4	School committee				
5	Madrasha committee				
6	Mosque/Motidir/Girza committee				
7	Union council				
8	NGO				
9	Others (specify)				

7. **Please mention your nature of extension contact with the following of information**

SL No.	Extension personnel	Nature of extension contact			
		Often (3)	Occasionally (2)	Rarely (1)	Not at all (0)
1	Tomato cultivated farmers				
2	Dealers (Fertilizer, pesticide)				
3	Experienced farmers				
4	Radio/ Television				
5	Block supervisor				
6	Agricultural extension officer				
7	Upazila Agricultural officer				

8. **Experiences in tomato marketing**

How many years you are engaged with tomato marketing?

Ans..(years)

9. **Land under tomato cultivation...hectare.**

10. **Income from tomato cultivation....................... taka.**

11. **Cost of tomato cultivation:**

Please mention following information:

    a. **Total cost per ha**

Sl No	Item of cost		Price/kg	Cost /kg (tk)
1.	Land Preparation			
2.	Seed			
3.	Irrigation			
4.	Fertilizer			
	Urea			
	TSP			
	MoP			
	ZnSO4			
	Gypsum			
	Manures (cow dung)			
5.	Pesticide			
6.	Labour cost	i. Hired labour		
		ii. Family labour		
	Total			

b. Total return per ha

Sl. No.	Price Kg/taka	Amount of Production kg/ha	Sources of return
1.			

12. Problems in tomato cultivation

1……………………………

2……………………………

3……………………………

4…………………………………

13. Suggestions

1………………………………

2…………………………….

3……………………………

Thanks you for your co-operation

Date: ....

_____
Signature of the interviewer

APPENDIX II: Interview schedule for Traders

Sample No.

1. General information of the respondent

Name……………………

Village…………………..

Upazila…………………..

District…………………..

2. Information about Purchase

Date/ Month	Type of Seller	Amount of Purchase	Place of Purchase	Price per unit	Pricing Method

3. Information about sale

Date/ Month	Type of buyers	Grading Quality	Amount of Sale	Place of Sale	Price per unit	Pricing Method

4. Differences between purchasing and selling price of different

Purchaser	Purchase From	Purchasing Place	Purchasing Amount	Grading Quality	Purchasing Price	Selling Price

5. Cost of Marketing (per 100 kg)

Item	Cost	Item	Cost
Transportation		Rent	
Loading and Unloading		Tax	
Grading		Security	
Salary and Wages		Electricity bill	
Marketing tolls		Aratdari commission	
Tips and donation		Telephone/ Mobile Phone bil	
Storage		Depreciation Cost	
Wastage		Miscellaneous	
Personal Expenses			

6. Transport media and cost (per 100 Kg)

Item	Distance (km)	Amount (%)	Cost
Head Load			
Cart/Rikshaw			
Truck / Bus			
Railway			
Boat/Launch			
Tractor			
Others			

Thanks you for your co-operation

Date: ....

_____
Signature of the interviewer