

Value Chain Analysis of Tomato: A Case Study in Jessore District of Bangladesh

Dr. Paresh Kumar Sarma¹, M. H. Ali²

¹Senior Scientific Officer, BAU Research System, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh
Email:paresh.baures@bau.edu.bd,Phone:01712052385Mymensingh

²Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

Abstract: *This study aims at analyzing tomato value chain in Jessore district in Southeast region of Bangladesh. The specific objectives of the study were identifying the main chain actors and map the tomato value chain, assessing their linkages and roles, calculating marketing margins of each actor, identifying the major constraints and opportunities in the value chain. Both primary and secondary data sources were used. Data were obtained from a convenience sample of participants from Jessore district and the total sample size was 150 including producers and different value chain actors. Data analysis was done using SPSS statistical software. The descriptive statistics and inferential statistics were employed in the analysis of collected data. Objective (i) was realized using value chain mapping. This approach was used to identify actors, their linkages, and roles. The major actors in the study are input suppliers, tomato producers, wholesalers, roadside traders, brokers, retailers, consumers, and supportive actors while objective (iii) was achieved using strengths, weaknesses, opportunities, and threats (SWOT) analysis. Market margin analysis was carried out to estimate value captured by each actor. The result revealed that the major actors in the value chain are input suppliers, tomato producers, collectors, small traders, big traders, processors and consumers. Producers market share shows that producers obtain the largest share when they sell out directly to roadside traders which is about 85.32%. The major problems confronting the tomato value chain were found to be low prices, high perishable nature, lack of access to credit, poor quality of tomatoes, inadequate storage and processing facilities, inadequate transportation facilities, dispersed nature of supply, high interest rate and lack of adequate information. While farmers ranked low price as their most worrying constraint, poor transportation facilities of Jessore produced tomatoes was ranked as the most pressing constraint of value chain actors.*

Keywords: Tomato, Value Chain, Value addition, Processing, and SWOT analysis

1. Introduction

Bangladesh is the third largest tomato producing country in South Asia. In 2014–15, Bangladesh produced about 413610MT of tomatoes; 95 percent of tomatoes were consumed fresh (BBS 2015). The total market value of fresh and processed tomatoes for FY 2014–15 was approximately USD 256 million. From 2005 to 2015, tomato production increased at an average rate of approximately 13 percent per year, the highest in South Asia. Fresh tomato consumption increased at an even higher rate of 13 percent per year. Changing consumer habits are driving the strong growth in the market for fresh and processed tomatoes in Bangladesh. Tomatoes are increasingly being used as a complementary food product, and the increased consumption of take away restaurant -prepared meals means that tomato sauces are being used more and more. Consumer behavioral trends, strong economic growth (6.5GDP>6%), and rapid urbanization and economic development, overlaid with a 1.2 percent growth in population in 2015, combine to drive the rapid growth in the market (World Bank, 2015). Tomato (*Lycopersicon esculentum* Mill.) belongs to the *Solanaceae* family and is one of the most popular and nutritious vegetable crops all over the world including Bangladesh. Tomatoes and tomato-based foods provide a wide variety of nutrients and many health-related benefits to the body. Tomato contains higher amounts of lycopene, a type of carotenoid with antioxidant properties (Arab *et al.*, 2000) which is beneficial in reducing the incidence of some chronic diseases (Basu *et al.*, 2007) like cancer and many other cardiovascular disorders (Freeman *et al.*, 2011). Due to its palatability and vitamin content, its demand in general is increasing day by day, while its production is far from the requirements. The selection of tomato for value chain

analysis because tomato is one of the major high-value crops. It has: (i) high market demand, (ii) high production potential, (iii) involves large numbers of small and poor farmers, and (iv) it has high post-harvest losses. Constraints include unfriendly domestic and export markets, disease prone cultivars; poor quality seed; ineffective services; weak technological know-how; poor market management; and value reduction through high product losses at each stage in the value chain. Tomato value chains are creating shared value to enhance marketing success. This study generated valuable information on tomato value chain that would assist concerned authorities to make relevant decisions to intervene in the development of tomato value chain and designing of appropriate policies and strategies. Governmental and non-governmental organizations that are working through their programs on the development of the value chain sub-sector would benefit from the result of this study. The general objective of the study was to undertake the value chain analysis of tomato in the *Jessore* so as to contribute to the development of the tomato sub-sector by providing relevant information. The specific objectives of the study are as follows:

- 1) To identify actors in the value chain and assess their linkages and roles,
- 2) To identify the amount of value addition of tomato value chain at each stage in the study area, and
- 3) To find out opportunities and challenges in the tomato value chain

The findings of the study would also be useful to producers, traders, consumers, and marketing agents to make their respective decisions. It can also serve as a reference for researchers and students who are interested in studying value

chain and other related subjects.

2. Literature Review of Value Chain Analysis

In the value chain literature, three main streams are distinguished: the French filière approach (Raikes., 2000), the business strategy approach (Porter, 1985) and the global approach (Gereffi *et al.*, 2005). In a filière approach, the main idea is to highlight and map out specific physical commodity flows within a sector, though usually confining the analysis to domestic markets and ignoring dynamic adjustments to sector characteristics and relationships (Raikes *et al.*, 2000; Kaplinsky and Morris, 2001). In the mid-1980s, Porter defined the "value chain" as a representation of a firm's value-adding activities, based on its pricing strategy and cost structure and highlighting the interdependencies and linkages between vertically-arrayed actors in the creation of value for a firm and also identified (1) primary activities, which directly contribute to add value to the production of goods and services and (2) support activities, which have an indirect effect on the final value of the product (van den Berg *et al.*, 2009). In the development literature, these ideas were later expanded to incorporate governance relationships between actors in the value chain (Gereffi *et al.*, 2005) and more broadly applied to emphasize the 134 Sky. J. Agric. Res. linkages and relationships both between and within actors at each stage of production (Gibbon 2008; Kaplinsky, 2000; Kaplinsky and Morris, 2001; Pietrobelli and Saliola, 2008; Gereffi *et al.*, 2005). The value chain analysis in the agriculture sector applies the following six sets of tools and steps (Kaplinsky and Morris, 2001; van den Berg *et al.*, 2009): (i) the analysis starts with prioritizing a commodity for value chain development: (ii) mapping of the value chain: (iii) analysis of the value chain performance in terms of costs, prices and margins: (iv) analysis of technology, knowledge and upgrading possibilities through assessment of gaps in technology and knowledge and existing or future opportunities; (v) value chain governance which is used to identify stakeholders influencing governance, rules and regulations and their enforcement and (vi) linkages among the stakeholder, referring to their relationships. This research intends to follow these steps as a framework for analysis. It is taken to mean a group of companies working together to satisfy market demands. It involves a chain of activities that are associated with adding value to a product through the production and distribution processes of each activity (Schmitz, 2005). An organization's competitive advantage is based on their product's value chain. The goal of the company is to deliver maximum value to the end user for the least possible total cost to the company, thereby maximizing profit (Porter, 1985). It is the full range of activities required to bring a product from conception, through the different phases of production and transformation. A value chain is made up of a series of actors (or stakeholders) from input suppliers, producers, and processors, to exporters and buyers engaged in the activities required to bring the agricultural product from its conception to its end use (Kohls. and. Uhl, 1985). Bammann (2007) has identified three important levels of the value chain: -Value chain actors: the chains of actors, who directly deal with the products, i.e. produce,

process, trade and own them. Value chain supporters: Services provided by various actors who never directly deal with the products, but whose services add value to the product. Value chain influencers: The regulatory framework, policies, infrastructure. Value chain analyses encompass issues such as organizational, coordination, the power relationship between actors, linkages, and governance aspects. The value chain approach has been a very useful analytical tool for taking a more objective look at an organization's position in a market. It allows for examining the consequence of empowering one group (the producer) and identifying how to link them to other actors and consumers. It enables analysis of the implication of who does what, at which stage in the chain, and what this means for risk, capital needed and margins. It can help to identify with whom to form the partnership in the chain (Schmitz, 2005). Value-chain analysis can play a key role in identifying the distribution of benefits of actors in the chain. That is, through the analysis of margins and profits within the chain, one can determine who benefits from participation in the chain and which actors could benefit from increased support or organization. This is particularly important in the context of developing countries, given concerns that the poor in particular are vulnerable to the process of globalization (Kaplinsky and Morris 2001). The value chain is an innovation that enhances or improves an existing product or introduces new products or new product uses (Fleming, 2005). The emerging trend for processed agricultural products in the global market creates opportunities for smallholder farmers in the developing countries to benefit from such opportunities by linking their activities to value chains through vertical and horizontal linkages (Vermeulen *et al.*, 2008).

3. Theoretical Framework of Tomato Value Chain Analysis

Value chain analysis is one of the principal ways of channel mapping and a high-level model of how businesses receive raw materials as input, add value to the raw materials through various processes and sell finished products to customers. In value chain analysis operation activities, value adding and costs are integrated phenomenon. It involves all the process from the market point back to the beginning of activities usually between input suppliers and product marketing. The process of tracing a product flow through an entire channel from the point of product concept to the point of consumption highlights the pattern of inputs, constraints, value adding or non-value-adding activities, associated costs and competitive advantages (Yohannes, 2005).



Figure 1: Sequential set of activities of tomato value chain

The study uses value chain analysis which is very effective in outlining product flows, showing the value adding stages, identifying key actors and the relationships with other actors in the chain. Tomato VC can be defined as the full range of activities required to bring a product to its final consumers passing through the different phases of input supply, production, transportation, fresh tomato marketing, processing, distribution, retailing and ultimate delivery to consumers. The Tomato value chain concept entails the addition of value as the product moves from input suppliers to producers to consumers. At each stage in the value chain, the product changes hand through chain actors, transaction cost are incurred, and generally, some form of value added. Value addition results from diverse activities including bulking, cleaning, grading and packaging, transporting, storing and processing (Anandajayasckeram and Berhanu, 2009) as shown in Figure 1 for the case of a typical tomato value chain.

The main idea of the value chain is to highlight and map out specific physical tomato and tomato product flows within the sector, including key stakeholders, through usually confining the analysis to domestic markets and ignoring dynamic adjustments to sector characteristics and relationships. A value chain, therefore, incorporates productive transformation and value addition at each stage of any value chain. At each stage in the value chain, the product changes hands through chain actors, transportation costs are incurred, and generally, some form of value is

added. Tomato value chain results from diverse activities including input supply, production, transportation, marketing, processing, distributions, retailing, and consumption. A schematic description of this concept is shown in Figure 1. The main benefits of VCA were productivity value creation, profit creating, employment, and competitiveness and consumer satisfaction. VCA involved research, examination, and interpretation of data to increase understanding of the value chain so as to improve its development.

4. Materials and Methods

The study was conducted in *Jessore* District of Bangladesh. The multi-stage sampling procedure was employed to select the sampling units of the study. Total sample size was 120 made up of 76 producers, 32 traders, and 12 consumers. Primary data was collected by taking response of different stakeholders in value chain with help of structured questionnaire. Secondary data was collected from different sources like BBS, thesis, journal articles and reports etc. . Structured questionnaire was used as a research tool for conducting the interviews and interactions with with tomato value chain actors such as tomato producers, traders, wholesalers, processors, and retailers. Data were analyzed using descriptive statistics and regression analysis. Specifically, descriptive statistics was used to analyze the demographic characteristics. Value Chain Mapping was used in the study because it is a powerful descriptive tool for the

analysis. It enables one to visualize the flow of the product from conception to end consumer through various actors. It also helps to identify the different actors involved in the tomato value chain and to understand their roles and linkages. These analytical frameworks were proposed by international organizations such as GTZ, ACIDI/VOCA, M4P (Market for Poor) and were applied because these frameworks are according to the context of research.

5. Results and Discussion

Value Chain Mapping of Tomato

According to McCormick and Schmitz (2002) value chain mapping enables to visualize the flow of the product from production to end consumer through various actors. It also helps to identify the different actors involved in the tomato value chain and to understand their roles and linkages. Consequently, the current value chain map of tomato in the study area is depicted in Figure 2.

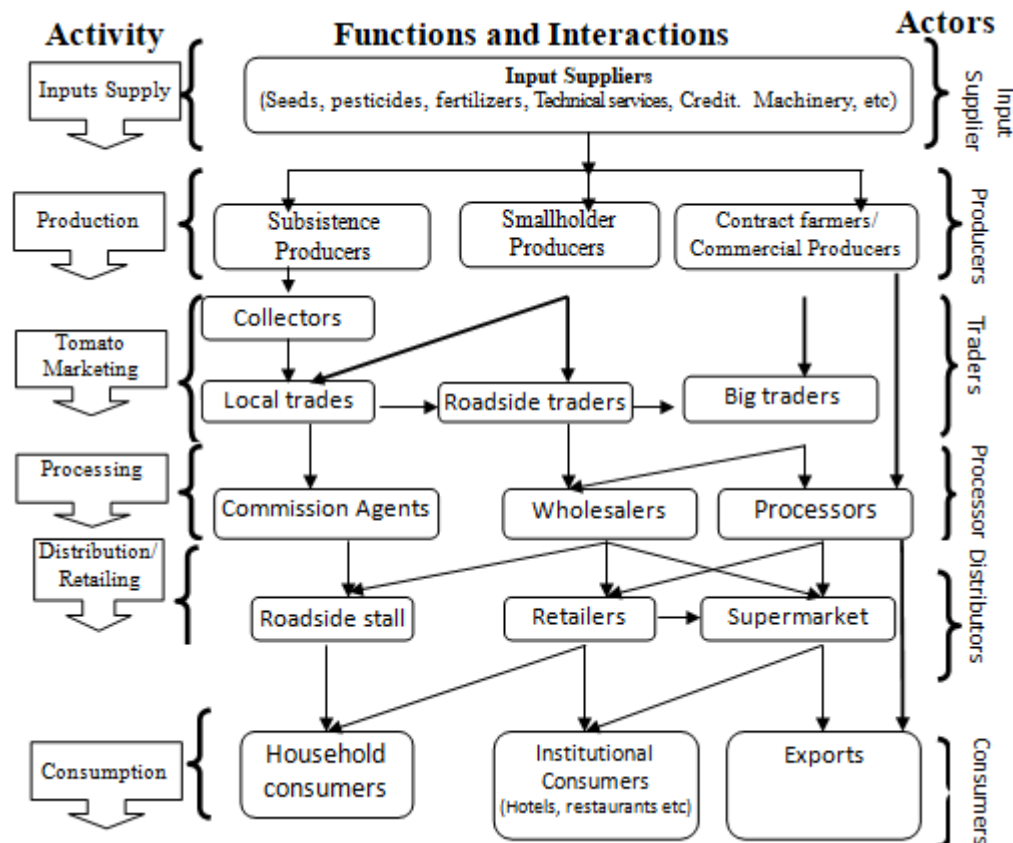


Figure 2: Linkages and flow of tomato value chain in the study area

It provides a graphical representation of tomato as it moves from production to the consumers, passing through different stages and processors. The linkages are shown vertically from left to the right hand side. The top head lists major functions of the chain. The functions, in this case, include input supply, production, trading, processing, distribution, and consumption. The vertical flow from left-hand to the right-hand side depicts the actors involved in carrying out the different functions. The enablers, shown on the left-hand side, assist and facilitate the actors in carrying out their functions. The enablers are mainly the institutions, both formal and informal as well as private institutions. The roles of the enablers can encompass several actors and functions in the value chain. As seen in the diagram, some actors perform more than one function whereas the others are confined to only one function. For example, the local traders both collect the product from the farmers and supply them to the wholesalers or processors.

Major actors and their role in the tomato value chain

The major value chain actors identified include input suppliers, producers, collectors, farmer-traders, middlemen/brokers, wholesalers, retailers, and consumers. A

brief discussion is given in the following sub-heading in below.

Input suppliers: Input suppliers are the manufacturers of agricultural inputs such as seeds, fertilizers, pesticides, mulching sheets, etc, required for the production of raw tomatoes. Through company owned, and other company dealers they sell their products to the farmers. Moreover, they also provide technical guidance on inputs usage and timely supply of inputs to the tomato farmers. They do maintain good relationships with the farmers and acts as one of the informal sources of finance. Regarding the delivery of inputs like improved seed, herbicides and pesticides, and credit among others, public and private extension services provide extension services to the farmers. Banks and microfinance institutions provide credit and information about schemes for tomato production. Input suppliers include fertilizer, seed and agribusiness companies, Government distributors, small wholesalers and even small retail shops that sell small quantities of seed, fertilizer, and pesticide to farmers at the village level.

Supporting actors: Such actors are those who provide

supportive services including training and extension, information, transportation, financial and research services. According to Martin *et al.* (2007) access to information or knowledge, technology and finance determine the state of the success of value chain actors, agricultural offices, agro input promotion offices, microfinance, NGOs, transport service providers and others, these are main supporting actors who play a central role in the provision of such services. Influencer actors include regulatory framework and policies such as revenue authority, trade and market development office, food safety, DAE and environmental protection office.

Producers: It is the first link in tomato value chain. The producer harvests products and supplies to the second agent. From the moment they decide what to produce, how much to grow and when to grow and sale. Three types of the production system can be observed viz., subsistence production, small-scale commercial production, and large-scale commercial production. Subsistence production is carried out for household consumption and produced in small quantities. The produce from the first category of farmers generally does not enter the market or enters in a very limited quantity especially in the local bazaar, market. Small and large scale commercial farmers sell most of their products to various market intermediaries. The producers generally deal with traders and wholesalers. In most cases, farmers depend on village level traders for price information but over the last 2-3 years, the situation has slightly changed due to easy access to communication technology and the big farmers generally have access to market information to some extent.

Primary Collectors: Normally farmers bring their tomatoes to the special location within the village where traders collect them and transport it to desired markets. Such collection and transporting activity is carried out either by the local trader, or an outside trader regularly visiting the location. They collect tomato together with other vegetables from growers at locations and send them to urban markets Upazila or district headquarters. Producers who do not have having road network use family or hired labor to transport tomatoes up to nearest road by head portorage, where collectors or agents of wholesalers buy the tomatoes and transport them to desired markets.

Commission Agents: Commission agent is a person who, on behalf of a principal and in consideration of the amount of commission involved in each transaction, keeps in his custody the goods of his principal and sells them, holding himself liable to deliver to the buyer and to make payment of its price to his principal.

Local Traders: Local traders are directly involved in buying and selling tomatoes from different remote upazials towns or markets and sell to the wholesalers at a profit. They often work as commission agents of the large wholesalers or processors.

Roadside traders: Roadside traders are farmers who collect tomato from farmers at the farm gate for the purpose of reselling to retailers and consumers. Producers sell about 25% of tomato 40 produce to roadside traders, and roadside

traders re-sell it to wholesalers, retailers, and consumers in the study areas roadside market. They play an important role and they do know areas of surplus well. There are few roadside traders who compete with wholesalers. When it is impossible for them to meet quantities of their demand, they employ brokers to collect tomato by paying a commission.

Wholesalers: They concentrate on the various intermediate sized loads and put the product into large uniform units. These activities all contribute to price determination. Wholesalers are market participants who buy large quantities of tomato and resell to other traders. They purchase tomato at the farm gate, in Jessore from roadside traders and producers in a larger volume than any other marketing actor does. They relatively spend their full time in wholesale buying throughout the year in and out of the Dinajpur. Each wholesaler uses trucks as a transportation vehicle when the amount of tomato supplied to the market is large. Otherwise, they purchase other vegetable crops together with tomato to fill the truck. The role of brokers was inclined towards buyers. Wholesalers usually get information from friends and mass media in the study areas, Jessore, Dinajpur, Mymensingh and Kishoregonj and set the daily price. There seems to be slight competition among wholesalers but the collusion outweighs it.

Processors: Processors are the secondary processing industries. The tomato processed products manufactured by the sample processors include tomato paste, sauce and ketchup. They usually collect fresh tomatoes from wholesalers in APMCs and vendors in major tomato production areas during peak season and glut in the market at cheaper prices. Big processors like PRAN also purchase tomatoes directly from farmers through contract farming. Tomato sauce and ketchup are the main processing items in Bangladesh. PRAN, the largest tomato sauce producing company in Bangladesh, needs about 3,600 tons of tomatoes to produce 1,000 tons of tomato paste. Vegan Agro Limited, one of two companies that produce tomato paste as an independent activity and that supply different sauce producers, supplies tomato paste to BD Foods, Square, and Ahmed. Vegan Agro Limited, a leading paste processing company, requires about 600 tons of tomato paste in each year. The most important of these is PRAN, the largest tomato sauce producer in the country with about 50 percent share of the total sauce market. Square (Brand name Radhuni), Golden Harvest, BD Foods, Sajeeb, and Aftab Foods also produce processed tomato items and distribute their products in the mainstream market. There are other local brands, such as Amrita and Tiger, which are expanding their businesses.

Processed market segment: The leading processing companies (e.g., PRAN and VEGAN) estimate that the processed tomato market is increasing at more than 25 percent per year. The demand for processed tomato items, such as sauce and ketchup, is increasing with the rise in consumption of fast food items. PRAN, the leading tomato processing company, has about 30 percent annual business growth in 2016. Satata Agro Product, a sauce supplying agent of Golden Harvest and other companies, has achieved about 25–30 percent annual growth. According to its owner, Satata Agro Products can supply only 20 percent of current

demand. To take advantage of the growing market opportunities, some private entrepreneurs are establishing tomato paste plants. PRAN, the leading sauce producer in Bangladesh, used to rely on imported tomato paste from China. PRAN has set up a captive tomato paste processing unit to support its sauce production operations. Satata Agro Product has started building a new plant in Narayanganj. The developments in the processed tomato are indicative of a very rapid growth in the demand for processed tomato production

Distributors usually buy processed tomato products from processors and supply small grocery stores and supermarkets. They generally sell products of different companies in different formats of retailers.

Supermarkets: Supermarket culture is relatively new in Bangladesh, but they are growing very fast. Some of them are also involved in the retailing of the fresh tomato as well as processed tomato products, together with other vegetables and fruits. Some of the producers directly contact the supermarket in large cities such as Dhaka, Jessore, and Kishoregonj for the supply of fresh tomato while some of the supermarkets purchase fresh tomatoes from the wholesalers.

Retailers: Middlemen that include the supermarket and another large-scale retailer who divides large shipments of produce and sell it to consumers in small units. The basic function they provide is bulk breaking. Retailers are the sellers of tomatoes to the ultimate consumers through multiple channels such as small grocery stores, exclusive fruits and vegetable shops, supermarkets and exporters. They normally buy from wholesalers and sell both fresh tomatoes and other tomato processed products in smaller quantities with a higher profit margin. They also create opportunities for value addition through their promotional tactics and various means of satisfying consumer wants and needs. Tomato retailers in the study areas purchase tomato directly from producers or roadside traders and sell to consumers. This is one of the final links in the chain that delivers tomato to consumers. They are very numerous as compared to others and their function is selling tomato to consumers in small volumes after receiving large volumes from roadside traders, wholesalers and producers.

Consumers: It is the last link in the vegetable market chain; the participants and their respective functions often overlap. The most widespread combinations are the following: producers to wholesalers that collect commodity and supply it to retailers, wholesalers to retailers (wholesalers that also sell directly to consumers) and wholesalers to exporters. From the consumer point of view, the shorter the market chain, the more likely is the retail price going to be low and affordable. B2C channel model. They are individual households and large consumers like restaurants, hotels. They buy the commodity for their own consumption.

Consumers' consumption patterns/demand structure, purchasing power, and traditions/norms are assumed to largely affect the potential market for agricultural commodities.

Costs and benefit shares of actors at different stages of tomato value chain

In this study, the degree of value addition on both fresh tomato and processed tomato products were calculated and presented in Table 2. The degree of value addition varies at each stage of the value chain. It is calculated by considering the price difference of the product. The margin is obtained by subtracting the cost from the price difference. The margin thus obtained is divided by the purchase price to get the figure of value addition. The degree of value addition is calculated by multiplying the figure of value addition by hundred. Each of the tomato value chain actors adds value to the product as the product passes from one actor to another during their performance. In a way, the actors change the form of the product through improving the produce processing or create space and time utility by transporting and keeping. Table 6.6 presents the additional value and services and received in the value chain considering the different stages of value addition to tomato. In the farming stage, farmers' contribution is 49.36% value added cost and services and received revenue only 21.58% which is lower than the cost in the value chain. In the fresh tomato trading stage, trader contributes 9.50% costs of value addition activities and received 21.37% of total revenue. On the other hand, big traders, processing company, and hotel or restaurant owner incurred the cost at 4.39%, 6.50%, and 29.71% and received profit or revenue at 14.19%, 17.25% and 25.61% respectively. The traders and processing companies benefited more in the chain. To make businesses sustainable, there is need to provide facilitating support services and market linkage.

a) The degree of value addition for fresh tomato: The degree of value addition for fresh and processed tomato is presented in Table 2. The process of value addition starts at the stage of trading. The farmer in the chain will not add any value to tomato at the farm level. The degree of value addition at trader's stage was eight percent followed by 8.2% at wholesaler stage and 20% at retailer stage. In the case of fresh tomato, there is no much variation in the degree of value addition at different stages because there will not be the change in the form of tomato in the fresh tomato chain. Net margin is estimated by deducting all cost from the gross margin. The net margin per quintal of tomato at farm level and actors' level was Tk.740.28 for farmers, Tk.206.26 for collectors, Tk. 136.05 for small traders, Tk. 383.35 for big-trader, Tk. 120.16 for wholesaler and Tk. 522.50 for retailers. Among the farmers added highest margin per quintal of tomato and the next was retailers, big-traders, collectors and consumer respectively in Table 2

Table 2: Degree of value addition share different actors (Tk./Quintal)

Value Chain Actors	Sale price	Purchase price	Price difference	Value Addition cost	Degree of Value Addition (%)	Margin	Net margin
Farmers	1613			697.25	43.72%	815.75	740.28
Collectors	1980	1613	367	156.25	9.80%	210.75	206.26
Small traders	2173	1980	193	50.24	3.15%	142.76	136.05
Big-trader	2863	2173	690	296.00	18.56%	394.00	383.35
Wholesaler	3033	2863	170	48.00	3.01%	122.00	120.16
Retailers	3687	3033	654	102.00	6.40%	552.00	522.50
Consumer	4413	3687	726	245.00	15.36%	481.00	469.67

Source: Calculation from field survey data 2016

The various actors who are involved in the tomato value chain and also indicates value addition by the farmer (43.72%), collectors (9.80%), small traders (3.15%), big-traders (18.56%), wholesaler (3.01%), retailers (6.40%) and **consumers (15.36%)** (49.51%). The highest value was added by farmer followed by hotel and restaurant owner, trader, and processor and the lowest value was added by the butcher.

a) **The degree of value addition for processed tomato:** In the tomato value chain, the value addition starts at the stage of trading as there is no farm level value addition at traders level (Table 3). It was the same as that in fresh tomato chain. i.e. eight percent which was followed by 114.30% at processor-I level followed by 203.80% and 250.70% ketchup and puree at the processor-II level and 8.90% and 7.30% for ketchup and puree at retailer stage. The degree of value addition of tomato at processing stage is much higher than in any other stage as it changes the form significantly..

Table 3: Degree of value addition share of different actors after post-harvest losses 18000

Value Chain Actors	Farmer	Trader	Processor-I	Processors-II	Retailers	Consumers
				Ketchup	Ketchup	Ketchup
Sale price	1613	2173	9075.00	15109.88	16577.00	16577.00
Purchase price		1980	3882.44	4309.51	14919.30	
Price difference		193	5192.57	10800.38	1657.70	
Value Addition cost		50.24	756.25	2014.65	331.50	
Gross Margin		142.76	4437.68	5511.93	1326.20	
Net margin		136.05	4260.70	5292.09	1326.20	
Degree of Value Addition (%)		1.59%	23.99%	63.90%	10.51%	

Source: Calculation from field survey data 2016

SWOT analysis

In order to determine the policy intervention needs of tomato in the study areas, a SWOT analysis was carried out amongst

actors in the tomato value chain. The list of the strengths, weaknesses, opportunities, and threats identified by the actors are shown in Table-3.

Table 3: SWOT analysis of tomato scenario in the study area

Internal Factors	
Strengths	Weaknesses
1) Tomato is a high-value agricultural commodity	1) Lack of good quality tomato seeds in the market
2) High consumer preference for high-value vegetable like tomato	2) Low prices at peak periods of tomato harvest
3) Product Diversification	3) High cost of labour
4) Comparative advantages in producing tomato	4) Lack of storage facilities on the ground to keep tomato fresh for a long time
5) Increased Productivity	5) Lack of processing industries in the study area to add value to the products
6) Post-Harvest Losses Reduction	6) High cost of transportation
7) Prevalence of trust among VC actors has reduced cost of doing business	7) Very poor access to low-interest credit facilities
8) Tomato has the highest return per acre compared with other computing commodities in the area	8) High cost of tomato farming inputs
9) Government's commitment to developing agriculture as pronounced in policies, strategies and implementation plans	9) Poor packaging of tomato
10) Export-oriented	10) Lack of granted sale channel
External Factors	
Opportunities	Threats
1) Increasing Demand	1) Harsh weather conditions
2) Prevalence of off-season cropping	2) High perishable nature of tomato
3) High population in Bangladesh which translates to high demand for tomato in the country	3) Illegal revenue collection on the roads by the police, touts, and other security agencies add to the final cost consumers pay for the tomato
4) Abundant land for tomato production in the country.	4) Inadequate supply of electricity to power proposed tomato processing companies
5) Extremely rapid demand growth for processed tomato products at	5) High market fees

the consumer level.	
6) Large excess demand for tomatoes in summer creates a very significant market opportunities for farmers	6) Congested and unhygienic marketplace
7) High attractive prices during off-season	7) Damage during transportation
8) Large-scale demand for fresh and processing markets	8) Lack of access to processing industries
9) Private sectors and NGOs also provide support to farmers	9) Inadequate storage and warehousing facilities
10) Increased rural incomes (due to its labour requirements at each stage of production and post-harvest)	10) Prevalence of tomato diseases and pests
11) Low-cost investment	11) Present physical infrastructure is insufficient and the traders are frequently compelled to do their business under the open sky
12) The presence of leading processing companies like PRAN, BD food etc.	12) Excessive use of pesticide and preservative
13) Growing trend in contract farming initiatives which need to be encouraged through supportive policies.	14) Lack of adaption of low-cost technologies to improve yield and quality.

6. Summary and Conclusions

The recommendations or policy implications to be drawn from this study are based on the value chain map, opportunities and constraints, gender disparity and the significant variables in the value chain analysis. There should be strong and clear relationship or vertical linkage between or among the main chain actors. Concerned governmental and non-governmental institutions should be in place to facilitate the value chain development. Significant post-harvest losses occur along the tomato value chain with detrimental effects on the incomes of smallholder farmers and traders. About a quarter of tomato produced is damaged and put out of normal use. The forms of damage include physical or mechanical damage, disease and/or insect pest infection, and/or poor shape, color and size of produce or combinations of these factors thereof. At the farm level, the post-harvest loss is a continuum of disease and pest attack, lack of access to appropriate tools and skills during harvesting, poor post-harvest handling and failure of the market to sell the produce immediately after harvest. The post-harvest loss which occurred at one value chain node extends to the other chain actors and also aggravates along the value chain due to poor handling, transporting, storage and ambient temperature which deteriorate the product quality. Fresh produce handling and marketing facilities such as cooling facilities are lacking. To reduce the post-harvest losses of tomato, serious interventions are needed, including skill building to improve post-harvest management practices, capacity for post-harvest handling including cool storage, improving market information, facilities and services.

In line with the results of this study and the need to make quality manuals and affordable to the population and to increase the value of farmers and players in the value chain and to give consumers value, the following recommendation is made:

Construction of small cold storage in Jessore District: It extends the fruits and vegetables shelf life and creates time and space for equipment, cold storage. Fruits and vegetables are recommended. It will reduce the loss of crops such as tomatoes, such as tomato-like raw materials such as tomato.

Govt. support to determine minimum price of tomatoes: Tomato price fluctuates throughout the year. When there is huge production of tomato, price of tomato reduced very sharply. At that time farmers bear huge losses because they

even could not cover their production cost. Government should also declare minimum support price for tomato.

Forward and backward link with value chain actors: It is important to develop farmer access to backward and forward markets in order to improve its profitability.

Established tomato processing industries: Establishment of tomato processing factories to add value to the tomatoes. For example processing tomato into Tomato Ketchup, Juice and Purees.

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